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J.R. Simplot Grandview Feedlot

Nutrient Management Plan

Appendix 5

Book 2 of 2

CONTENTS

Table of Contents

Grandview Feedlot
EPA – CWA
Information
Request

Nutrient Management Plan
Book 2 of 2

NO.1 Cox Farm
NO.2 Dixie Farm
NO.3 Dobaron Farm
NO.4 Gilbert Farm
NO.5 Jayo Farm
NO.6 McCune Farm
NO.7 Morrison Farm
NO.8 Nicholson Farm
NO.9 Palmer – Lopez Farm
NO.10 Sandhill Farm
NO.11 Shaw Farm
NO.12 Smith Pasture
NO.13 Triangle Farm
NO.14 ***
NO.15 ***

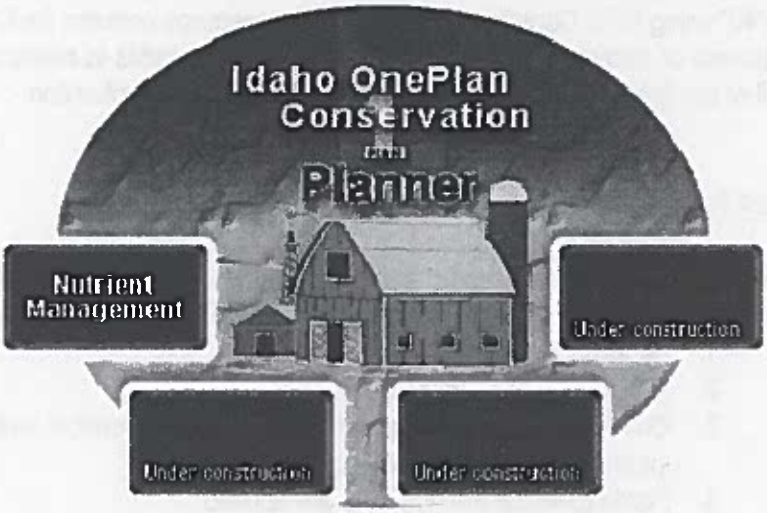
AVERY® READY INDEX® DIVIDERS

Grandview Cox Farm

Nutrient Management Plan

Agriculture . . .

Launching into the Future



Nutrient Management Plan Prepared For:
Grandview Farms
(208) 834-2231
Cox Farm

Certified Planner:
Michael Mitchell
Professional Engineer, EAC Engineering, Inc
(559) 381-0607

Producer Signature: _____ Certificated Planner Signature: _____

Date Completed: 10-02-07

The information provided by those using the "Idaho OnePlan" shall be deemed to be trade secrets, production records, or other proprietary information and shall be kept confidential and shall be exempt from enclosure pursuant to section 9-340D, Idaho Code. (Title 22 Chapter 27 17D6)

COX FARM
Producer Summary

Farm Summary

Cox Farm is an existing farm located 7.5 miles west of Mountain Home Air Force Base. The farm is owned by Grandview Farms and managed by Mike Usabel. The farm consists of four handline irrigated fields for a total of 328 acres available for accepting imported manure/compost from Simplot/Grandview Feedlot.

Farm Resource Concerns

Cox Farm is located in the Watershed Basin of the Middle Snake Succor (#17050103). The facility is found at 116W 01'39" 43N 02'46" using GPS Coordinates. The primary resource concern for Cox Farm is ground water quality. No canals, laterals or ditches with irrigation water are near the fields to cause any type of runoff. Solid waste is applied to all of the fields and incorporated within seven days of application.

Nutrient Management Plan Requirements

Producer will maintain field application records for a minimum of five years and make them available for review at routine inspections by ISDA personnel. These records must include (where applicable):

1. Fertilizer application rates
2. Manure/Compost application rates
3. On each field, keep a record of manure and chemical fertilizer applications, crop information, and soil and manure test results.
4. Fields to which the nutrients are applied
5. Spring soil test for nitrogen (required annually)
   0-12" and 12-24" nitrogen test

Crop Nutrient Requirement	
Crop	**Pounds of P205 per acres**
Wheat	60

Manure/Compost field application requirement (tons)						
Acres x crop nutrient requirement ÷ manure p205 value* = Tons required						
Example	Corn - 250(acres)	X	75 (crop requirement)	÷	**16.85**	
Corn	250	X	65** = 18750	÷ **16.85***	=	**1112.76 tons**

***based on manure test values for P205**
**pounds of p205 required per acre

Irrigation Management Plan Recommendations

Irrigation water management is very important in nutrient management. If irrigation water is applied at a rate over the crop needs, there is potential for runoff and/or leaching of nutrients. If irrigation water is under-applied, the crop will not have optimal growth conditions. Crop irrigation water requirements changes through the growing season depending on climate conditions and crop Evapotranspiration rate. Proper irrigation water management responds to these crop demands. It is recommended that:

- Irrigation schedules continue to be managed by your irrigation specialist.
- Continual inspection and maintenance of irrigation equipment will prevent unwarranted waste discharges into surface or ground water.

Nutrient Management Plan Recommendations

Land application of manure at agronomic rates, along with irrigation scheduling, is the most effective way to obtain maximum nutrient benefits from manure, condition the soil, and avoid potential water quality problems downstream. Cattle manure is a valuable resource, which will also improve soil properties such as water holding capacity, infiltration, tilth, structure, porosity, and nutrient retention and release. If animal manure and/or commercial fertilizers are not properly managed, contaminants may impact surface and/or groundwater.

Application of manure applied at an agronomic rate is a sustainable practice and is always allowed under ISDA regulations. Regardless of the rate prescribed by this nutrient management plan, soil testing at the 0-12 inch and 12-24 inch soil depths is required for nitrogen management.

- Set realistic crop yield goals in order to provide an accurate account of the plant nitrogen needs.
- Apply N so that it is available during peak plant demand.
- Apply fertilizer to cool season crop in the spring rather than the previous fall. This will prevent fertilizer leaching through the soil profile and provide the crop with the necessary levels of nutrients.
- Use split or multiple fertilizer applications in order to provide the crop with a pre-plant treatment and the needed nutrient levels throughout the growing season until the point of major nutrient uptake.
- Avoid the application of nutrient sources in close proximity to streams, wetlands, drainage ditches, areas of very shallow soils, and sinkholes.

Cox Farm

ANALYSIS OF RESOURCE CONCERNS

INTRODUCTION

The purpose of this nutrient management plan is to meet agricultural production goals and to certify that manure and nutrients are properly managed to minimize adverse impact to surface or groundwater. Plans are written in cooperation with the producer to:

1) assure proper containment of animal manure and process waste water

2) assess resource concerns which exist on the property

3) budget nutrient sources to optimize crop water and nutrient needs. Nutrient sources include commercial fertilizers, animal manure, mineralization of previous crop soil organic matter, accounting of residues, and irrigation water.

4) When applicable, assess irrigation water management to minimize movement of nutrients beyond the root zone or with runoff.

If animal manure and/or commercial fertilizers are not properly managed, contaminants may negatively impact surface and/or groundwater. Some water resource contaminants associated with poorly managed animal manure and fertilizers are:

Phosphorus in the soil readily adsorbs to soil particles; thus, erosion of soil by surface runoff is the general mode of phosphorus transport. Even at very low concentrations, phosphorus can result in plant and algae blooms in surface water bodies. Alga blooms are a nuisance to boaters, irrigators, and others. Toxins released by certain algae can be lethal to livestock or other animals that drink the water. Dissolved oxygen in the water is depleted as algae die and decompose, sometimes causing fish kills.

Nitrogen in the form of nitrate (NO_3^-) is highly water-soluble and will move with water, particularly down the soil profile past the root zone if not utilized by plants (thus becoming a groundwater contamination issue).Nitrates are toxic to infants under 6 months, and to livestock at high concentrations. In surface water, excess nitrogen, like phosphorus, can result in nuisance plant and algae growth.

Organic matter in high load decreases dissolved oxygen in a surface water body when it decomposes. Low levels of dissolved oxygen is harmful or even fatal to fish and other aquatic life.

Bacteria and microorganism illnesses (pathogens) potentially transmitted through water by animal manure include Giardia, Typhoid Fever, Cryptosporidium, and Cholera. Pathogens from animal waste can negatively impact surface and groundwater quality.

FACILITY DESCRIPTION

Owner Information

Owner (1):	Grandview Farms
Address:	1301 Hwy 67, Grandview, IDAHO
Phone:	(208) 834-2231 N/A
	N/A

Location

Site Map: Facility site plan illustrated in Figure 1

Soil Conservation District:	Elmore
County:	Elmore
Watershed Basin:	Middle Snake-succor (USGS Hydrologic Unit Code # 17050103)

ANALYSIS OF RESOURCE CONCERNS

Farm Resource Concerns

Cox Farm is located in a watershed containing water quality limited stream segments listed according to the Clean Water Act. Stream segments are listed because a water quality parameter prevents the attainment of the "Fishable/Swimmable" goal of the Clean Water Act.

WATERBODY	BOUNDARIES	BACT	CHAN STAB	DO	FLOW ALT	HAB ALT	MET HG	MET	NH3	NUTR	O_G	ORG	PEST	PH	SAL	SED	TDG	TEMP	UNKN	*
Snake River	CJ Strike Res to Castle Creek	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	X

Cox Farm is not located in a critical Nitrate-Nitrogen management area. Nitrate Management Areas are designated based upon ground water quality sampling results. Two priority groups exist as follows:

Priority 1 is designated because at least 25% of the ground water sampling locations within the area exceed 5-milligrams/liter nitrate. This is one-half of the maximum contaminant level of 10-milligrams/liter nitrate. This nitrate concentration is considered evidence of significant degradation. Public drinking water systems are required to increase monitoring frequency when this level is reached.

Priority 2 is designated because at least 50% of the ground water sampling locations within the area exceed 2-milligrams/liter nitrate. This concentration threshold provides an indication of human-caused (anthropogenic) impacts. The upper limit for naturally occurring (background) concentrations of nitrate is considered to be about 2 mg/l.

Cox Farm is located in a sole source aquifer area - Western Snake River Plain Aquifer.

Field Resource Concerns

- No Resource Concerns -

Depth Limiting Subsurface Features

Field Name	Subsurface Feature	Depth from Surface (in)
Field 1	Cobbles	30
	Water Table	>72
Field 2	Cobbles	30
	Fractured Bedrock	8
	Water Table	>72
Field 3	Cobbles	30
	Fractured Bedrock	8
	Water Table	>72
Field 4	Cobbles	30
	Fractured Bedrock	8
	Water Table	>72

Well Testing Results (See back of page):

Well	Date	Hardness	EC	PH	K	Nitrates	Nitrites	NH3	Na	Carbonate	Bicarbonate
No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data

ISDA REGULATIONS AND THE IDAHO NUTRIENT MANAGEMENT STANDARD

Nutrient management plans for animal agricultural operations regulated by the Idaho State Department of Agriculture (ISDA) must be approved by the Idaho State Department of Agriculture and must follow the Natural Resource Conservation Service (NRCS) Agriculture Waste Management Field Handbook and the Idaho Nutrient Management Standard. ISDA regulation and the Standard use soil test phosphorus as the indicator for environmental impact from agricultural production practices. The Idaho Nutrient Management Standard is based on a threshold soil test phosphorus level (TH), above which there is no agronomic advantage to application of phosphorus.

The Idaho Nutrient Management Standard categorizes fields as a surface water concern or a groundwater concern. A surface water concern indicates that runoff leaves the contiguous operating unit from normal storm events, rain on snow, frozen ground, or irrigation. The soil phosphorus threshold for a field with a surface water concern is 40 ppm phosphorus for soils alkaline (ph > 6) tested with the Olsen method and 60 ppm phosphorus for acidic (ph < 6.5) soils tested with the Bray method (0-12"Soil Sample Depth).

A groundwater resource concern indicates that runoff does not leave the contiguous operating unit from normal storm events, rain on snow, frozen ground, or irrigation. There are two sub-categories for fields identified as having a groundwater concern. The first category applies to fields with a resource concern within the first five feet of the soil profile. A resource concern could be shallow soils, gravel, cobble, bedrock, high groundwater table, or a drained field. These fields are indicated as a groundwater concern <5'. The soil phosphorus threshold for a field with a groundwater concern <5' is 20 ppm phosphorus for soils tested with the Olsen method and 25 ppm phosphorus for soils tested with the Bray method(18-24" Soil Sample Depth).

If a field is not classified as having a surface water concern or a groundwater <5' concern, by default it is classified as having a groundwater concern >5'. The soil phosphorus threshold for a field with a groundwater concern >5' is 30 ppm phosphorus for soils tested with the Olsen method and 45 ppm phosphorus for soils tested with the Bray method(18-24" Soil Sample Depth).

Field Phosphorus Threshold

Field	Resource Concern	P Threshold (ppm)	P Threshold Soil Test Depth
Field 1	Groundwater < 5'	20	18 - 24"
Field 2	Groundwater < 5'	20	18 - 24"
Field 3	Groundwater < 5'	20	18 - 24"
Field 4	Groundwater < 5'	20	18 - 24"

Farm Location

Idaho Transverse Mercator

Coordinates of the farm center (meters): X = 2334951.03566935, Y = 1318226.00461893

Map Scale: 1 : 138

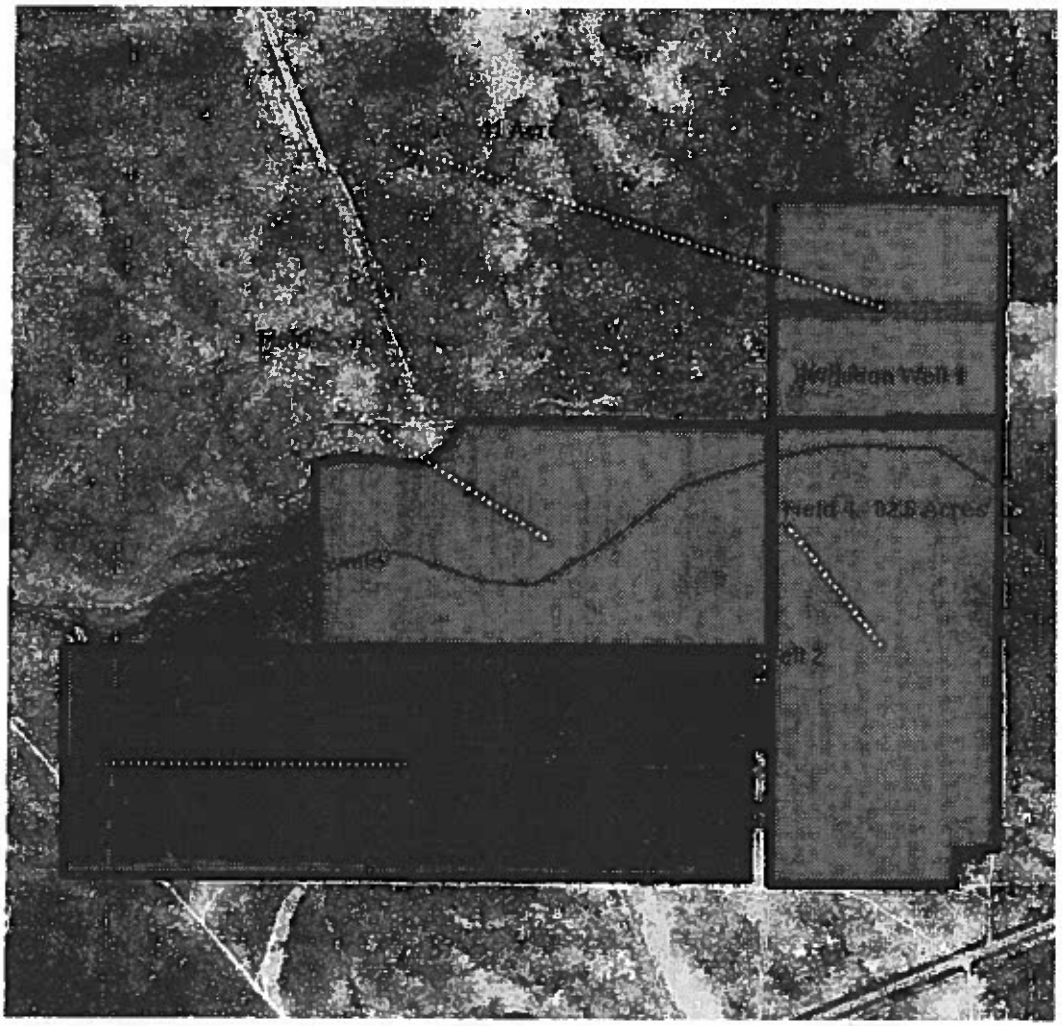


Figure 1. Base Map

Farm Location

Idaho Transverse Mercator

Coordinates of the farm center (meters): X = 2334951.03566935, Y = 1318226.00461893

Map Scale: 1 : 112

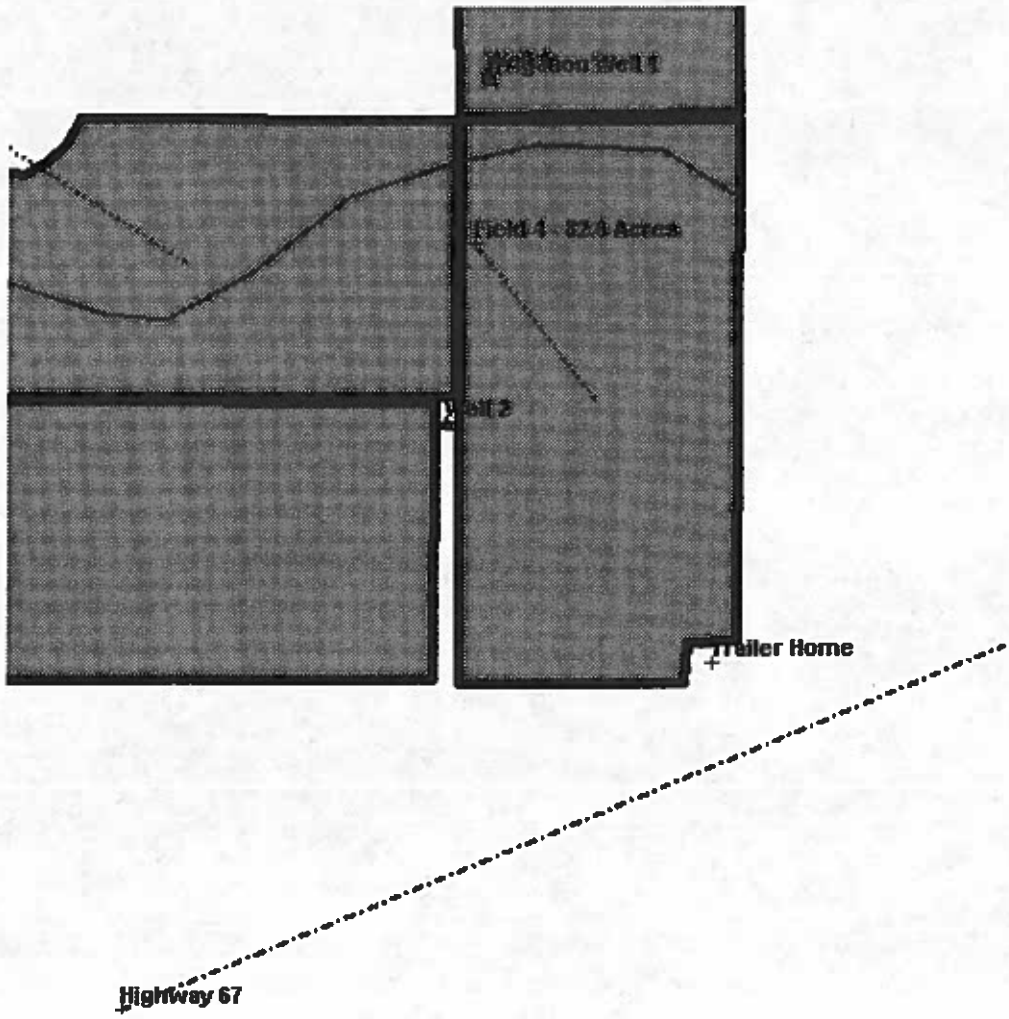


Figure 2. Farmstead Map

NUTRIENT MANAGEMENT REQUIREMENTS/RECOMMENDATIONS

Manure Application Rate Requirement By Year

FIELD: Field 1

Name	Man App		Imported Nutrients	Mineralization		Total	
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	Y		4 T/ac				
		N	49	N	0	N	49
		P	71			P	71
		K	272			K	272
Wheat-Winter, Irrigated South ID(2005)	Y		4 T/ac				
		N	49	N	126	N	175
		P	71			P	71
		K	272			K	272
Potatoes(2006)	Y		4 T/ac				
		N	49	N	-11	N	38
		P	71			P	71
		K	272			K	272
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2007)	Y		4 T/ac				
		N	49	N	27	N	76
		P	71			P	71
		K	272			K	272

FIELD: Field 2

Name	Man App		Imported Nutrients	Mineralization		Total	
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	Y		5 T/ac				
		N	54	N	0	N	54
		P	77			P	77
		K	297			K	297
Wheat-Winter, Irrigated South ID(2005)	Y		5 T/ac				
		N	54	N	129	N	183
		P	77			P	77
		K	297			K	297
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2006)	Y		5 T/ac				
		N	54	N	-8	N	46
		P	77			P	77
		K	297			K	297
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2007)	Y		5 T/ac				
		N	54	N	30	N	84
		P	77			P	77
		K	297			K	297

FIELD: Field 3

Name	Man App		Imported Nutrients	Mineralization		Total	
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	Y		5 T/ac				
		N	54	N	0	N	54
		P	77			P	77
		K	297			K	297
Wheat-Winter, Irrigated South ID(2005)	Y		5 T/ac				
		N	54	N	129	N	183
		P	77			P	77
		K	297			K	297
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2006)	Y		5 T/ac				
		N	54	N	-8	N	46
		P	77			P	77
		K	297			K	297
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2007)	Y		5 T/ac				
		N	54	N	30	N	84
		P	77			P	77
		K	297			K	297

FIELD: Field 4

Name	Man App		Imported Nutrients	Mineralization		Total	
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	Y		4 T/ac				
		N	52	N	0	N	52
		P	75			P	75
		K	287			K	287
Wheat-Winter, Irrigated South ID(2005)	Y		4 T/ac				
		N	52	N	128	N	180
		P	75			P	75
		K	287			K	287
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2006)	Y		4 T/ac				
		N	52	N	-9	N	43
		P	75			P	75
		K	287			K	287
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2007)	Y		4 T/ac				
		N	52	N	29	N	81
		P	75			P	75
		K	287			K	287

Minimum Acres Required for Manure Application

Manure Group	Acres
Imported Nutrients	276

The acreage in the table is based on an average crop uptake of 100 lbs P_2O_5 per acre. These acreage numbers are for estimating export acreage needed. Wastewater application should begin with the first irrigation of the season and end with the last irrigation of the season. Rates should be designed to supply uniform application. When applying wastewater outside of the irrigation window you must contact the Department of Agriculture, Division of Animal Industries.

Hydraulic Balance

Field	Date
Field 1	March 15
Field 2	March 15
Field 3	March 15
Field 4	March 15

0.5" of wastewater may be applied to fields after the hydraulic balance date to remain in compliance with this nutrient management plan.

Spring Soil Test
Spring soils tests must be taken every year from every field to determine a commercial fertilization rate. If commercial fertilizer isn't applied (for a perennial crop), spring soil samples are not required. If you do not apply commercial fertilizer, a complete soil analysis will need to be conducted initially to determine the nutrient baseline.

Record Keeping For each field keep a record of annual manure and chemical fertilizer applications. Include nutrient source, date, time, rate and application method.

ANNUAL NUTRIENT BUDGET

The following crop nutrient budget is based on soil test data and cropping information. It is for one year for the following field and specified crop information:

Nutrient Budget Summary

Field: Field 1 **Crop:** Wheat-Winter, Irrigated South ID **Yield:** 110

	N	P205	K20
Crop Nutrient Requirement	220	60	41
Nutrients From Soil	?		
from Mineralized Nitrogen	45		
from Prior Crops	54		
from Prior Bio-Nutrients	27		
from Irrigation Water	0		0
Nutrient Balance from above	94.7	60.5	41.2
Imported Nutrients	49	71	272
Estimated Remaining Nutrients Required	46	-11	-231
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	46	-11	-231

Unacceptable Rate: May be a resource risk.
Acceptable: Sustainable agronomic rate.

Field: Field 2 **Crop:** Wheat-Winter, Irrigated South ID **Yield:** 109.6

	N	P205	K20
Crop Nutrient Requirement	220	60	41
Nutrients From Soil	?		
from Mineralized Nitrogen	45		
from Prior Crops	54		
from Prior Bio-Nutrients	30		
from Irrigation Water	0		0
Nutrient Balance from above	92.3	60.2	41
Imported Nutrients	54	77	297
Estimated Remaining Nutrients Required	38	-17	-256
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	38	-17	-256

Unacceptable Rate: May be a resource risk.
Acceptable: Sustainable agronomic rate.

Field: Field 3 **Crop:** Wheat-Winter, Irrigated South ID **Yield:** 109.6

	N	P205	K20
Crop Nutrient Requirement	220	60	41
Nutrients From Soil	?		
from Mineralized Nitrogen	45		

from Prior Crops	54		
from Prior Bio-Nutrients	30		
from Irrigation Water	0		0
Nutrient Balance from above	92.3	60.2	41
Imported Nutrients	54	77	297
Estimated Remaining Nutrients Required	38	-17	-256
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	38	-17	-256

Unacceptable Rate: May be a resource risk.
Acceptable: Sustainable agronomic rate.

Field: Field 4 **Crop:** Wheat-Winter, Irrigated South ID **Yield:** 109.6

	N	P205	K20
Crop Nutrient Requirement	220	60	41
Nutrients From Soil	?		
from Mineralized Nitrogen	45		
from Prior Crops	54		
from Prior Bio-Nutrients	29		
from Irrigation Water	0		0
Nutrient Balance from above	93.2	60.2	41
Imported Nutrients	52	75	287
Estimated Remaining Nutrients Required	41	-15	-246
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	41	-15	-246

Unacceptable Rate: May be a resource risk.
Acceptable: Sustainable agronomic rate.

BIO-NUTRIENT EXPORT INFO

Exported Bio-Nutrient Summary					
Bio-Nutrient Group Name	**Amount**	**Consumer**	**Consumer's Address**	**Telephone**	**Acres**
No Data	No Data	No Data	No Data	No Data	No Data

Appendix B: NUTRIENT RISK ANALYSIS

Phosphorus Runoff Risk Assessment

FIELD: Field 1
Overall Risk Rating: Very High
Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 71

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: N/A

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: Field 2

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 77.3

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum

soil P levels.

Manure Phosphorus Application Method Rating:

Manure Application Method: Surface applied no incorporation

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: Field 3

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 77.3

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: Surface applied no incorporation

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: Field 4

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 74.8

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: N/A

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or

sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

Nutrient Leaching Risk Assessment

FIELD: Field 1
Overall Risk Rating: Low
Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very Low or N.A.

Comments: Good apparent irrigation water management, but if crop requirements are not being met crop yields may suffer from a water shortage. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: Field 2
Overall Risk Rating: Low
Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very Low or N.A.

Comments: Good apparent irrigation water management, but if crop requirements are not being met crop yields may suffer from a water shortage. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: Field 3

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very Low or N.A.

Comments: Good apparent irrigation water management, but if crop requirements are not being met crop yields may suffer from a water shortage. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: Field 4

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very Low or N.A.

Comments: Good apparent irrigation water management, but if crop requirements are not being met crop yields may suffer from a water shortage. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

NUTRIENT RISK ANALYSIS Legend

BMP	Definition	Purpose
Buffer Strip	Contour buffer strips are strips of perennial grass alternated with wider cultivated strips that are farmed on the contour.	Contour buffer strips slow runoff water and trap sediment. Consequently, soil erosion is generally reduced significantly by this practice. Sediments, nutrients, pesticides, and other potential pollutants are filtered out as water flows through the grass strips. The grass strips also provide food and cover for wildlife.
Channel Vegetation	Establishing and maintaining adequate plants on channel banks, berms, spoil, and associated areas.	To stabilize channel banks and adjacent areas and reduce erosion and sedimentation. To maintain or enhance the quality of the environment, including visual aspects and fish and wildlife habitat.
Chiseling and Sub soiling	Loosening the soil, without inverting and with a minimum of mixing of the surface soil, to shatter restrictive layers below normal plow depth that inhibit water movement or root development.	To improve water and root penetration and aeration.
Composting Facility	A composting facility is installed for biological stabilization of waste organic material.	The purpose of this practice is to biologically treat waste organic material and produce humus-like material that can be recycled as a soil amendment or organic fertilizer. The material may also be used by other acceptable methods of recycling that comply with laws, rules and regulations.
Conservation Cover	This practice involves establishing and maintaining a protective cover	This practice reduces soil erosion, associated sedimentation, improves

	of perennial vegetation on land retired from agriculture production.	water quality, and creates or enhances wildlife habitat.
Conservation Cropping Sequence	Growing crops in a recurring sequence on the same field.	This practice may be applied as part of a best management practice to support one or more of the following: Reduce sheet and rill erosion, Reduce irrigation induced erosion, Reduce soil erosion from wind, Maintain or improve soil organic matter content, Manage deficient or excess plant nutrients, Improve water use efficiency, Manage saline seeps, Manage plant pests (weeds, insects, diseases), Provide food for domestic livestock, and Provide food and cover for wildlife.
Contour Farming	Farming sloping land in such a way that preparing land, planting, and cultivating are done on the contours. (This includes following established grades of terraces or diversion.)	To reduce erosion and control water.
Cover and Green Manure Crop	A crop of close-growing, legumes, or small grain grown primarily for seasonal protection and soil improvement. It usually is grown for 1 year or less, except where there is permanent cover as in orchards.	To control erosion during periods when the major crops do not furnish adequate cover; add organic material to the soil; and improve infiltration, aeration, and tilth.
Critical Area Planting	Planting vegetation on critically eroding areas that require extraordinary treatment.	This practice is used on highly erodible areas that cannot be stabilized by ordinary planting techniques and if left untreated may cause severe erosion or sediment damage. Examples of critical areas include the following: 1) Dams, dikes, levees, and other construction sites with very steep slopes, 2) Mine spoil and surface mined land with poor quality soil and possibly chemical problems,

		and 3) Agriculture land with severe gullies requiring specialized planting techniques and management.
Dike or Berm	An embankment constructed of earth or other suitable materials to protect land against overflow or to regulate water.	Dikes are used to: Permit improvement of agricultural land by preventing overflow and better use of drainage facilities, Prevent damage to land and property, Facilitate water storage and control in connection with wildlife and other developments, and Protect natural areas, scenic features and archeological sites from damage.
Diversion	A channel constructed across the slope with a supporting ridge on the lower side.	To divert excess water from one area for use or safe disposal in other areas.
Drip Irrigation	A planned irrigation system in which all necessary facilities are installed for efficiently applying water directly to the root zone of plants by means of applicators (orifices, emitters, porous tubing, perforated pipe) operated under low pressure. The applicators can be placed on or below the surface of the ground.	To efficiently apply water directly to the plant root zone to maintain soil moisture within the range for good plant growth and without excessive water loss, erosion, reduction in water quality, or salt accumulation.
Filter Strip	A strip or area of vegetation for removing pollutants water.	A filter strip reduces pollution by filtration, deposition, infiltration, absorption, adsorption, decomposition, and volatilization of sediment, organic matter, and other pollutants from runoff and waste water.
Fish Stream Improvement	Fish Stream Improvement is improving a stream channel to make or enhance fish habitat.	The purpose of the practice is to increase production of desired species of fish. The practice involves improving food supplies, shelter, spawning areas, water quality, and other elements of fish habitat.

Grade Stabilization Construction	A structure used to control the grade and head cutting in natural or artificial channels.	These structures are to: Stabilize the grade and control erosion in natural or artificial channels, prevent the formation or advance of gullies, enhance environmental quality, and reduce pollution hazards.
Grassed Waterway	A natural or constructed channel that is shaped or graded to required dimensions and established in suitable vegetation for the stable conveyance of runoff.	Grassed waterways convey runoff from terraces, diversions, or other water concentrations without causing erosion or flooding and to improve water quality.
Grazing Land Mechanical Treatment	Modifying physical soil and/or plant conditions with mechanical tools by treatments such as; pitting, contour furrowing, and ripping or sub-soiling.	This practice should be applied as part of a best management practice to support one or more of the following purposes: Fracture compacted soil layers and improve soil permeability, Reduce water runoff and increase infiltration, Break up sod bound conditions and thatch to increase plant vigor, and Renovate and stimulate plant community for greater productivity and yield.
Heavy Use Area Protection	Protecting heavily used areas by establishing vegetative cover, by surfacing with suitable materials, or by installing needed structures.	To stabilize urban, recreation, or facility areas frequently and intensely used by people, animals, or vehicles.
Irrigation Land Leveling	Reshaping the surface of land to be irrigated to planned grades.	To permit uniform and efficient application of irrigation water without causing erosion, loss of water quality, or damage to land by water logging and at the same time to provide for adequate surface drainage.
Irrigation Water Management	Irrigation water management is the process of determining and controlling the volume, frequency, and application rate of irrigation water in a planned, efficient	Irrigation water management is applied as part of a conservation management system to support one or more of the following: Manage soil Moisture to promote desired

	manner.	crop response; Optimize use of available water supplies; Minimize irrigation induced soil erosion; Decrease non-point source pollution of surface and groundwater resources; Manage salts in the crop root zone; Manage air, soil, or plant micro-climate.
Mulching	Applying plant residues or other suitable materials not produced on the site to the soil surface.	To conserve moisture; prevent surface compaction or crusting; reduce runoff and erosion; control weeds; and help establish plant cover.
Polyacrylamide (PAM)	Polyacrylamide is an organic polymer formulated to stabilize soil when applied in irrigation water.	Water applied with PAM stabilizes soil aggregates which can then resist the erosive forces of water. If correctly applied, PAM will produce clear runoff water and residue erosion within the field by over 90 percent.
Prescribed Grazing	Prescribed grazing is the controlled harvest of vegetation with grazing animals, managed with the intent to achieve a specific objective.	Application of this practice will manipulate the intensity, frequency, duration, and season of grazing to: 1) Improve water infiltration, 2) maintain or improve riparian and upland area vegetation, 3) protect stream banks from erosion, 4) manage for deposition of fecal material away from water bodies, and 5) promote ecological and economically stable plant communities which meet landowner objectives.
Residue Management (Conservation Tillage)	Managing the amount, orientation, and distribution of crop and other plant residue on the soil surface.	This practice may be applied as part of a conservation system to support one or more of the following: Reduce sheet and rill erosion. Reduce wind erosion. Maintain or improve soil organic matter content and tilth. Conserve soil moisture. Manage snow to increase plant available moisture. Provide food and escape cover for

		wildlife.
Riparian Forest Buffer	A riparian forest buffer is an area of trees and/or shrubs located adjacent to a body of water. The vegetation extends outward from the water body for a specified distance necessary to provide a minimum level of protection and/or enhancement.	The riparian forest buffer is a multi-purpose practice design to accomplish one or more of the following: Create shade to lower water temperatures and improve habitat for aquatic animals, Provide a source of debris necessary for healthy robust populations of aquatic organisms and wildlife, and Act as a buffer to filter out sediment, organic material, fertilizer, pesticides and other pollutants that may adversely impact the water body, including shallow ground water.
Sediment Basin	A basin constructed to collect and store debris or sediment.	A sediment basin may have the following uses: Preserve the capacity of reservoirs, ditches, canals, diversion, waterways, and streams, Prevent undesirable deposition on bottom lands and developed areas, Trap sediment originating from construction sites, and Reduce or abate pollution by providing basins for deposition and storage of silt, sand, gravel, stone, agricultural wastes, and other detritus.
Sprinkler System	A planned irrigation system in which all necessary facilities are installed for efficiently applying water by means of perforated pipes or nozzles operated under pressure.	To efficiently and uniformly apply irrigation water to maintain adequate soil moisture for optimum plant growth without causing excessive water loss, erosion, or reduced water quality.
Stream Channel Stabilization	Stabilizing the channel of a stream with suitable structures.	To control aggradations or degradation in a stream channel.
Stream bank Protection	Using vegetation or structures to stabilize and protect banks of streams, lakes, estuaries, or excavated channels against scour	To stabilize or protect banks of streams, lakes, estuaries, or excavated channels for one or more of the following purposes: Prevent

	and erosion.	the loss of land or damage to utilities, roads, buildings, or other facilities adjacent to the banks, Maintain the capacity of the channel, Control channel meander that would adversely affect downstream facilities, Reduce sediment loads causing downstream damages and pollution, and Improve the stream for recreation or as a habitat for fish and wildlife.
Strip-cropping, Contour	Growing crops in a systematic arrangement of strips or bands on the contour to reduce water erosion. The crops are arranged so that a strip of grass or close-growing crop is alternated with a strip of clean-tilled crop or fallow or a strip of grass is alternated with a close-growing crop.	To reduce sheet and rill erosion and/or to reduce transport of sediment and other water-borne contaminants.
Strip-cropping, Field	Growing crops in a systematic arrangement of strips or bands across the general slope (not on the contour) to reduce water erosion. The crops are arranged so that a strip of grass or a close-growing crop is alternated with a clean-tilled crop or fallow.	To help control erosion and runoff on sloping cropland where contour strip-cropping is not practical.
Subsurface Drains	A Subsurface Drain is a conduit, such as corrugated plastic tubing, tile, or pipe, installed beneath the ground surface to collect and/or convey drainage water.	The purpose of a subsurface drain is to: Improve the environment for vegetation, Reduce erosion, Improve water quality, Collect ground water for beneficial use, Remove water from heavy use areas such as recreation areas, or around buildings, and Regulate water to control health hazards caused by pests.
Surge Irrigation	Surge irrigation is the intermittent application of water to furrows, corrugates, or borders creating a series of on and off periods of	Surge allows a lighter application of water with a higher efficiency. The result is less deep percolation of water at the upper end of the

	constant or variable time spans.	field and a more uniform application.
Tailwater Recovery & Pumpback System	A facility to collect, store, and transport irrigation tailwater for reuse in a farm irrigation distribution system.	To conserve farm irrigation water supplies and water quality by collecting the water that runs off the field surface for reuse on the farm.
Terraces	An earth embankment, a channel, or a combination ridge and channel constructed across the slope.	Reduce slope length, reduce sediment content in runoff water, reduce erosion, Improve water quality, intercept and conduct surface runoff at a non-erosive velocity to a stable outlet, retain runoff for moisture conservation, prevent gully development, reform the land surface, improve farmability, and reduce flooding.
Use Exclusion	Excluding animals, people or vehicles from an area.	To protect, maintain, or improve the quantity and quality of the plant, animal, soil, air, water, and aesthetics resources and human health and safety.
Water and Sediment Control Basin	An earth embankment or a combination ridge and channel generally constructed across the slope and minor watercourses to form a sediment trap and water detention basin.	To improve farmability of sloping land, reduce watercourse and gully erosion, trap sediment, reduce and manage onsite and downstream runoff, and improve downstream water quality.
Watering Facility	A device (tank, trough, or other watertight container) for providing animal access to water.	To provide watering facilities for livestock and/or wildlife at selected locations in order to: 1) protect and enhance vegetative cover through proper distribution of grazing; 2) provide erosion control through better grassland management; or 3) protect streams, ponds and water supplies from contamination by providing alternative access to water.

Wetland Development/Restoration	The construction or restoration of a wetland facility to provide the hydrological and biological benefits of a wetland.	To develop or restore hydric soil conditions, hydrologic conditions, hydrophytic plant communities, and wetland functions.

Appendix C: CROP SPECIFIC GUIDELINES

Alfalfa Hay, Irrigated South ID-Cut Mid Bloom

NITROGEN

Nitrogen (N) fertilizer is generally not needed for alfalfa since a healthy alfalfa stand is capable of fixing adequate levels of N. Responses to applied N usually indicate the alfalfa stand is not effectively nodulated due to lack of proper seed inoculation at planting, or that the stand is aging.

Soils containing 20 to 30 pounds (4 to 7.5 ppm) of nitrate-nitrogen (NO3-N) in the top 12 inches have sufficient N to establish a stand of alfalfa seeded alone. Adding fertilizer N at establishment reduces nodule number and nodule activity.

Establishing alfalfa with a companion crop is not recommended because the alfalfa stand typically is reduced by the excessive competition from the companion plantings. When growers plant alfalfa with a companion crop, both crops compete for the N. Under these conditions, N rates of 30 to 40 pounds per acre are suggested to establish alfalfa stands.

PHOSPHORUS

Alfalfa responds well to applied phosphorus (P). The need for P fertilization can be determined by a soil test. Phosphorus materials should be broadcast and incorporated into the seedbed before planting. For best results, P fertilizers should be applied on established stands in the fall. The University of Idaho recommended application should be sufficient for 2 years of production.

POTASSIUM

Alfalfa has a high potassium (K) requirement. Recommended K fertilization levels are determined by soil test. Broadcast and incorporate K at establishment or apply in the fall or early spring on established stands.

SULFUR

Mountain valleys and foothill areas that receive higher amounts of precipitation and/or that are irrigated with low sulfur-containing water are likely areas for sulfur (S) deficiency. Areas irrigated with water from the Snake River or any water containing the sulfate (SO4) form of sulfur should have an adequate amount of S.

Alfalfa and other legumes require more S than grasses. Plant tissue testing is an excellent tool for detecting S-deficient alfalfa. Samples should be analyzed for total N and total S. These values are used to calculated the nitrogen/sulfur ratio, which should be less than 15. When the ratio is greater than 15, an S deficiency is suspected.

Soils testing less than 8 ppm SO4-S for 0- to 12-inch soil depth should receive 40 pounds S per acre. This rate of application should provide adequate sulfur for 2 years of production. Many southern Idaho soils contain accumulated S below the 12-inch depth. Although the 0- to 12-inch soil zone may be low in S (8 ppm), the soil below 12 inches may supply enough S for alfalfa production. Thus, testing the soil at both 0- to 12- and 12- to 24-inch depths is advised for good S recommendation.

Fertilizer S sources include gypsum (CaS04) and elemental sulfur. S is also included in some N, P and K fertilizer materials. Elemental S must be biologically converted to the S04 form to be used by the plant. The rate of conversion depends on soil temperature, soil water content and particle size of the elemental S applied. To correct a S deficiency, the year of application use a fertilizer containing S04 as the readily available S source. Elemental S can be used to provide long term S release.

MICRONUTRIENTS

Zinc (Zn) deficiencies on alfalfa have not been observed in Idaho. Crops such as beans, corn, potatoes, and onions would normally exhibit Zn deficiency before alfalfa. Zinc applied to any of those crops

would have sufficient residual for alfalfa.

BORON

Alfalfa is sensitive to low soil boron (B). Boron deficiencies have been observed in southern Idaho, but they are not widespread. Deficiencies normally occur on acidic soils (pH less than 7.0) and droughty (gravelly and sandy) soils. If the soil tests less than 0.25 ppm B, apply 1 to 3 pounds per acre of B. Do not use higher rates because B in excessive amounts is toxic to plants.

GENERAL COMMENTS

Complete information on cultural practices necessary for alfalfa production is contained in University of Idaho Current Information Series 144, "Producing maximum Yields of Irrigated Alfalfa hay."

Irrigation, weeds, and insects can influence the effectiveness of a fertilizer application.

Alfalfa fields in southern Idaho frequently become yellow during the regrowth of the second and third crop. These fields have not responded to applications of fertilizer to correct this temporary yellowing condition.

Alfalfa can become a cash crop in the rotation by the application of needed management inputs such as water, fertilizer and pesticides and by timely harvesting. Alfalfa quality is enhanced by cutting at the early bud stage and more frequently during the growing season. This practice will reduce stand life, however.

Alfalfa hay should be analyzed to determine P content. Phosphorus is important for animal nutrition and can greatly influence animal performance and animal health. Fertilization can increase P content of forage.

Applications of S have been shown to reduce alfalfa selenium (Se) concentrations on soils low in available Se. Levels of Se above 0.1 ppm in the dry forage are considered adequate to prevent white muscle disease and other disorders related to limited Se forage.

Potatoes

NITROGEN

Nitrogen rates depend upon some of the following factors: previous crop, past fertilizer use, soil type and leaching hazard and realistic yield goal for the grower and the area.

Most Idaho potato fields will respond to fertilizer nitrogen (N). The N rate used, along with other management factors, particularly irrigation, can have a marked effect on the yield and quality of the potato crop.

TOTAL N REQUIREMENTS BASED ON POTENTIAL YIELD

Fertilizer N rates should be used which correspond to the yield growers can reasonably expect under their soil and management conditions. The historical potato yield obtained by a grower in a specific field or area generally provides a fair approximation of yield potential given a grower's traditional crop management. Projected changes in crop management (i.e. improved variety, better disease and weed control) designed to appreciably increase production may require adjustment of yield potential upward. Research has shown that the available N required to produce a good potato yield depends on a variety of crop management practices. Factors such as weed, insect and disease control as well as irrigation, planting date and soil type can influence the N required by potatoes for maximum yield.

AVAILABLE NITROGEN

Available N in the soil includes mineralizable N (released from organic matter during the growing season) inorganic N as nitrate (N03-N) and ammonium (NH4-N), and N credits from previous cropping or manures. Each component of available N must be estimated for accurate determination of optimum fertilizer N rates.

MINERALIZABLE NITROGEN - Soils vary in their capacity to release N from organic matter during

the growing season. The amount of N released depends on such factors as soil type, soil moisture, soil temperature, previous crop, and the history of fertilizer N applied. While soil organic matter content is frequently used to estimate annual mineralizable N contributions, in southern Idaho irrigated soils organic matter does not accurately predict the amount of N that is mineralized.

INORGANIC NITROGEN - Residual soil inorganic N (N03, NH4) can be evaluated most effectively with a soil test. Soil samples should be collected in foot increments to a depth of two feet, unless roots are restricted by dense soil layers or high water tables. Ammonium is generally low in preplant soil samples and thus contributes little to available N. However, it can be as high or higher than N03-N. NH4-N should be determined along with N03-N, especially when there is reason to expect the presence of appreciable NH4-N, such as recent ammonium N fertilizer applications. Soil samples should be collected before seeding in the spring to represent the area to be fertilized.

NITROGEN FROM PREVIOUS CROP RESIDUES - Nitrogen associated with decomposition of previous crop residues should also be considered when estimating available N. Residues that require additional N for decomposition include cereal straw and mature corn stalks. Research has shown that 15 pounds of additional N are needed per ton of straw returned to the soil, up to a maximum of 50 pounds. For more information on compensating for cereal residues, refer to CIS 825, "Wheat Straw Management and Nitrogen Fertilizer Requirements."

Row crop residues (potatoes, sugar beets, onions) generally do not require additional N for decomposition. Consequently, these residues have little effect on the N needs of potatoes.

Legume residues from beans, peas, and alfalfa can release appreciable N during the following crop season that may not be reflected by the preplant soil test. This N is derived from the decomposition of both plant tops and nodulated root systems.

NITROGEN FROM MANURES - Soils in which potatoes are grown rarely receive animal manures or lagoon wastes. Nutrient contributions from these sources should also be taken into consideration when estimating available N for the next season. Manures can preclude the need for any fertilizer, depending on the rate applied and their nutrient composition.

Manures can vary appreciably depending on the animal, how the manure is processed, and the kind and extent of bedding material. For the most accurate estimate of fertilizer equivalent values, the manure should be analyzed for its nutrient content.

IRRIGATION WATER - Irrigation waters derived from deep wells are generally low in N. More shallow wells can have significant levels of nitrogen because of leaching of nitrogen from impacts from commercial fertilizer use, animal waste, and improperly functioning septic systems. Irrigation waters from most districts are also low in N when diverted from its source. Background levels of N from original sources are generally about 2 parts per million (ppm). The more return flow included in diverted water sources, the higher the N content. Return flows may include N dissolved when irrigation waters pass through fields high in residual or recently added fertilizer N as well as from soluble fertilizer N applied with the irrigation water.

Most irrigation districts should know the N content of the water they divert. Contact them for this information to determine the levels of N added with your irrigation water. However, since irrigation water N levels are influenced by upstream management, if you use irrigation water that receives runoff after it is diverted, only a water test can accurately evaluate the N added with irrigation waters.

For each ppm or milligrams per liter (mg/L) of N reported in the water sample, multiply by 2.7 to get the N added per acre foot of water applied. For example, if the water sample contained 10 ppm of N, 3 acre feet of water applied would be the equivalent of 81 pounds of N per acre. Typically, of the water applied with furrow irrigation only 50 percent is retained on the field and the rest runs off the end. The net retention of N applied with furrow irrigation would, therefore, be about half of the water applied or about 40 pounds per acre in this example. If more or less of the irrigation water is retained with each wetting, then growers should adjust the water N contribution accordingly.

Excessive irrigation by any method reduces N availability to potatoes. Additional N may be needed under these conditions. Growers should not use aqua or anhydrous N through a sprinkler irrigation

system.

Water running soluble N sources with a furrow irrigation system can be an effective means of adding N. Two limitations of this practice are that (1) the application of the N with this method may not be as uniform as desired and (2) runoff containing the N may contaminate downstream surface waters. Growers can minimize the loss of N by shutting off the injection unit before the irrigation water reaches the end of the furrow. This practice should not substitute for careful consideration of N needs while N can be side dressed.

CALCULATION OF N APPLICATION RATES

To calculate the fertilizer N application rate, the following equation is used:

Fertilizer application rate (deficit) or Over application of Nitrogen =
(Total N required to produce a given yield) - (Mineralizable N) - (Inorganic N measured by the soil test) - (previous crop/residue management) - (Manure Nitrogen) -(Irrigation Water)

TIMING OF NITROGEN APPLICATION

Nitrogen fertilizer recommendations are for Russet Burbank potatoes grown on sandy loam soils. Adjustments are made for very sandy soils (add 30 lb N/acre) and silt loam soils (subtract 40 lb N/acre) to account for differences in nitrogen mineralization rates and nitrogen use efficiency. To maximize yield and quality, growers should aim to have about 40 to 45% of their total N supply applied by row closure. Nitrogen applications made during tuber bulking should be guided by petiole sampling to maintain at least 15,000 ppm N03-N in the fourth petiole from the growing tip.

Excess levels of soil N at or before tuberization can delay tuber growth, reduce yields and lower tuber specific gravity. Excess N in late summer and fall can delay maturity of the tubers. This delayed tuber maturity can adversely affect tuber storability and quality.

The N needs of the potato crop are best met by split-application of N fertilizer. This involves applying lower rates of N fertilizer preplant and at planting, with the remainder of the crop's N needs applied with the irrigation water. Some cropping systems - for example, furrow irrigation - make it difficult to apply N fertilizer and get efficient plant uptake. Under these conditions most of the crop N needs are applied to the soil before planting.

Nitrogen applied with irrigation water is an effective way to supplement the crop during the growing season. Do not use aqua or anhydrous ammonia in sprinkler system applications. Applications through a sprinkler system are not folar fertilization.

PHOSPHORUS

Potato plants need phosphorus (P) for plant growth and will respond to P fertilizer if the soil test concentration is low. Phosphorus soil test for potatoes is based on an extraction with sodium bicarbonate. Soil samples for a phosphorus soil test should be taken from 0- to 12-inch depths. This depth of sampling is critical to achieve an accurate soil test P level. Deviation in sampling depth from the 12-inch depth may drastically alter soil test results.

Phosphorus is immobile in soil and therefore does not move from where it is placed. Applied P fertilizer must be mixed into the seedbed before planting for best results. Banding P fertilizer along side plants has not been as effective as P fertilizer that has been broadcast and incorporated. Eroded or scraped areas, commonly referred to as "white soil" areas, may be low in available P because of its high content of "free lime." These areas should be tested and fertilized separately. To compensate for low P availability when free lime is present in the soil, rates of P are increased with increasing levels of free lime. Total phosphorus concentrations should be kept above 0.22% in the fourth petiole during tuber bulking.

POTASSIUM

Potatoes require high levels of available potassium (K). Potassium is relatively immobile in the soil. For best results, K fertilizers should be applied preplant and mixed into the seedbed. Banding beside the plants has been used successfully but is not as effective as K fertilizer which has been broadcast and incorporated.

Potassium fertilizer applications reduce specific gravity of harvested tubers. Potassium chloride fertilizer (KCl or muriate of potash) lowers specific gravity of tubers more than potassium sulfate fertilizer (K2SO4 or sulfate of potash). Growers should avoid over-fertilization of potatoes with K fertilizers. When specific gravity of tubers is important, potassium sulfate is the preferred K fertilizer source. Total potassium concentrations should be kept above 7.0% in the fourth petiole during tuber bulking.

SULFUR

Potatoes generally do not respond to sulfur (S) fertilization. Sulfur response is most likely to occur in sandy soils and in areas where irrigation water sources are low in S. Water low in S includes mountain streams and some well waters. The more irrigation return-flow in the water source the greater the amount of dissolved, plant-available sulfate (S04) form. Elemental sulfur is not recommended because it is not immediately available to plants. Elemental sulfur will require several months from time of application until it is converted to plant-available form.

MICRONUTRIENTS

"Shotgun" application of micronutrients - I.e. complete mixes containing boron (B), copper (Cu), iron (Fe), manganese (Mn) and zinc (Zn) - "for insurance" are not recommended since these elements have not been shown to give an economical response. Soil tests for individual micronutrients are available and concentrations in the 0- to 1-inch soil sample are: B = 0.5 ppm, Cu = 0.2 ppm, Fe = 4.0 ppm, Mn = 2.0 ppm, Zn = 0.5 ppm. Critical concentrations represent values below which a response from the application of that micronutrient may be obtained.

Zinc deficiencies have not been widespread on potatoes although some crops in certain areas of southern Idaho do show a Zn deficiency. When the soil test for Zn is below the critical concentration or where land leveling or erosion has exposed white subsoil containing free lime, apply Zn fertilizer at a rate which will supply 10 pounds of Zn per acre or equivalent. This amount of Zn should be sufficient for 4 to 6 years of crop production.

GENERAL COMMENTS

The P, K, and Zn nutritional status of the plant should also be monitored during the growing season. The same petiole sample used for N03-N concentrations can also be used for this purpose. Guidelines for adequate concentrations of these and other nutrients in the petiole can be obtained from your county agricultural Extension agent, consultant, or fieldman.

Fertilizer materials containing P, K and Zn should be thoroughly incorporated into the root zone. These materials can be effectively applied in the fall.

Wheat-Winter, Irrigated South ID

NITROGEN

Adequate nitrogen is necessary for maximum production of irrigated wheat. Nitrogen represents, by far, the largest share of fertilizer costs for wheat in Idaho. The amount of nitrogen required depends on many factors which influence total wheat production and quality. Both yield potential and available nitrogen (N03 = NH4) should be considered when determining N fertilizer rates.

TOTAL N REQUIREMENTS BASED ON POTENTIAL YIELD

Fertilizer N rates should be used which correspond to the yield growers can reasonably expect under their soil and management conditions. The historical wheat yield obtained by a grower in a specific

field or area generally provides a fair approximation of yield potential given a grower's traditional crop management. Projected changes in crop management (i.e. improved variety, better disease and weed control) designed to appreciably increase production may require adjustment of yield potential upward. Research has shown that the available N required to produce a bushel of irrigated wheat depends on a variety of crop management practices. Factors such as weed, insect and disease control as well as irrigation, planting date and soil type can influence the N required by wheat for maximum yield. The results of irrigated field trials in the Boise and Magic valleys suggest as a rule that 2 pounds available N per bushel of wheat is required for maximum production up to 120 bushels per acre. Above 120 bushels per acre, the factor is somewhat less than two.

AVAILABLE NITROGEN

Available N in the soil includes mineralizable N (released from organic matter during the growing season) inorganic N as nitrate (N03-N) and ammonium (NH4-N), and N credits from previous cropping or manures. Each component of available N must be estimated for accurate determination of optimum fertilizer N rates.

MINERALIZABLE NITROGEN - Soils vary in their capacity to release N from organic matter during the growing season. The amount of N released depends on such factors as soil type, soil moisture, soil temperature, previous crop, and the history of fertilizer N applied. While soil organic matter content is frequently used to estimate annual mineralizable N contributions, in southern Idaho irrigated soils organic matter does not accurately predict the amount of N that is mineralized.

INORGANIC NITROGEN - Residual soil inorganic N (N03, NH4) can be evaluated most effectively with a soil test. Soil samples should be collected in foot increments to a depth of two feet, unless roots are restricted by dense soil layers or high water tables. Ammonium is generally low in preplant soil samples and thus contributes little to available N. However, it can be as high or higher than N03-N. NH4-N should be determined along with N03-N, especially when there is reason to expect the presence of appreciable NH4-N, such as recent ammonium N fertilizer applications.

A preplant soil sample is often only collected from the first foot of soil. Although this information is not as complete and reliable as would be provided by deeper sampling, residual N measurements from the first foot of soil can be combined with estimates of residual N in the second foot to predict N requirements for irrigated winter wheat. For fall planted winter cereals in western Idaho, preplant soil test N03-N in the second foot of the soil is commonly only one-half to two-thirds as high as in the first foot of soil. However, this estimate may not be accurate after potatoes or other sprinkler irrigated crops, especially in coarser textured soils. Basing N rate recommendations on estimates of residual N in the second foot increases the risk of recommending either too little or too much N.

NITROGEN FROM PREVIOUS CROP RESIDUES - Nitrogen associated with decomposition of previous crop residues should also be considered when estimating available N. Residues that require additional N for decomposition include cereal straw and mature corn stalks. Research has shown that 15 pounds of additional N are needed per ton of straw returned to the soil, up to a maximum of 50 pounds. For more information on compensating for cereal residues, refer to CIS 825, "Wheat Straw Management and Nitrogen Fertilizer Requirements."

Row crop residues (potatoes, sugar beets, onions) generally do not require additional N for decomposition. Consequently, these residues have little effect on the N needs of winter wheat. Legume residues from beans, peas, and alfalfa can release appreciable N during the following crop season that may not be reflected by the preplant soil test. This N is derived from the decomposition of both plant tops and nodulated root systems.

NITROGEN FROM MANURES - Soils in which winter wheat is grown occasionally receive animal manures or lagoon wastes. Nutrient contributions from these sources should also be taken into consideration when estimating available N for the next season. Manures can preclude the need for any fertilizer, depending on the rate applied and their nutrient composition.

Manures can vary appreciable depending on the animal, how the manure is processed, and the kind and

extent of bedding material. For the most accurate estimate of fertilizer equivalent values, the manure should be analyzed for its nutrient content.

IRRIGATION WATER - Irrigation waters derived from deep wells are generally low in N. More shallow wells can have significant levels of nitrogen because of leaching of nitrogen from impacts from commercial fertilizer use, animal waste, and improperly functioning septic systems. Irrigation waters from most districts are also low in N when diverted from its source. Background levels of N from original sources are generally about 2 parts per million (ppm). The more return flow included in diverted water sources, the higher the N content. Return flows may include N dissolved when irrigation waters pass through fields high in residual or recently added fertilizer N as well as from soluble fertilizer N applied with the irrigation water.

Most irrigation districts should know the N content of the water they divert. Contact them for this information to determine the levels of N added with your irrigation water. However, since irrigation water N levels are influenced by upstream management, if you use irrigation water that receives runoff after it is diverted, only a water test can accurately evaluate the N added with irrigation waters.

For each ppm or milligrams per liter (mg/L) of N reported in the water sample, multiply by 2.7 to get the N added per acre foot of water applied. For example, if the water sample contained 10 ppm of N, 3 acre feet of water applied would be the equivalent of 81 pounds of N per acre. Typically, of the water applied with furrow irrigation only 50 percent is retained on the field and the rest runs off the end. The net retention of N applied with furrow irrigation would, therefore, be about half of the water applied or about 40 pounds per acre in this example. If more or less of the irrigation water is retained with each wetting, then growers should adjust the water N contribution accordingly.

Excessive irrigation by any method reduces N availability to winter wheat. Additional N may be needed under these conditions. Growers should not use aqua or anhydrous N through a sprinkler irrigation system.

Water running soluble N sources with a furrow irrigation system can be an effective means of adding N. Two limitations of this practice are that (1) the application of the N with this method may not be as uniform as desired and (2) runoff containing the N may contaminate downstream surface waters. Growers can minimize the loss of N by shutting off the injection unit before the irrigation water reaches the end of the furrow. This practice should not substitute for careful consideration of N needs while N can be side dressed.

CALCULATION OF N APPLICATION RATES

To calculate the fertilizer N application rate, the following equation is used:

Fertilizer application rate (deficit) or Over application of Nitrogen =
(Total N required to produce a given yield) - (Mineralizable N) - (Inorganic N measured by the soil test) - (previous crop/residue management) - (Manure Nitrogen) - Irrigation Water

TIMING OF NITROGEN APPLICATION

Excessive irrigation or heavy winter precipitation can result in leaching of nitrate N beyond the root systems. This hazard exists on all soils, but particularly on coarse textured soils such as sands, and sandy loams. Fall pre-plant N was once thought to be as good or preferable to spring top dressed N in calcareous silt loam or clay soils in areas of low rainfall. However, even under these conditions, southern Idaho research has shown than N applied in late winter or early spring is frequently used more effectively than early fall preplant applied N.

Nitrogen fertilizers containing ammonium (ammonium sulfate, anhydrous or aqua ammonia, or urea) are less subject to leaching losses when lower soil temperatures (less than 40 F) inhibit the microbial conversion of ammonium to nitrate. Lower temperatures also reduce the microbial activity that is responsible for the immobilization of applied N. Late fall, split, or spring applied N is also

recommended when residues from previous grain or mature corn crops are returned to the soil in early fall.

Early spring N applications are more effective for increasing grain protein for irrigated hard red winter wheat. Nitrogen applied after the boot stage will contribute more to grain protein than to yield. Most wheat varieties respond in a similar way to N. However, varieties differ in their tolerance of high N rates. High N contributes to lodging of varieties with poor straw strength.

PHOSPHORUS (P)

Wheat requires little phosphorus compared to the P requirements of other crops although minimum soil levels are necessary for maximum production. Adequate P is especially necessary for winter hardiness. Soil tests can indicate whether soils require phosphorus fertilization for maximum wheat production. Soil samples are taken from the 0- to 12-inch depth.

Broadcast plow down, broadcasts seedbed incorporation or drill banding low rates of P with seed are effective methods of application. Drill banding may reduce the fertilizer P required. Drill banding high rates of P, especially ammonium phosphate fertilizers, can cause seedling damage. For more detailed discussion of banding, refer to PNW 283, "Fertilizer Band Location for Cereal Root Access."

POTASSIUM (K)

Wheat has a lower requirement for K compared to sugar beets, corn or potatoes. Soil tests can be useful indicators of the need for K. Potassium should be incorporated during seedbed preparation.

SULFUR (S)

Sulfur requirements for wheat will vary depending on soil texture, previously incorporated crop residues, leaching losses, S content of irrigation water and S soil test. Wheat irrigated with Snake River water should not experience S shortages. Soils low in S (less than 10 ppm S04-S in the plow layer or 8 ppm in the 0- to 12-inch depth) should receive 20 to 40 pounds of S per acre.

Sulfur deficiency appears as a general yellowing of the plant early in the season and looks much like N deficiency. Plant analysis can be a useful means of differentiating between the two deficiencies. An N to S ratio of 17 in whole plant tissues is generally used for diagnosing sulfur deficient wheat. Sulfur deficient wheat has also been known to contain high nitrate nitrogen (N03-N) concentrations.

MICRONUTRIENTS

Micronutrients have not been shown to be limiting wheat production and "shotgun" application of micronutrient mixtures containing boron, manganese, iron and copper "for insurance" have not been shown to be responsive and are not suggested.

GENERAL COMMENTS

Avoid a heavy first irrigation on spring cereals to prevent water logging, reduced tillering and N leaching.

The above fertilizer guidelines are based on relationships established between University of Idaho soil test and crop yield response research. In this research, crop response to fertilizers was evaluated at several sites where the response to fertilizer differed. The recommendations reflect the general or overall response to fertilizers at specific soil test values and the response in individual fields can differ appreciably from the general table recommendation. Some sites will require less than the general recommendation, other sites more. Unfortunately, the science has not developed to the point where the table recommendations can account for all the unknown variables influencing the effectiveness of applied fertilizers at individual sites. The table fertilizer recommendations can only be used as general guides rather than specific recommendations for each and every field.

Furthermore, soil variability can sharply reduce the accuracy composite soil test values for individual fields. That is why large contiguous areas within fields should be sampled separately when they are known to differ in crop growth or soil characteristics known to influence the response to fertilizer. But soil variability frequently does not occur conveniently in large areas that can be sampled separately or fertilized differently. The fertilizer recommendations in most cases do not account for this variability. Soil test based recommendations may be excessive in some field areas and inadequate in other areas of the same field. The recommendations then will be appropriate only to the degree that the composite soil test values for fields actually represent the field. Thus, for fields that are highly variable, the fertilizer recommendations should be considered conservative estimates of fertilizers needed. All the more reason to consider the table fertilizer recommendations as general guides rather than specific recommendations for each and every field.

The fertilizer rates suggested in the tables will support above average yields if other factors are not limiting production. Therefore the recommendations assume that good crop management practices will be used, i.e. insect, disease, and weed control. Nutrient requirements can be met using either commercial fertilizers or equivalent organic matter sources, such as manure or compost, provided their nutrient content and relative availability are known or can be estimated from published literature. Soil test based recommended rates will not be appropriate if the soil samples are improperly taken or do not represent the area to be fertilized. For nitrogen in particular, recommendations will be most accurate when crop history is taken into account and projected yields are reasonable estimates based on long term records.

General Comments:

- Over irrigation and nutrient loss is a hazard. Optimum irrigation management is necessary to meet crop water use needs and avoid loss of nutrients through leaching beyond the root zone and runoff with irrigation tail water.
- Nitrogen leaching is particularly a concern on sandy soils. Optimum management may require split Nitrogen applications to meet crop needs.
- Weed, insect, and disease control significantly influence the efficiency and effectiveness of your fertilizer applications and ultimately crop yield and farm profitability.
- Phosphorus, potassium, and zinc nutrients can be effectively fall-applied as they are not readily leached over winter.
- Phosphorus can be budgeted for a crop rotation.
- If you have questions regarding the interpretation of this information, please contact your Extension Agricultural agent, Crop consultant, or your commodity company fieldman.
- Both farm profitability and water quality can be improved with efficient nutrient use. The following are recommendations in nutrient management, which will optimize nutrient use for crop production while protecting water quality:

1) Avoid the application of nutrient sources in close proximity to streams, wetlands, drainage ditches, areas of very shallow soils, and sinkholes.

2) Accurately calibrate nutrient application equipment to insure that recommended rates are applied.

3) Nitrogen recommendations for many crops are based on yield goals for the crops. It is important to establish realistic yield goals for each field based upon historical yield data, county averages, and your management practices to avoid unnecessary fertilizer costs and minimize potential water quality impairments.

Appendix D: SOIL TEST DATA

Field: No Data **Date of Test:** No Data

Parameter	Units	0-12"	12-24"	18-24"
Soil Texture		No Data	No Data	
EC	mmhos	No Data	No Data	
PH		No Data	No Data	
%Lime	%	No Data	No Data	
OM	%	No Data	No Data	
CEC	meq	No Data	No Data	
Nitrate-N	ppm	No Data	No Data	
Ammonia-N	ppm	No Data	No Data	
P	ppm	No Data	No Data	No Data
K	ppm	No Data	No Data	
Z	ppm	No Data	No Data	
Mn	ppm	No Data	No Data	
Fe	ppm	No Data	No Data	
Cu	ppm	No Data	No Data	
Ca	ppm	No Data	No Data	
Mg	ppm	No Data	No Data	
Na	ppm	No Data	No Data	

Farm Location

Idaho Transverse Mercator

Coordinates of the farm center (meters): X = 2330764.55612318, Y = 1312313.05761805

Map Scale: 1 : 119

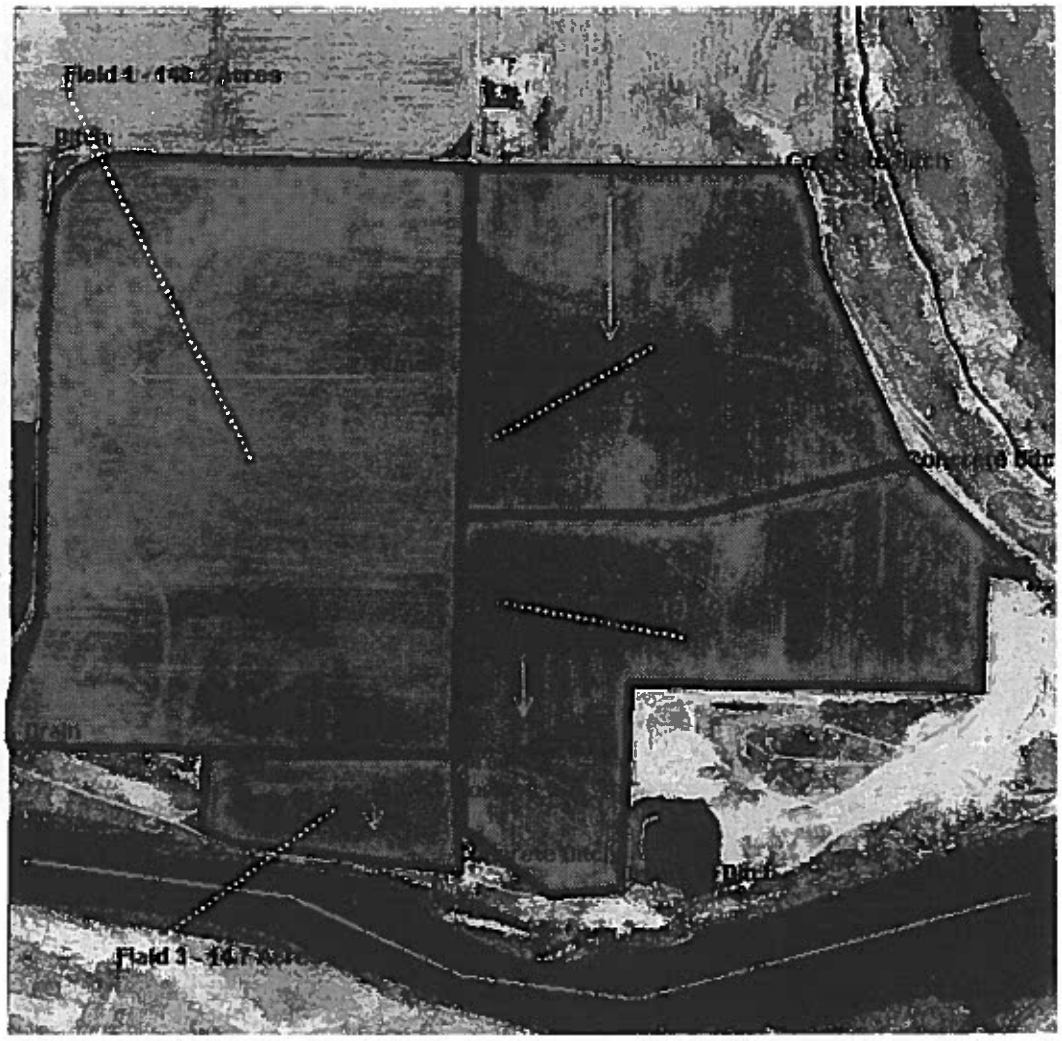


Figure 1. Base Map

Farm Location

Idaho Transverse Mercator

Coordinates of the farm center (meters): X = 2330764.55612318, Y = 1312313.05761805

Map Scale: 1 : 45

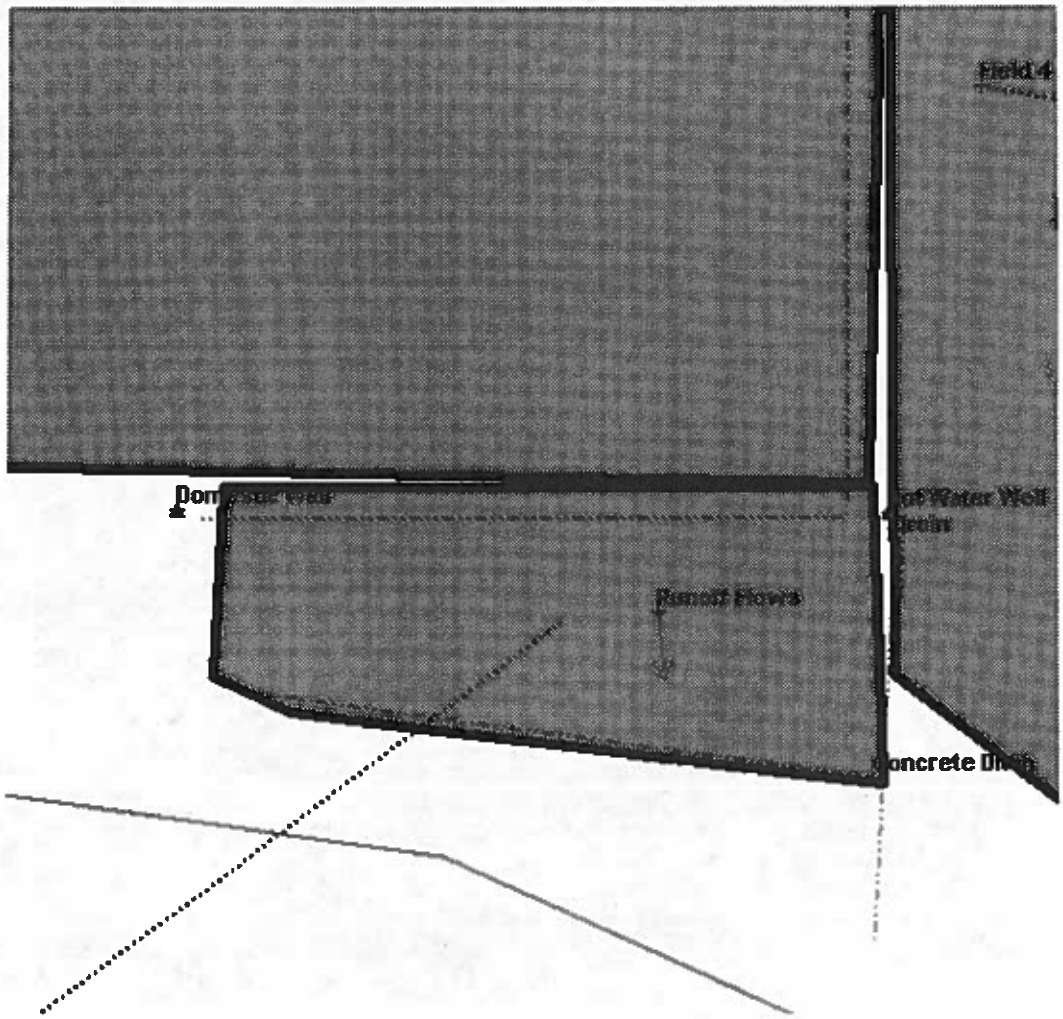


Figure 2. Farmstead Map

NUTRIENT MANAGEMENT REQUIREMENTS/RECOMMENDATIONS

Manure Application Rate Requirement By Year

FIELD: Field 1

Name	Man App		Imported Nutrients	Mineralization		Total	
Corn-Field Grain, Irrigated South ID(2004)	Y		4 T/ac				
		N	45	N	0	N	45
		P	65			P	65
		K	248			K	248
Corn-Field Grain, Irrigated South ID(2005)	Y		4 T/ac				
		N	45	N	-10	N	35
		P	65			P	65
		K	248			K	248
Corn-Field Grain, Irrigated South ID(2006)	Y		4 T/ac				
		N	45	N	-10	N	35
		P	65			P	65
		K	248			K	248
Corn-Field Grain, Irrigated South ID(2007)	Y		4 T/ac				
		N	45	N	25	N	70
		P	65			P	65
		K	248			K	248

FIELD: Field 2

Name	Man App		Imported Nutrients	Mineralization		Total	
Corn-Field Grain, Irrigated South ID(2004)	Y		4 T/ac				
		N	45	N	0	N	45
		P	65			P	65
		K	248			K	248
Corn-Field Grain, Irrigated South ID(2005)	Y		4 T/ac				
		N	45	N	-10	N	35
		P	65			P	65
		K	248			K	248
Corn-Field Grain, Irrigated South ID(2006)	Y		4 T/ac				
		N	45	N	-10	N	35
		P	65			P	65
		K	248			K	248
Corn-Field Grain, Irrigated South ID(2007)	Y		4 T/ac				
		N	45	N	25	N	70
		P	65			P	65
		K	248			K	248

FIELD: Field 3

Name	Man App		Imported Nutrients	Mineralization		Total	
Corn-Field Grain, Irrigated South ID(2004)	Y		4 T/ac				
		N	45	N	0	N	45
		P	65			P	65
		K	248			K	248
Corn-Field Grain, Irrigated South ID(2005)	Y		4 T/ac				
		N	45	N	-10	N	35
		P	65			P	65
		K	248			K	248
Corn-Field Grain, Irrigated South ID(2006)	Y		4 T/ac				
		N	45	N	-10	N	35
		P	65			P	65
		K	248			K	248
Corn-Field Grain, Irrigated South ID(2007)	Y		4 T/ac				
		N	45	N	25	N	70
		P	65			P	65
		K	248			K	248

FIELD: Field 4

Name	Man App		Imported Nutrients	Mineralization		Total	
Corn-Field Grain, Irrigated South ID(2004)	Y		4 T/ac				
		N	45	N	0	N	45
		P	65			P	65
		K	248			K	248
Corn-Field Grain, Irrigated South ID(2005)	Y		4 T/ac				
		N	45	N	-10	N	35
		P	65			P	65
		K	248			K	248
Corn-Field Grain, Irrigated South ID(2006)	Y		4 T/ac				
		N	45	N	-10	N	35
		P	65			P	65
		K	248			K	248
Corn-Field Grain, Irrigated South ID(2007)	Y		4 T/ac				
		N	45	N	25	N	70
		P	65			P	65
		K	248			K	248

Minimum Acres Required for Manure Application

Manure Group	Acres
Imported Nutrients	227

The acreage in the table is based on an average crop uptake of 100 lbs P_2O_5 per acre. These acreage numbers are for estimating export acreage needed. Wastewater application should begin with the first irrigation of the season and end with the last irrigation of the season. Rates should be designed to supply uniform application. When applying wastewater outside of the irrigation window you must contact the Department of Agriculture, Division of Animal Industries.

Hydraulic Balance

Field	Date
Field 1	April 1
Field 2	April 1
Field 3	April 1
Field 4	April 1

0.5" of wastewater may be applied to fields after the hydraulic balance date to remain in compliance with this nutrient management plan.

Spring Soil Test

Spring soils tests must be taken every year from every field to determine a commercial fertilization rate. If commercial fertilizer isn't applied (for a perennial crop), spring soil samples are not required. If you do not apply commercial fertilizer, a complete soil analysis will need to be conducted initially to determine the nutrient baseline.

Record Keeping For each field keep a record of annual manure and chemical fertilizer applications. Include nutrient source, date, time, rate and application method.

ANNUAL NUTRIENT BUDGET

The following crop nutrient budget is based on soil test data and cropping information. It is for one year for the following field and specified crop information:

Nutrient Budget Summary

Field: Field 1 **Crop:** Corn-Field Grain, Irrigated South ID **Yield:** 180

	N	P205	K20
Crop Nutrient Requirement	280	65	48
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	-35		
from Prior Bio-Nutrients	25		
from Irrigation Water	0		0
Nutrient Balance from above	291.1	64.6	48.4
Imported Nutrients	45	65	248
Estimated Remaining Nutrients Required	246	0	-200
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	246	0	-200

Acceptable: Sustainable agronomic rate.

Field: Field 2 **Crop:** Corn-Field Grain, Irrigated South ID **Yield:** 180

	N	P205	K20
Crop Nutrient Requirement	280	65	48
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	-35		
from Prior Bio-Nutrients	25		
from Irrigation Water	0		0
Nutrient Balance from above	291.1	64.6	48.4
Imported Nutrients	45	65	248
Estimated Remaining Nutrients Required	246	0	-200
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	246	0	-200

Acceptable: Sustainable agronomic rate.

Field: Field 3 **Crop:** Corn-Field Grain, Irrigated South ID **Yield:** 180

	N	P205	K20
Crop Nutrient Requirement	280	65	48
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	-35		
from Prior Bio-Nutrients	25		

from Irrigation Water	0		0
Nutrient Balance from above	291.1	64.6	48.4
Imported Nutrients	45	65	248
Estimated Remaining Nutrients Required	246	0	-200
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	246	0	-200

Acceptable: Sustainable agronomic rate.

Field: Field 4 **Crop:** Corn-Field Grain, Irrigated South ID **Yield:** 180

	N	P205	K20
Crop Nutrient Requirement	280	65	48
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	-35		
from Prior Bio-Nutrients	25		
from Irrigation Water	0		0
Nutrient Balance from above	291.1	64.6	48.4
Imported Nutrients	45	65	248
Estimated Remaining Nutrients Required	246	0	-200
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	246	0	-200

Acceptable: Sustainable agronomic rate.

BIO-NUTRIENT EXPORT INFO

Exported Bio-Nutrient Summary					
Bio-Nutrient Group Name	**Amount**	**Consumer**	**Consumer's Address**	**Telephone**	**Acres**
No Data	No Data	No Data	No Data	No Data	No Data

Appendix B: NUTRIENT RISK ANALYSIS

Phosphorus Runoff Risk Assessment

FIELD: Field 1
Overall Risk Rating: Very High
Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 64.6

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: Surface applied no incorporation

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: Field 2

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 64.6

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific

Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: Surface applied no incorporation

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: Field 3

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 64.6

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: Surface applied no incorporation

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: Field 4

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 64.6

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: Surface applied no incorporation

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very High

Comments: Reduce surface irrigation flows and/or field slope; or capture tail-water and use a pump back to reapply tail-water; or if possible and appropriate convert to sprinkler irrigation.

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

Nutrient Leaching Risk Assessment

FIELD: Field 1
Overall Risk Rating: Medium
Leaching losses may be contributing to soluble nutrient leaching below the root zone during some years.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very High

Comments: Due to the low irrigation efficiency on this field, conversion to a more efficient irrigation system like Sprinkler or Drip Irrigation should be considered. If this is not possible consider shorter set times to minimize runoff and/or the length of run to minimize leaching. A Tailwater Recovery & Pump back System will help to reduce or eliminate runoff. An additional consideration is to incorporate a Surge Irrigation that will help to reduce runoff and deep percolation losses. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth Rating: High

Comments: Because the water table is near the surface (and/or the soil is shallow), this field is vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a significant concern.

FIELD: Field 2

Overall Risk Rating: Medium
Leaching losses may be contributing to soluble nutrient leaching below the root zone during some years.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very High

Comments: Due to the low irrigation efficiency on this field, conversion to a more efficient irrigation system like Sprinkler or Drip Irrigation should be considered. If this is not possible consider shorter set times to minimize runoff and/or the length of run to minimize leaching. A Tailwater Recovery & Pump back System will help to reduce or eliminate runoff. An additional consideration is to incorporate a Surge Irrigation that will help to reduce runoff and deep percolation losses. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth Rating: High

Comments: Because the water table is near the surface (and/or the soil is shallow), this field is vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a significant concern.

FIELD: Field 3
Overall Risk Rating: Medium
Leaching losses may be contributing to soluble nutrient leaching below the root zone during some years.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very High

Comments: Due to the low irrigation efficiency on this field, conversion to a more efficient irrigation system like Sprinkler or Drip Irrigation should be considered. If this is not possible consider shorter set times to minimize runoff and/or the length of run to minimize leaching. A Tailwater Recovery & Pump back System will help to reduce or eliminate runoff. An additional consideration is to incorporate a Surge Irrigation that will help to reduce runoff and deep percolation losses. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: Field 4

Overall Risk Rating: Very High

Leaching losses are likely contributing to soluble nutrient leaching below the root zone during most years. Nutrient management practices must be intense.

Percolation Rating: Very High

Deep Percolation (as % of Evapotranspiration): >40% Over ET

Comments: High potential for soluble nutrient leaching to occur. Nitrogen losses from denitrification will probably occur. Apply water according to crop requirements. Do not apply nitrogen prior to leaching events. Water logging and poor soil aeration may negatively effect crop yields (in some areas of field).

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very High

Comments: Due to the low irrigation efficiency on this field, conversion to a more efficient irrigation system like Sprinkler or Drip Irrigation should be considered. If this is not possible consider shorter set times to minimize runoff and/or the length of run to minimize leaching. A Tailwater Recovery & Pump

back System will help to reduce or eliminate runoff. An additional consideration is to incorporate a Surge Irrigation that will help to reduce runoff and deep percolation losses. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth Rating: High

Comments: Because the water table is near the surface (and/or the soil is shallow), this field is vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a significant concern.

NUTRIENT RISK ANALYSIS Legend

BMP	Definition	Purpose
Buffer Strip	Contour buffer strips are strips of perennial grass alternated with wider cultivated strips that are farmed on the contour.	Contour buffer strips slow runoff water and trap sediment. Consequently, soil erosion is generally reduced significantly by this practice. Sediments, nutrients, pesticides, and other potential pollutants are filtered out as water flows through the grass strips. The grass strips also provide food and cover for wildlife.
Channel Vegetation	Establishing and maintaining adequate plants on channel banks, berms, spoil, and associated areas.	To stabilize channel banks and adjacent areas and reduce erosion and sedimentation. To maintain or enhance the quality of the environment, including visual aspects and fish and wildlife habitat.
Chiseling and Sub soiling	Loosening the soil, without inverting and with a minimum of mixing of the surface soil, to shatter restrictive layers below normal plow depth that inhibit water movement or root development.	To improve water and root penetration and aeration.
Composting Facility	A composting facility is installed for biological stabilization of waste organic material.	The purpose of this practice is to biologically treat waste organic material and produce humus-like material that can be recycled as a soil amendment or organic fertilizer. The material may also be used by other acceptable methods of recycling that comply with laws, rules and regulations.
Conservation Cover	This practice involves establishing and maintaining a protective cover	This practice reduces soil erosion, associated sedimentation, improves

	of perennial vegetation on land retired from agriculture production.	water quality, and creates or enhances wildlife habitat.
Conservation Cropping Sequence	Growing crops in a recurring sequence on the same field.	This practice may be applied as part of a best management practice to support one or more of the following: Reduce sheet and rill erosion, Reduce irrigation induced erosion, Reduce soil erosion from wind, Maintain or improve soil organic matter content, Manage deficient or excess plant nutrients, Improve water use efficiency, Manage saline seeps, Manage plant pests (weeds, insects, diseases), Provide food for domestic livestock, and Provide food and cover for wildlife.
Contour Farming	Farming sloping land in such a way that preparing land, planting, and cultivating are done on the contours. (This includes following established grades of terraces or diversion.)	To reduce erosion and control water.
Cover and Green Manure Crop	A crop of close-growing, legumes, or small grain grown primarily for seasonal protection and soil improvement. It usually is grown for 1 year or less, except where there is permanent cover as in orchards.	To control erosion during periods when the major crops do not furnish adequate cover; add organic material to the soil; and improve infiltration, aeration, and tilth.
Critical Area Planting	Planting vegetation on critically eroding areas that require extraordinary treatment.	This practice is used on highly erodible areas that cannot be stabilized by ordinary planting techniques and if left untreated may cause severe erosion or sediment damage. Examples of critical areas include the following: 1) Dams, dikes, levees, and other construction sites with very steep slopes, 2) Mine spoil and surface mined land with poor quality soil

		and possibly chemical problems, and 3) Agriculture land with severe gullies requiring specialized planting techniques and management.
Dike or Berm	An embankment constructed of earth or other suitable materials to protect land against overflow or to regulate water.	Dikes are used to: Permit improvement of agricultural land by preventing overflow and better use of drainage facilities, Prevent damage to land and property, Facilitate water storage and control in connection with wildlife and other developments, and Protect natural areas, scenic features and archeological sites from damage.
Diversion	A channel constructed across the slope with a supporting ridge on the lower side.	To divert excess water from one area for use or safe disposal in other areas.
Drip Irrigation	A planned irrigation system in which all necessary facilities are installed for efficiently applying water directly to the root zone of plants by means of applicators (orifices, emitters, porous tubing, perforated pipe) operated under low pressure. The applicators can be placed on or below the surface of the ground.	To efficiently apply water directly to the plant root zone to maintain soil moisture within the range for good plant growth and without excessive water loss, erosion, reduction in water quality, or salt accumulation.
Filter Strip	A strip or area of vegetation for removing pollutants water.	A filter strip reduces pollution by filtration, deposition, infiltration, absorption, adsorption, decomposition, and volatilization of sediment, organic matter, and other pollutants from runoff and waste water.
Fish Stream Improvement	Fish Stream Improvement is improving a stream channel to make or enhance fish habitat.	The purpose of the practice is to increase production of desired species of fish. The practice involves improving food supplies, shelter, spawning areas, water quality, and other elements of fish habitat.

Grade Stabilization Construction	A structure used to control the grade and head cutting in natural or artificial channels.	These structures are to: Stabilize the grade and control erosion in natural or artificial channels, prevent the formation or advance of gullies, enhance environmental quality, and reduce pollution hazards.
Grassed Waterway	A natural or constructed channel that is shaped or graded to required dimensions and established in suitable vegetation for the stable conveyance of runoff.	Grassed waterways convey runoff from terraces, diversions, or other water concentrations without causing erosion or flooding and to improve water quality.
Grazing Land Mechanical Treatment	Modifying physical soil and/or plant conditions with mechanical tools by treatments such as; pitting, contour furrowing, and ripping or sub-soiling.	This practice should be applied as part of a best management practice to support one or more of the following purposes: Fracture compacted soil layers and improve soil permeability, Reduce water runoff and increase infiltration, Break up sod bound conditions and thatch to increase plant vigor, and Renovate and stimulate plant community for greater productivity and yield.
Heavy Use Area Protection	Protecting heavily used areas by establishing vegetative cover, by surfacing with suitable materials, or by installing needed structures.	To stabilize urban, recreation, or facility areas frequently and intensely used by people, animals, or vehicles.
Irrigation Land Leveling	Reshaping the surface of land to be irrigated to planned grades.	To permit uniform and efficient application of irrigation water without causing erosion, loss of water quality, or damage to land by water logging and at the same time to provide for adequate surface drainage.
Irrigation Water Management	Irrigation water management is the process of determining and controlling the volume, frequency,	Irrigation water management is applied as part of a conservation management system to support one

	and application rate of irrigation water in a planned, efficient manner.	or more of the following: Manage soil Moisture to promote desired crop response; Optimize use of available water supplies; Minimize irrigation induced soil erosion; Decrease non-point source pollution of surface and groundwater resources; Manage salts in the crop root zone; Manage air, soil, or plant micro-climate.
Mulching	Applying plant residues or other suitable materials not produced on the site to the soil surface.	To conserve moisture; prevent surface compaction or crusting; reduce runoff and erosion; control weeds; and help establish plant cover.
Polyacrylamide (PAM)	Polyacrylamide is an organic polymer formulated to stabilize soil when applied in irrigation water.	Water applied with PAM stabilizes soil aggregates which can then resist the erosive forces of water. If correctly applied, PAM will produce clear runoff water and residue erosion within the field by over 90 percent.
Prescribed Grazing	Prescribed grazing is the controlled harvest of vegetation with grazing animals, managed with the intent to achieve a specific objective.	Application of this practice will manipulate the intensity, frequency, duration, and season of grazing to: 1) Improve water infiltration, 2) maintain or improve riparian and upland area vegetation, 3) protect stream banks from erosion, 4) manage for deposition of fecal material away from water bodies, and 5) promote ecological and economically stable plant communities which meet landowner objectives.
Residue Management (Conservation Tillage)	Managing the amount, orientation, and distribution of crop and other plant residue on the soil surface.	This practice may be applied as part of a conservation system to support one or more of the following: Reduce sheet and rill erosion. Reduce wind erosion. Maintain or improve soil organic matter content and tilth. Conserve

		soil moisture. Manage snow to increase plant available moisture. Provide food and escape cover for wildlife.
Riparian Forest Buffer	A riparian forest buffer is an area of trees and/or shrubs located adjacent to a body of water. The vegetation extends outward from the water body for a specified distance necessary to provide a minimum level of protection and/or enhancement.	The riparian forest buffer is a multi-purpose practice design to accomplish one or more of the following: Create shade to lower water temperatures and improve habitat for aquatic animals, Provide a source of debris necessary for healthy robust populations of aquatic organisms and wildlife, and Act as a buffer to filter out sediment, organic material, fertilizer, pesticides and other pollutants that may adversely impact the water body, including shallow ground water.
Sediment Basin	A basin constructed to collect and store debris or sediment.	A sediment basin may have the following uses: Preserve the capacity of reservoirs, ditches, canals, diversion, waterways, and streams, Prevent undesirable deposition on bottom lands and developed areas, Trap sediment originating from construction sites, and Reduce or abate pollution by providing basins for deposition and storage of silt, sand, gravel, stone, agricultural wastes, and other detritus.
Sprinkler System	A planned irrigation system in which all necessary facilities are installed for efficiently applying water by means of perforated pipes or nozzles operated under pressure.	To efficiently and uniformly apply irrigation water to maintain adequate soil moisture for optimum plant growth without causing excessive water loss, erosion, or reduced water quality.
Stream Channel Stabilization	Stabilizing the channel of a stream with suitable structures.	To control aggradations or degradation in a stream channel.

Stream bank Protection	Using vegetation or structures to stabilize and protect banks of streams, lakes, estuaries, or excavated channels against scour and erosion.	To stabilize or protect banks of streams, lakes, estuaries, or excavated channels for one or more of the following purposes: Prevent the loss of land or damage to utilities, roads, buildings, or other facilities adjacent to the banks, Maintain the capacity of the channel, Control channel meander that would adversely affect downstream facilities, Reduce sediment loads causing downstream damages and pollution, and Improve the stream for recreation or as a habitat for fish and wildlife.
Strip-cropping, Contour	Growing crops in a systematic arrangement of strips or bands on the contour to reduce water erosion. The crops are arranged so that a strip of grass or close-growing crop is alternated with a strip of clean-tilled crop or fallow or a strip of grass is alternated with a close-growing crop.	To reduce sheet and rill erosion and/or to reduce transport of sediment and other water-borne contaminants.
Strip-cropping, Field	Growing crops in a systematic arrangement of strips or bands across the general slope (not on the contour) to reduce water erosion. The crops are arranged so that a strip of grass or a close-growing crop is alternated with a clean-tilled crop or fallow.	To help control erosion and runoff on sloping cropland where contour strip-cropping is not practical.
Subsurface Drains	A Subsurface Drain is a conduit, such as corrugated plastic tubing, tile, or pipe, installed beneath the ground surface to collect and/or convey drainage water.	The purpose of a subsurface drain is to: Improve the environment for vegetation, Reduce erosion, Improve water quality, Collect ground water for beneficial use, Remove water from heavy use areas such as recreation areas, or around buildings, and Regulate water to control health hazards caused by pests.

Surge Irrigation	Surge irrigation is the intermittent application of water to furrows, corrugates, or borders creating a series of on and off periods of constant or variable time spans.	Surge allows a lighter application of water with a higher efficiency. The result is less deep percolation of water at the upper end of the field and a more uniform application.
Tailwater Recovery & Pump back System	A facility to collect, store, and transport irrigation tailwater for reuse in a farm irrigation distribution system.	To conserve farm irrigation water supplies and water quality by collecting the water that runs off the field surface for reuse on the farm.
Terraces	An earth embankment, a channel, or a combination ridge and channel constructed across the slope.	Reduce slope length, reduce sediment content in runoff water, reduce erosion, Improve water quality, intercept and conduct surface runoff at a non-erosive velocity to a stable outlet, retain runoff for moisture conservation, prevent gully development, reform the land surface, improve farmability, and reduce flooding.
Use Exclusion	Excluding animals, people or vehicles from an area.	To protect, maintain, or improve the quantity and quality of the plant, animal, soil, air, water, and aesthetics resources and human health and safety.
Water and Sediment Control Basin	An earth embankment or a combination ridge and channel generally constructed across the slope and minor watercourses to form a sediment trap and water detention basin.	To improve farmability of sloping land, reduce watercourse and gully erosion, trap sediment, reduce and manage onsite and downstream runoff, and improve downstream water quality.
Watering Facility	A device (tank, trough, or other watertight container) for providing animal access to water.	To provide watering facilities for livestock and/or wildlife at selected locations in order to: 1) protect and enhance vegetative cover through proper distribution of grazing; 2) provide erosion control through better grassland management; or 3) protect streams, ponds and water

		supplies from contamination by providing alternative access to water.
Wetland Development/Restoration	The construction or restoration of a wetland facility to provide the hydrological and biological benefits of a wetland.	To develop or restore hydric soil conditions, hydrologic conditions, hydrophytic plant communities, and wetland functions.

Appendix C: CROP SPECIFIC GUIDELINES

Corn-Field Grain, Irrigated South ID

NITROGEN

Nitrogen rates depend upon some of the following factors: previous crop, past fertilizer use, soil type and leaching hazard and realistic yield goal for the grower and the area.

Adequate N is necessary for maximum economic production of irrigated field corn used for silage or grain. Fertilizer N represents by far the largest share of the fertilizer costs for field corn in Idaho. The amount of N required depends on many factors that influence total corn production and quality. These factors include length of growing season, corn hybrid, previous crop, past fertilizer use, soil type, leaching hazard and previous manuring. Estimates of both the N available to corn during the season and the yield potential of the crop should be considered when determining N fertilizer rates.

TOTAL N REQUIREMENTS BASED ON POTENTIAL YIELD

Fertilizer N rates should be used which correspond to the yield growers can reasonably expect under their soil and management conditions. The historical field corn yield obtained by a grower in a specific field or area generally provides a fair approximation of yield potential given a grower's traditional crop management. Projected changes in crop management (i.e. improved variety, better disease and weed control) designed to appreciably increase production may require adjustment of yield potential upward. Research has shown that the available N required to produce a good field corn yield depends on a variety of crop management practices. Factors such as weed, insect and disease control as well as irrigation, planting date and soil type can influence the N required by triticale for maximum yield.

AVAILABLE NITROGEN

Available N in the soil includes mineralizable N (released from organic matter during the growing season) inorganic N as nitrate (N03-N) and ammonium (NH4-N), and N credits from previous cropping or manures. Each component of available N must be estimated for accurate determination of optimum fertilizer N rates.

MINERALIZABLE NITROGEN - Soils vary in their capacity to release N from organic matter during the growing season. The amount of N released depends on such factors as soil type, soil moisture, soil temperature, previous crop, and the history of fertilizer N applied. While soil organic matter content is frequently used to estimate annual mineralizable N contributions, in southern Idaho irrigated soils organic matter does not accurately predict the amount of N that is mineralized.

INORGANIC NITROGEN - Residual soil inorganic N (N03, NH4) can be evaluated most effectively with a soil test. Soil samples should be collected in foot increments to a depth of two feet, unless roots are restricted by dense soil layers or high water tables. Ammonium is generally low in preplant soil samples and thus contributes little to available N. However, it can be as high or higher than N03-N. NH4-N should be determined along with N03-N, especially when there is reason to expect the presence of appreciable NH4-N, such as recent ammonium N fertilizer applications. Soil samples should be collected before seeding in the spring to represent the area to be fertilized.

NITROGEN FROM PREVIOUS CROP RESIDUES - Nitrogen associated with decomposition of previous crop residues should also be considered when estimating available N. Residues that require additional N for decomposition include cereal straw and mature corn stalks. Research has shown that 15 pounds of additional N are needed per ton of straw returned to the soil, up to a maximum of 50 pounds. For more information on compensating for cereal residues, refer to CIS 825, "Wheat Straw Management and Nitrogen Fertilizer Requirements."

Row crop residues (potatoes, sugar beets, onions) generally do not require additional N for decomposition. Consequently, these residues have little effect on the N needs of field corn.

Legume residues from beans, peas, and alfalfa can release appreciable N during the following crop season that may not be reflected by the preplant soil test. This N is derived from the decomposition of both plant tops and nodulated root systems.

NITROGEN FROM MANURES - Soils in which field corn is grown occasionally receive animal manures or lagoon wastes. Nutrient contributions from these sources should also be taken into consideration when estimating available N for the next season. Manures can preclude the need for any fertilizer, depending on the rate applied and their nutrient composition.

Manures can vary appreciably depending on the animal, how the manure is processed, and the kind and extent of bedding material. For the most accurate estimate of fertilizer equivalent values, the manure should be analyzed for its nutrient content.

IRRIGATION WATER - Irrigation waters derived from deep wells are generally low in N. More shallow wells can have significant levels of nitrogen because of leaching of nitrogen from impacts from commercial fertilizer use, animal waste, and improperly functioning septic systems. Irrigation waters from most districts are also low in N when diverted from its source. Background levels of N from original sources are generally about 2 parts per million (ppm). The more return flow included in diverted water sources, the higher the N content. Return flows may include N dissolved when irrigation waters pass through fields high in residual or recently added fertilizer N as well as from soluble fertilizer N applied with the irrigation water.

Most irrigation districts should know the N content of the water they divert. Contact them for this information to determine the levels of N added with your irrigation water. However, since irrigation water N levels are influenced by upstream management, if you use irrigation water that receives runoff after it is diverted, only a water test can accurately evaluate the N added with irrigation waters.

For each ppm or milligrams per liter (mg/L) of N reported in the water sample, multiply by 2.7 to get the N added per acre foot of water applied. For example, if the water sample contained 10 ppm of N, 3 acre feet of water applied would be the equivalent of 81 pounds of N per acre. Typically, of the water applied with furrow irrigation only 50 percent is retained on the field and the rest runs off the end. The net retention of N applied with furrow irrigation would, therefore, be about half of the water applied or about 40 pounds per acre in this example. If more or less of the irrigation water is retained with each wetting, then growers should adjust the water N contribution accordingly.

Excessive irrigation by any method reduces N availability to field corn. Additional N may be needed under these conditions. Growers should not use aqua or anhydrous N through a sprinkler irrigation system.

Water running soluble N sources with a furrow irrigation system can be an effective means of adding N. Two limitations of this practice are that (1) the application of the N with this method may not be as uniform as desired and (2) runoff containing the N may contaminate downstream surface waters. Growers can minimize the loss of N by shutting off the injection unit before the irrigation water reaches the end of the furrow. This practice should not substitute for careful consideration of N needs while N can be side dressed.

CALCULATION OF N APPLICATION RATES

To calculate the fertilizer N application rate, the following equation is used:

Fertilizer application rate (deficit) or Over application of Nitrogen =
(Total N required to produce a given yield) - (Mineralizable N) - (Inorganic N measured by the soil test) - (previous crop/residue management) - (Manure Nitrogen) - (Irrigation Water)

TIMING OF NITROGEN APPLICATION

Coarse-textured soils, including sandy loams, loamy soils and sands, may lose N from leaching. For these soils, side dress a portion of the N at the time of the last cultivation. Sprinkler irrigation of corn under center pivots provides increased flexibility for providing N during the season. With sprinklers N

can be injected into the system and applied with the water. On silt loam soils, split applications of N have not proven more effective as long as preplant N is adequately incorporated.

High N rates (approaching 300 pounds per acre) broadcast and incorporated before planting may reduce early season corn growth. If high N rates are needed, split applications should be considered. High plant populations (above 28,000 to 30,000) and early plantings of longer season hybrids in the Treasure Valley will respond to high N rates provided there are no other limiting factors. High N rates will not compensate for reductions in stand or delayed plantings. High plant populations of field corn are more susceptible to N shortages because of greater competition among plants for limited N.

Side dressing may cause root pruning depending on plant size, distance of shank from the row and placement depth. High N rates (above 300 pounds per acre) broadcast and incorporated before planting may reduce early season corn growth. If high N rates are needed, split applications should be considered. On sandy textured soils subject to leaching, side dress a portion of the N at the time of the last cultivation. Under sprinkler irrigations, N can be injected through the lines throughout the season. On silt loam soils, split applications of N have not proven more effective as long as preplant N is adequately incorporated.

PHOSPHORUS

Adequate phosphorus (P) is necessary for maximum production of field corn. The soil test for P is based on samples collected from the first foot of soil. The soil is extracted with sodium bicarbonate. Economic response to fertilizer P is more likely with cooler soil temperatures and soils with high lime content, particularly when planting long season hybrids. Phosphorus is an immobile nutrient that does not move appreciably from where it is placed. It should be mixed into the seedbed or banded within easy reach of the seedling roots before or during the planting operation.

POTASSIUM

Field corn requires adequate potassium (K) for optimum growth. Soil test K can be useful in determining the need for K fertilizers. The soil sample is taken from the first foot of soil and extracted with sodium bicarbonate. Fertilizer K rates are based on soil test.

MICRONUTRIENTS

Zinc (Zn) deficiencies occur primarily on soils that are eroded, leveled or where the exposed subsoil is higher in lime. The DTPA test on soil samples collected from the first foot can be used for identifying Zn fertilizer needs. Apply 10 pounds of Zn per acre when the soil test measures less than 0.6 ppm. Other micronutrients have not been shown to limit corn production. "Shotgun" applications of micronutrient mixtures containing boron (B), copper (Cu), iron (Fe) and manganese (Mn) "for insurance" have not been shown to be economical and are not recommended.

SULFUR (S)

The major corn-growing regions in Idaho should not experience shortages of S. Areas with S deficiencies include some irrigated areas where both the soil and irrigation water are low in S. Snake River water is known to have high S concentrations. Coarse-textured soils including sandy loams, loamy sands and sands would be more susceptible to S deficiencies than silt loam soils. Where the need for S is evident, use 30 pounds per acre of sulfate-sulfur (S04).

SALINITY (SALTS)

Field corn has a low to moderate tolerance to accumulated salts. Soils with total salt readings above 3 or 4 mmhos/cm can be cropped effectively. Readings up to 6 are also satisfactory although more careful water management may be required.

The above fertilizer guidelines are based on relationships established between University of Idaho soil test and crop yield response research. In this research, crop response to fertilizers was evaluated at several sites where the response to fertilizer differed. The recommendations reflect the general or overall response to fertilizers at specific soil test values and the response in individual fields can differ appreciably from the general table recommendation. Some sites will require less than the general recommendation, other sites more. Unfortunately, the science has not developed to the point where the table recommendations can account for all the unknown variables influencing the effectiveness of applied fertilizers at individual sites. The table fertilizer recommendations can only be used as general guides rather than specific recommendations for each and every field.

Furthermore, soil variability can sharply reduce the accuracy composite soil test values for individual fields. That is why large contiguous areas within fields should be sampled separately when they are known to differ in crop growth or soil characteristics known to influence the response to fertilizer. But soil variability frequently does not occur conveniently in large areas that can be sampled separately or fertilized differently. The fertilizer recommendations in most cases do not account for this variability. Soil test based recommendations may be excessive in some field areas and inadequate in other areas of the same field. The recommendations then will be appropriate only to the degree that the composite soil test values for fields actually represent the field. Thus, for fields that are highly variable, the fertilizer recommendations should be considered conservative estimates of fertilizers needed. All the more reason to consider the table fertilizer recommendations as general guides rather than specific recommendations for each and every field.

The fertilizer rates suggested in the tables will support above average yields if other factors are not limiting production. Therefore the recommendations assume that good crop management practices will be used, i.e. insect, disease, and weed control. Nutrient requirements can be met using either commercial fertilizers or equivalent organic matter sources, such as manure or compost, provided their nutrient content and relative availability are known or can be estimated from published literature. Soil test based recommended rates will not be appropriate if the soil samples are improperly taken or do not represent the area to be fertilized. For nitrogen in particular, recommendations will be most accurate when crop history is taken into account and projected yields are reasonable estimates based on long term records.

General Comments:

- Over irrigation and nutrient loss is a hazard. Optimum irrigation management is necessary to meet crop water use needs and avoid loss of nutrients through leaching beyond the root zone and runoff with irrigation tail water.
- Nitrogen leaching is particularly a concern on sandy soils. Optimum management may require split Nitrogen applications to meet crop needs.
- Weed, insect, and disease control significantly influence the efficiency and effectiveness of your fertilizer applications and ultimately crop yield and farm profitability.
- Phosphorus, potassium, and zinc nutrients can be effectively fall-applied as they are not readily leached over winter.
- Phosphorus can be budgeted for a crop rotation.
- If you have questions regarding the interpretation of this information, please contact your Extension Agricultural agent, Crop consultant, or your commodity company fieldman.
- Both farm profitability and water quality can be improved with efficient nutrient use. The following are recommendations in nutrient management, which will optimize nutrient use for crop production while protecting water quality:

1) Avoid the application of nutrient sources in close proximity to streams, wetlands, drainage ditches, areas of very shallow soils, and sinkholes.

2) Accurately calibrate nutrient application equipment to insure that recommended rates are applied.

3) Nitrogen recommendations for many crops are based on yield goals for the crops. It is important to establish realistic yield goals for each field based upon historical yield data, county averages, and your management practices to avoid unnecessary fertilizer costs and minimize potential water quality impairments.

Appendix D: SOIL TEST DATA

Field: No Data **Date of Test:** No Data

Parameter	Units	0-12"	12-24"	18-24"
Soil Texture		No Data	No Data	
EC	mmhos	No Data	No Data	
PH		No Data	No Data	
%Lime	%	No Data	No Data	
OM	%	No Data	No Data	
CEC	meq	No Data	No Data	
Nitrate-N	ppm	No Data	No Data	
Ammonia-N	ppm	No Data	No Data	
P	ppm	No Data	No Data	No Data
K	ppm	No Data	No Data	
Z	ppm	No Data	No Data	
Mn	ppm	No Data	No Data	
Fe	ppm	No Data	No Data	
Cu	ppm	No Data	No Data	
Ca	ppm	No Data	No Data	
Mg	ppm	No Data	No Data	
Na	ppm	No Data	No Data	

Grandview Dixie Farm

Nutrient Management Plan

2

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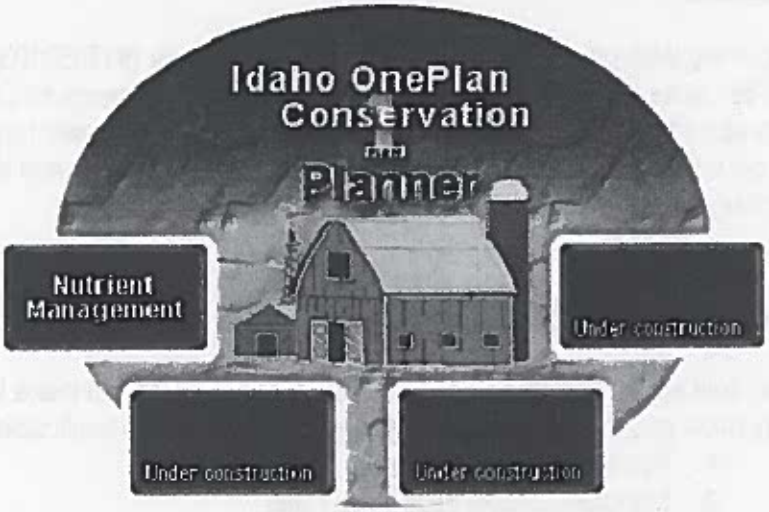

Nutrient Management Plan Prepared For:
Grandview Farms
(208) 834-2231
Dixie Farm

Certified Planner:
Michael Mitchell
Professional Engineer, EAC Engineering, Inc
(559) 381-0607

Producer Signature: _____ Certificated Planner Signature: _____

Date Completed: 10-02-07

The information provided by those using the "Idaho OnePlan" shall be deemed to be trade secrets, production records, or other proprietary information and shall be kept confidential and shall be exempt from enclosure pursuant to section 9-340D, Idaho Code. (Title 22 Chapter 27 17D6)

DIXIE FARM
Producer Summary

Farm Summary

Dixie Farm is an existing farm located ½ mile east of Grandview, Idaho. The farm is owned by Grandview Farms and managed by Mike Usabel. The farm consists of four furrow irrigated field for a total of 315 acres available for accepting imported manure/compost from Simplot/Grandview Feedlot.

Farm Resource Concerns

Dixie Farm is located in the Watershed Basin of the Middle Snake Succor (#17050103). The facility is found at 116W 04'40" 42N 59'46" using GPS Coordinates. The primary resource concern for Dixie Farm is ground water quality. The farm sits along the Snake River however fields are bermed to prevent runoff to the river therefore runoff is not likely to occur. Solid waste is applied to all of the fields and pasture and incorporated on fields within seven days of application.

Nutrient Management Plan Requirements

Producer will maintain field application records for a minimum of five years and make them available for review at routine inspections by ISDA personnel. These records must include (where applicable):

1. Fertilizer application rates
2. Manure/Compost application rates
3. On each field, keep a record of manure and chemical fertilizer applications, crop information, and soil and manure test results.
4. Fields to which the nutrients are applied
5. Spring soil test for nitrogen (required annually)
   0-12" and 12-24" nitrogen test

Crop Nutrient Requirement	
Crop	**Pounds of P205 per acres**
Corn	65

Manure/Compost field application requirement (tons)						
Acres x crop nutrient requirement ÷ manure p205 value* = Tons required						
Example	Corn - 250(acres)	X	75 (crop requirement)		÷ 16.85	
Corn	250	X	65**	= 18750	÷ 16.85* =	1112.76 tons

***based on manure test values for P205**
**pounds of p205 required per acre

Irrigation Management Plan Recommendations

Irrigation water management is very important in nutrient management. If irrigation water is applied at a rate over the crop needs, there is potential for runoff and/or leaching of nutrients. If irrigation water is under-applied, the crop will not have optimal growth conditions. Crop

irrigation water requirements changes through the growing season depending on climate conditions and crop Evapotranspiration rate. Proper irrigation water management responds to these crop demands. It is recommended that:

- Irrigation schedules continue to be managed by your irrigation specialist.
- Continual inspection and maintenance of irrigation equipment will prevent unwarranted waste discharges into surface or ground water.

Nutrient Management Plan Recommendations

Land application of manure at agronomic rates, along with irrigation scheduling, is the most effective way to obtain maximum nutrient benefits from manure, condition the soil, and avoid potential water quality problems downstream. Cattle manure is a valuable resource, which will also improve soil properties such as water holding capacity, infiltration, tilth, structure, porosity, and nutrient retention and release. If animal manure and/or commercial fertilizers are not properly managed, contaminants may impact surface and/or groundwater.

Application of manure applied at an agronomic rate is a sustainable practice and is always allowed under ISDA regulations. Regardless of the rate prescribed by this nutrient management plan, soil testing at the 0-12 inch and 12-24 inch soil depths is required for nitrogen management.

- Set realistic crop yield goals in order to provide an accurate account of the plant nitrogen needs.
- Apply N so that it is available during peak plant demand.
- Apply fertilizer to cool season crop in the spring rather than the previous fall. This will prevent fertilizer leaching through the soil profile and provide the crop with the necessary levels of nutrients.
- Use split or multiple fertilizer applications in order to provide the crop with a pre-plant treatment and the needed nutrient levels throughout the growing season until the point of major nutrient uptake.
- Avoid the application of nutrient sources in close proximity to streams, wetlands, drainage ditches, areas of very shallow soils, and sinkholes.

Dixie Farm

ANALYSIS OF RESOURCE CONCERNS

INTRODUCTION

The purpose of this nutrient management plan is to meet agricultural production goals and to certify that manure and nutrients are properly managed to minimize adverse impact to surface or groundwater. Plans are written in cooperation with the producer to:

1) assure proper containment of animal manure and process waste water

2) assess resource concerns which exist on the property

3) budget nutrient sources to optimize crop water and nutrient needs. Nutrient sources include commercial fertilizers, animal manure, mineralization of previous crop soil organic matter, accounting of residues, and irrigation water.

4) When applicable, assess irrigation water management to minimize movement of nutrients beyond the root zone or with runoff.

If animal manure and/or commercial fertilizers are not properly managed, contaminants may negatively impact surface and/or groundwater. Some water resource contaminants associated with poorly managed animal manure and fertilizers are:

Phosphorus in the soil readily adsorbs to soil particles; thus, erosion of soil by surface runoff is the general mode of phosphorus transport. Even at very low concentrations, phosphorus can result in plant and algae blooms in surface water bodies. Alga blooms are a nuisance to boaters, irrigators, and others. Toxins released by certain algae can be lethal to livestock or other animals that drink the water. Dissolved oxygen in the water is depleted as algae die and decompose, sometimes causing fish kills.

Nitrogen in the form of nitrate (NO_3^-) is highly water-soluble and will move with water, particularly down the soil profile past the root zone if not utilized by plants (thus becoming a groundwater contamination issue).Nitrates are toxic to infants under 6 months, and to livestock at high concentrations. In surface water, excess nitrogen, like phosphorus, can result in nuisance plant and algae growth.

Organic matter in high load decreases dissolved oxygen in a surface water body when it decomposes. Low levels of dissolved oxygen is harmful or even fatal to fish and other aquatic life.

Bacteria and microorganism illnesses (pathogens) potentially transmitted through water by animal manure include Giardia, Typhoid Fever, Cryptosporidium, and Cholera. Pathogens from animal waste can negatively impact surface and groundwater quality.

FACILITY DESCRIPTION

Owner Information

Owner (1):	Grandview Farms
Address:	1301 Hwy 67 , Grandview, ID 83264
Phone:	(208) 834-2231 N/A
	N/A

Location

Site Map: Facility site plan illustrated in Figure 1

Soil Conservation District:	Bruneau River
County:	Elmore
Watershed Basin:	Middle Snake-succor (USGS Hydrologic Unit Code # 17050103)

ANALYSIS OF RESOURCE CONCERNS

Farm Resource Concerns

Dixie Farm is located in a watershed containing water quality limited stream segments listed according to the Clean Water Act. Stream segments are listed because a water quality parameter prevents the attainment of the "Fishable/Swimmable" goal of the Clean Water Act.

WATERBODY	BOUNDARIES	BACT	CHAN STAB	DO	FLOW ALT	HAB ALT	MET HG	MET	NH3	NUTR	O_G	ORG	PEST	PH	SAL	SED	TDG	TEMP	UNKN	*
Snake River	CJ Strike Res to Castle Creek	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	X

Dixie Farm is not located in a critical Nitrate-Nitrogen management area. Nitrate Management Areas are designated based upon ground water quality sampling results. Two priority groups exist as follows:

Priority 1 is designated because at least 25% of the ground water sampling locations within the area exceed 5-milligrams/liter nitrate. This is one-half of the maximum contaminant level of 10-milligrams/liter nitrate. This nitrate concentration is considered evidence of significant degradation. Public drinking water systems are required to increase monitoring frequency when this level is reached.

Priority 2 is designated because at least 50% of the ground water sampling locations within the area exceed 2-milligrams/liter nitrate. This concentration threshold provides an indication of human-caused (anthropogenic) impacts. The upper limit for naturally occurring (background) concentrations of nitrate is considered to be about 2 mg/l.

Dixie Farm is located in a sole source aquifer area - Western Snake River Plain Aquifer.

Field Resource Concerns

- Open Irrigation Water Conveyances - Irrigation tail water can deliver nutrients to surface water via open canals. Nutrient loading of open canals can have a detrimental affect on the health of receiving waters.
- Drain Tile Outlet - Subsurface drains can deliver nutrients to surface water. Subsurface drains run the risk of decreased time for contact of the nutrients to adsorb onto soil particles or to be utilized by the crop. Irrigation management is also affected because shallow soils have a lower water holding capacity.

Depth Limiting Subsurface Features

Field Name	Subsurface Feature	Depth from Surface (in)
Field 1	Cobbles	26
	Water Table	36
Field 2	Water Table	36
Field 3	Cobbles	26
	Water Table	>72

Field 4	Cobbles	26
	Water Table	36

Well Testing Results (See back of page):

Well	Date	Hardness	EC	PH	K	Nitrates	Nitrites	NH3	Na	Carbonate	Bicarbonate
No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data

ISDA REGULATIONS AND THE IDAHO NUTRIENT MANAGEMENT STANDARD

Nutrient management plans for animal agricultural operations regulated by the Idaho State Department of Agriculture (ISDA) must be approved by the Idaho State Department of Agriculture and must follow the Natural Resource Conservation Service (NRCS) Agriculture Waste Management Field Handbook and the Idaho Nutrient Management Standard. ISDA regulation and the Standard use soil test phosphorus as the indicator for environmental impact from agricultural production practices. The Idaho Nutrient Management Standard is based on a threshold soil test phosphorus level (TH), above which there is no agronomic advantage to application of phosphorus.

The Idaho Nutrient Management Standard categorizes fields as a surface water concern or a groundwater concern. A surface water concern indicates that runoff leaves the contiguous operating unit from normal storm events, rain on snow, frozen ground, or irrigation. The soil phosphorus threshold for a field with a surface water concern is 40 ppm phosphorus for soils alkaline (ph > 6) tested with the Olsen method and 60 ppm phosphorus for acidic (ph < 6.5) soils tested with the Bray method (0-12"Soil Sample Depth).

A groundwater resource concern indicates that runoff does not leave the contiguous operating unit from normal storm events, rain on snow, frozen ground, or irrigation. There are two sub-categories for fields identified as having a groundwater concern. The first category applies to fields with a resource concern within the first five feet of the soil profile. A resource concern could be shallow soils, gravel, cobble, bedrock, high groundwater table, or a drained field. These fields are indicated as a groundwater concern <5'. The soil phosphorus threshold for a field with a groundwater concern <5' is 20 ppm phosphorus for soils tested with the Olsen method and 25 ppm phosphorus for soils tested with the Bray method(18-24" Soil Sample Depth).

If a field is not classified as having a surface water concern or a groundwater <5' concern, by default it is classified as having a groundwater concern >5'. The soil phosphorus threshold for a field with a groundwater concern >5' is 30 ppm phosphorus for soils tested with the Olsen method and 45 ppm phosphorus for soils tested with the Bray method(18-24" Soil Sample Depth).

Field Phosphorus Threshold

Field	Resource Concern	P Threshold (ppm)	P Threshold Soil Test Depth
Field 1	Groundwater < 5'	20	18 - 24"
Field 2	Groundwater < 5'	20	18 - 24"
Field 3	Groundwater < 5'	20	18 - 24"
Field 4	Groundwater < 5'	20	18 - 24"

Grandview Dobaron

Nutrient Management Plan

3

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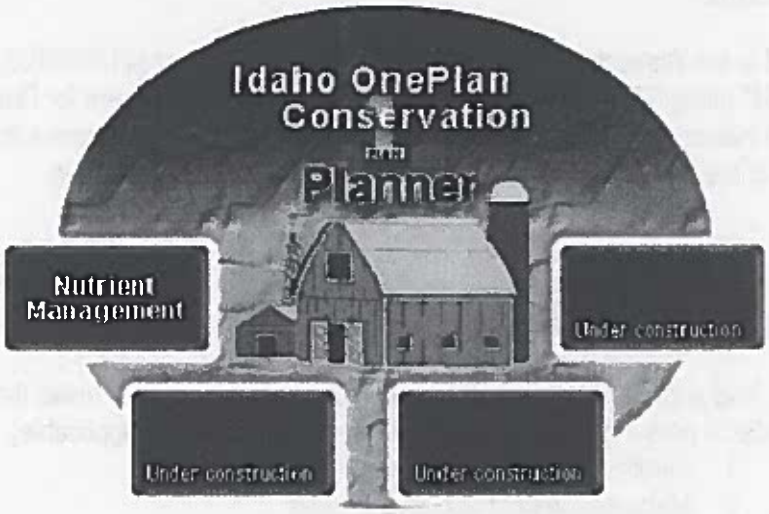

Nutrient Management Plan Prepared For:
Grandview Farms
(208) 834-2231
Dobaron Farm

Certified Planner:
Michael Mitchell
Professional Engineer, EAC Engineering, Inc
(559) 381-0607

Producer Signature: _____ Certificated Planner Signature: _____

Date Completed: 10-02-07

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DOBARON FARM
Producer Summary

Farm Summary

Dobaron Farm is an existing farm located 7 miles west of Mountain Home Air Force Base. The farm is owned by Grandview Farms and managed by Mike Usabel. The farm consists of one pivot irrigated field, and thirteen handline irrigated fields for a total of 591 acres available for accepting imported manure/compost from Simplot/Grandview Feedlot.

Farm Resource Concerns

Dobaron Farm located in the Watershed Basin of the Middle Snake Succor (#17050103). The facility is found at 116W 00'29" 43N 01'54" using GPS Coordinates. The primary resource concern for Dobaron Farm is ground water quality. No canals, laterals or ditches with irrigation water are near the fields to cause any type of runoff. Solid waste is applied to all of the fields and incorporated within seven days of application.

Nutrient Management Plan Requirements

Producer will maintain field application records for a minimum of five years and make them available for review at routine inspections by ISDA personnel. These records must include (where applicable):

1. Fertilizer application rates
2. Manure/Compost application rates
3. On each field, keep a record of manure and chemical fertilizer applications, crop information, and soil and manure test results.
4. Fields to which the nutrients are applied
5. Spring soil test for nitrogen (required annually)
   0-12" and 12-24" nitrogen test

Crop Nutrient Requirement	
Crop	**Pounds of P205 per acres**
Alfalfa	86
Potatoes	76
Wheat	60

Manure/Compost field application requirement (tons)							
Acres x crop nutrient requirement ÷ manure p205 value* = Tons required							
Example	Corn - 250(acres)	X	75 (crop requirement)		÷	**16.85**	
Corn	250	X	75**	= 18750	÷ **16.85***	=	**1112.76 tons**

***based on manure test values for P205**
****pounds of p205 required per acre**

Irrigation Management Plan Recommendations

Irrigation water management is very important in nutrient management. If irrigation water is applied at a rate over the crop needs, there is potential for runoff and/or leaching of nutrients. If irrigation water is under-applied, the crop will not have optimal growth conditions. Crop irrigation water requirements changes through the growing season depending on climate conditions and crop Evapotranspiration rate. Proper irrigation water management responds to these crop demands. It is recommended that:

- Irrigation schedules continue to be managed by your irrigation specialist.
- Continual inspection and maintenance of irrigation equipment will prevent unwarranted waste discharges into surface or ground water.

Nutrient Management Plan Recommendations

Land application of manure at agronomic rates, along with irrigation scheduling, is the most effective way to obtain maximum nutrient benefits from manure, condition the soil, and avoid potential water quality problems downstream. Cattle manure is a valuable resource, which will also improve soil properties such as water holding capacity, infiltration, tilth, structure, porosity, and nutrient retention and release. If animal manure and/or commercial fertilizers are not properly managed, contaminants may impact surface and/or groundwater.

Application of manure applied at an agronomic rate is a sustainable practice and is always allowed under ISDA regulations. Regardless of the rate prescribed by this nutrient management plan, soil testing at the 0-12 inch and 12-24 inch soil depths is required for nitrogen management.

- Set realistic crop yield goals in order to provide an accurate account of the plant nitrogen needs.
- Apply N so that it is available during peak plant demand.
- Apply fertilizer to cool season crop in the spring rather than the previous fall. This will prevent fertilizer leaching through the soil profile and provide the crop with the necessary levels of nutrients.
- Use split or multiple fertilizer applications in order to provide the crop with a pre-plant treatment and the needed nutrient levels throughout the growing season until the point of major nutrient uptake.
- Avoid the application of nutrient sources in close proximity to streams, wetlands, drainage ditches, areas of very shallow soils, and sinkholes.

Dobaron Farm

ANALYSIS OF RESOURCE CONCERNS

INTRODUCTION

The purpose of this nutrient management plan is to meet agricultural production goals and to certify that manure and nutrients are properly managed to minimize adverse impact to surface or groundwater. Plans are written in cooperation with the producer to:

1) assure proper containment of animal manure and process waste water

2) assess resource concerns which exist on the property

3) budget nutrient sources to optimize crop water and nutrient needs. Nutrient sources include commercial fertilizers, animal manure, mineralization of previous crop soil organic matter, accounting of residues, and irrigation water.

4) When applicable, assess irrigation water management to minimize movement of nutrients beyond the root zone or with runoff.

If animal manure and/or commercial fertilizers are not properly managed, contaminants may negatively impact surface and/or groundwater. Some water resource contaminants associated with poorly managed animal manure and fertilizers are:

Phosphorus in the soil readily adsorbs to soil particles; thus, erosion of soil by surface runoff is the general mode of phosphorus transport. Even at very low concentrations, phosphorus can result in plant and algae blooms in surface water bodies. Alga blooms are a nuisance to boaters, irrigators, and others. Toxins released by certain algae can be lethal to livestock or other animals that drink the water. Dissolved oxygen in the water is depleted as algae die and decompose, sometimes causing fish kills.

Nitrogen in the form of nitrate (NO_3^-) is highly water-soluble and will move with water, particularly down the soil profile past the root zone if not utilized by plants (thus becoming a groundwater contamination issue).Nitrates are toxic to infants under 6 months, and to livestock at high concentrations. In surface water, excess nitrogen, like phosphorus, can result in nuisance plant and algae growth.

Organic matter in high load decreases dissolved oxygen in a surface water body when it decomposes. Low levels of dissolved oxygen is harmful or even fatal to fish and other aquatic life.

Bacteria and microorganism illnesses (pathogens) potentially transmitted through water by animal manure include Giardia, Typhoid Fever, Cryptosporidium, and Cholera. Pathogens from animal waste can negatively impact surface and groundwater quality.

FACILITY DESCRIPTION

Owner Information

Owner (1):	Grandview Farms
Address:	1304 Hwy 67, Grandview, IDAHO 83624
Phone:	(208) 834-2231 N/A
	(000) 000-0000 N/A

Location

Site Map: Facility site plan illustrated in Figure 1

Soil Conservation District:	Elmore
County:	Elmore
Watershed Basin:	Middle Snake-succor (USGS Hydrologic Unit Code # 17050103)

ANALYSIS OF RESOURCE CONCERNS

Farm Resource Concerns

Dobaron Farm is located in a watershed containing water quality limited stream segments listed according to the Clean Water Act. Stream segments are listed because a water quality parameter prevents the attainment of the "Fishable/Swimmable" goal of the Clean Water Act.

WATERBODY	BOUNDARIES	BACT	CHAN STAB	DO	FLOW ALT	HAB ALT	MET HG	MET	NH3	NUTR	O_G	ORG	PEST	PH	SAL	SED	TDG	TEMP	UNKN	*
Snake River	CJ Strike Res to Castle Creek	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	X

Dobaron Farm is not located in a critical Nitrate-Nitrogen management area. Nitrate Management Areas are designated based upon ground water quality sampling results. Two priority groups exist as follows:

Priority 1 is designated because at least 25% of the ground water sampling locations within the area exceed 5-milligrams/liter nitrate. This is one-half of the maximum contaminant level of 10-milligrams/liter nitrate. This nitrate concentration is considered evidence of significant degradation. Public drinking water systems are required to increase monitoring frequency when this level is reached.

Priority 2 is designated because at least 50% of the ground water sampling locations within the area exceed 2-milligrams/liter nitrate. This concentration threshold provides an indication of human-caused (anthropogenic) impacts. The upper limit for naturally occurring (background) concentrations of nitrate is considered to be about 2 mg/l.

Dobaron Farm is located in a sole source aquifer area - Western Snake River Plain Aquifer.

Field Resource Concerns

- No Resource Concerns -

Depth Limiting Subsurface Features

Field Name	Subsurface Feature	Depth from Surface (in)
Field 1	Cobbles	30
	Fractured Bedrock	8
	Water Table	>72
Field 10	Cobbles	30
	Fractured Bedrock	8
	Water Table	>72
Field 11	Cobbles	30
	Fractured Bedrock	8
	Water Table	>72
Field 12	Cobbles	30
	Fractured Bedrock	8

	Water Table	>72
Field 13	Cobbles	30
	Fractured Bedrock	8
	Water Table	>72
Field 14	Cobbles	30
	Fractured Bedrock	8
	Water Table	>72
Field 2	Cobbles	30
	Fractured Bedrock	8
	Water Table	>72
Field 3	Cobbles	30
	Fractured Bedrock	8
	Water Table	>72
Field 4	Cobbles	30
	Fractured Bedrock	8
	Water Table	>72
Field 5	Cobbles	30
	Fractured Bedrock	8
	Water Table	>72
Field 6	Cobbles	30
	Fractured Bedrock	8
	Water Table	>72
Field 7	Cobbles	30
	Fractured Bedrock	8
	Water Table	>72
Field 8	Cobbles	30
	Fractured Bedrock	8
	Water Table	>72
Field 9	Cobbles	30
	Fractured Bedrock	8
	Water Table	>72

Well Testing Results (See back of page):

Well	Date	Hardness	EC	PH	K	Nitrates	Nitrites	NH3	Na	Carbonate	Bicarbonate
No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data

ISDA REGULATIONS AND THE IDAHO NUTRIENT MANAGEMENT STANDARD

Nutrient management plans for animal agricultural operations regulated by the Idaho State Department of Agriculture (ISDA) must be approved by the Idaho State Department of Agriculture and must follow the Natural Resource Conservation Service (NRCS) Agriculture Waste Management Field Handbook and the Idaho Nutrient Management Standard. ISDA regulation and the Standard use soil test phosphorus as the indicator for environmental impact from agricultural production practices. The Idaho

Nutrient Management Standard is based on a threshold soil test phosphorus level (TH), above which there is no agronomic advantage to application of phosphorus.

The Idaho Nutrient Management Standard categorizes fields as a surface water concern or a groundwater concern. A surface water concern indicates that runoff leaves the contiguous operating unit from normal storm events, rain on snow, frozen ground, or irrigation. The soil phosphorus threshold for a field with a surface water concern is 40 ppm phosphorus for soils alkaline (ph > 6) tested with the Olsen method and 60 ppm phosphorus for acidic (ph < 6.5) soils tested with the Bray method (0-12"Soil Sample Depth).

A groundwater resource concern indicates that runoff does not leave the contiguous operating unit from normal storm events, rain on snow, frozen ground, or irrigation. There are two sub-categories for fields identified as having a groundwater concern. The first category applies to fields with a resource concern within the first five feet of the soil profile. A resource concern could be shallow soils, gravel, cobble, bedrock, high groundwater table, or a drained field. These fields are indicated as a groundwater concern <5'. The soil phosphorus threshold for a field with a groundwater concern <5' is 20 ppm phosphorus for soils tested with the Olsen method and 25 ppm phosphorus for soils tested with the Bray method(18-24" Soil Sample Depth).

If a field is not classified as having a surface water concern or a groundwater <5' concern, by default it is classified as having a groundwater concern >5'. The soil phosphorus threshold for a field with a groundwater concern >5' is 30 ppm phosphorus for soils tested with the Olsen method and 45 ppm phosphorus for soils tested with the Bray method(18-24" Soil Sample Depth).

Field Phosphorus Threshold

Field	Resource Concern	P Threshold (ppm)	P Threshold Soil Test Depth
Field 1	Groundwater < 5'	20	18 - 24"
Field 10	Groundwater < 5'	20	18 - 24"
Field 11	Groundwater < 5'	20	18 - 24"
Field 12	Groundwater < 5'	20	18 - 24"
Field 13	Groundwater < 5'	20	18 - 24"
Field 14	Groundwater < 5'	20	18 - 24"
Field 2	Groundwater < 5'	20	18 - 24"
Field 3	Groundwater < 5'	20	18 - 24"
Field 4	Groundwater < 5'	20	18 - 24"
Field 5	Groundwater < 5'	20	18 - 24"
Field 6	Groundwater < 5'	20	18 - 24"
Field 7	Groundwater < 5'	20	18 - 24"
Field 8	Groundwater < 5'	20	18 - 24"
Field 9	Groundwater < 5'	20	18 - 24"

Farm Location

Idaho Transverse Mercator

Coordinates of the farm center (meters): X = 2336457.73451102, Y = 1316545.93961292

Map Scale: 1 : 189

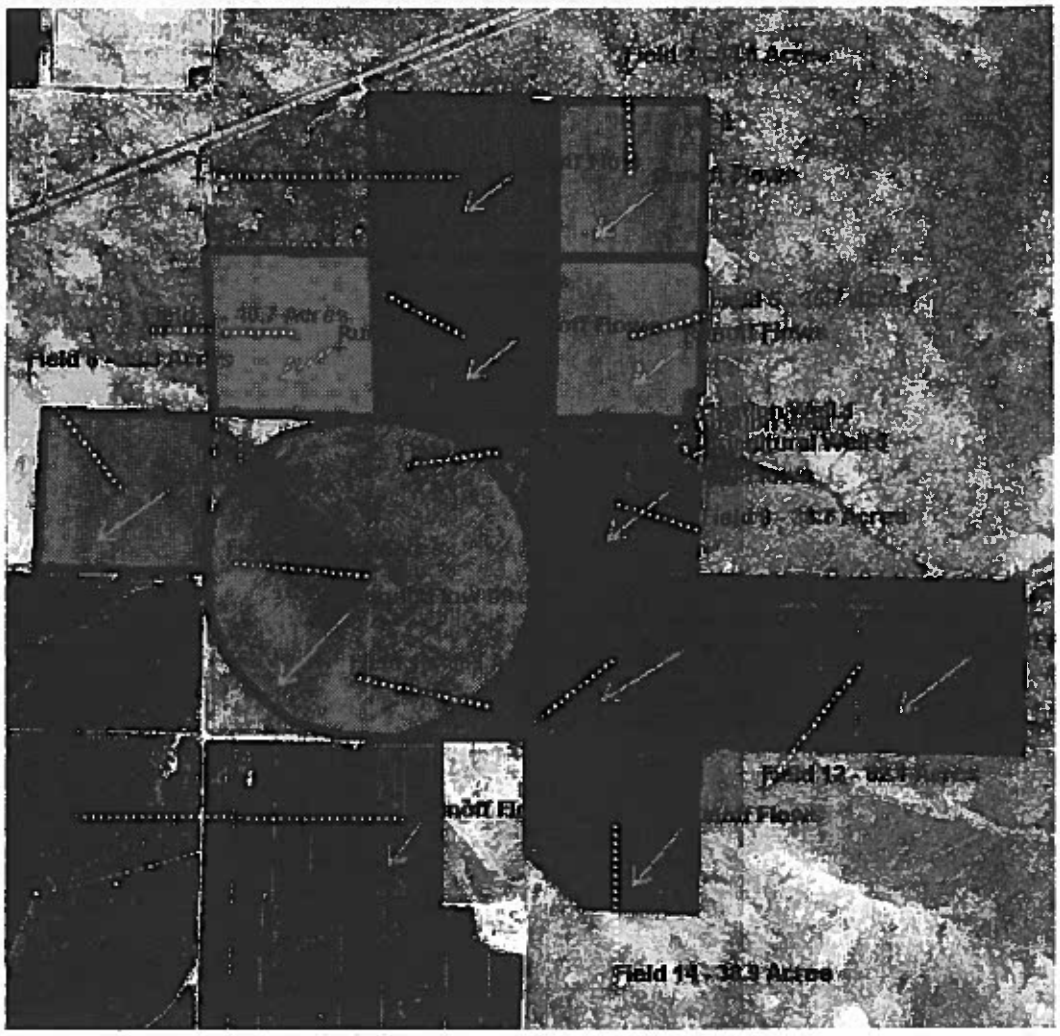


Figure 1. Base Map

Farm Location

Idaho Transverse Mercator

Coordinates of the farm center (meters): X = 2336457.73451102, Y = 1316545.93961292

Map Scale: 1 : 75

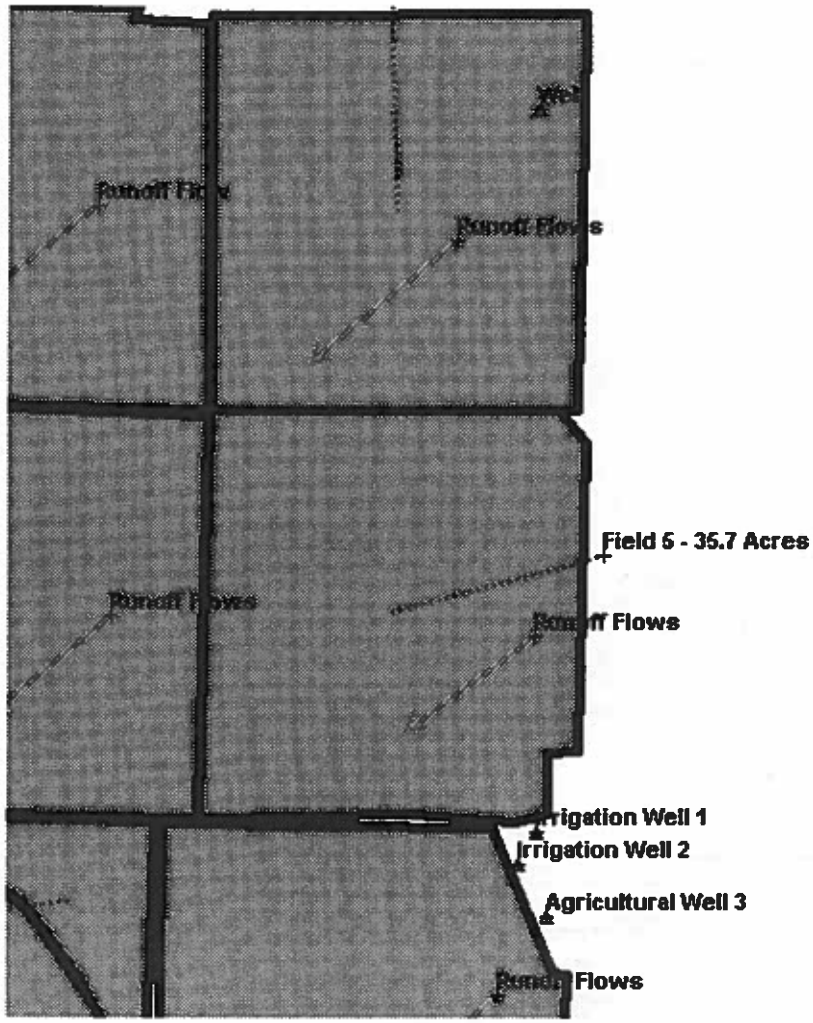


Figure 2. Farmstead Map

NUTRIENT MANAGEMENT REQUIREMENTS/RECOMMENDATIONS

Manure Application Rate Requirement By Year

FIELD: Field 1

Name	Man App		Imported Nutrients	Mineralization		Total	
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	Y		5 T/ac				
		N	54	N	0	N	54
		P	77			P	77
		K	297			K	297
Wheat-Winter, Irrigated South ID(2005)	Y		5 T/ac				
		N	54	N	129	N	183
		P	77			P	77
		K	297			K	297
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2006)	Y		5 T/ac				
		N	54	N	-8	N	46
		P	77			P	77
		K	297			K	297
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2007)	Y		5 T/ac				
		N	54	N	30	N	84
		P	77			P	77
		K	297			K	297

FIELD: Field 10

Name	Man App		Imported Nutrients	Mineralization		Total	
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	Y		5 T/ac				
		N	54	N	0	N	54
		P	77			P	77
		K	297			K	297
Wheat-Winter, Irrigated South ID(2005)	Y		5 T/ac				
		N	54	N	129	N	183
		P	77			P	77
		K	297			K	297
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2006)	Y		5 T/ac				
		N	54	N	-8	N	46
		P	77			P	77
		K	297			K	297
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2007)	Y		5 T/ac				
		N	54	N	30	N	84
		P	77			P	77
		K	297			K	297

FIELD: Field 11

Name	Man App		Imported Nutrients	Mineralization		Total	
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	Y		5 T/ac				
		N	57	N	0	N	57
		P	82			P	82
		K	316			K	316
Potatoes(2005)	Y		5 T/ac				
		N	57	N	97	N	154
		P	82			P	82
		K	316			K	316
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2006)	Y		5 T/ac				
		N	57	N	32	N	89
		P	82			P	82
		K	316			K	316
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2007)	Y		5 T/ac				
		N	57	N	32	N	89
		P	82			P	82
		K	316			K	316

FIELD: Field 12

Name	Man App		Imported Nutrients	Mineralization		Total	
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	Y		5 T/ac				
		N	57	N	0	N	57
		P	82			P	82
		K	315			K	315
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2005)	Y		5 T/ac				
		N	57	N	32	N	89
		P	82			P	82
		K	315			K	315
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2006)	Y		5 T/ac				
		N	57	N	32	N	89
		P	82			P	82
		K	315			K	315
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2007)	Y		5 T/ac				
		N	57	N	32	N	89
		P	82			P	82
		K	315			K	315

FIELD: Field 13

Name	Man App		Imported Nutrients	Mineralization		Total	
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	Y		5 T/ac				
		N	57	N	0	N	57
		P	82			P	82
		K	316			K	316
Potatoes(2005)	Y		5 T/ac				

		N	57	N	97	N	154
		P	82			P	82
		K	316			K	316
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2006)	Y		5 T/ac				
		N	57	N	32	N	89
		P	82			P	82
		K	316			K	316
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2007)	Y		5 T/ac				
		N	57	N	32	N	89
		P	82			P	82
		K	316			K	316

FIELD: Field 14

Name	Man App		Imported Nutrients	Mineralization		Total	
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	Y		5 T/ac				
		N	57	N	0	N	57
		P	82			P	82
		K	316			K	316
Potatoes(2005)	Y		5 T/ac				
		N	57	N	97	N	154
		P	82			P	82
		K	316			K	316
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2006)	Y		5 T/ac				
		N	57	N	32	N	89
		P	82			P	82
		K	316			K	316
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2007)	Y		5 T/ac				
		N	57	N	32	N	89
		P	82			P	82
		K	316			K	316

FIELD: Field 2

Name	Man App		Imported Nutrients	Mineralization		Total	
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	Y		5 T/ac				
		N	54	N	0	N	54
		P	77			P	77
		K	297			K	297
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2005)	Y		5 T/ac				
		N	54	N	30	N	84
		P	77			P	77
		K	297			K	297
Wheat-Winter, Irrigated South ID(2006)	Y		5 T/ac				
		N	54	N	75	N	129
		P	77			P	77
		K	297			K	297

Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2007)	Y		5 T/ac				
		N	54	N	30	N	84
		P	77			P	77
		K	297			K	297

FIELD: Field 3

Name	Man App		Imported Nutrients	Mineralization		Total	
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	Y		5 T/ac				
		N	54	N	0	N	54
		P	77			P	77
		K	297			K	297
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2005)	Y		5 T/ac				
		N	54	N	30	N	84
		P	77			P	77
		K	297			K	297
Wheat-Winter, Irrigated South ID(2006)	Y		5 T/ac				
		N	54	N	75	N	129
		P	77			P	77
		K	297			K	297
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2007)	Y		5 T/ac				
		N	54	N	30	N	84
		P	77			P	77
		K	297			K	297

FIELD: Field 4

Name	Man App		Imported Nutrients	Mineralization		Total	
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	Y		5 T/ac				
		N	54	N	0	N	54
		P	77			P	77
		K	297			K	297
Wheat-Winter, Irrigated South ID(2005)	Y		5 T/ac				
		N	54	N	129	N	183
		P	77			P	77
		K	297			K	297
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2006)	Y		5 T/ac				
		N	54	N	-8	N	46
		P	77			P	77
		K	297			K	297
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2007)	Y		5 T/ac				
		N	54	N	30	N	84
		P	77			P	77
		K	297			K	297

FIELD: Field 5

Name	Man App		Imported Nutrients	Mineralization		Total	
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	Y		5 T/ac				
		N	59	N	0	N	59
		P	86			P	86
		K	330			K	330
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2005)	Y		5 T/ac				
		N	59	N	33	N	92
		P	86			P	86
		K	330			K	330
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2006)	Y		5 T/ac				
		N	59	N	33	N	92
		P	86			P	86
		K	330			K	330
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2007)	Y		5 T/ac				
		N	59	N	33	N	92
		P	86			P	86
		K	330			K	330

FIELD: Field 6

Name	Man App		Imported Nutrients	Mineralization		Total	
Wheat-Winter, Irrigated South ID(2004)	Y		5 T/ac				
		N	54	N	45	N	99
		P	77			P	77
		K	297			K	297
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2005)	Y		5 T/ac				
		N	54	N	-8	N	46
		P	77			P	77
		K	297			K	297
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2006)	Y		5 T/ac				
		N	54	N	30	N	84
		P	77			P	77
		K	297			K	297
Wheat-Winter, Irrigated South ID(2007)	Y		5 T/ac				
		N	54	N	75	N	129
		P	77			P	77
		K	297			K	297

FIELD: Field 7

Name	Man App		Imported Nutrients	Mineralization		Total	
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	Y		5 T/ac				
		N	54	N	0	N	54
		P	77			P	77
		K	297			K	297
Wheat-Winter, Irrigated South ID(2005)	Y		5 T/ac				

		N	54	N	129	N	183
		P	77			P	77
		K	297			K	297
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2006)	Y		5 T/ac				
		N	54	N	-8	N	46
		P	77			P	77
		K	297			K	297
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2007)	Y		5 T/ac				
		N	54	N	30	N	84
		P	77			P	77
		K	297			K	297

FIELD: Field 8

Name	Man App		Imported Nutrients	Mineralization		Total	
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	Y		5 T/ac				
		N	54	N	0	N	54
		P	77			P	77
		K	297			K	297
Wheat-Winter, Irrigated South ID(2005)	Y		5 T/ac				
		N	54	N	129	N	183
		P	77			P	77
		K	297			K	297
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2006)	Y		5 T/ac				
		N	54	N	-8	N	46
		P	77			P	77
		K	297			K	297
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2007)	Y		5 T/ac				
		N	54	N	30	N	84
		P	77			P	77
		K	297			K	297

FIELD: Field 9

Name	Man App		Imported Nutrients	Mineralization		Total	
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	Y		5 T/ac				
		N	59	N	0	N	59
		P	86			P	86
		K	330			K	330
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2005)	Y		5 T/ac				
		N	59	N	33	N	92
		P	86			P	86
		K	330			K	330
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2006)	Y		5 T/ac				
		N	59	N	33	N	92
		P	86			P	86
		K	330			K	330

Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2007)	Y		5 T/ac				
		N	59	N	33	N	92
		P	86			P	86
		K	330			K	330

Minimum Acres Required for Manure Application

Manure Group	Acres
Imported Nutrients	524

The acreage in the table is based on an average crop uptake of 100 lbs P_2O_5 per acre. These acreage numbers are for estimating export acreage needed. Wastewater application should begin with the first irrigation of the season and end with the last irrigation of the season. Rates should be designed to supply uniform application. When applying wastewater outside of the irrigation window you must contact the Department of Agriculture, Division of Animal Industries.

Hydraulic Balance

Field	Date
Field 1	March 15
Field 10	March 15
Field 11	March 15
Field 12	March 15
Field 13	March 15
Field 14	March 15
Field 2	March 15
Field 3	March 15
Field 4	March 15
Field 5	March 15
Field 6	March 15
Field 7	March 15
Field 8	March 15
Field 9	March 15

0.5" of wastewater may be applied to fields after the hydraulic balance date to remain in compliance with this nutrient management plan.

Spring Soil Test

Spring soils tests must be taken every year from every field to determine a commercial fertilization rate. If commercial fertilizer isn't applied (for a perennial crop), spring soil samples are not required. If you do not apply commercial fertilizer, a complete soil analysis will need to be conducted initially to determine the nutrient baseline.

Record Keeping For each field keep a record of annual manure and chemical fertilizer applications. Include nutrient source, date, time, rate and application method.

ANNUAL NUTRIENT BUDGET

The following crop nutrient budget is based on soil test data and cropping information. It is for one year for the following field and specified crop information:

Nutrient Budget Summary

Field: Field 1 **Crop:** Wheat-Winter, Irrigated South ID **Yield:** 110

	N	P205	K20
Crop Nutrient Requirement	220	60	41
Nutrients From Soil	?		
from Mineralized Nitrogen	45		
from Prior Crops	54		
from Prior Bio-Nutrients	30		
from Irrigation Water	0		0
Nutrient Balance from above	92.2	60.5	41.2
Imported Nutrients	54	77	297
Estimated Remaining Nutrients Required	38	-17	-256
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	38	-17	-256

Unacceptable Rate: May be a resource risk.
Acceptable: Sustainable agronomic rate.

Field: Field 10 **Crop:** Wheat-Winter, Irrigated South ID **Yield:** 110

	N	P205	K20
Crop Nutrient Requirement	220	60	41
Nutrients From Soil	?		
from Mineralized Nitrogen	45		
from Prior Crops	54		
from Prior Bio-Nutrients	30		
from Irrigation Water	0		0
Nutrient Balance from above	92.2	60.5	41.2
Imported Nutrients	54	77	297
Estimated Remaining Nutrients Required	38	-17	-256
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	38	-17	-256

Unacceptable Rate: May be a resource risk.
Acceptable: Sustainable agronomic rate.

Field: Field 11 **Crop:** Potatoes **Yield:** 550

	N	P205	K20
Crop Nutrient Requirement	330	76	343
Nutrients From Soil	?		
from Mineralized Nitrogen	0		

from Prior Crops	65		
from Prior Bio-Nutrients	32		
from Irrigation Water	0		0
Nutrient Balance from above	234.3	75.6	343.2
Imported Nutrients	57	82	316
Estimated Remaining Nutrients Required	177	-6	27
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	177	-6	27

Unacceptable Rate: May be a resource risk.
Acceptable: Sustainable agronomic rate.

Field: Field 12 **Crop:** Alfalfa Hay, Irrigated South ID-Cut Mid Bloom **Yield:** 7.5

	N	P205	K20
Crop Nutrient Requirement	364	86	351
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	0		
from Prior Bio-Nutrients	32		
from Irrigation Water	0		0
Nutrient Balance from above	334	85.9	351
Imported Nutrients	57	82	315
Estimated Remaining Nutrients Required	277	4	36
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	277	4	36

Acceptable: Sustainable agronomic rate.

Field: Field 13 **Crop:** Potatoes **Yield:** 550

	N	P205	K20
Crop Nutrient Requirement	330	76	343
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	65		
from Prior Bio-Nutrients	32		
from Irrigation Water	0		0
Nutrient Balance from above	234.3	75.6	343.2
Imported Nutrients	57	82	316
Estimated Remaining Nutrients Required	177	-6	27
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	177	-6	27

Unacceptable Rate: May be a resource risk.
Acceptable: Sustainable agronomic rate.

Field: Field 14 **Crop:** Potatoes **Yield:** 550

	N	P205	K20

Crop Nutrient Requirement	330	76	343
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	65		
from Prior Bio-Nutrients	32		
from Irrigation Water	0		0
Nutrient Balance from above	234.3	75.6	343.2
Imported Nutrients	57	82	316
Estimated Remaining Nutrients Required	177	-6	27
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	177	-6	27

Unacceptable Rate: May be a resource risk.
Acceptable: Sustainable agronomic rate.

Field: Field 2 **Crop:** Alfalfa Hay, Irrigated South ID-Cut Mid Bloom **Yield:** 7.5

	N	P205	K20
Crop Nutrient Requirement	364	86	351
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	0		
from Prior Bio-Nutrients	30		
from Irrigation Water	0		0
Nutrient Balance from above	335.7	85.9	351
Imported Nutrients	54	77	297
Estimated Remaining Nutrients Required	282	9	54
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	282	9	54

Acceptable: Sustainable agronomic rate.

Field: Field 3 **Crop:** Alfalfa Hay, Irrigated South ID-Cut Mid Bloom **Yield:** 7.5

	N	P205	K20
Crop Nutrient Requirement	364	86	351
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	0		
from Prior Bio-Nutrients	30		
from Irrigation Water	0		0
Nutrient Balance from above	335.7	85.9	351
Imported Nutrients	54	77	297
Estimated Remaining Nutrients Required	282	9	54
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	282	9	54

Acceptable: Sustainable agronomic rate.

Field: Field 4 **Crop:** Wheat-Winter, Irrigated South ID **Yield:** 110

	N	P205	K20
Crop Nutrient Requirement	220	60	41
Nutrients From Soil	?		
from Mineralized Nitrogen	45		
from Prior Crops	54		
from Prior Bio-Nutrients	30		
from Irrigation Water	0		0
Nutrient Balance from above	92.2	60.5	41.2
Imported Nutrients	54	77	297
Estimated Remaining Nutrients Required	38	-17	-256
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	38	-17	-256

Unacceptable Rate: May be a resource risk.
Acceptable: Sustainable agronomic rate.

Field: Field 5 **Crop:** Alfalfa Hay, Irrigated South ID-Cut Mid Bloom **Yield:** 7.5

	N	P205	K20
Crop Nutrient Requirement	364	86	351
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	0		
from Prior Bio-Nutrients	33		
from Irrigation Water	0		0
Nutrient Balance from above	332.5	85.9	351
Imported Nutrients	59	86	330
Estimated Remaining Nutrients Required	273	0	22
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	273	0	22

Acceptable: Sustainable agronomic rate.

Field: Field 6 **Crop:** Alfalfa Hay, Irrigated South ID-Cut Mid Bloom **Yield:** 7.5

	N	P205	K20
Crop Nutrient Requirement	364	86	351
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	-38		
from Prior Bio-Nutrients	30		
from Irrigation Water	0		0
Nutrient Balance from above	373.7	85.9	351
Imported Nutrients	54	77	297
Estimated Remaining Nutrients Required	320	9	54
Commercial Fertilizer Application	0	0	0

Final Nutrient Balance	320	9	54

Acceptable: Sustainable agronomic rate.

Field: Field 7 **Crop:** Wheat-Winter, Irrigated South ID **Yield:** 110

	N	P205	K20
Crop Nutrient Requirement	220	60	41
Nutrients From Soil	?		
from Mineralized Nitrogen	45		
from Prior Crops	54		
from Prior Bio-Nutrients	30		
from Irrigation Water	0		0
Nutrient Balance from above	92.2	60.5	41.2
Imported Nutrients	54	77	297
Estimated Remaining Nutrients Required	38	-17	-256
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	38	-17	-256

Unacceptable Rate: May be a resource risk.
Acceptable: Sustainable agronomic rate.

Field: Field 8 **Crop:** Wheat-Winter, Irrigated South ID **Yield:** 110

	N	P205	K20
Crop Nutrient Requirement	220	60	41
Nutrients From Soil	?		
from Mineralized Nitrogen	45		
from Prior Crops	54		
from Prior Bio-Nutrients	30		
from Irrigation Water	0		0
Nutrient Balance from above	92.2	60.5	41.2
Imported Nutrients	54	77	297
Estimated Remaining Nutrients Required	38	-17	-256
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	38	-17	-256

Unacceptable Rate: May be a resource risk.
Acceptable: Sustainable agronomic rate.

Field: Field 9 **Crop:** Alfalfa Hay, Irrigated South ID-Cut Mid Bloom **Yield:** 7.5

	N	P205	K20
Crop Nutrient Requirement	364	86	351
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	0		
from Prior Bio-Nutrients	33		
from Irrigation Water	0		0
Nutrient Balance from above	332.5	85.9	351

Imported Nutrients	59	86	330
Estimated Remaining Nutrients Required	273	0	22
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	273	0	22

Acceptable: Sustainable agronomic rate.

BIO-NUTRIENT EXPORT INFO

Exported Bio-Nutrient Summary					
Bio-Nutrient Group Name	**Amount**	**Consumer**	**Consumer's Address**	**Telephone**	**Acres**
No Data	No Data	No Data	No Data	No Data	No Data

Appendix B: NUTRIENT RISK ANALYSIS

Phosphorus Runoff Risk Assessment

FIELD: Field 1
Overall Risk Rating: Very High
Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 77.4

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating:

Manure Application Method: N/A

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: Field 10

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 0-12"

Idaho Nutrient Management Standard Threshold: 40

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 77.4

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific

Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: N/A

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff N/A Rating: Very High

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Very High

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices on-field and off-field that reduce or eliminate runoff and erosion.

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: Field 11

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 82.4

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: N/A

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: Field 12

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 82

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: N/A

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: Field 13

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 82.4

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: N/A

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: Field 14

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 82.4

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil

P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: N/A

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: Field 2

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 77.4

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: N/A

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: Field 3

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 77.4

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: N/A

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: Field 4
Overall Risk Rating: Very High
Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 77.4

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating:

Manure Application Method: N/A

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: Field 5

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 85.9

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: Surface applied no incorporation

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: Field 6

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 77.4

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: N/A

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: Field 7

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 77.4

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating:

Manure Application Method: N/A

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or

sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: Field 8
Overall Risk Rating: Very High
Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 0-12"

Idaho Nutrient Management Standard Threshold: 40

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 77.4

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: N/A

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff N/A Rating: Very High

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Very High

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices on-field and off-field that reduce or eliminate runoff and erosion.

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: Field 9

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 85.9

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: Surface applied no incorporation

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

Nutrient Leaching Risk Assessment

FIELD: Field 1

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very Low or N.A.

Comments: Good apparent irrigation water management, but if crop requirements are not being met crop yields may suffer from a water shortage. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: Field 10

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating:

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: No Data

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: No Data

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: No Data

Soil/Water Table Depth Rating: Medium

Comments: No Data

FIELD: Field 11

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very Low or N.A.

Comments: Good apparent irrigation water management, but if crop requirements are not being met crop yields may suffer from a water shortage. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: Field 12

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very Low or N.A.

Comments: Good apparent irrigation water management, but if crop requirements are not being met crop yields may suffer from a water shortage. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: Field 13
Overall Risk Rating: Low
Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very Low or N.A.

Comments: Good apparent irrigation water management, but if crop requirements are not being met crop yields may suffer from a water shortage. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: Field 14
Overall Risk Rating: Low
Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very Low or N.A.

Comments: Good apparent irrigation water management, but if crop requirements are not being met crop yields may suffer from a water shortage. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: Field 2

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very Low or N.A.

Comments: Good apparent irrigation water management, but if crop requirements are not being met crop yields may suffer from a water shortage. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: Field 3
Overall Risk Rating: Low
Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very Low or N.A.

Comments: Good apparent irrigation water management, but if crop requirements are not being met crop yields may suffer from a water shortage. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: Field 4
Overall Risk Rating: Low
Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very Low or N.A.

Comments: Good apparent irrigation water management, but if crop requirements are not being met crop yields may suffer from a water shortage. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: Field 5

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very Low or N.A.

Comments: Good apparent irrigation water management, but if crop requirements are not being met crop yields may suffer from a water shortage. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: Field 6
Overall Risk Rating: Low
Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very Low or N.A.

Comments: Good apparent irrigation water management, but if crop requirements are not being met crop yields may suffer from a water shortage. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: Field 7
Overall Risk Rating: Low
Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very Low or N.A.

Comments: No Data

Soil/Water Table Depth Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: Field 8

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating:

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: No Data

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: No Data

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: No Data

Soil/Water Table Depth Rating: Medium

Comments: No Data

FIELD: Field 9

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very Low or N.A.

Comments: Good apparent irrigation water management, but if crop requirements are not being met crop yields may suffer from a water shortage. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

NUTRIENT RISK ANALYSIS Legend

BMP	Definition	Purpose
Buffer Strip	Contour buffer strips are strips of perennial grass alternated with wider cultivated strips that are farmed on the contour.	Contour buffer strips slow runoff water and trap sediment. Consequently, soil erosion is generally reduced significantly by this practice. Sediments, nutrients, pesticides, and other potential pollutants are filtered out as water flows through the grass strips. The grass strips also provide food and cover for wildlife.
Channel Vegetation	Establishing and maintaining adequate plants on channel banks, berms, spoil, and associated areas.	To stabilize channel banks and adjacent areas and reduce erosion and sedimentation. To maintain or enhance the quality of the environment, including visual aspects and fish and wildlife habitat.
Chiseling and Sub soiling	Loosening the soil, without inverting and with a minimum of mixing of the surface soil, to shatter restrictive layers below normal plow depth that inhibit water movement or root development.	To improve water and root penetration and aeration.
Composting Facility	A composting facility is installed for biological stabilization of waste organic material.	The purpose of this practice is to biologically treat waste organic material and produce humus-like material that can be recycled as a soil amendment or organic fertilizer. The material may also be used by other acceptable methods of recycling that comply with laws, rules and regulations.
Conservation Cover	This practice involves establishing and maintaining a protective cover	This practice reduces soil erosion, associated sedimentation, improves

	of perennial vegetation on land retired from agriculture production.	water quality, and creates or enhances wildlife habitat.
Conservation Cropping Sequence	Growing crops in a recurring sequence on the same field.	This practice may be applied as part of a best management practice to support one or more of the following: Reduce sheet and rill erosion, Reduce irrigation induced erosion, Reduce soil erosion from wind, Maintain or improve soil organic matter content, Manage deficient or excess plant nutrients, Improve water use efficiency, Manage saline seeps, Manage plant pests (weeds, insects, diseases), Provide food for domestic livestock, and Provide food and cover for wildlife.
Contour Farming	Farming sloping land in such a way that preparing land, planting, and cultivating are done on the contours. (This includes following established grades of terraces or diversion.)	To reduce erosion and control water.
Cover and Green Manure Crop	A crop of close-growing, legumes, or small grain grown primarily for seasonal protection and soil improvement. It usually is grown for 1 year or less, except where there is permanent cover as in orchards.	To control erosion during periods when the major crops do not furnish adequate cover; add organic material to the soil; and improve infiltration, aeration, and tilth.
Critical Area Planting	Planting vegetation on critically eroding areas that require extraordinary treatment.	This practice is used on highly erodible areas that cannot be stabilized by ordinary planting techniques and if left untreated may cause severe erosion or sediment damage. Examples of critical areas include the following: 1) Dams, dikes, levees, and other construction sites with very steep slopes, 2) Mine spoil and surface mined land with poor quality soil

		and possibly chemical problems, and 3) Agriculture land with severe gullies requiring specialized planting techniques and management.
Dike or Berm	An embankment constructed of earth or other suitable materials to protect land against overflow or to regulate water.	Dikes are used to: Permit improvement of agricultural land by preventing overflow and better use of drainage facilities, Prevent damage to land and property, Facilitate water storage and control in connection with wildlife and other developments, and Protect natural areas, scenic features and archeological sites from damage.
Diversion	A channel constructed across the slope with a supporting ridge on the lower side.	To divert excess water from one area for use or safe disposal in other areas.
Drip Irrigation	A planned irrigation system in which all necessary facilities are installed for efficiently applying water directly to the root zone of plants by means of applicators (orifices, emitters, porous tubing, perforated pipe) operated under low pressure. The applicators can be placed on or below the surface of the ground.	To efficiently apply water directly to the plant root zone to maintain soil moisture within the range for good plant growth and without excessive water loss, erosion, reduction in water quality, or salt accumulation.
Filter Strip	A strip or area of vegetation for removing pollutants water.	A filter strip reduces pollution by filtration, deposition, infiltration, absorption, adsorption, decomposition, and volatilization of sediment, organic matter, and other pollutants from runoff and waste water.
Fish Stream Improvement	Fish Stream Improvement is improving a stream channel to make or enhance fish habitat.	The purpose of the practice is to increase production of desired species of fish. The practice involves improving food supplies, shelter, spawning areas, water quality, and other elements of fish habitat.

Grade Stabilization Construction	A structure used to control the grade and head cutting in natural or artificial channels.	These structures are to: Stabilize the grade and control erosion in natural or artificial channels, prevent the formation or advance of gullies, enhance environmental quality, and reduce pollution hazards.
Grassed Waterway	A natural or constructed channel that is shaped or graded to required dimensions and established in suitable vegetation for the stable conveyance of runoff.	Grassed waterways convey runoff from terraces, diversions, or other water concentrations without causing erosion or flooding and to improve water quality.
Grazing Land Mechanical Treatment	Modifying physical soil and/or plant conditions with mechanical tools by treatments such as; pitting, contour furrowing, and ripping or sub-soiling.	This practice should be applied as part of a best management practice to support one or more of the following purposes: Fracture compacted soil layers and improve soil permeability, Reduce water runoff and increase infiltration, Break up sod bound conditions and thatch to increase plant vigor, and Renovate and stimulate plant community for greater productivity and yield.
Heavy Use Area Protection	Protecting heavily used areas by establishing vegetative cover, by surfacing with suitable materials, or by installing needed structures.	To stabilize urban, recreation, or facility areas frequently and intensely used by people, animals, or vehicles.
Irrigation Land Leveling	Reshaping the surface of land to be irrigated to planned grades.	To permit uniform and efficient application of irrigation water without causing erosion, loss of water quality, or damage to land by water logging and at the same time to provide for adequate surface drainage.
Irrigation Water Management	Irrigation water management is the process of determining and controlling the volume, frequency,	Irrigation water management is applied as part of a conservation management system to support one

	and application rate of irrigation water in a planned, efficient manner.	or more of the following: Manage soil Moisture to promote desired crop response; Optimize use of available water supplies; Minimize irrigation induced soil erosion; Decrease non-point source pollution of surface and groundwater resources; Manage salts in the crop root zone; Manage air, soil, or plant micro-climate.
Mulching	Applying plant residues or other suitable materials not produced on the site to the soil surface.	To conserve moisture; prevent surface compaction or crusting; reduce runoff and erosion; control weeds; and help establish plant cover.
Polyacrylamide (PAM)	Polyacrylamide is an organic polymer formulated to stabilize soil when applied in irrigation water.	Water applied with PAM stabilizes soil aggregates which can then resist the erosive forces of water. If correctly applied, PAM will produce clear runoff water and residue erosion within the field by over 90 percent.
Prescribed Grazing	Prescribed grazing is the controlled harvest of vegetation with grazing animals, managed with the intent to achieve a specific objective.	Application of this practice will manipulate the intensity, frequency, duration, and season of grazing to: 1) Improve water infiltration, 2) maintain or improve riparian and upland area vegetation, 3) protect stream banks from erosion, 4) manage for deposition of fecal material away from water bodies, and 5) promote ecological and economically stable plant communities which meet landowner objectives.
Residue Management (Conservation Tillage)	Managing the amount, orientation, and distribution of crop and other plant residue on the soil surface.	This practice may be applied as part of a conservation system to support one or more of the following: Reduce sheet and rill erosion. Reduce wind erosion. Maintain or improve soil organic matter content and tilth. Conserve

		soil moisture. Manage snow to increase plant available moisture. Provide food and escape cover for wildlife.
Riparian Forest Buffer	A riparian forest buffer is an area of trees and/or shrubs located adjacent to a body of water. The vegetation extends outward from the water body for a specified distance necessary to provide a minimum level of protection and/or enhancement.	The riparian forest buffer is a multi-purpose practice design to accomplish one or more of the following: Create shade to lower water temperatures and improve habitat for aquatic animals, Provide a source of debris necessary for healthy robust populations of aquatic organisms and wildlife, and Act as a buffer to filter out sediment, organic material, fertilizer, pesticides and other pollutants that may adversely impact the water body, including shallow ground water.
Sediment Basin	A basin constructed to collect and store debris or sediment.	A sediment basin may have the following uses: Preserve the capacity of reservoirs, ditches, canals, diversion, waterways, and streams, Prevent undesirable deposition on bottom lands and developed areas, Trap sediment originating from construction sites, and Reduce or abate pollution by providing basins for deposition and storage of silt, sand, gravel, stone, agricultural wastes, and other detritus.
Sprinkler System	A planned irrigation system in which all necessary facilities are installed for efficiently applying water by means of perforated pipes or nozzles operated under pressure.	To efficiently and uniformly apply irrigation water to maintain adequate soil moisture for optimum plant growth without causing excessive water loss, erosion, or reduced water quality.
Stream Channel Stabilization	Stabilizing the channel of a stream with suitable structures.	To control aggradations or degradation in a stream channel.

Stream bank Protection	Using vegetation or structures to stabilize and protect banks of streams, lakes, estuaries, or excavated channels against scour and erosion.	To stabilize or protect banks of streams, lakes, estuaries, or excavated channels for one or more of the following purposes: Prevent the loss of land or damage to utilities, roads, buildings, or other facilities adjacent to the banks, Maintain the capacity of the channel, Control channel meander that would adversely affect downstream facilities, Reduce sediment loads causing downstream damages and pollution, and Improve the stream for recreation or as a habitat for fish and wildlife.
Strip-cropping, Contour	Growing crops in a systematic arrangement of strips or bands on the contour to reduce water erosion. The crops are arranged so that a strip of grass or close-growing crop is alternated with a strip of clean-tilled crop or fallow or a strip of grass is alternated with a close-growing crop.	To reduce sheet and rill erosion and/or to reduce transport of sediment and other water-borne contaminants.
Strip-cropping, Field	Growing crops in a systematic arrangement of strips or bands across the general slope (not on the contour) to reduce water erosion. The crops are arranged so that a strip of grass or a close-growing crop is alternated with a clean-tilled crop or fallow.	To help control erosion and runoff on sloping cropland where contour strip-cropping is not practical.
Subsurface Drains	A Subsurface Drain is a conduit, such as corrugated plastic tubing, tile, or pipe, installed beneath the ground surface to collect and/or convey drainage water.	The purpose of a subsurface drain is to: Improve the environment for vegetation, Reduce erosion, Improve water quality, Collect ground water for beneficial use, Remove water from heavy use areas such as recreation areas, or around buildings, and Regulate water to control health hazards caused by pests.

Surge Irrigation	Surge irrigation is the intermittent application of water to furrows, corrugates, or borders creating a series of on and off periods of constant or variable time spans.	Surge allows a lighter application of water with a higher efficiency. The result is less deep percolation of water at the upper end of the field and a more uniform application.
Tailwater Recovery & Pumpback System	A facility to collect, store, and transport irrigation tailwater for reuse in a farm irrigation distribution system.	To conserve farm irrigation water supplies and water quality by collecting the water that runs off the field surface for reuse on the farm.
Terraces	An earth embankment, a channel, or a combination ridge and channel constructed across the slope.	Reduce slope length, reduce sediment content in runoff water, reduce erosion, Improve water quality, intercept and conduct surface runoff at a non-erosive velocity to a stable outlet, retain runoff for moisture conservation, prevent gully development, reform the land surface, improve farmability, and reduce flooding.
Use Exclusion	Excluding animals, people or vehicles from an area.	To protect, maintain, or improve the quantity and quality of the plant, animal, soil, air, water, and aesthetics resources and human health and safety.
Water and Sediment Control Basin	An earth embankment or a combination ridge and channel generally constructed across the slope and minor watercourses to form a sediment trap and water detention basin.	To improve farmability of sloping land, reduce watercourse and gully erosion, trap sediment, reduce and manage onsite and downstream runoff, and improve downstream water quality.
Watering Facility	A device (tank, trough, or other watertight container) for providing animal access to water.	To provide watering facilities for livestock and/or wildlife at selected locations in order to: 1) protect and enhance vegetative cover through proper distribution of grazing; 2) provide erosion control through better grassland management; or 3) protect streams, ponds and water

		supplies from contamination by providing alternative access to water.
Wetland Development/Restoration	The construction or restoration of a wetland facility to provide the hydrological and biological benefits of a wetland.	To develop or restore hydric soil conditions, hydrologic conditions, hydrophytic plant communities, and wetland functions.

Appendix C: CROP SPECIFIC GUIDELINES

Alfalfa Hay, Irrigated South ID-Cut Mid Bloom

NITROGEN

Nitrogen (N) fertilizer is generally not needed for alfalfa since a healthy alfalfa stand is capable of fixing adequate levels of N. Responses to applied N usually indicate the alfalfa stand is not effectively nodulated due to lack of proper seed inoculation at planting, or that the stand is aging.

Soils containing 20 to 30 pounds (4 to 7.5 ppm) of nitrate-nitrogen (NO3-N) in the top 12 inches have sufficient N to establish a stand of alfalfa seeded alone. Adding fertilizer N at establishment reduces nodule number and nodule activity.

Establishing alfalfa with a companion crop is not recommended because the alfalfa stand typically is reduced by the excessive competition from the companion plantings. When growers plant alfalfa with a companion crop, both crops compete for the N. Under these conditions, N rates of 30 to 40 pounds per acre are suggested to establish alfalfa stands.

PHOSPHORUS

Alfalfa responds well to applied phosphorus (P). The need for P fertilization can be determined by a soil test. Phosphorus materials should be broadcast and incorporated into the seedbed before planting. For best results, P fertilizers should be applied on established stands in the fall. The University of Idaho recommended application should be sufficient for 2 years of production.

POTASSIUM

Alfalfa has a high potassium (K) requirement. Recommended K fertilization levels are determined by soil test. Broadcast and incorporate K at establishment or apply in the fall or early spring on established stands.

SULFUR

Mountain valleys and foothill areas that receive higher amounts of precipitation and/or that are irrigated with low sulfur-containing water are likely areas for sulfur (S) deficiency. Areas irrigated with water from the Snake River or any water containing the sulfate (SO4) form of sulfur should have an adequate amount of S.

Alfalfa and other legumes require more S than grasses. Plant tissue testing is an excellent tool for detecting S-deficient alfalfa. Samples should be analyzed for total N and total S. These values are used to calculated the nitrogen/sulfur ratio, which should be less than 15. When the ratio is greater than 15, an S deficiency is suspected.

Soils testing less than 8 ppm SO4-S for 0- to 12-inch soil depth should receive 40 pounds S per acre. This rate of application should provide adequate sulfur for 2 years of production. Many southern Idaho soils contain accumulated S below the 12-inch depth. Although the 0- to 12-inch soil zone may be low in S (8 ppm), the soil below 12 inches may supply enough S for alfalfa production. Thus, testing the soil at both 0- to 12- and 12- to 24-inch depths is advised for good S recommendation.

Fertilizer S sources include gypsum (CaS04) and elemental sulfur. S is also included in some N, P and K fertilizer materials. Elemental S must be biologically converted to the S04 form to be used by the plant. The rate of conversion depends on soil temperature, soil water content and particle size of the elemental S applied. To correct a S deficiency, the year of application use a fertilizer containing S04 as the readily available S source. Elemental S can be used to provide long term S release.

MICRONUTRIENTS

Zinc (Zn) deficiencies on alfalfa have not been observed in Idaho. Crops such as beans, corn, potatoes,

and onions would normally exhibit Zn deficiency before alfalfa. Zinc applied to any of those crops would have sufficient residual for alfalfa.

BORON

Alfalfa is sensitive to low soil boron (B). Boron deficiencies have been observed in southern Idaho, but they are not widespread. Deficiencies normally occur on acidic soils (pH less than 7.0) and droughty (gravelly and sandy) soils. If the soil tests less than 0.25 ppm B, apply 1 to 3 pounds per acre of B. Do not use higher rates because B in excessive amounts is toxic to plants.

GENERAL COMMENTS

Complete information on cultural practices necessary for alfalfa production is contained in University of Idaho Current Information Series 144, "Producing maximum Yields of Irrigated Alfalfa hay."

Irrigation, weeds, and insects can influence the effectiveness of a fertilizer application.

Alfalfa fields in southern Idaho frequently become yellow during the regrowth of the second and third crop. These fields have not responded to applications of fertilizer to correct this temporary yellowing condition.

Alfalfa can become a cash crop in the rotation by the application of needed management inputs such as water, fertilizer and pesticides and by timely harvesting. Alfalfa quality is enhanced by cutting at the early bud stage and more frequently during the growing season. This practice will reduce stand life, however.

Alfalfa hay should be analyzed to determine P content. Phosphorus is important for animal nutrition and can greatly influence animal performance and animal health. Fertilization can increase P content of forage.

Applications of S have been shown to reduce alfalfa selenium (Se) concentrations on soils low in available Se. Levels of Se above 0.1 ppm in the dry forage are considered adequate to prevent white muscle disease and other disorders related to limited Se forage.

Potatoes

NITROGEN

Nitrogen rates depend upon some of the following factors: previous crop, past fertilizer use, soil type and leaching hazard and realistic yield goal for the grower and the area.

Most Idaho potato fields will respond to fertilizer nitrogen (N). The N rate used, along with other management factors, particularly irrigation, can have a marked effect on the yield and quality of the potato crop.

TOTAL N REQUIREMENTS BASED ON POTENTIAL YIELD

Fertilizer N rates should be used which correspond to the yield growers can reasonably expect under their soil and management conditions. The historical potato yield obtained by a grower in a specific field or area generally provides a fair approximation of yield potential given a grower's traditional crop management. Projected changes in crop management (i.e. improved variety, better disease and weed control) designed to appreciably increase production may require adjustment of yield potential upward. Research has shown that the available N required to produce a good potato yield depends on a variety of crop management practices. Factors such as weed, insect and disease control as well as irrigation, planting date and soil type can influence the N required by potatoes for maximum yield.

AVAILABLE NITROGEN

Available N in the soil includes mineralizable N (released from organic matter during the growing season) inorganic N as nitrate (N03-N) and ammonium (NH4-N), and N credits from previous cropping or manures. Each component of available N must be estimated for accurate determination of optimum

fertilizer N rates.

MINERALIZABLE NITROGEN - Soils vary in their capacity to release N from organic matter during the growing season. The amount of N released depends on such factors as soil type, soil moisture, soil temperature, previous crop, and the history of fertilizer N applied. While soil organic matter content is frequently used to estimate annual mineralizable N contributions, in southern Idaho irrigated soils organic matter does not accurately predict the amount of N that is mineralized.

INORGANIC NITROGEN - Residual soil inorganic N (N03, NH4) can be evaluated most effectively with a soil test. Soil samples should be collected in foot increments to a depth of two feet, unless roots are restricted by dense soil layers or high water tables. Ammonium is generally low in preplant soil samples and thus contributes little to available N. However, it can be as high or higher than N03-N. NH4-N should be determined along with N03-N, especially when there is reason to expect the presence of appreciable NH4-N, such as recent ammonium N fertilizer applications. Soil samples should be collected before seeding in the spring to represent the area to be fertilized.

NITROGEN FROM PREVIOUS CROP RESIDUES - Nitrogen associated with decomposition of previous crop residues should also be considered when estimating available N. Residues that require additional N for decomposition include cereal straw and mature corn stalks. Research has shown that 15 pounds of additional N are needed per ton of straw returned to the soil, up to a maximum of 50 pounds. For more information on compensating for cereal residues, refer to CIS 825, "Wheat Straw Management and Nitrogen Fertilizer Requirements."

Row crop residues (potatoes, sugar beets, onions) generally do not require additional N for decomposition. Consequently, these residues have little effect on the N needs of potatoes.

Legume residues from beans, peas, and alfalfa can release appreciable N during the following crop season that may not be reflected by the preplant soil test. This N is derived from the decomposition of both plant tops and nodulated root systems.

NITROGEN FROM MANURES - Soils in which potatoes are grown rarely receive animal manures or lagoon wastes. Nutrient contributions from these sources should also be taken into consideration when estimating available N for the next season. Manures can preclude the need for any fertilizer, depending on the rate applied and their nutrient composition.

Manures can vary appreciably depending on the animal, how the manure is processed, and the kind and extent of bedding material. For the most accurate estimate of fertilizer equivalent values, the manure should be analyzed for its nutrient content.

IRRIGATION WATER - Irrigation waters derived from deep wells are generally low in N. More shallow wells can have significant levels of nitrogen because of leaching of nitrogen from impacts from commercial fertilizer use, animal waste, and improperly functioning septic systems. Irrigation waters from most districts are also low in N when diverted from its source. Background levels of N from original sources are generally about 2 parts per million (ppm). The more return flow included in diverted water sources, the higher the N content. Return flows may include N dissolved when irrigation waters pass through fields high in residual or recently added fertilizer N as well as from soluble fertilizer N applied with the irrigation water.

Most irrigation districts should know the N content of the water they divert. Contact them for this information to determine the levels of N added with your irrigation water. However, since irrigation water N levels are influenced by upstream management, if you use irrigation water that receives runoff after it is diverted, only a water test can accurately evaluate the N added with irrigation waters.

For each ppm or milligrams per liter (mg/L) of N reported in the water sample, multiply by 2.7 to get the N added per acre foot of water applied. For example, if the water sample contained 10 ppm of N, 3 acre feet of water applied would be the equivalent of 81 pounds of N per acre. Typically, of the water applied with furrow irrigation only 50 percent is retained on the field and the rest runs off the end. The net retention of N applied with furrow irrigation would, therefore, be about half of the water applied or about 40 pounds per acre in this example. If more or less of the irrigation water is retained with each wetting, then growers should adjust the water N contribution accordingly.

Excessive irrigation by any method reduces N availability to potatoes. Additional N may be needed under these conditions. Growers should not use aqua or anhydrous N through a sprinkler irrigation system.

Water running soluble N sources with a furrow irrigation system can be an effective means of adding N. Two limitations of this practice are that (1) the application of the N with this method may not be as uniform as desired and (2) runoff containing the N may contaminate downstream surface waters. Growers can minimize the loss of N by shutting off the injection unit before the irrigation water reaches the end of the furrow. This practice should not substitute for careful consideration of N needs while N can be side dressed.

CALCULATION OF N APPLICATION RATES

To calculate the fertilizer N application rate, the following equation is used:

Fertilizer application rate (deficit) or Over application of Nitrogen =
(Total N required to produce a given yield) - (Mineralizable N) - (Inorganic N measured by the soil test) - (previous crop/residue management) - (Manure Nitrogen) -(Irrigation Water)

TIMING OF NITROGEN APPLICATION

Nitrogen fertilizer recommendations are for Russet Burbank potatoes grown on sandy loam soils. Adjustments are made for very sandy soils (add 30 lb N/acre) and silt loam soils (subtract 40 lb N/acre) to account for differences in nitrogen mineralization rates and nitrogen use efficiency. To maximize yield and quality, growers should aim to have about 40 to 45% of their total N supply applied by row closure. Nitrogen applications made during tuber bulking should be guided by petiole sampling to maintain at least 15,000 ppm N03-N in the fourth petiole from the growing tip.

Excess levels of soil N at or before tuberization can delay tuber growth, reduce yields and lower tuber specific gravity. Excess N in late summer and fall can delay maturity of the tubers. This delayed tuber maturity can adversely affect tuber storability and quality.

The N needs of the potato crop are best met by split-application of N fertilizer. This involves applying lower rates of N fertilizer preplant and at planting, with the remainder of the crop's N needs applied with the irrigation water. Some cropping systems - for example, furrow irrigation - make it difficult to apply N fertilizer and get efficient plant uptake. Under these conditions most of the crop N needs are applied to the soil before planting.

Nitrogen applied with irrigation water is an effective way to supplement the crop during the growing season. Do not use aqua or anhydrous ammonia in sprinkler system applications. Applications through a sprinkler system are not folar fertilization.

PHOSPHORUS

Potato plants need phosphorus (P) for plant growth and will respond to P fertilizer if the soil test concentration is low. Phosphorus soil test for potatoes is based on an extraction with sodium bicarbonate. Soil samples for a phosphorus soil test should be taken from 0- to 12-inch depths. This depth of sampling is critical to achieve an accurate soil test P level. Deviation in sampling depth from the 12-inch depth may drastically alter soil test results.

Phosphorus is immobile in soil and therefore does not move from where it is placed. Applied P fertilizer must be mixed into the seedbed before planting for best results. Banding P fertilizer along side plants has not been as effective as P fertilizer that has been broadcast and incorporated. Eroded or scraped areas, commonly referred to as "white soil" areas, may be low in available P because of its high content of "free lime." These areas should be tested and fertilized separately. To compensate for low P availability when free lime is present in the soil, rates of P are increased with increasing levels of free lime. Total phosphorus concentrations should be kept above 0.22% in the fourth petiole during tuber bulking.

POTASSIUM

Potatoes require high levels of available potassium (K). Potassium is relatively immobile in the soil. For best results, K fertilizers should be applied preplant and mixed into the seedbed. Banding beside the plants has been used successfully but is not as effective as K fertilizer which has been broadcast and incorporated.

Potassium fertilizer applications reduce specific gravity of harvested tubers. Potassium chloride fertilizer (KCl or muriate of potash) lowers specific gravity of tubers more than potassium sulfate fertilizer (K2SO4 or sulfate of potash). Growers should avoid over-fertilization of potatoes with K fertilizers. When specific gravity of tubers is important, potassium sulfate is the preferred K fertilizer source. Total potassium concentrations should be kept above 7.0% in the fourth petiole during tuber bulking.

SULFUR

Potatoes generally do not respond to sulfur (S) fertilization. Sulfur response is most likely to occur in sandy soils and in areas where irrigation water sources are low in S. Water low in S includes mountain streams and some well waters. The more irrigation return-flow in the water source the greater the amount of dissolved, plant-available sulfate (S04) form. Elemental sulfur is not recommended because it is not immediately available to plants. Elemental sulfur will require several months from time of application until it is converted to plant-available form.

MICRONUTRIENTS

"Shotgun" application of micronutrients - I.e. complete mixes containing boron (B), copper (Cu), iron (Fe), manganese (Mn) and zinc (Zn) - "for insurance" are not recommended since these elements have not been shown to give an economical response. Soil tests for individual micronutrients are available and concentrations in the 0- to 1-inch soil sample are: B = 0.5 ppm, Cu = 0.2 ppm, Fe = 4.0 ppm, Mn = 2.0 ppm, Zn = 0.5 ppm. Critical concentrations represent values below which a response from the application of that micronutrient may be obtained.

Zinc deficiencies have not been widespread on potatoes although some crops in certain areas of southern Idaho do show a Zn deficiency. When the soil test for Zn is below the critical concentration or where land leveling or erosion has exposed white subsoil containing free lime, apply Zn fertilizer at a rate which will supply 10 pounds of Zn per acre or equivalent. This amount of Zn should be sufficient for 4 to 6 years of crop production.

GENERAL COMMENTS

The P, K, and Zn nutritional status of the plant should also be monitored during the growing season. The same petiole sample used for N03-N concentrations can also be used for this purpose. Guidelines for adequate concentrations of these and other nutrients in the petiole can be obtained from your county agricultural Extension agent, consultant, or fieldman.

Fertilizer materials containing P, K and Zn should be thoroughly incorporated into the root zone. These materials can be effectively applied in the fall.

Wheat-Winter, Irrigated South ID

NITROGEN

Adequate nitrogen is necessary for maximum production of irrigated wheat. Nitrogen represents, by far, the largest share of fertilizer costs for wheat in Idaho. The amount of nitrogen required depends on many factors which influence total wheat production and quality. Both yield potential and available nitrogen (N03 = NH4) should be considered when determining N fertilizer rates.

TOTAL N REQUIREMENTS BASED ON POTENTIAL YIELD

Fertilizer N rates should be used which correspond to the yield growers can reasonably expect under their soil and management conditions. The historical wheat yield obtained by a grower in a specific field or area generally provides a fair approximation of yield potential given a grower's traditional crop management. Projected changes in crop management (i.e. improved variety, better disease and weed control) designed to appreciably increase production may require adjustment of yield potential upward. Research has shown that the available N required to produce a bushel of irrigated wheat depends on a variety of crop management practices. Factors such as weed, insect and disease control as well as irrigation, planting date and soil type can influence the N required by wheat for maximum yield. The results of irrigated field trials in the Boise and Magic valleys suggest as a rule that 2 pounds available N per bushel of wheat is required for maximum production up to 120 bushels per acre. Above 120 bushels per acre, the factor is somewhat less than two.

AVAILABLE NITROGEN

Available N in the soil includes mineralizable N (released from organic matter during the growing season) inorganic N as nitrate (N03-N) and ammonium (NH4-N), and N credits from previous cropping or manures. Each component of available N must be estimated for accurate determination of optimum fertilizer N rates.

MINERALIZABLE NITROGEN - Soils vary in their capacity to release N from organic matter during the growing season. The amount of N released depends on such factors as soil type, soil moisture, soil temperature, previous crop, and the history of fertilizer N applied. While soil organic matter content is frequently used to estimate annual mineralizable N contributions, in southern Idaho irrigated soils organic matter does not accurately predict the amount of N that is mineralized.

INORGANIC NITROGEN - Residual soil inorganic N (N03, NH4) can be evaluated most effectively with a soil test. Soil samples should be collected in foot increments to a depth of two feet, unless roots are restricted by dense soil layers or high water tables. Ammonium is generally low in preplant soil samples and thus contributes little to available N. However, it can be as high or higher than N03-N. NH4-N should be determined along with N03-N, especially when there is reason to expect the presence of appreciable NH4-N, such as recent ammonium N fertilizer applications.

A preplant soil sample is often only collected from the first foot of soil. Although this information is not as complete and reliable as would be provided by deeper sampling, residual N measurements from the first foot of soil can be combined with estimates of residual N in the second foot to predict N requirements for irrigated winter wheat. For fall planted winter cereals in western Idaho, preplant soil test N03-N in the second foot of the soil is commonly only one-half to two-thirds as high as in the first foot of soil. However, this estimate may not be accurate after potatoes or other sprinkler irrigated crops, especially in coarser textured soils. Basing N rate recommendations on estimates of residual N in the second foot increases the risk of recommending either too little or too much N.

NITROGEN FROM PREVIOUS CROP RESIDUES - Nitrogen associated with decomposition of previous crop residues should also be considered when estimating available N. Residues that require additional N for decomposition include cereal straw and mature corn stalks. Research has shown that 15 pounds of additional N are needed per ton of straw returned to the soil, up to a maximum of 50 pounds. For more information on compensating for cereal residues, refer to CIS 825, "Wheat Straw Management and Nitrogen Fertilizer Requirements."

Row crop residues (potatoes, sugar beets, onions) generally do not require additional N for decomposition. Consequently, these residues have little effect on the N needs of winter wheat. Legume residues from beans, peas, and alfalfa can release appreciable N during the following crop season that may not be reflected by the preplant soil test. This N is derived from the decomposition of both plant tops and nodulated root systems.

NITROGEN FROM MANURES - Soils in which winter wheat is grown occasionally receive animal manures or lagoon wastes. Nutrient contributions from these sources should also be taken into consideration when estimating available N for the next season. Manures can preclude the need for any

fertilizer, depending on the rate applied and their nutrient composition.

Manures can vary appreciable depending on the animal, how the manure is processed, and the kind and extent of bedding material. For the most accurate estimate of fertilizer equivalent values, the manure should be analyzed for its nutrient content.

IRRIGATION WATER - Irrigation waters derived from deep wells are generally low in N. More shallow wells can have significant levels of nitrogen because of leaching of nitrogen from impacts from commercial fertilizer use, animal waste, and improperly functioning septic systems. Irrigation waters from most districts are also low in N when diverted from its source. Background levels of N from original sources are generally about 2 parts per million (ppm). The more return flow included in diverted water sources, the higher the N content. Return flows may include N dissolved when irrigation waters pass through fields high in residual or recently added fertilizer N as well as from soluble fertilizer N applied with the irrigation water.

Most irrigation districts should know the N content of the water they divert. Contact them for this information to determine the levels of N added with your irrigation water. However, since irrigation water N levels are influenced by upstream management, if you use irrigation water that receives runoff after it is diverted, only a water test can accurately evaluate the N added with irrigation waters.

For each ppm or milligrams per liter (mg/L) of N reported in the water sample, multiply by 2.7 to get the N added per acre foot of water applied. For example, if the water sample contained 10 ppm of N, 3 acre feet of water applied would be the equivalent of 81 pounds of N per acre. Typically, of the water applied with furrow irrigation only 50 percent is retained on the field and the rest runs off the end. The net retention of N applied with furrow irrigation would, therefore, be about half of the water applied or about 40 pounds per acre in this example. If more or less of the irrigation water is retained with each wetting, then growers should adjust the water N contribution accordingly.

Excessive irrigation by any method reduces N availability to winter wheat. Additional N may be needed under these conditions. Growers should not use aqua or anhydrous N through a sprinkler irrigation system.

Water running soluble N sources with a furrow irrigation system can be an effective means of adding N. Two limitations of this practice are that (1) the application of the N with this method may not be as uniform as desired and (2) runoff containing the N may contaminate downstream surface waters. Growers can minimize the loss of N by shutting off the injection unit before the irrigation water reaches the end of the furrow. This practice should not substitute for careful consideration of N needs while N can be side dressed.

CALCULATION OF N APPLICATION RATES

To calculate the fertilizer N application rate, the following equation is used:

Fertilizer application rate (deficit) or Over application of Nitrogen =
(Total N required to produce a given yield) - (Mineralizable N) - (Inorganic N measured by the soil test) - (previous crop/residue management) - (Manure Nitrogen) - Irrigation Water

TIMING OF NITROGEN APPLICATION

Excessive irrigation or heavy winter precipitation can result in leaching of nitrate N beyond the root systems. This hazard exists on all soils, but particularly on coarse textured soils such as sands, and sandy loams. Fall pre-plant N was once thought to be as good or preferable to spring top dressed N in calcareous silt loam or clay soils in areas of low rainfall. However, even under these conditions, southern Idaho research has shown than N applied in late winter or early spring is frequently used more effectively than early fall preplant applied N.

Nitrogen fertilizers containing ammonium (ammonium sulfate, anhydrous or aqua ammonia, or urea) are less subject to leaching losses when lower soil temperatures (less than 40 F) inhibit the microbial

conversion of ammonium to nitrate. Lower temperatures also reduce the microbial activity that is responsible for the immobilization of applied N. Late fall, split, or spring applied N is also recommended when residues from previous grain or mature corn crops are returned to the soil in early fall.

Early spring N applications are more effective for increasing grain protein for irrigated hard red winter wheat. Nitrogen applied after the boot stage will contribute more to grain protein than to yield. Most wheat varieties respond in a similar way to N. However, varieties differ in their tolerance of high N rates. High N contributes to lodging of varieties with poor straw strength.

PHOSPHORUS (P)

Wheat requires little phosphorus compared to the P requirements of other crops although minimum soil levels are necessary for maximum production. Adequate P is especially necessary for winter hardiness. Soil tests can indicate whether soils require phosphorus fertilization for maximum wheat production. Soil samples are taken from the 0- to 12-inch depth.

Broadcast plow down, broadcasts seedbed incorporation or drill banding low rates of P with seed are effective methods of application. Drill banding may reduce the fertilizer P required. Drill banding high rates of P, especially ammonium phosphate fertilizers, can cause seedling damage. For more detailed discussion of banding, refer to PNW 283, "Fertilizer Band Location for Cereal Root Access."

POTASSIUM (K)

Wheat has a lower requirement for K compared to sugar beets, corn or potatoes. Soil tests can be useful indicators of the need for K. Potassium should be incorporated during seedbed preparation.

SULFUR (S)

Sulfur requirements for wheat will vary depending on soil texture, previously incorporated crop residues, leaching losses, S content of irrigation water and S soil test. Wheat irrigated with Snake River water should not experience S shortages. Soils low in S (less than 10 ppm S04-S in the plow layer or 8 ppm in the 0- to 12-inch depth) should receive 20 to 40 pounds of S per acre.

Sulfur deficiency appears as a general yellowing of the plant early in the season and looks much like N deficiency. Plant analysis can be a useful means of differentiating between the two deficiencies. An N to S ratio of 17 in whole plant tissues is generally used for diagnosing sulfur deficient wheat. Sulfur deficient wheat has also been known to contain high nitrate nitrogen (N03-N) concentrations.

MICRONUTRIENTS

Micronutrients have not been shown to be limiting wheat production and "shotgun" application of micronutrient mixtures containing boron, manganese, iron and copper "for insurance" have not been shown to be responsive and are not suggested.

GENERAL COMMENTS

Avoid a heavy first irrigation on spring cereals to prevent water logging, reduced tillering and N leaching.

The above fertilizer guidelines are based on relationships established between University of Idaho soil test and crop yield response research. In this research, crop response to fertilizers was evaluated at several sites where the response to fertilizer differed. The recommendations reflect the general or overall response to fertilizers at specific soil test values and the response in individual fields can differ appreciably from the general table recommendation. Some sites will require less than the general recommendation, other sites more. Unfortunately, the science has not developed to the point where the table recommendations can account for all the unknown variables influencing the effectiveness of

applied fertilizers at individual sites. The table fertilizer recommendations can only be used as general guides rather than specific recommendations for each and every field.

Furthermore, soil variability can sharply reduce the accuracy composite soil test values for individual fields. That is why large contiguous areas within fields should be sampled separately when they are known to differ in crop growth or soil characteristics known to influence the response to fertilizer. But soil variability frequently does not occur conveniently in large areas that can be sampled separately or fertilized differently. The fertilizer recommendations in most cases do not account for this variability. Soil test based recommendations may be excessive in some field areas and inadequate in other areas of the same field. The recommendations then will be appropriate only to the degree that the composite soil test values for fields actually represent the field. Thus, for fields that are highly variable, the fertilizer recommendations should be considered conservative estimates of fertilizers needed. All the more reason to consider the table fertilizer recommendations as general guides rather than specific recommendations for each and every field.

The fertilizer rates suggested in the tables will support above average yields if other factors are not limiting production. Therefore the recommendations assume that good crop management practices will be used, i.e. insect, disease, and weed control. Nutrient requirements can be met using either commercial fertilizers or equivalent organic matter sources, such as manure or compost, provided their nutrient content and relative availability are known or can be estimated from published literature. Soil test based recommended rates will not be appropriate if the soil samples are improperly taken or do not represent the area to be fertilized. For nitrogen in particular, recommendations will be most accurate when crop history is taken into account and projected yields are reasonable estimates based on long term records.

General Comments:

- Over irrigation and nutrient loss is a hazard. Optimum irrigation management is necessary to meet crop water use needs and avoid loss of nutrients through leaching beyond the root zone and runoff with irrigation tail water.
- Nitrogen leaching is particularly a concern on sandy soils. Optimum management may require split Nitrogen applications to meet crop needs.
- Weed, insect, and disease control significantly influence the efficiency and effectiveness of your fertilizer applications and ultimately crop yield and farm profitability.
- Phosphorus, potassium, and zinc nutrients can be effectively fall-applied as they are not readily leached over winter.
- Phosphorus can be budgeted for a crop rotation.
- If you have questions regarding the interpretation of this information, please contact your Extension Agricultural agent, Crop consultant, or your commodity company fieldman.
- Both farm profitability and water quality can be improved with efficient nutrient use. The following are recommendations in nutrient management, which will optimize nutrient use for crop production while protecting water quality:

1) Avoid the application of nutrient sources in close proximity to streams, wetlands, drainage ditches, areas of very shallow soils, and sinkholes.

2) Accurately calibrate nutrient application equipment to insure that recommended rates are applied.

3) Nitrogen recommendations for many crops are based on yield goals for the crops. It is important to establish realistic yield goals for each field based upon historical yield data, county averages,

and your management practices to avoid unnecessary fertilizer costs and minimize potential water quality impairments.

Appendix D: SOIL TEST DATA

Field: No Data **Date of Test:** No Data

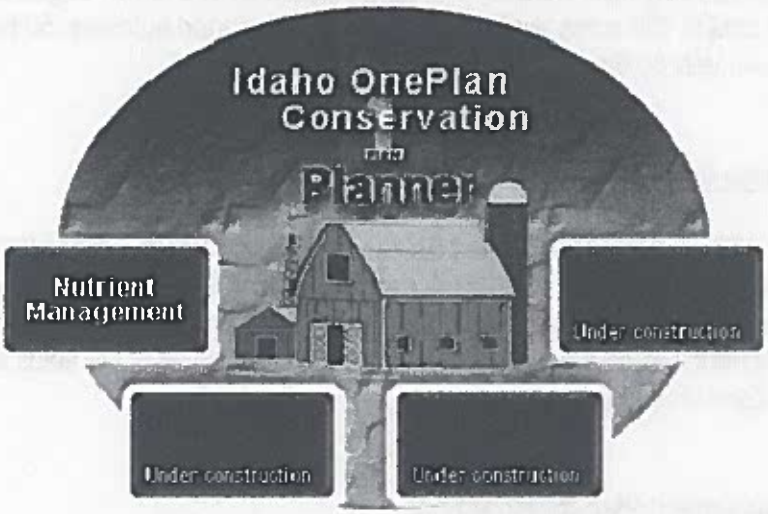
Parameter	Units	0-12"	12-24"	18-24"
Soil Texture		No Data	No Data	
EC	mmhos	No Data	No Data	
PH		No Data	No Data	
%Lime	%	No Data	No Data	
OM	%	No Data	No Data	
CEC	meq	No Data	No Data	
Nitrate-N	ppm	No Data	No Data	
Ammonia-N	ppm	No Data	No Data	
P	ppm	No Data	No Data	No Data
K	ppm	No Data	No Data	
Z	ppm	No Data	No Data	
Mn	ppm	No Data	No Data	
Fe	ppm	No Data	No Data	
Cu	ppm	No Data	No Data	
Ca	ppm	No Data	No Data	
Mg	ppm	No Data	No Data	
Na	ppm	No Data	No Data	

Grandview Gilbert Farm

Nutrient Management Plan

Agriculture . . .

Launching into the Future



Nutrient Management Plan Prepared For:
Grandview Farms
(208) 834-2231
Gilbert Farm

Certified Planner:
Michael Mitchell
Professional Engineer, EAC Engineering, Inc
(559) 381-0607

Producer Signature: _____ Certificated Planner Signature: _____

Date Completed: 10-02-07

The information provided by those using the "Idaho OnePlan" shall be deemed to be trade secrets, production records, or other proprietary information and shall be kept confidential and shall be exempt from enclosure pursuant to section 9-340D, Idaho Code. (Title 22 Chapter 27 17D6)

4

GILBERT FARM
Producer Summary

Farm Summary

Gilbert Farm is located 2 miles northeast of Grandview Idaho. The farm is owned by Grandview Farms and operated by Mike Usabel. The farm consists of one furrow irrigated field, and one pasture for a total of 183 acres available for accepting imported nutrients. 50 head of pasture cattle spend approximately 30 days each year on the pasture.

Farm Resource Concerns

Gilbert Farm is located in the watershed Basin of the Middle Snake Succor (#17050103). The facility is found at 116W 04'37" 43N 01'04". using GPS Coordinates The primary resource concern for Gilbert Farm is ground water quality. One canal runs near field 18 however field is bermed to prevent runoff from leaving the area. Solid waste is applied to all of the fields and incorporated within seven days of application.

Nutrient Management Plan Requirements

Producer will maintain field application records for a minimum of five years and make them available for review at routine inspections by ISDA personnel. These records must include (where applicable):

1. Fertilizer application rates
2. Manure/Compost application rates
3. On each field, keep a record of manure and chemical fertilizer applications, crop information, and soil and manure test results.
4. Fields to which the nutrients are applied
5. Spring soil test for nitrogen (required annually)
   0-12" and 12-24" nitrogen test

Crop Nutrient Requirement	
Crop	**Pounds of P205 per acres**
Corn	79
Pasture	73

Manure/Compost field application requirement (tons)
Acres x crop nutrient requirement ÷ manure p205 value* = Tons required

Example	Corn - 250(acres)	X	75 (crop requirement)		÷ 16.85		
Hay	250	X	86**	= 21500	÷ 16.85*	=	1276 tons

*based on manure test values for P205
**pounds of p205 required per acre

Irrigation Management Plan Recommendations

Irrigation water management is very important in nutrient management. If irrigation water is applied at a rate over the crop needs, there is potential for runoff and/or leaching of nutrients. If irrigation water is under-applied, the crop will not have optimal growth conditions. Crop irrigation water requirements changes through the growing season depending on climate conditions and crop Evapotranspiration rate. Proper irrigation water management responds to these crop demands. It is recommended that:

- Irrigation schedules continue to be managed by your irrigation specialist.
- Continual inspection and maintenance of irrigation equipment will prevent unwarranted waste discharges into surface or ground water.

Nutrient Management Plan Recommendations

Land application of manure at agronomic rates, along with irrigation scheduling, is the most effective way to obtain maximum nutrient benefits from manure, condition the soil, and avoid potential water quality problems downstream. Cattle manure is a valuable resource, which will also improve soil properties such as water holding capacity, infiltration, tilth, structure, porosity, and nutrient retention and release. If animal manure and/or commercial fertilizers are not properly managed, contaminants may impact surface and/or groundwater.

Application of manure applied at an agronomic rate is a sustainable practice and is always allowed under ISDA regulations. Regardless of the rate prescribed by this nutrient management plan, soil testing at the 0-12 inch and 12-24 inch soil depths is required for nitrogen management.

- Set realistic crop yield goals in order to provide an accurate account of the plant nitrogen needs.
- Apply N so that it is available during peak plant demand.
- Apply fertilizer to cool season crop in the spring rather than the previous fall. This will prevent fertilizer leaching through the soil profile and provide the crop with the necessary levels of nutrients.
- Use split or multiple fertilizer applications in order to provide the crop with a pre-plant treatment and the needed nutrient levels throughout the growing season until the point of major nutrient uptake.
- Avoid the application of nutrient sources in close proximity to streams, wetlands, drainage ditches, areas of very shallow soils, and sinkholes.

Grandview Gilbert
ANALYSIS OF RESOURCE CONCERNS

INTRODUCTION

The purpose of this nutrient management plan is to meet agricultural production goals and to certify that manure and nutrients are properly managed to minimize adverse impact to surface or groundwater. Plans are written in cooperation with the producer to:

1) assure proper containment of animal manure and process waste water

2) assess resource concerns which exist on the property

3) budget nutrient sources to optimize crop water and nutrient needs. Nutrient sources include commercial fertilizers, animal manure, mineralization of previous crop soil organic matter, accounting of residues, and irrigation water.

4) When applicable, assess irrigation water management to minimize movement of nutrients beyond the root zone or with runoff.

If animal manure and/or commercial fertilizers are not properly managed, contaminants may negatively impact surface and/or groundwater. Some water resource contaminants associated with poorly managed animal manure and fertilizers are:

Phosphorus in the soil readily adsorbs to soil particles; thus, erosion of soil by surface runoff is the general mode of phosphorus transport. Even at very low concentrations, phosphorus can result in plant and algae blooms in surface water bodies. Alga blooms are a nuisance to boaters, irrigators, and others. Toxins released by certain algae can be lethal to livestock or other animals that drink the water. Dissolved oxygen in the water is depleted as algae die and decompose, sometimes causing fish kills.

Nitrogen in the form of nitrate (NO_3^-) is highly water-soluble and will move with water, particularly down the soil profile past the root zone if not utilized by plants (thus becoming a groundwater contamination issue).Nitrates are toxic to infants under 6 months, and to livestock at high concentrations. In surface water, excess nitrogen, like phosphorus, can result in nuisance plant and algae growth.

Organic matter in high load decreases dissolved oxygen in a surface water body when it decomposes. Low levels of dissolved oxygen is harmful or even fatal to fish and other aquatic life.

Bacteria and microorganism illnesses (pathogens) potentially transmitted through water by animal manure include Giardia, Typhoid Fever, Cryptosporidium, and Cholera. Pathogens from animal waste can negatively impact surface and groundwater quality.

FACILITY DESCRIPTION

Owner Information

Owner (1): Grandview Farms

Address: 1304 Hwy 67 , Grandview, ID 83624
Phone: (208) 834-2231 N/A
N/A

Location

Site Map: Facility site plan illustrated in Figure 1

Soil Conservation District:	Elmore
County:	Elmore
Watershed Basin:	Middle Snake-succor (USGS Hydrologic Unit Code # 17050103)

ANALYSIS OF RESOURCE CONCERNS

Farm Resource Concerns

Grandview Gilbert is located in a watershed containing water quality limited stream segments listed according to the Clean Water Act. Stream segments are listed because a water quality parameter prevents the attainment of the "Fishable/Swimmable" goal of the Clean Water Act.

WATERBODY	BOUNDARIES	BACT	CHAN STAB	DO	FLOW ALT	HAB ALT	MET HG	MET	NH3	NUTR	O_G	ORG	PEST	PH	SAL	SED	TDG	TEMP	UNKN	*
Snake River	CJ Strike Res to Castle Creek	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	X

Grandview Gilbert is not located in a critical Nitrate-Nitrogen management area. Nitrate Management Areas are designated based upon ground water quality sampling results. Two priority groups exist as follows:

Priority 1 is designated because at least 25% of the ground water sampling locations within the area exceed 5-milligrams/liter nitrate. This is one-half of the maximum contaminant level of 10-milligrams/liter nitrate. This nitrate concentration is considered evidence of significant degradation. Public drinking water systems are required to increase monitoring frequency when this level is reached.

Priority 2 is designated because at least 50% of the ground water sampling locations within the area exceed 2-milligrams/liter nitrate. This concentration threshold provides an indication of human-caused (anthropogenic) impacts. The upper limit for naturally occurring (background) concentrations of nitrate is considered to be about 2 mg/l.

Grandview Gilbert is located in a sole source aquifer area - Western Snake River Plain Aquifer.

Field Resource Concerns

- Open Irrigation Water Conveyances - Irrigation tail water can deliver nutrients to surface water via open canals. Nutrient loading of open canals can have a detrimental affect on the health of receiving waters.

Depth Limiting Subsurface Features

Field Name	Subsurface Feature	Depth from Surface (in)
Field 18	Water Table	48
Pasture	Fractured Bedrock	20
	Water Table	48

Well Testing Results (See back of page):

Well	Date	Hardness	EC	PH	K	Nitrates	Nitrites	NH3	Na	Carbonate	Bicarbonate
No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data

ISDA REGULATIONS AND THE IDAHO NUTRIENT MANAGEMENT STANDARD

Nutrient management plans for animal agricultural operations regulated by the Idaho State Department of Agriculture (ISDA) must be approved by the Idaho State Department of Agriculture and must follow the Natural Resource Conservation Service (NRCS) Agriculture Waste Management Field Handbook and the Idaho Nutrient Management Standard. ISDA regulation and the Standard use soil test phosphorus as the indicator for environmental impact from agricultural production practices. The Idaho Nutrient Management Standard is based on a threshold soil test phosphorus level (TH), above which there is no agronomic advantage to application of phosphorus.

The Idaho Nutrient Management Standard categorizes fields as a surface water concern or a groundwater concern. A surface water concern indicates that runoff leaves the contiguous operating unit from normal storm events, rain on snow, frozen ground, or irrigation. The soil phosphorus threshold for a field with a surface water concern is 40 ppm phosphorus for soils alkaline (ph > 6) tested with the Olsen method and 60 ppm phosphorus for acidic (ph < 6.5) soils tested with the Bray method (0-12"Soil Sample Depth).

A groundwater resource concern indicates that runoff does not leave the contiguous operating unit from normal storm events, rain on snow, frozen ground, or irrigation. There are two sub-categories for fields identified as having a groundwater concern. The first category applies to fields with a resource concern within the first five feet of the soil profile. A resource concern could be shallow soils, gravel, cobble, bedrock, high

groundwater table, or a drained field. These fields are indicated as a groundwater concern <5'. The soil phosphorus threshold for a field with a groundwater concern <5' is 20 ppm phosphorus for soils tested with the Olsen method and 25 ppm phosphorus for soils tested with the Bray method(18-24" Soil Sample Depth).

If a field is not classified as having a surface water concern or a groundwater <5' concern, by default it is classified as having a groundwater concern >5'. The soil phosphorus threshold for a field with a groundwater concern >5' is 30 ppm phosphorus for soils tested with the Olsen method and 45 ppm phosphorus for soils tested with the Bray method(18-24" Soil Sample Depth).

Field Phosphorus Threshold

Field	Resource Concern	P Threshold (ppm)	P Threshehold Soil Test Depth
Field 18	Groundwater < 5'	20	18 - 24"
Pasture	Groundwater < 5'	20	18 - 24"

Farm Location

Idaho Transverse Mercator

Coordinates of the farm center (meters): X = 2331055.4907776, Y = 1315165.82857725

Map Scale: 1 : 128

Figure 1. Base Map

Farm Location

Idaho Transverse Mercator

Coordinates of the farm center (meters): X = 2331055.4907776, Y = 1315165.82857725

Map Scale: 1 : 128

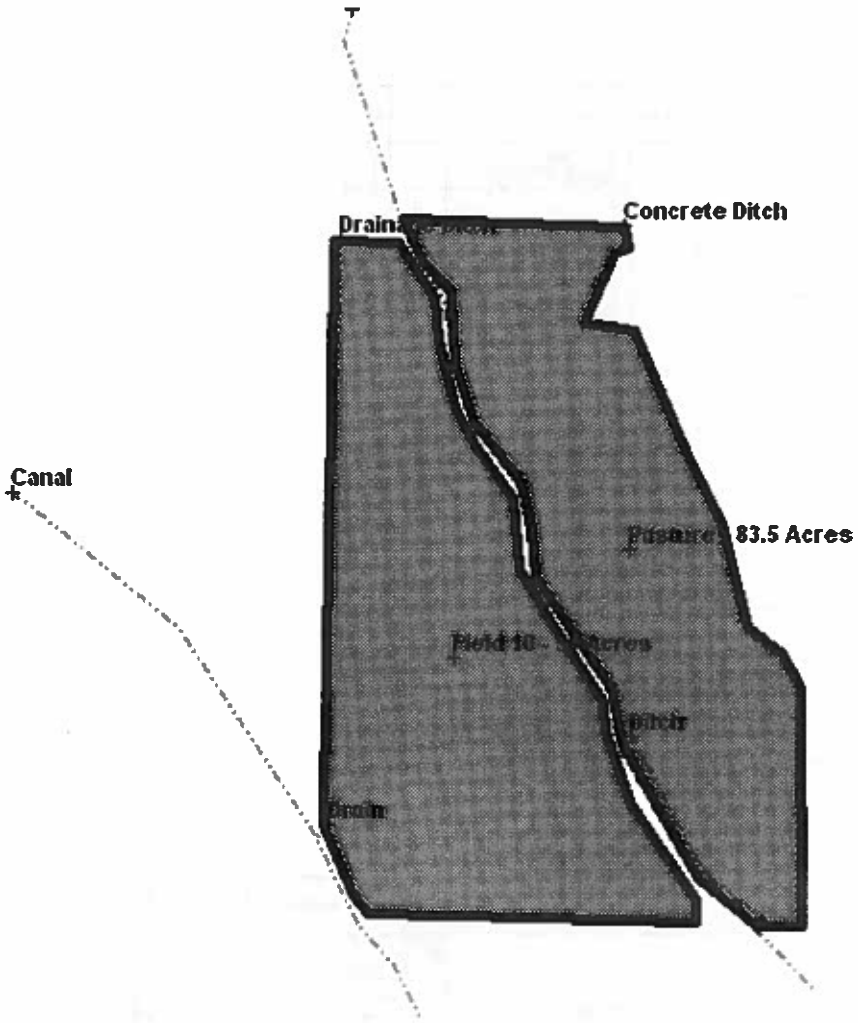


Figure 2. Farmstead Map

NUTRIENT MANAGEMENT REQUIREMENTS/RECOMMENDATIONS

Manure Application Rate Requirement By Year

Assisted Mode has been turned off.

FIELD: Field 18

Name	Man App		Imported Nutrients	Mineralization		Total	
Corn-Field Grain, Irrigated South ID(2004)	Y		5 T/ac				
		N	55	N	0	N	55
		P	79			P	79
		K	303			K	303
Corn-Field Grain, Irrigated South ID(2005)	Y		5 T/ac				
		N	55	N	-5	N	50
		P	79			P	79
		K	303			K	303
Corn-Field Grain, Irrigated South ID(2006)	Y		5 T/ac				
		N	55	N	-5	N	50
		P	79			P	79
		K	303			K	303
Corn-Field Grain, Irrigated South ID(2007)	Y		5 T/ac				
		N	55	N	30	N	85
		P	79			P	79
		K	303			K	303

FIELD: Pasture

Name	Man App		Imported Nutrients	Pasture(s)	Mineralization		Total	
Pasture, Irrigated South ID - Good Condition Root Depth 4 feet(2004)	Y		4 T/ac	0 T/ac				
		N	48	0	N	0	N	48
		P	70	3			P	73
		K	269	4			K	273
Pasture, Irrigated South ID - Good Condition Root Depth 4 feet(2005)	Y		4 T/ac	0 T/ac				
		N	48	0	N	27	N	75
		P	70	3			P	73
		K	269	4			K	273

Minimum Acres Required for Manure Application

Manure Group	Acres
Imported Nutrients	153
Pasture(s)	3

The acreage in the table is based on an average crop uptake of 100 lbs P_2O_5 per acre. These acreage numbers are for estimating export acreage needed. Wastewater application should begin with the first irrigation of the season and end with the last irrigation of the season. Rates should be designed to supply uniform application. When applying wastewater outside of the irrigation window you must contact the Department of Agriculture.

Hydraulic Balance

Field	Date
Field 18	April 15
Pasture	April 15

0.5" of wastewater may be applied to fields after the hydraulic balance date to remain in compliance with this nutrient management plan.

Spring Soil Test
Spring soils tests must be taken every year from every field to determine a commercial fertilization rate. If commercial fertilizer isn't applied (for a perennial crop), spring soil samples are not required. If you do not apply commercial fertilizer, a complete soil analysis will need to be conducted initially to determine the nutrient baseline.

Record Keeping For each field keep a record of annual manure and chemical fertilizer applications. Include nutrient source, date, time, and rate and application method.

ANNUAL NUTRIENT BUDGET

The following crop nutrient budget is based on soil test data and cropping information. It is for one year for the following field and specified crop information:

Nutrient Budget Summary

Field: Field 18 **Crop:** Corn-Field Grain, Irrigated South ID **Yield:** 220

	N	P205	K20
Crop Nutrient Requirement	320	79	59
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	-35		
from Prior Bio-Nutrients	30		
from Irrigation Water	0		0
Nutrient Balance from above	325.6	79	59.1
Imported Nutrients	55	79	303
Estimated Remaining Nutrients Required	271	0	-244
Commercial Fertilizer Application	0	0	0

Final Nutrient Balance	271	0	-244

Acceptable: Sustainable agronomic rate.

Field: Pasture **Crop:** Pasture, Irrigated South ID - Good Condition Root Depth 4 feet **Yield:** 4

	N	P205	K20
Crop Nutrient Requirement	150	73	207
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	0		
from Prior Bio-Nutrients	27		
from Irrigation Water	0		0
Nutrient Balance from above		73.3	207.4
Imported Nutrients	48	70	269
Pasture(s)	0	3	4
Estimated Remaining Nutrients Required	76	0	-66
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	76	0	-66

Rate is either deficit or is approaching an amount that may potentially contribute to an environmental risk.

Acceptable: Sustainable agronomic rate.

ANALYSIS OF ANIMAL SYSTEM

WASTE STORAGE AND HANDLING

Livestock Unit Characteristic

Description	Animal	Number	Weight	Days Collected	Housing	Bedding Type	Bedding (tons)
Pasture Cattle	Beef - High forage diet	50	700	30	Open Lot	N/A	0

Manure/Biosolid Groups

Manure Group	Storage Type	Application Method	Days to Incorporation	Nitrogen Retention(%)	Annual Volume (ft3)	Annual Weight (tons)
Imported Nutrients	Manure Stored in Open Lot, Arid	Broadcast, Incorporated less than 3 inches	4-7 days	80	196,154	816

	Region					
Pasture(s)	Pasture	Broadcast, no incorporation, with containment	>7 days	14	1,050	33

* in Nitrogen Retention % Column means "Overridden Nitrogen Values"
Assisted Mode has been turned off.

Manure Group		Pasture Cattle
Pasture(s)	% To Group	100

Annual Production of Nutrients

The nutrient values were calculated based on animal weight and nitrogen loss estimates as described in the NRCS Agricultural Waste Management Field Handbook guidelines (1996). The calculations are estimates, and manure testing is recommended for more accuracy, as manure nutrient content varies widely among operations.

	Nutrient Distribution on Facility			
	Pounds N	Pounds P_2O_5	Pounds K_2O	% of Total
Total Nutrients Produced	21197	14014	53067	
Imported Nutrients	21151	13750	52763	99
Pasture(s)	46	264	304	1

Comments on Bionutrients
No Comments

MANURE STORAGE SUMMARY

Total Solid Capacity		
Bio-Nutrient Group	Cubic Feet	% Contained
Pasture(s)	1,050	0%
Imported Nutrients	196,154	0%

Containment of Corral Runoff
It is important that all contaminated runoff from corrals be contained and/or diverted to the lagoon storage system. As stated in the Idaho State Department of Agriculture (ISDA) regulation, a discharge is allowed only under large precipitation events (>25yr, 24hr storm event). Lagoon structures must be properly designed, operated, and maintained to

contain all contaminated runoff from a 25-year, 24-hour rainfall event for the site location and maintained to contain all runoff from accumulation of winter precipitation from a one in five-year winter. Animals confined in the CAFO may not have direct contact with canals, streams, lakes, or other surface waters.

Comments
No Comments

BIO-NUTRIENT EXPORT INFO

Exported Bio-Nutrient Summary					
Bio-Nutrient Group Name	**Amount**	**Consumer**	**Consumer's Address**	**Telephone**	**Acres**
No Manure is exported from the facility					

ANALYSIS OF CROPPING SYSTEM

Farming Operation
Total Acres: 182.5

Crop Production History

THIS IS NOT A FERTILIZER RECOMMENDATION

Crop Rotation Name: Rotation A

Crop	Yield	Yield Units	N Requirement	P_2O_5 uptake	K_2O Requirement
Corn-Field Grain, Irrigated South ID	220	bu/acre	320	79	240
Corn-Field Grain, Irrigated South ID	220	bu/acre	320	79	240
Corn-Field Grain, Irrigated South ID	220	bu/acre	320	79	240
Average				79	

* Nitrogen and Potassium Requirements assume zero credits.

THIS IS NOT A FERTILIZER RECOMMENDATION

Crop Rotation Name: Rotation B

Crop	Yield	Yield Units	N Requirement	P_2O_5 uptake	K_2O Requirement
Pasture, Irrigated South ID - Good Condition Root Depth 4 feet	4	tons/acre	150	73.3	200
Average				73	

* Nitrogen and Potassium Requirements assume zero credits.

Mapped Resource Concern(s)

Field Name	Acres	Resource Concern(s)
Field 18	99	Open Irrigation Water Conveyances
Pasture	83.5	Open Irrigation Water Conveyances

ANALYSIS OF IRRIGATION PRACTICES

Irrigation Management

Proper irrigation management depends on factors such as the following.

Irrigation Efficiency: The efficiency with which the irrigation wets the entire crop root zone. This takes losses that occur from evaporation, runoff and deep percolation.

Crop Evapotranspiration Rate (ET): The combined rate at which water from the soil profile is evaporated into the atmosphere and transpired from the crop. The rate is expressed in units of inches/day.

Management Allowable Depletion (MAD): The percentage of water, which can be depleted from the soil before the crop, experiences water deficiency stress.

Available Water Holding Capacity in the Soil (AWH): The amount of water the pores in the soil profile can hold against gravity. The AWH is expressed as inches of water per inch of soil.

Crop Rooting Depth: The depth in the soil profile to which the crop roots can penetrate.

Field Name: Field 18

Date of Initial Irrigation:	
Current Crop	Corn-Field Grain, Irrigated South ID
Furrow Flow Rate	.0 gpm
Delivery Method	N/A
Furrow Length	.0 ft
Furrow Spacing	.0 ft
Time to Reach End of Furrow	.0 hours

Month	Days Between Irrigation	Set Time (hours)	Irrigation Application Efficiency	Water Applied (in)	Net Irrigation Requirement (in)	Deep Perc.	Runoff Index
Mar	.0	.0	.0	.0	.0	.0	.0
Apr	.0	.0	.0	.0	.0	.0	.0
May	.0	.0	.0	.0	1.1	.0	.0
Jun	.0	.0	.0	.0	3.3	.0	.0
Jul	.0	.0	.0	.0	7.7	.0	.0
Aug	.0	.0	.0	.0	6.3	.0	.0
Sep	.0	.0	.0	.0	2.5	.0	.0
Oct	.0	.0	.0	.0	.0	.0	.0

Surface Irrigation Summary

Field Name: Pasture

Date of Initial Irrigation:	
Current Crop	Pasture, Irrigated South ID - Good Condition Root Depth 4 feet
Furrow Flow Rate	.0 gpm
Delivery Method	N/A
Furrow Length	.0 ft
Furrow Spacing	.0 ft
Time to Reach End of Furrow	.0 hours

Month	Days Between Irrigation	Set Time (hours)	Irrigation Application Efficiency	Water Applied (in)	Net Irrigation Requirement (in)	Deep Perc.	Runoff Index
Mar	.0	.0	.0	.0	.4	.0	.0
Apr	.0	.0	.0	.0	1.7	.0	.0
May	.0	.0	.0	.0	3.0	.0	.0
Jun	.0	.0	.0	.0	4.5	.0	.0
Jul	.0	.0	.0	.0	6.5	.0	.0
Aug	.0	.0	.0	.0	5.5	.0	.0

Sep	.0	.0	.0	.0	3.0	.0	.0
Oct	.0	.0	.0	.0	1.3	.0	.0

Appendix A: ANALYSIS OF SOIL CHARACTERISTICS

Soil Survey (USDA NRCS) information was used to describe the soil variations across each field. **This is not absolute** and may vary for each specific situation. The soil map has broad areas that have distinctive pattern of soils, relief, and drainage. Each map unit on the soil map is a unique natural landscape. Typically, it consists of one or more major soils or miscellaneous areas and some minor soils or miscellaneous areas. It is named for the major soils or miscellaneous areas. Because the minor soils are not described in the following summary, the combined acreage for all major soils will be less than the acreage for each field.

Table 1. Soil type across each field

Field Name	Soil Type	Percentage	Approximate Acreage	Surface Texture[1]
Field 18	LETHA	80	79.22	FSL
Pasture	TYPIC TORRIORTHENTS	75	0.26	FSL
	MAZUMA	75	0.53	FSL
	LETHA	80	65.93	FSL

Note: 1- See Appendix A.

Table 2 contains important soil characteristics for each of the fields identified in this plan. Each soil characteristic listed is representative for the entire field based on a weighted average. *(**Caution:** USDA NRCS Soil Survey information was used to estimate the values reported in Table 2. **These are not absolute values** and may vary for each specific situation. They are estimated values representative for each field.)* The following includes a brief description of each of those factors:

Dominant Surface Texture -- The predominant texture of the surface layer. Soil texture is the relative proportion, by weight, of the particle separate classes (sand, silt, and clay) finer than 2 mm in equivalent diameter. Soil texture influences engineering works and plant growth and is used as an indicator of how soils formed. (See Appendix A)

Available Water Capacity (AWC) -- The volume of water that should be available to plants if the soil, inclusive of fragments, were at field capacity. It is commonly defined as the difference between the amount of soil moisture at field capacity and the amount at permanent wilting point. Typical Available Water Capacities are 0.6 inches/foot for a Sand and 2.0 inches/foot for a Silt Loam. Available Water Capacity is an important soil

property in developing water budgets, predicting droughtiness, designing and operating irrigation systems, designing drainage systems, protecting water resources, and predicting yields.

Surface Soil Erodibility Factor (K) -- A factor which quantifies the susceptibility of soil detachment by water. Factors vary from a low of 0.02 to a high of 0.64.

Soil Loss Tolerance (T) -- The maximum amount of erosion at which the quality of a soil as a medium for plant growth can be maintained.

Slope -- The difference in elevation between two points expressed as a percentage of the distance between those points.

Permeability -- The quality of the soil that enables water or air to move through it.

Permeability Class -- Permeability expressed by classes ranging from very rapid to impermeable. (See Appendix A)

Runoff Class - An index of the likelihood for runoff to occur based on inherent soil and slope characteristic. Runoff classes range from Negligible to Very High. (See Appendix A)

Surface pH -- A numerical expression of the relative acidity or alkalinity of the surface soil layer.

Surface pH Classification -- A general descriptive term for soil pH, acid or alkaline.

Table 3 contains additional important soil characteristics for each of the fields identified in this plan. Each soil characteristic listed represents a potential limiting condition within the soil profile (< 5 feet) across the field. *(**Caution:** USDA NRCS Soil Survey information was used to estimate the values reported in Table 2. **These are not absolute values** and may vary for each specific situation. They are estimated values representative for each field.)* The following includes a brief description of each of those factors:

Soil Layer with > 50 % Gravel, Cobble or Stone -- A layer comprised of more than 50 % gravel, cobbles or stones.

Pan - A compact, dense layer in the soil that impedes the movement of water and the growth of roots. Examples include, *hardpan, claypan, plowpan*, and *Fragipan*. (See Appendix A)

Rock -- A layer of rock in the soil that impedes the movement of water and the growth of roots.

Seasonal High Water Table -- A seasonal water table that exist near the surface.

Drainage Class - Drainage class identifies the natural drainage condition of the soil. It refers to the frequency and duration of wet periods. Alteration of the water regime by humans, either through drainage or irrigation, is not a consideration unless the alterations have significantly changed the morphology of the soil. (See Appendix A)

Hydrologic Group -- A group of soils having similar runoff potential under similar storm and cover conditions.

Table 2. Soil characteristics representative for each field

Field Name	Representative For Entire Field (Weighted Average)											
	Dominant Surface Texture & (Acreage)[1]	Total Available Water Capacity to 5 feet (in)	Surface Soil Erodibility Factor - K	Soil Loss Tolerance - T (tons/acre)	Calculated Sheet and Rill Erosion Rate[1] (tons/acre)	Calculated Irrigation Induced Erosion Rate[1] (tons/acre)	Slope (%)	Permeability (in/hour)	Permeability Class[1,2]	Runoff Class[1,3]	Surface pH	Surface pH Classification
Field 18	FSL(98.56)	6.48	0.24	4	-1	-1	2	1.27	Moderate	L	8.45	Alkaline
Pasture	FSL(83.46)	6.46	0.24	4	-1	-1	2.04	1.3	Moderate	L	8.42	Alkaline

NOTES:

1 - See Appendix A;

2 - PERMEABILITY CLASSES: VR = Very Rapid, R = Rapid, MR = Moderately Rapid, M = Moderate, MS = Moderately Slow, S = Slow, VS = Very Slow, I = Impermeable;

3 - RUNOFF CLASS: N = Negligible, LV = Very Low, L = Low, M = Medium, H = High, HV = Very High;

Table 3. Soil characteristics that represent a potential limiting condition within the soil profile (< 5 feet) across the entire field.

Field Name	Depth to Limiting Layer < 5 feet - Soil Layer with > 50 % Gravel, Cobble or Stone					Depth to Limiting Layer < 5 feet - Pan[1]				
	Dominant Condition		Most Limiting Condition			Dominant Condition		Most Limiting Condition		
	Layer Description[1,2]	Acres	Layer Description[1,2]	Acres	Minimum Depth (in)	Layer Description	Acres	Layer Description	Acres	Minimum Depth (in)
Field 18	None Present	98.56		98.56	0	No Pan Present	98.56	No Pan Present	98.56	0
Pasture	None Present	83.46		83.46	0	No Pan Present	83.46	No Pan Present	83.46	0

Field Name	Depth to Limiting Layer < 5 feet - Rock					Depth to Limiting Layer < 5 feet - Seasonal High Water Table				
	Dominant Condition		Most Limiting Condition			Dominant Condition		Most Limiting Condition		
	Layer Description	Acres	Layer Description	Acres	Minimum Depth (in)	Layer Description	Acres	Layer Description	Acres	Minimum Depth (in)
Field 18	No Rock Layer Present	98.56	No Rock Layer Present	98.56	N/A	No Water Table Present	98.56	No Water Table Present	98.56	4
Pasture	No Rock Layer Present	83.11	No Rock Layer Present	0.35	N/A	No Water Table Present	82.41	No Water Table Present	82.41	4

Field Name	Drainage Class[1,3]		Hydrologic Group[1]	
	Dominant Drainage Class	Acres	Dominant Hydrologic Group	Acres
Field 18	Moderately well drained	98.56	C	98.56
Pasture	Moderately well drained	82.41	C	82.76

NOTES:

1 - See Appendix A;

2 - GRAVEL, COBBLE, or STONE: GRV = Very Gravelly, GRX = Extremely Gravelly, CBV = Very Cobbly, CBX = Extremely Cobbly, STV = Very Stony, STX = Extremely Stony, WB = Weathered Bedrock, and UWB = Unweathered Bedrock;

3 - DRAINAGE CLASS: E = Excessively drained, SE = Somewhat Excessively drained, W = Well drained, MW = Moderately Well drained, SP = Somewhat Poorly drained, P = Poorly drained, VP = Very Poorly drained;

ANALYSIS OF SOIL CHARACTERISTICS Legend

Soil Pan

Hardpan – A hardened or cemented layer soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

Claypan – A slowly permeable soil horizon that contains much more clay than the horizon above it. A claypan is commonly hard when dry and plastic or stiff when wet.

Plowpan – A compacted layer formed in the soil directly below the plow layer.

Fragipan – A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restrict roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than deform slowly.

Soil Drainage Class

Excessively drained (E). Water is removed very rapidly. The occurrence of internal free water commonly is very rare or very deep. The soils are commonly coarse-textured and have very high hydraulic conductivity or are very shallow. They are not suited to crop production unless irrigated.

Somewhat excessively drained (SE). Water is removed from the soil rapidly. Internal free water occurrence commonly is very rare or very deep. The soils are commonly coarse-textured and have high saturated hydraulic conductivity or are very shallow. Without irrigation, only a narrow range of crops can be grown and yields are low.

Well drained (W). Water is removed from the soil readily but not rapidly. Internal free water occurrence commonly is deep or very deep; annual duration is not specified. Water is available to plants throughout most of the growing season in humid regions. Wetness does not inhibit growth of roots for significant periods during most growing seasons.

Moderately well drained (MW). Water is removed from the soil somewhat slowly during some periods of the year. Internal free water occurrence commonly is moderately deep and transitory through permanent. The soils are wet for only a short time within the rooting depth during the growing season, but long enough that most mesophytic crops are affected. They commonly have a moderately low or lower saturated hydraulic conductivity in a layer within the upper 1 m, periodically receive high rainfall, or both.

Somewhat poorly drained (SP). Water is removed slowly so that the soil is wet at a shallow depth for significant periods during the growing season. The occurrence of internal free water commonly is shallow to moderately deep and transitory to permanent. Wetness markedly restricts the growth of mesophytic crops, unless artificial drainage is provided. The soils commonly have one or more of the following characteristics: low or very low saturated hydraulic conductivity, a high water table, additional water from seepage, or nearly continuous rainfall.

Poorly drained (P). Water is removed so slowly that the soil is wet at shallow depths periodically during the growing season or remains wet for long periods. The occurrence of internal free water is shallow or very shallow and common or persistent. Free water is commonly at or near the surface long enough during the growing season so that most mesophytic crops cannot be grown, unless the soil is artificially drained. The soil, however, is not continuously wet directly below plow-depth. Free water at shallow depth is usually present. This water table is commonly the result of low or very low saturated hydraulic conductivity of nearly continuous rainfall, or of a combination of these.

Very poorly drained (VP). Water is removed from the soil so slowly that free water remains at or very near the ground surface during much of the growing season. The occurrence of internal free water is very shallow and persistent or permanent. Unless the soil is artificially drained, most mesophytic crops cannot be grown. The soils are commonly level or depressed and frequently ponded. If rainfall is high or nearly continuous, slope gradients may be greater.

Soil Hydrologic Group

Group A – Soils that have low runoff potential and high infiltration rates even when thoroughly wetted. They consist chiefly of deep, well to excessively drained sands and gravels. These soils have a high rate of water transmission (greater than 0.30 in/hr).

Group B – Soils that have moderate infiltration rates when thoroughly wetted. They consist chiefly of moderately deep to deep, moderately well to well drained soils with moderately fine to moderately coarse textures. These soils have a moderate rate of water transmission (greater than 0.15 – 0.30 in/hr).

Group C – Soils that have low infiltration rates when thoroughly wetted. They consist chiefly of soils with a layer that impedes downward movement of water and soils with moderately fine to fine texture. These soils have a low rate of water transmission (greater than 0.05 - 0.15 in/hr).

Group D – Soils that have high runoff potential. They have very low infiltration rates when thoroughly wetted. They consist chiefly of clay soils with high swelling potential, soils with a permanent high water table, soils with a claypan or clay layer at or near the surface, and shallow soils over impervious material. These soils have a very low rate of water transmission (greater than 0.0 - 0.05 in/hr).

Soil Permeability Class

Very Rapid:	20.0 to 100.0 inches/hour
Rapid:	6.0 to 20.0 inches/hour
Moderately Rapid:	2.0 to 6.0 inches/hour
Moderate:	0.6 to 2.0 inches/hour
Moderately Slow:	0.2 to 0.6 inches/hour
Slow:	0.06 to 0.20 inches
Very Slow:	0.0015 to 0.06 inches/hour
Impermeable:	0.0000 to 0.0015 inches/hour

Soil Texture Modifiers, Texture Class and Terms Used in Lieu of Texture.

Texture Modifiers	
ASHY	Ashy
BY	Bouldery
BYV	Very bouldery
BYX	Extremely bouldery
CB	Cobbly
CBV	Very cobbly
CBX	Extremely cobbly
CN	Channery
CNV	Very channery
CNX	Extremely channery
COP	Coprogenous
DIA	Diatomaceous
FL	Flaggy
FLV	Very flaggy
FLX	Extremely flaggy
GR	Gravelly
GRC	Coarse gravelly
GRF	Fine gravelly
GRM	Medium gravelly
GRV	Very gravelly
GRX	Extremely gravelly
GS	Grassy
GYP	Gypsiferous
HB	Herbaceous
HYDR	Hydrous
MEDL	Medial
MK	Mucky
MR	Marly
MS	Mossy
PBY	Parabouldery
PBYV	Very Parabouldery
PBYX	Extremely Parabouldery
PCB	Paracobbly
PCBV	Very Paracobbly
PCBX	Extremely Paracobbly
PCN	Parachannery
PCNV	Very Parachannery
PCNX	Extremely Parachannery
PF	Permanently frozen
PFL	Paraflaggy
PFLV	Very Paraflaggy
PFLX	Extremely Paraflaggy

Texture Class	
C	Clay
CL	Clay loam
COS	Coarse sand
COSL	Coarse sandy loam
FS	Fine sand
FSL	Fine sandy loam
L	Loam
LCOS	Loamy coarse sand
LFS	Loamy fine sand
LS	Loamy sand
LVFS	Loamy very fine sand
S	Sand
SC	Sandy clay
SCL	Sandy clay loam
SI	Silt
SIC	Silty clay
SICL	Silty clay loam
SIL	Silt loam
SL	Sandy loam
VFS	Very fine sand
VFSL	Very fine sandy loam

Terms used in lieu of texture	
BR	Bedrock
BY	Boulders
CB	Cobbles
CN	Channers
DUR	Duripan
FL	Flagstones
G	Gravel
HPM	Highly Decomposed plant material
MAT	Material
MPM	Moderately Decomposed plant material
MPT	Mucky peat
MUCK	Muck
OR	Ortstein
PBY	Paraboulders
PC	Petrocalcic
PCB	Paracobbles
PCN	Parachanners
PEAT	Peat
PF	Petroferric
PFL	Paraflagstones
PG	Paragravel
PGP	Petrogypsic
PL	Placic
PST	Parastones
SPM	Slightly Decomposed plant material
ST	Stones
W	Water

PGR Paragravelly
PGRV Very Paragravelly
PGRX Extremely Paragravelly
PST Parastony
PSTV Very Parastony
PSTX Extremely Parastony
PT Peaty
ST Stony
STV Very stony
STX Extremely stony
WD Woody

Appendix B: NUTRIENT RISK ANALYSIS

Phosphorus Runoff Risk Assessment

FIELD: Field 18
Overall Risk Rating: Very High
Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 79

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: Surface applied no incorporation

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: Pasture

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 73.3

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: Very High

Manure Application Method: N/A

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

Nutrient Leaching Risk Assessment

FIELD: Field 18
Overall Risk Rating: Medium
Leaching losses may be contributing to soluble nutrient leaching below the root zone during some years.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very High

Comments: Due to the low irrigation efficiency on this field, conversion to a more efficient irrigation system like Sprinkler or Drip Irrigation should be considered. If this is not possible consider shorter set times to minimize runoff and/or the length of run to minimize leaching. A Tail water Recovery & Pumpback System will help to reduce or eliminate runoff. An additional consideration is to incorporate a Surge Irrigation that will help to reduce runoff and deep percolation losses. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth Rating: High

Comments: Because the water table is near the surface (and/or the soil is shallow), this field is vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a significant concern.

FIELD: Pasture

Overall Risk Rating: Medium

Leaching losses may be contributing to soluble nutrient leaching below the root zone during some years.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very High

Comments: Due to the low irrigation efficiency on this field, conversion to a more efficient irrigation system like Sprinkler or Drip Irrigation should be considered. If this is not possible consider shorter set times to minimize runoff and/or the length of run to minimize leaching. A Tail water Recovery & Pumpback System will help to reduce or eliminate runoff. An additional consideration is to incorporate a Surge Irrigation that will help to reduce runoff and deep percolation losses. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth Rating: High

Comments: Because the water table is near the surface (and/or the soil is shallow), this field is vulnerable to ground water contamination. Nutrient leaching and subsequent

subsurface transport to ground water and interconnected surface water may be a significant concern.

NUTRIENT RISK ANALYSIS Legend

BMP	Definition	Purpose
Buffer Strip	Contour buffer strips are strips of perennial grass alternated with wider cultivated strips that are farmed on the contour.	Contour buffer strips slow runoff water and trap sediment. Consequently, soil erosion is generally reduced significantly by this practice. Sediments, nutrients, pesticides, and other potential pollutants are filtered out as water flows through the grass strips. The grass strips also provide food and cover for wildlife.
Channel Vegetation	Establishing and maintaining adequate plants on channel banks, berms, spoil, and associated areas.	To stabilize channel banks and adjacent areas and reduce erosion and sedimentation. To maintain or enhance the quality of the environment, including visual aspects and fish and wildlife habitat.
Chiseling and Sub soiling	Loosening the soil, without inverting and with a minimum of mixing of the surface soil, to shatter restrictive layers below normal plow depth that inhibit water movement or root development.	To improve water and root penetration and aeration.
Composting Facility	A composting facility is installed for biological stabilization of waste organic material.	The purpose of this practice is to biologically treat waste organic material and produce humus-like material that can be recycled as a soil amendment or organic

		fertilizer. The material may also be used by other acceptable methods of recycling that comply with laws, rules and regulations.
Conservation Cover	This practice involves establishing and maintaining a protective cover of perennial vegetation on land retired from agriculture production.	This practice reduces soil erosion, associated sedimentation, improves water quality, and creates or enhances wildlife habitat.
Conservation Cropping Sequence	Growing crops in a recurring sequence on the same field.	This practice may be applied as part of a best management practice to support one or more of the following: Reduce sheet and rill erosion, Reduce irrigation induced erosion, Reduce soil erosion from wind, Maintain or improve soil organic matter content, Manage deficient or excess plant nutrients, Improve water use efficiency, Manage saline seeps, Manage plant pests (weeds, insects, diseases), Provide food for domestic livestock, and Provide food and cover for wildlife.
Contour Farming	Farming sloping land in such a way that preparing land, planting, and cultivating are done on the contours. (This includes following established grades of terraces or diversion.)	To reduce erosion and control water.
Cover and Green Manure Crop	A crop of close-growing, legumes, or small grain grown primarily for seasonal protection and soil improvement. It usually is grown for 1 year or less, except where there is	To control erosion during periods when the major crops do not furnish adequate cover; add organic material to the soil; and improve infiltration, aeration, and tilth.

	permanent cover as in orchards.	
Critical Area Planting	Planting vegetation on critically eroding areas that require extraordinary treatment.	This practice is used on highly erodible areas that cannot be stabilized by ordinary planting techniques and if left untreated may cause severe erosion or sediment damage. Examples of critical areas include the following: 1) Dams, dikes, levees, and other construction sites with very steep slopes, 2) Mine spoil and surface mined land with poor quality soil and possibly chemical problems, and 3) Agriculture land with severe gullies requiring specialized planting techniques and management.
Dike or Berm	An embankment constructed of earth or other suitable materials to protect land against overflow or to regulate water.	Dikes are used to: Permit improvement of agricultural land by preventing overflow and better use of drainage facilities, Prevent damage to land and property, Facilitate water storage and control in connection with wildlife and other developments, and Protect natural areas, scenic features and archeological sites from damage.
Diversion	A channel constructed across the slope with a supporting ridge on the lower side.	To divert excess water from one area for use or safe disposal in other areas.
Drip Irrigation	A planned irrigation system in which all necessary facilities are installed for efficiently applying water directly to the root zone of plants by means of applicators (orifices, emitters, porous tubing, and perforated	To efficiently apply water directly to the plant root zone to maintain soil moisture within the range for good plant growth and without excessive water loss, erosion, reduction in water quality, or salt accumulation.

	pipe) operated under low pressure. The applicators can be placed on or below the surface of the ground.	
Filter Strip	A strip or area of vegetation for removing pollutants water.	A filter strip reduces pollution by filtration, deposition, infiltration, absorption, adsorption, decomposition, and volatilization of sediment, organic matter, and other pollutants from runoff and waste water.
Fish Stream Improvement	Fish Stream Improvement is improving a stream channel to make or enhance fish habitat.	The purpose of the practice is to increase production of desired species of fish. The practice involves improving food supplies, shelter, spawning areas, water quality, and other elements of fish habitat.
Grade Stabilization Construction	A structure used to control the grade and head cutting in natural or artificial channels.	These structures are to: Stabilize the grade and control erosion in natural or artificial channels, prevent the formation or advance of gullies, enhance environmental quality, and reduce pollution hazards.
Grassed Waterway	A natural or constructed channel that is shaped or graded to required dimensions and established in suitable vegetation for the stable conveyance of runoff.	Grassed waterways convey runoff from terraces, diversions, or other water concentrations without causing erosion or flooding and to improve water quality.
Grazing Land Mechanical Treatment	Modifying physical soil and/or plant conditions with mechanical tools by treatments such as; pitting, contour furrowing, and ripping or sub-soiling.	This practice should be applied as part of a best management practice to support one or more of the following purposes: Fracture compacted soil layers and improve soil permeability,

		Reduce water runoff and increase infiltration, Break up sod bound conditions and thatch to increase plant vigor, and Renovate and stimulate plant community for greater productivity and yield.
Heavy Use Area Protection	Protecting heavily used areas by establishing vegetative cover, by surfacing with suitable materials, or by installing needed structures.	To stabilize urban, recreation, or facility areas frequently and intensely used by people, animals, or vehicles.
Irrigation Land Leveling	Reshaping the surface of land to be irrigated to planned grades.	To permit uniform and efficient application of irrigation water without causing erosion, loss of water quality, or damage to land by water logging and at the same time to provide for adequate surface drainage.
Irrigation Water Management	Irrigation water management is the process of determining and controlling the volume, frequency, and application rate of irrigation water in a planned, efficient manner.	Irrigation water management is applied as part of a conservation management system to support one or more of the following: Manage soil Moisture to promote desired crop response; Optimize use of available water supplies; Minimize irrigation induced soil erosion; Decrease non-point source pollution of surface and groundwater resources; Manage salts in the crop root zone; Manage air, soil, or plant micro-climate.
Mulching	Applying plant residues or other suitable materials not produced on the site to the soil surface.	To conserve moisture; prevent surface compaction or crusting; reduce runoff and erosion; control weeds; and help establish plant cover.

Polyacrylamide (PAM)	Polyacrylamide is an organic polymer formulated to stabilize soil when applied in irrigation water.	Water applied with PAM stabilizes soil aggregates which can then resist the erosive forces of water. If correctly applied, PAM will produce clear runoff water and residue erosion within the field by over 90 percent.
Prescribed Grazing	Prescribed grazing is the controlled harvest of vegetation with grazing animals, managed with the intent to achieve a specific objective.	Application of this practice will manipulate the intensity, frequency, duration, and season of grazing to: 1) Improve water infiltration, 2) maintain or improve riparian and upland area vegetation, 3) protect stream banks from erosion, 4) manage for deposition of fecal material away from water bodies, and 5) promote ecological and economically stable plant communities which meet landowner objectives.
Residue Management (Conservation Tillage)	Managing the amount, orientation, and distribution of crop and other plant residue on the soil surface.	This practice may be applied as part of a conservation system to support one or more of the following: Reduce sheet and rill erosion. Reduce wind erosion. Maintain or improve soil organic matter content and tilth. Conserve soil moisture. Manage snow to increase plant available moisture. Provide food and escape cover for wildlife.
Riparian Forest Buffer	A riparian forest buffer is an area of trees and/or shrubs located adjacent to a body of water. The vegetation extends outward from the water body for a specified distance necessary to provide a minimum level of protection	The riparian forest buffer is a multi-purpose practice design to accomplish one or more of the following: Create shade to lower water temperatures and improve habitat for aquatic animals, Provide a source of debris necessary for healthy robust

	and/or enhancement.	populations of aquatic organisms and wildlife, and Act as a buffer to filter out sediment, organic material, fertilizer, pesticides and other pollutants that may adversely impact the water body, including shallow ground water.
Sediment Basin	A basin constructed to collect and store debris or sediment.	A sediment basin may have the following uses: Preserve the capacity of reservoirs, ditches, canals, diversion, waterways, and streams, Prevent undesirable deposition on bottom lands and developed areas, Trap sediment originating from construction sites, and Reduce or abate pollution by providing basins for deposition and storage of silt, sand, gravel, stone, agricultural wastes, and other detritus.
Sprinkler System	A planned irrigation system in which all necessary facilities are installed for efficiently applying water by means of perforated pipes or nozzles operated under pressure.	To efficiently and uniformly apply irrigation water to maintain adequate soil moisture for optimum plant growth without causing excessive water loss, erosion, or reduced water quality.
Stream Channel Stabilization	Stabilizing the channel of a stream with suitable structures.	To control aggradation or degradation in a stream channel.
Stream bank Protection	Using vegetation or structures to stabilize and protect banks of streams, lakes, estuaries, or excavated channels against scour and erosion.	To stabilize or protect banks of streams, lakes, estuaries, or excavated channels for one or more of the following purposes: Prevent the loss of land or damage to utilities, roads, buildings, or other facilities adjacent to the banks, Maintain the capacity of the channel, Control channel meander that would adversely affect

		downstream facilities, Reduce sediment loads causing downstream damages and pollution, and Improve the stream for recreation or as a habitat for fish and wildlife.
Strip-cropping, Contour	Growing crops in a systematic arrangement of strips or bands on the contour to reduce water erosion. The crops are arranged so that a strip of grass or close-growing crop is alternated with a strip of clean-tilled crop or fallow or a strip of grass is alternated with a close-growing crop.	To reduce sheet and rill erosion and/or to reduce transport of sediment and other water-borne contaminants.
Strip-cropping, Field	Growing crops in a systematic arrangement of strips or bands across the general slope (not on the contour) to reduce water erosion. The crops are arranged so that a strip of grass or a close-growing crop is alternated with a clean-tilled crop or fallow.	To help control erosion and runoff on sloping cropland where contour strip-cropping is not practical.
Subsurface Drains	A Subsurface Drain is a conduit, such as corrugated plastic tubing, tile, or pipe, installed beneath the ground surface to collect and/or convey drainage water.	The purpose of a subsurface drain is to: Improve the environment for vegetation, Reduce erosion, Improve water quality, Collect ground water for beneficial use, Remove water from heavy use areas such as recreation areas, or around buildings, and Regulate water to control health hazards caused by pests.
Surge Irrigation	Surge irrigation is the intermittent application of water to furrows, corrugates, or borders creating a series of on	Surge allows a lighter application of water with a higher efficiency. The result is less deep percolation of water at the upper end of the

	and off periods of constant or variable time spans.	field and a more uniform application.
Tail water Recovery & Pumpback System	A facility to collect, store, and transport irrigation tail water for reuse in a farm irrigation distribution system.	To conserve farm irrigation water supplies and water quality by collecting the water that runs off the field surface for reuse on the farm.
Terraces	An earth embankment, a channel, or a combination ridge and channel constructed across the slope.	Reduce slope length, reduce sediment content in runoff water, reduce erosion, Improve water quality, intercept and conduct surface runoff at a non-erosive velocity to a stable outlet, retain runoff for moisture conservation, prevent gully development, reform the land surface, improve farmability, and reduce flooding.
Use Exclusion	Excluding animals, people or vehicles from an area.	To protect, maintain, or improve the quantity and quality of the plant, animal, soil, air, water, and aesthetics resources and human health and safety.
Water and Sediment Control Basin	An earth embankment or a combination ridge and channel generally constructed across the slope and minor watercourses to form a sediment trap and water detention basin.	To improve farmability of sloping land, reduce watercourse and gully erosion, trap sediment, reduce and manage onsite and downstream runoff, and improve downstream water quality.
Watering Facility	A device (tank, trough, or other watertight container) for providing animal access to water.	To provide watering facilities for livestock and/or wildlife at selected locations in order to: 1) protect and enhance vegetative cover through proper distribution of grazing; 2) provide erosion control through better grassland management; or 3) protect

		streams, ponds and water supplies from contamination by providing alternative access to water.
Wetland Development/Restoration	The construction or restoration of a wetland facility to provide the hydrological and biological benefits of a wetland.	To develop or restore hydric soil conditions, hydrologic conditions, hydrophytic plant communities, and wetland functions.

Appendix C: CROP SPECIFIC GUIDELINES

Corn-Field Grain, Irrigated South ID

NITROGEN

Nitrogen rates depend upon some of the following factors: previous crop, past fertilizer use, soil type and leaching hazard and realistic yield goal for the grower and the area. Adequate N is necessary for maximum economic production of irrigated field corn used for silage or grain. Fertilizer N represents by far the largest share of the fertilizer costs for field corn in Idaho. The amount of N required depends on many factors that influence total corn production and quality. These factors include length of growing season, corn hybrid, previous crop, past fertilizer use, soil type, leaching hazard and previous manuring. Estimates of both the N available to corn during the season and the yield potential of the crop should be considered when determining N fertilizer rates.

TOTAL N REQUIREMENTS BASED ON POTENTIAL YIELD

Fertilizer N rates should be used which correspond to the yield growers can reasonably expect under their soil and management conditions. The historical field corn yield obtained by a grower in a specific field or area generally provides a fair approximation of yield potential given a grower's traditional crop management. Projected changes in crop management (i.e. improved variety, better disease and weed control) designed to appreciably increase production may require adjustment of yield potential upward. Research has shown that the available N required to produce a good field corn yield depends on a variety of crop management practices. Factors such as weed, insect and disease control as well as irrigation, planting date and soil type can influence the N required by triticale for maximum yield.

AVAILABLE NITROGEN

Available N in the soil includes mineralizable N (released from organic matter during the growing season) inorganic N as nitrate (N03-N) and ammonium (NH4-N), and N credits from previous cropping or manures. Each component of available N must be estimated for accurate determination of optimum fertilizer N rates.

MINERALIZABLE NITROGEN - Soils vary in their capacity to release N from organic matter during the growing season. The amount of N released depends on such factors as soil type, soil moisture, soil temperature, previous crop, and the history of fertilizer N applied. While soil organic matter content is frequently used to estimate annual

mineralizable N contributions, in southern Idaho irrigated soils organic matter does not accurately predict the amount of N that is mineralized.

INORGANIC NITROGEN - Residual soil inorganic N (N03, NH4) can be evaluated most effectively with a soil test. Soil samples should be collected in foot increments to a depth of two feet, unless roots are restricted by dense soil layers or high water tables. Ammonium is generally low in pre-plant soil samples and thus contributes little to available N. However, it can be as high or higher than N03-N. NH4-N should be determined along with N03-N, especially when there is reason to expect the presence of appreciable NH4-N, such as recent ammonium N fertilizer applications. Soil samples should be collected before seeding in the spring to represent the area to be fertilized.

NITROGEN FROM PREVIOUS CROP RESIDUES - Nitrogen associated with decomposition of previous crop residues should also be considered when estimating available N. Residues that require additional N for decomposition include cereal straw and mature corn stalks. Research has shown that 15 pounds of additional N are needed per ton of straw returned to the soil, up to a maximum of 50 pounds. For more information on compensating for cereal residues, refer to CIS 825, "Wheat Straw Management and Nitrogen Fertilizer Requirements."

Row crop residues (potatoes, sugar beets, onions) generally do not require additional N for decomposition. Consequently, these residues have little effect on the N needs of field corn.

Legume residues from beans, peas, and alfalfa can release appreciable N during the following crop season that may not be reflected by the pre-plant soil test. This N is derived from the decomposition of both plant tops and nodulated root systems.

NITROGEN FROM MANURES - Soils in which field corn is grown occasionally receive animal manures or lagoon wastes. Nutrient contributions from these sources should also be taken into consideration when estimating available N for the next season. Manures can preclude the need for any fertilizer, depending on the rate applied and their nutrient composition.

Manures can vary appreciably depending on the animal, how the manure is processed, and the kind and extent of bedding material. For the most accurate estimate of fertilizer equivalent values, the manure should be analyzed for its nutrient content.

IRRIGATION WATER - Irrigation waters derived from deep wells are generally low in N. More shallow wells can have significant levels of nitrogen because of leaching of nitrogen from impacts from commercial fertilizer use, animal waste, and improperly functioning septic systems. Irrigation waters from most districts are also low in N when diverted from its source. Background levels of N from original sources are generally about 2 parts per million (ppm). The more return flow included in diverted water sources, the higher the N content. Return flows may include N dissolved when irrigation waters pass through fields high in residual or recently added fertilizer N as well as from soluble fertilizer N applied with the irrigation water.

Most irrigation districts should know the N content of the water they divert. Contact them for this information to determine the levels of N added with your irrigation water. However, since irrigation water N levels are influenced by upstream management, if you use irrigation water that receives runoff after it is diverted, only a water test can accurately evaluate the N added with irrigation waters.

For each ppm or milligrams per liter (mg/L) of N reported in the water sample, multiply

by 2.7 to get the N added per acre foot of water applied. For example, if the water sample contained 10 ppm of N, 3 acre feet of water applied would be the equivalent of 81 pounds of N per acre. Typically, of the water applied with furrow irrigation only 50 percent is retained on the field and the rest runs off the end. The net retention of N applied with furrow irrigation would, therefore, be about half of the water applied or about 40 pounds per acre in this example. If more or less of the irrigation water is retained with each wetting, then growers should adjust the water N contribution accordingly.

Excessive irrigation by any method reduces N availability to field corn. Additional N may be needed under these conditions. Growers should not use aqua or anhydrous N through a sprinkler irrigation system.

Water running soluble N sources with a furrow irrigation system can be an effective means of adding N. Two limitations of this practice are that (1) the application of the N with this method may not be as uniform as desired and (2) runoff containing the N may contaminate downstream surface waters. Growers can minimize the loss of N by shutting off the injection unit before the irrigation water reaches the end of the furrow. This practice should not substitute for careful consideration of N needs while N can be side dressed.

CALCULATION OF N APPLICATION RATES

To calculate the fertilizer N application rate, the following equation is used:

Fertilizer application rate (deficit) or Over application of Nitrogen =
(Total N required to produce a given yield) - (Mineralizable N) - (Inorganic N measured by the soil test) - (previous crop/residue management) - (Manure Nitrogen) - (Irrigation Water)

TIMING OF NITROGEN APPLICATION

Coarse-textured soils, including sandy loams, loamy soils and sands, may lose N from leaching. For these soils, side dress a portion of the N at the time of the last cultivation.

Sprinkler irrigation of corn under center pivots provides increased flexibility for providing N during the season. With sprinklers N can be injected into the system and applied with the water. On silt loam soils, split applications of N have not proven more effective as long as pre-plant N is adequately incorporated.

High N rates (approaching 300 pounds per acre) broadcast and incorporated before planting may reduce early season corn growth. If high N rates are needed, split applications should be considered.

High plant populations (above 28,000 to 30,000) and early plantings of longer season hybrids in the Treasure Valley will respond to high N rates provided there are no other limiting factors. High N rates will not compensate for reductions in stand or delayed plantings. High plant populations of field corn are more susceptible to N shortages because of greater competition among plants for limited N.

Side dressing may cause root pruning depending on plant size, distance of shank from the row and placement depth. High N rates (above 300 pounds per acre) broadcast and incorporated before planting may reduce early season corn growth. If high N rates are needed, split applications should be considered. On sandy textured soils subject to leaching, side dress a portion of the N at the time of the last cultivation. Under sprinkler

irrigations, N can be injected through the lines throughout the season. On silt loam soils, split applications of N have not proven more effective as long as pre-plant N is adequately incorporated.

PHOSPHORUS

Adequate phosphorus (P) is necessary for maximum production of field corn. The soil test for P is based on samples collected from the first foot of soil. The soil is extracted with sodium bicarbonate.

Economic response to fertilizer P is more likely with cooler soil temperatures and soils with high lime content, particularly when planting long season hybrids. Phosphorus is an immobile nutrient that does not move appreciably from where it is placed. It should be mixed into the seedbed or banded within easy reach of the seedling roots before or during the planting operation.

POTASSIUM

Field corn requires adequate potassium (K) for optimum growth. Soil test K can be useful in determining the need for K fertilizers. The soil sample is taken from the first foot of soil and extracted with sodium bicarbonate. Fertilizer K rates are based on soil test.

MICRONUTRIENTS

Zinc (Zn) deficiencies occur primarily on soils that are eroded, leveled or where the exposed subsoil is higher in lime. The DTPA test on soil samples collected from the first foot can be used for identifying Zn fertilizer needs. Apply 10 pounds of Zn per acre when the soil test measures less than 0.6 ppm.

Other micronutrients have not been shown to limit corn production. "Shotgun" applications of micronutrient mixtures containing boron (B), copper (Cu), iron (Fe) and manganese (Mn) "for insurance" have not been shown to be economical and are not recommended.

SULFUR (S)

The major corn-growing regions in Idaho should not experience shortages of S. Areas with S deficiencies include some irrigated areas where both the soil and irrigation water are low in S. Snake River water is known to have high S concentrations. Coarse-textured soils including sandy loams, loamy sands and sands would be more susceptible to S deficiencies than silt loam soils. Where the need for S is evident, use 30 pounds per acre of sulfate-sulfur (S04).

SALINITY (SALTS)

Field corn has a low to moderate tolerance to accumulated salts. Soils with total salt readings above 3 or 4 mmhos/cm can be cropped effectively. Readings up to 6 are also satisfactory although more careful water management may be required.

Pasture, Irrigated South ID - Good Condition Root Depth 4 feet

Lack of adequate fertilizer, improper irrigation management, poor stands, non-adapted plant species and poor grazing management are the major causes of low forage

production in irrigated pastures. When properly managed, pastures will respond to fertilization and produce large quantities of high-quality forage and livestock products. Irrigated pastures are typically composed either of grass-legume mixtures or grasses alone. The composition of the pasture can be changed by fertilizer management and grazing method. Adapted and high-quality grasses for irrigated pastures include bromegrass and orchard grass for well-drained soil, fescue and wheatgrass for saline soils and creeping meadow foxtail and reed canary grass for wet soil. These grasses make excellent summer re-growth. Highest producing grass-legume mixtures usually include one or more of the above grasses with a well-adapted legume variety. An adapted legume variety should have good winter hardiness and resistance to insects and diseases.

NITROGEN

Nitrogen rates depend upon some of the following factors: previous crop, past fertilizer use, soil type and leaching hazard and realistic yield goal for the grower and the area. Grass pastures have responded well to nitrogen (N) fertilizer applications up to 150 pounds N per acre. The N rate depends upon the length of frost-free growing season and the number of cuttings or grazing periods. Production potential increases as the frost-free growing period is extended. Split applications of N fertilizer maintain a more uniform level of forage production through summer and fall. Broadcast 30 to 50 pounds N per acre per application after each cutting or grazing cycle, and irrigate to move N into the plant root zone. As the amount of legume increases in a grass/legume mixture, the need for N fertilizer decreases. When the legume composes over 60 percent of the mixture, responses from N are limited. Nitrogen applications will reduce the quantity of legume in a mixed species stand. Inoculation of legumes when the stand is established will reduce the need for N fertilization when legumes dominate the stand composition.

PHOSPHORUS

Intensively managed, high-producing pasture may respond to phosphorus (P) fertilization. Grasses generally have a low P requirement, and legumes generally have a high P requirement. Thus, P fertilizer applications tend to encourage legumes. Phosphorus movement in soils is limited, so P fertilizer needs to be placed in the rooting zone. Apply phosphorus during seedbed preparation whenever possible. Top-dress established pastures with P fertilizer, preferably in the fall.

POTASSIUM

Grasses have moderate potassium (K) requirements, and legumes have high K requirements. Idaho soils are usually high in natural K. Irrigation water contains K except in mountain streams. Potassium movement in soils is limited, though not to the same extent as that of phosphorus. Incorporate K during seedbed preparation or broadcast in the fall on established stands.

SULFUR

Sulfur (S) demand is greater for legumes than grasses. Sulfur requirements for grass and legumes will vary with soil texture, leaching losses, S soil test and S content of irrigation water. Apply 30 pounds of S to soil testing less than 10 ppm sulfate-sulfur (S04-S) in the plow layer. Areas irrigated with water from the Snake River and other streams fed by

return flow should have adequate S. High rainfall areas, mountain valleys and foothill areas are likely areas for S deficiencies. Sulfur sources should be carefully selected due to variation in its availability to plants. Elemental sulfur must be converted so sulfate (S04) form by soil micro-organisms before it can be taken up by plants. Conversion of elemental S to S04 may take several months in warm moist soils. Elemental S fertilizers cannot supply adequate levels of S the year of application. However, these elemental S sources can supply considerable S the year after the initial application. Sulfate-sulfur sources are recommended to alleviate deficiencies the year of application.

MICRONUTRIENTS

Deficiencies of micronutrients such as zinc (Zn), copper (Cu), manganese (Mn) and iron (Fe) have not been observed on irrigated pastures in southern Idaho. Grasses and legumes are not sensitive to low levels of micronutrients as are row crops such as beans and corn. Boron (B) deficiencies may be observed on legumes in gravelly textured soils. If the soil tests less than 0.25 ppm B, apply 1 to 3 pounds of B per acre. Do not use higher rates because B is toxic to plants in excessive amounts.

GENERAL COMMENTS

Nitrogen and phosphorus are the elements needed most on Idaho irrigated pastures. Potassium, sulfur, zinc and boron may be needed. Their need is best determined by soil and plant tissue tests.

Legume population in a grass-legume mixture is reduced by nitrogen fertilization and increased by phosphorus and potassium addition when these nutrients are low in the soil.

Forage from properly fertilized grass or mixed grass-legume pastures has higher protein, providing higher quality livestock feed than unfertilized pastures.

Irrigated pastures make good use of sloping land, stony soils and shallow soils which are less desirable for row crops. Pastures reduce soil erosion during irrigation on sloping land.

Fertilizers are only one part of pasture management. Pastures are most profitable when plant selection, irrigation and harvest techniques are not limiting production.

Rotational grazing will provide more forage and greater returns than continuous grazing.

Contact your County Extension Agent if you have any questions regarding the interpretation of this information or for further information on your local needs.

The above fertilizer guidelines are based on relationships established between University of Idaho soil test and crop yield response research. In this research, crop response to fertilizers was evaluated at several sites where the response to fertilizer differed. The recommendations reflect the general or overall response to fertilizers at specific soil test

values and the response in individual fields can differ appreciably from the general table recommendation. Some sites will require less than the general recommendation, other sites more. Unfortunately, the science has not developed to the point where the table recommendations can account for all the unknown variables influencing the effectiveness of applied fertilizers at individual sites. The table fertilizer recommendations can only be used as general guides rather than specific recommendations for each and every field.

Furthermore, soil variability can sharply reduce the accuracy composite soil test values for individual fields. That is why large contiguous areas within fields should be sampled separately when they are known to differ in crop growth or soil characteristics known to influence the response to fertilizer. But soil variability frequently does not occur conveniently in large areas that can be sampled separately or fertilized differently. The fertilizer recommendations in most cases do not account for this variability. Soil test based recommendations may be excessive in some field areas and inadequate in other areas of the same field. The recommendations then will be appropriate only to the degree that the composite soil test values for fields actually represent the field. Thus, for fields that are highly variable, the fertilizer recommendations should be considered conservative estimates of fertilizers needed. All the more reason to consider the table fertilizer recommendations as general guides rather than specific recommendations for each and every field.

The fertilizer rates suggested in the tables will support above average yields if other factors are not limiting production. Therefore the recommendations assume that good crop management practices will be used, i.e. insect, disease, and weed control. Nutrient requirements can be met using either commercial fertilizers or equivalent organic matter sources, such as manure or compost, provided their nutrient content and relative availability are known or can be estimated from published literature. Soil test based recommended rates will not be appropriate if the soil samples are improperly taken or do not represent the area to be fertilized. For nitrogen in particular, recommendations will be most accurate when crop history is taken into account and projected yields are reasonable estimates based on long term records.

General Comments:

- Over irrigation and nutrient loss is a hazard. Optimum irrigation management is necessary to meet crop water use needs and avoid loss of nutrients through leaching beyond the root zone and runoff with irrigation tail water.

- Nitrogen leaching is particularly a concern on sandy soils. Optimum management may require split Nitrogen applications to meet crop needs.

- Weed, insect, and disease control significantly influence the efficiency and effectiveness of your fertilizer applications and ultimately crop yield and farm profitability.

- Phosphorus, potassium, and zinc nutrients can be effectively fall-applied as they are not readily leached over winter.

- Phosphorus can be budgeted for a crop rotation.

- If you have questions regarding the interpretation of this information, please contact your Extension Agricultural agent, Crop consultant, or your commodity company fieldsman.

- Both farm profitability and water quality can be improved with efficient nutrient use. The following are recommendations in nutrient management, which will optimize nutrient use for crop production while protecting water quality:

1) Avoid the application of nutrient sources in close proximity to streams, wetlands, drainage ditches, areas of very shallow soils, and sinkholes.

2) Accurately calibrate nutrient application equipment to insure that recommended rates are applied.

3) Nitrogen recommendations for many crops are based on yield goals for the crops. It is important to establish realistic yield goals for each field based upon historical yield data, county averages, and your management practices to avoid unnecessary fertilizer costs and minimize potential water quality impairments.

Appendix D: SOIL TEST DATA

Field: No Data **Date of Test:** No Data

Parameter	Units	0-12"	12-24"	18-24"
Soil Texture		No Data	No Data	
EC	mmhos	No Data	No Data	
PH		No Data	No Data	
%Lime	%	No Data	No Data	
OM	%	No Data	No Data	
CEC	meq	No Data	No Data	
Nitrate-N	ppm	No Data	No Data	
Ammonia-N	ppm	No Data	No Data	
P	ppm	No Data	No Data	No Data
K	ppm	No Data	No Data	
Z	ppm	No Data	No Data	

Mn	ppm	No Data	No Data	
Fe	ppm	No Data	No Data	
Cu	ppm	No Data	No Data	
Ca	ppm	No Data	No Data	
Mg	ppm	No Data	No Data	
Na	ppm	No Data	No Data	

Grandview Jayo

Nutrient Management Plan

Agriculture . . .
Launching into the Future

Nutrient Management Plan Prepared For:
Grandview Farms
(208) 834-2231
Jayo Farm

Certified Planner:
Michael Mitchell
Professional Engineer, EAC Engineering, Inc
(559) 381-0607

Producer Signature: _____ Certificated Planner Signature: _____

Date Completed: 10-02-07

The information provided by those using the "Idaho OnePlan" shall be deemed to be trade secrets, production records, or other proprietary information and shall be kept confidential and shall be exempt from enclosure pursuant to section 9-340D, Idaho Code. (Title 22 Chapter 27 17D6)

5

JAYO FARM
Producer Summary

Farm Summary

Jayo Farm is an existing farm located 1.3 miles northeast of Grandview, Idaho. The farm is owned by Grandview Farms and managed by Mike Usabel. The farm consists of one furrow irrigated field and one pasture totaling 107 acres available for accepting imported manure/compost from Simplot/Grandview Feedlot. Approximately 50 head of pasture cattle graze this facility for 30 days per year.

Farm Resource Concerns

Jayo Farm located in the Watershed Basin of the Middle Snake Succor (#17050103). The facility is found at 116W 04'56" 43N '55" using GPS Coordinates. The primary resource concern for Jayo Farm is ground water quality. No canals, laterals or ditches with irrigation water are near the fields to cause any type of runoff. Solid waste is applied to all of the fields and incorporated within seven days of application.

Nutrient Management Plan Requirements

Producer will maintain field application records for a minimum of five years and make them available for review at routine inspections by ISDA personnel. These records must include (where applicable):

1. Fertilizer application rates
2. Manure/Compost application rates
3. On each field, keep a record of manure and chemical fertilizer applications, crop information, and soil and manure test results.
4. Fields to which the nutrients are applied
5. Spring soil test for nitrogen (required annually)
   0-12" and 12-24" nitrogen test

Crop Nutrient Requirement	
Crop	Pounds of P205 per acres
Corn	79
Pasture	73

Manure/Compost field application requirement (tons)
Acres x crop nutrient requirement ÷ manure p205 value* = Tons required

Example	Corn - 250(acres)	X	75 (crop requirement)		÷ 16.85		
Corn	250	X	79**	= 19750	÷ 16.85*	=	1172 tons

*based on manure test values for P205
**pounds of p205 required per acre

Irrigation Management Plan Recommendations

Irrigation water management is very important in nutrient management. If irrigation water is applied at a rate over the crop needs, there is potential for runoff and/or leaching of nutrients. If
irrigation water is under-applied, the crop will not have optimal growth conditions. Crop irrigation water requirements changes through the growing season depending on climate conditions and crop Evapotranspiration rate. Proper irrigation water management responds to these crop demands. It is recommended that:

- Irrigation schedules continue to be managed by your irrigation specialist.
- Continual inspection and maintenance of irrigation equipment will prevent unwarranted waste discharges into surface or ground water.

Nutrient Management Plan Recommendations

Land application of manure at agronomic rates, along with irrigation scheduling, is the most
effective way to obtain maximum nutrient benefits from manure, condition the soil, and avoid
potential water quality problems downstream. Cattle manure is a valuable resource, which will
also improve soil properties such as water holding capacity, infiltration, tilth, structure, porosity,
and nutrient retention and release. If animal manure and/or commercial fertilizers are not properly managed, contaminants may impact surface and/or groundwater.

Application of manure applied at an agronomic rate is a sustainable practice and is always allowed under ISDA regulations. Regardless of the rate prescribed by this nutrient management plan, soil testing at the 0-12 inch and 12-24 inch soil depths is required for nitrogen management.

- Set realistic crop yield goals in order to provide an accurate account of the plant nitrogen needs.
- Apply N so that it is available during peak plant demand.
- Apply fertilizer to cool season crop in the spring rather than the previous fall. This will prevent fertilizer leaching through the soil profile and provide the crop with the necessary levels of nutrients.
- Use split or multiple fertilizer applications in order to provide the crop with a pre-plant treatment and the needed nutrient levels throughout the growing season until the point of major nutrient uptake.

- Avoid the application of nutrient sources in close proximity to streams, wetlands, drainage ditches, areas of very shallow soils, and sinkholes.

Grandview Jayo
ANALYSIS OF RESOURCE CONCERNS

INTRODUCTION

The purpose of this nutrient management plan is to meet agricultural production goals and to certify that manure and nutrients are properly managed to minimize adverse impact to surface or groundwater. Plans are written in cooperation with the producer to:

1) assure proper containment of animal manure and process waste water

2) assess resource concerns which exist on the property

3) budget nutrient sources to optimize crop water and nutrient needs. Nutrient sources include commercial fertilizers, animal manure, mineralization of previous crop soil organic matter, accounting of residues, and irrigation water.

4) When applicable, assess irrigation water management to minimize movement of nutrients beyond the root zone or with runoff.

If animal manure and/or commercial fertilizers are not properly managed, contaminants may negatively impact surface and/or groundwater. Some water resource contaminants associated with poorly managed animal manure and fertilizers are:

Phosphorus in the soil readily adsorbs to soil particles; thus, erosion of soil by surface runoff is the general mode of phosphorus transport. Even at very low concentrations, phosphorus can result in plant and algae blooms in surface water bodies. Alga blooms are a nuisance to boaters, irrigators, and others. Toxins released by certain algae can be lethal to livestock or other animals that drink the water. Dissolved oxygen in the water is depleted as algae die and decompose, sometimes causing fish kills.

Nitrogen in the form of nitrate (NO_3^-) is highly water-soluble and will move with water, particularly down the soil profile past the root zone if not utilized by plants (thus becoming a groundwater contamination issue).Nitrates are toxic to infants under 6 months, and to livestock at high concentrations. In surface water, excess nitrogen, like phosphorus, can result in nuisance plant and algae growth.

Organic matter in high load decreases dissolved oxygen in a surface water body when it decomposes. Low levels of dissolved oxygen is harmful or even fatal to fish and other aquatic life.

Bacteria and microorganism illnesses (pathogens) potentially transmitted through water by animal manure include Giardia, Typhoid Fever, Cryptosporidium, and Cholera. Pathogens from animal waste can negatively impact surface and groundwater quality.

FACILITY DESCRIPTION

Owner Information

Owner (1): Grandview Farms
Address: 1304 Hwy 67 , Grandview, ID 83624
Phone: (208) 834-2231 N/A
N/A

Location

Site Map: Facility site plan illustrated in Figure 1

Soil Conservation District:	Elmore
County:	Elmore
Watershed Basin:	Middle Snake-succor (USGS Hydrologic Unit Code # 17050103)

ANALYSIS OF RESOURCE CONCERNS

Farm Resource Concerns

Grandview Jayo is located in a watershed containing water quality limited stream segments listed according to the Clean Water Act. Stream segments are listed because a water quality parameter prevents the attainment of the "Fishable/Swimmable" goal of the Clean Water Act.

WATERBODY	BOUNDARIES	BACT	CHAN STAB	DO	FLOW ALT	HAB ALT	MET HG	MET	NH3	NUTR	O_G	ORG	PEST	PH	SAL	SED	TDG	TEMP	UNKN	*
Snake River	CJ Strike Res to Castle Creek	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	X

Grandview Jayo is <u>not</u> located in a critical Nitrate-Nitrogen management area. Nitrate Management Areas are designated based upon ground water quality sampling results. Two priority groups exist as follows:

Priority 1 is designated because at least 25% of the ground water sampling locations within the area exceed 5-milligrams/liter nitrate. This is one-half of the maximum contaminant level of 10-milligrams/liter nitrate. This nitrate concentration is considered evidence of significant degradation. Public drinking water systems are required to increase monitoring frequency when this level is reached.

Priority 2 is designated because at least 50% of the ground water sampling locations within the area exceed 2-milligrams/liter nitrate. This concentration threshold provides an indication of human-caused (anthropogenic) impacts. The upper limit for naturally occurring (background) concentrations of nitrate is considered to be about 2 mg/l.

Grandview Jayo is located in a sole source aquifer area - Western Snake River Plain Aquifer.

Field Resource Concerns

- Open Irrigation Water Conveyances - Irrigation tail water can deliver nutrients to surface water via open canals. Nutrient loading of open canals can have a detrimental affect on the health of receiving waters.

Depth Limiting Subsurface Features

Field Name	Subsurface Feature	Depth from Surface (in)
Field 19	Water Table	48
Pasture	Cobbles	26
	Water Table	48

Well Testing Results (See back of page):

Well	Date	Hardness	EC	PH	K	Nitrates	Nitrites	NH3	Na	Carbonate	Bicarbonate
No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data

ISDA REGULATIONS AND THE IDAHO NUTRIENT MANAGEMENT STANDARD

Nutrient management plans for animal agricultural operations regulated by the Idaho State Department of Agriculture (ISDA) must be approved by the Idaho State Department of Agriculture and must follow the Natural Resource Conservation Service (NRCS) Agriculture Waste Management Field Handbook and the Idaho Nutrient Management Standard. ISDA regulation and the Standard use soil test phosphorus as the indicator for environmental impact from agricultural production practices. The Idaho Nutrient Management Standard is based on a threshold soil test phosphorus level (TH), above which there is no agronomic advantage to application of phosphorus.

The Idaho Nutrient Management Standard categorizes fields as a surface water concern or a groundwater concern. A surface water concern indicates that runoff leaves the

contiguous operating unit from normal storm events, rain on snow, frozen ground, or irrigation. The soil phosphorus threshold for a field with a surface water concern is 40 ppm phosphorus for soils alkaline (ph > 6) tested with the Olsen method and 60 ppm phosphorus for acidic (ph < 6.5) soils tested with the Bray method (0-12"Soil Sample Depth).

A groundwater resource concern indicates that runoff does not leave the contiguous operating unit from normal storm events, rain on snow, frozen ground, or irrigation. There are two sub-categories for fields identified as having a groundwater concern. The first category applies to fields with a resource concern within the first five feet of the soil profile. A resource concern could be shallow soils, gravel, cobble, bedrock, high groundwater table, or a drained field. These fields are indicated as a groundwater concern <5'. The soil phosphorus threshold for a field with a groundwater concern <5' is 20 ppm phosphorus for soils tested with the Olsen method and 25 ppm phosphorus for soils tested with the Bray method(18-24" Soil Sample Depth).

If a field is not classified as having a surface water concern or a groundwater <5' concern, by default it is classified as having a groundwater concern >5'. The soil phosphorus threshold for a field with a groundwater concern >5' is 30 ppm phosphorus for soils tested with the Olsen method and 45 ppm phosphorus for soils tested with the Bray method(18-24" Soil Sample Depth).

Field Phosphorus Threshold

Field	Resource Concern	P Threshold (ppm)	P Threshehold Soil Test Depth
Field 19	Groundwater < 5'	20	18 - 24"
Pasture	Groundwater < 5'	20	18 - 24"

Farm Location

Idaho Transverse Mercator

Coordinates of the farm center (meters): X = 2330456.34735489, Y = 1314161.65593031

Map Scale: 1 : 76

Figure 1. Base Map

Farm Location

Idaho Transverse Mercator

Coordinates of the farm center (meters): X = 2330456.34735489, Y = 1314161.65593031

Map Scale: 1 : 15

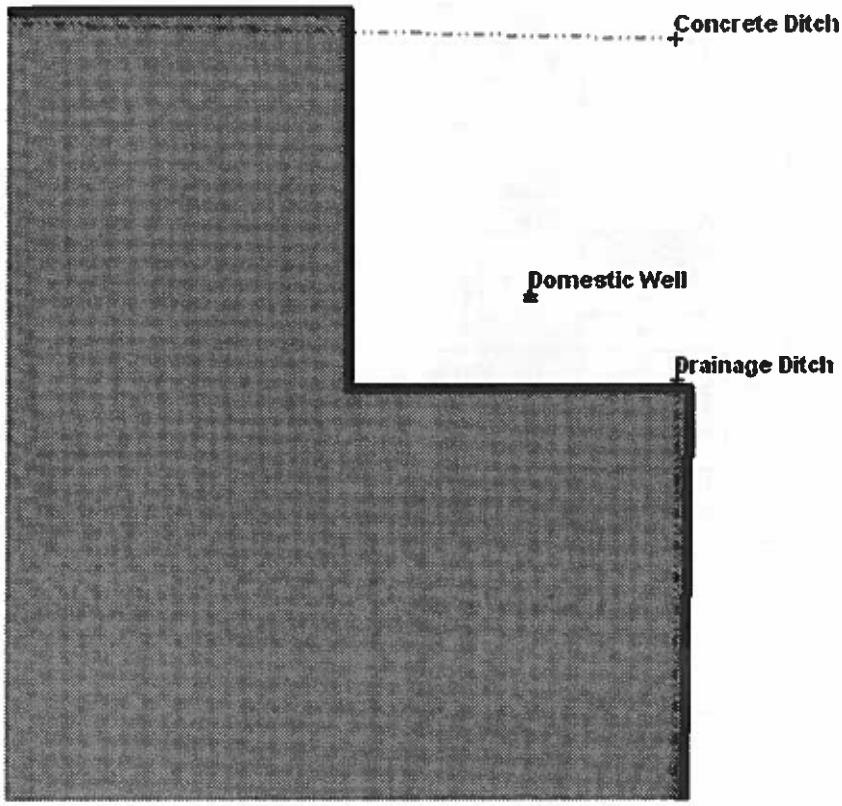


Figure 2. Farmstead Map

NUTRIENT MANAGEMENT REQUIREMENTS/RECOMMENDATIONS

Manure Application Rate Requirement By Year

Assisted Mode has been turned off.

FIELD: Field 19

Name	Man App		Imported Nutrients	Mineralization		Total	
Corn-Field Grain, Irrigated South ID(2004)	Y		5 T/ac				
		N	55	N	0	N	55
		P	79			P	79
		K	303			K	303
Corn-Field Grain, Irrigated South ID(2005)	Y		5 T/ac				
		N	55	N	-5	N	50
		P	79			P	79
		K	303			K	303
Corn-Field Grain, Irrigated South ID(2006)	Y		5 T/ac				
		N	55	N	-5	N	50
		P	79			P	79
		K	303			K	303
Corn-Field Grain, Irrigated South ID(2007)	Y		5 T/ac				
		N	55	N	30	N	85
		P	79			P	79
		K	303			K	303

FIELD: Pasture

Name	Man App		Imported Nutrients	Pasture(s)	Mineralization		Total	
Pasture, Irrigated South ID - Good Condition Root Depth 4 feet(2004)	Y		4 T/ac	1 T/ac				
		N	44	1	N	0	N	45
		P	63	10			P	73
		K	242	12			K	254
Pasture, Irrigated South ID - Good Condition Root Depth 4 feet(2005)	Y		4 T/ac	1 T/ac				
		N	44	1	N	25	N	70
		P	63	10			P	73
		K	242	12			K	254

Minimum Acres Required for Manure Application

Manure Group	Acres
Imported Nutrients	89
Pasture(s)	3

The acreage in the table is based on an average crop uptake of 100 lbs P_2O_5 per acre. These acreage numbers are for estimating export acreage needed. Wastewater application should begin with the first irrigation of the season and end with the last irrigation of the season. Rates should be designed to supply uniform application. When applying wastewater outside of the irrigation window you must contact the Department of Agriculture.

Hydraulic Balance

Field	Date
Field 19	April 15
Pasture	April 1

0.5" of wastewater may be applied to fields after the hydraulic balance date to remain in compliance with this nutrient management plan.

Spring Soil Test
Spring soils tests must be taken every year from every field to determine a commercial fertilization rate. If commercial fertilizer isn't applied (for a perennial crop), spring soil samples are not required. If you do not apply commercial fertilizer, a complete soil analysis will need to be conducted initially to determine the nutrient baseline.

Record Keeping For each field keep a record of annual manure and chemical fertilizer applications. Include nutrient source, date, time, and rate and application method.

ANNUAL NUTRIENT BUDGET

The following crop nutrient budget is based on soil test data and cropping information. It is for one year for the following field and specified crop information:

Nutrient Budget Summary

Field: Field 19 **Crop:** Corn-Field Grain, Irrigated South ID **Yield:** 220

	N	P205	K20
Crop Nutrient Requirement	320	79	59
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	-35		
from Prior Bio-Nutrients	30		
from Irrigation Water	0		0
Nutrient Balance from above	325.6	79	59.1
Imported Nutrients	55	79	303
Estimated Remaining Nutrients Required	271	0	-244
Commercial Fertilizer Application	0	0	0

Final Nutrient Balance	271	0	-244

Acceptable: Sustainable agronomic rate.

Field: Pasture **Crop:** Pasture, Irrigated South ID - Good Condition Root Depth 4 feet **Yield:** 4

	N	P205	K20
Crop Nutrient Requirement	150	73	207
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	0		
from Prior Bio-Nutrients	25		
from Irrigation Water	0		0
Nutrient Balance from above		73.3	207.4
Imported Nutrients	44	63	242
Pasture(s)	1	10	12
Estimated Remaining Nutrients Required	81	0	-47
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	81	0	-47

Caution: Rate is either deficit or is approaching an amount that may potentially contribute to an environmental risk.
Acceptable: Sustainable agronomic rate.

ANALYSIS OF ANIMAL SYSTEM

WASTE STORAGE AND HANDLING

Livestock Unit Characteristic

Description	Animal	Number	Weight	Days Collected	Housing	Bedding Type	Bedding (tons)
Pasture Cattle	Beef - High forage diet	50	700	30	Open Lot	N/A	0

Manure/Biosolid Groups

Manure Group	Storage Type	Application Method	Days to Incorporation	Nitrogen Retention(%)	Annual Volume (ft3)	Annual Weight (tons)
Imported Nutrients	Manure Stored in Open Lot, Arid	Broadcast, Incorporated less than 3 inches	4-7 days	80	114,663	477

	Region					
Pasture(s)	Pasture	Broadcast, no incorporation, with containment	>7 days	14	1,050	33

* in Nitrogen Retention % Column means "Overridden Nitrogen Values"
Assisted Mode has been turned off.

Manure Group		Pasture Cattle
Pasture(s)	% To Group	100

Annual Production of Nutrients

The nutrient values were calculated based on animal weight and nitrogen loss estimates as described in the NRCS Agricultural Waste Management Field Handbook guidelines (1996). The calculations are estimates, and manure testing is recommended for more accuracy, as manure nutrient content varies widely among operations.

	Nutrient Distribution on Facility			
	Pounds N	Pounds P_2O_5	Pounds K_2O	% of Total
Total Nutrients Produced	12410	8301	31147	
Imported Nutrients	12364	8037	30843	99
Pasture(s)	46	264	304	1

Comments on Bionutrients
No Comments

MANURE STORAGE SUMMARY

Total Solid Capacity		
Bio-Nutrient Group	Cubic Feet	% Contained
Pasture(s)	1,050	0%
Imported Nutrients	114,663	0%

Containment of Waste and Corral Runoff
It is important that all contaminated runoff from corrals be contained and/or diverted to the lagoon storage system. As stated in the Idaho State Department of Agriculture (ISDA) regulation, a discharge is allowed only under large precipitation events (>25yr, 24hr storm event). Lagoon structures must be properly designed, operated, and maintained to contain all contaminated runoff from a 25-year, 24-hour rainfall event for the site location

and maintained to contain all runoff from accumulation of winter precipitation from a one in five-year winter. Animals confined in the CAFO may not have direct contact with canals, streams, lakes, or other surface waters.

Comments
No Comments

BIO-NUTRIENT EXPORT INFO

Exported Bio-Nutrient Summary					
Bio-Nutrient Group Name	**Amount**	**Consumer**	**Consumer's Address**	**Telephone**	**Acres**
No manure is exported from this facility					

ANALYSIS OF CROPPING SYSTEM

Farming Operation
Total Acres: 107

Crop Production History

THIS IS NOT A FERTILIZER RECOMMENDATION

Crop Rotation Name: Rotation A

Crop	Yield	Yield Units	N Requirement	P_20_5 uptake	K_20 Requirement
Corn-Field Grain, Irrigated South ID	220	bu/acre	320	79	240
Corn-Field Grain, Irrigated South ID	220	bu/acre	320	79	240
Corn-Field Grain, Irrigated South ID	220	bu/acre	320	79	240
Average				79	

* Nitrogen and Potassium Requirements assume zero credits.

THIS IS NOT A FERTILIZER RECOMMENDATION

Crop Rotation Name: Rotation B

Crop	Yield	Yield Units	N Requirement	P_2O_5 uptake	K_2O Requirement
Pasture, Irrigated South ID - Good Condition Root Depth 4 feet	4	tons/acre	150	73.3	200
Average				73	

* Nitrogen and Potassium Requirements assume zero credits.

Mapped Resource Concern(s)

Field Name	Acres	Resource Concern(s)
Field 19	81	Open Irrigation Water Conveyances
Pasture	26	Open Irrigation Water Conveyances

ANALYSIS OF IRRIGATION PRACTICES

Irrigation Management

Proper irrigation management depends on factors such as the following.

Irrigation Efficiency: The efficiency with which the irrigation wets the entire crop root zone. This takes losses that occur from evaporation, runoff and deep percolation.

Crop Evapotranspiration Rate (ET): The combined rate at which water from the soil profile is evaporated into the atmosphere and transpired from the crop. The rate is expressed in units of inches/day.

Management Allowable Depletion (MAD): The percentage of water, which can be depleted from the soil before the crop, experiences water deficiency stress.

Available Water Holding Capacity in the Soil (AWH): The amount of water the pores in the soil profile can hold against gravity. The AWH is expressed as inches of water per inch of soil.

Crop Rooting Depth: The depth in the soil profile to which the crop roots can penetrate.

Surface Irrigation Summary

Field Name: Field 19

Date of Initial Irrigation:

Current Crop Corn-Field Grain, Irrigated South ID

Furrow Flow Rate	.0 gpm
Delivery Method	N/A
Furrow Length	.0 ft
Furrow Spacing	.0 ft
Time to Reach End of Furrow	.0 hours

Month	Days Between Irrigation	Set Time (hours)	Irrigation Application Efficiency	Water Applied (in)	Net Irrigation Requirement (in)	Deep Perc.	Runoff Index
Mar	.0	.0	.0	.0	.0	.0	.0
Apr	.0	.0	.0	.0	.0	.0	.0
May	.0	.0	.0	.0	1.1	.0	.0
Jun	.0	.0	.0	.0	3.3	.0	.0
Jul	.0	.0	.0	.0	7.7	.0	.0
Aug	.0	.0	.0	.0	6.3	.0	.0
Sep	.0	.0	.0	.0	2.5	.0	.0
Oct	.0	.0	.0	.0	.0	.0	.0

Surface Irrigation Summary

Field Name: Pasture

Date of Initial Irrigation:	
Current Crop	Pasture, Irrigated South ID - Good Condition Root Depth 4 feet
Furrow Flow Rate	.0 gpm
Delivery Method	N/A
Furrow Length	.0 ft
Furrow Spacing	.0 ft
Time to Reach End of Furrow	.0 hours

Month	Days Between Irrigation	Set Time (hours)	Irrigation Application Efficiency	Water Applied (in)	Net Irrigation Requirement (in)	Deep Perc.	Runoff Index
Mar	.0	.0	.0	.0	.4	.0	.0
Apr	.0	.0	.0	.0	1.7	.0	.0
May	.0	.0	.0	.0	3.0	.0	.0
Jun	.0	.0	.0	.0	4.5	.0	.0
Jul	.0	.0	.0	.0	6.5	.0	.0
Aug	.0	.0	.0	.0	5.5	.0	.0
Sep	.0	.0	.0	.0	3.0	.0	.0
Oct	.0	.0	.0	.0	1.3	.0	.0

Appendix A: ANALYSIS OF SOIL CHARACTERISTICS

Soil Survey (USDA NRCS) information was used to describe the soil variations across each field. **This is not absolute** and may vary for each specific situation. The soil map has broad areas that have distinctive pattern of soils, relief, and drainage. Each map unit on the soil map is a unique natural landscape. Typically, it consists of one or more major soils or miscellaneous areas and some minor soils or miscellaneous areas. It is named for the major soils or miscellaneous areas. Because the minor soils are not described in the following summary, the combined acreage for all major soils will be less than the acreage for each field.

Table 1. Soil type across each field

Field Name	Soil Type	Percentage	Approximate Acreage	Surface Texture[1]
Field 19	LETHA	80	64.77	FSL
Pasture	LETHA	80	16.87	FSL
	DORS	75	3.72	FSL

Note: 1- See Appendix A.

Table 2 contains important soil characteristics for each of the fields identified in this plan. Each soil characteristic listed is representative for the entire field based on a weighted average. *(**Caution:** USDA NRCS Soil Survey information was used to estimate the values reported in Table 2. **These are not absolute values** and may vary for each specific situation. They are estimated values representative for each field.)* The following includes a brief description of each of those factors:

Dominant Surface Texture -- The predominant texture of the surface layer. Soil texture is the relative proportion, by weight, of the particle separate classes (sand, silt, and clay) finer than 2 mm in equivalent diameter. Soil texture influences engineering works and plant growth and is used as an indicator of how soils formed. (See Appendix A)

Available Water Capacity (AWC) -- The volume of water that should be available to plants if the soil, inclusive of fragments, were at field capacity. It is commonly defined as the difference between the amount of soil moisture at field capacity and the amount at permanent wilting point. Typical Available Water Capacities are 0.6 inches/foot for a Sand and 2.0 inches/foot for a Silt Loam. Available Water Capacity is an important soil property in developing water budgets, predicting droughtiness, designing and operating irrigation systems, designing drainage systems, protecting water resources, and predicting yields.

Surface Soil Erodibility Factor (K) -- A factor which quantifies the susceptibility of soil detachment by water. Factors vary from a low of 0.02 to a high of 0.64.

Soil Loss Tolerance (T) -- The maximum amount of erosion at which the quality of a soil as a medium for plant growth can be maintained.

Slope -- The difference in elevation between two points expressed as a percentage of the distance between those points.

Permeability -- The quality of the soil that enables water or air to move through it.

Permeability Class -- Permeability expressed by classes ranging from very rapid to impermeable. (See Appendix A)

Runoff Class - An index of the likelihood for runoff to occur based on inherent soil and slope characteristic. Runoff classes range from Negligible to Very High. (See Appendix A)

Surface pH -- A numerical expression of the relative acidity or alkalinity of the surface soil layer.

Surface pH Classification -- A general descriptive term for soil pH, acid or alkaline.

Table 3 contains additional important soil characteristics for each of the fields identified in this plan. Each soil characteristic listed represents a potential limiting condition within the soil profile (< 5 feet) across the field. *(**Caution:** USDA NRCS Soil Survey information was used to estimate the values reported in Table 2. **These are not absolute values** and may vary for each specific situation. They are estimated values representative for each field.)* The following includes a brief description of each of those factors:

Soil Layer with > 50 % Gravel, Cobble or Stone -- A layer comprised of more than 50 % gravel, cobbles or stones.

Pan - A compact, dense layer in the soil that impedes the movement of water and the growth of roots. Examples include, *hardpan, claypan, plowpan*, and *Fragipan*. (See Appendix A)

Rock -- A layer of rock in the soil that impedes the movement of water and the growth of roots.

Seasonal High Water Table -- A seasonal water table that exist near the surface.

Drainage Class - Drainage class identifies the natural drainage condition of the soil. It refers to the frequency and duration of wet periods. Alteration of the water regime by humans, either through drainage or irrigation, is not a consideration unless the alterations have significantly changed the morphology of the soil. (See Appendix A)

Hydrologic Group -- A group of soils having similar runoff potential under similar storm and cover conditions.

Table 2. Soil characteristics representative for each field

Field Name	Representative For Entire Field (Weighted Average)											
	Dominant Surface Texture & (Acreage)[1]	Total Available Water Capacity to 5 feet (in)	Surface Soil Erodibility Factor - K	Soil Loss Tolerance - T (tons/acre)	Calculated Sheet and Rill Erosion Rate[1] (tons/acre)	Calculated Irrigation Induced Erosion Rate[1] (tons/acre)	Slope (%)	Permeability (in/hour)	Permeability Class[1,2]	Runoff Class[1,3]	Surface pH	Surface pH Classification
Field 19	FSL(80.6)	6.48	0.24	4	-1	-1	2	1.27	Moderate	L	8.45	Alkaline
Pasture	FSL(27.46)	6.27	0.24	4	-1	-1	2	1.79	Moderate	L	8.39	Alkaline

NOTES:

1 - See Appendix A;

2 - PERMEABILITY CLASSES: VR = Very Rapid, R = Rapid, MR = Moderately Rapid, M = Moderate, MS = Moderately Slow, S = Slow, VS = Very Slow, I = Impermeable;

3 - RUNOFF CLASS: N = Negligible, LV = Very Low, L = Low, M = Medium, H = High, HV = Very High;

Table 3. Soil characteristics that represent a potential limiting condition within the soil profile (< 5 feet) across the entire field.

Field Name	Depth to Limiting Layer < 5 feet - Soil Layer with > 50 % Gravel, Cobble or Stone					Depth to Limiting Layer < 5 feet - Pan[1]				
	Dominant Condition		Most Limiting Condition			Dominant Condition		Most Limiting Condition		
	Layer Description[1,2]	Acres	Layer Description[1,2]	Acres	Minimum Depth (in)	Layer Description	Acres	Layer Description	Acres	Minimum Depth (in)
Field 19	None Present	80.6		80.6	0	No Pan Present	80.6	No Pan Present	80.6	0
Pasture	None Present	22.25	GRV	5.21	26	Pan Present	27.46	Pan Present	27.46	0

Field Name	Depth to Limiting Layer < 5 feet - Rock					Depth to Limiting Layer < 5 feet - Seasonal High Water Table				
	Dominant Condition		Most Limiting Condition			Dominant Condition		Most Limiting Condition		
	Layer Description	Acres	Layer Description	Acres	Minimum Depth (in)	Layer Description	Acres	Layer Description	Acres	Minimum Depth (in)
Field 19	No Rock Layer Present	80.6	No Rock Layer Present	80.6	N/A	No Water Table Present	80.6	No Water Table Present	80.6	4
Pasture	No Rock Layer Present	27.46	No Rock Layer Present	27.46	N/A	Water Table Present	22.25	Water Table Present	22.25	4

Field Name	Drainage Class[1,3]		Hydrologic Group[1]	
	Dominant Drainage Class	Acres	Dominant Hydrologic Group	Acres
Field 19	Moderately well drained	80.6	C	80.6
Pasture	Moderately well drained	22.25	C	22.25

NOTES:

1 - See Appendix A;

2 - GRAVEL, COBBLE, or STONE: GRV = Very Gravelly, GRX = Extremely Gravelly, CBV = Very Cobbly, CBX = Extremely Cobbly, STV = Very Stony, STX = Extremely Stony, WB = Weathered Bedrock, and UWB = Unweathered Bedrock;

3 - DRAINAGE CLASS: E = Excessively drained, SE = Somewhat Excessively drained, W = Well drained, MW = Moderately Well drained, SP = Somewhat Poorly drained, P = Poorly drained, VP = Very Poorly drained;

ANALYSIS OF SOIL CHARACTERISTICS Legend

Soil Pan

Hardpan – A hardened or cemented layer soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

Claypan – A slowly permeable soil horizon that contains much more clay than the horizon above it. A claypan is commonly hard when dry and plastic or stiff when wet.

Plowpan – A compacted layer formed in the soil directly below the plow layer.

Fragipan – A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restrict roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than deform slowly.

Soil Drainage Class

Excessively drained (E). Water is removed very rapidly. The occurrence of internal free water commonly is very rare or very deep. The soils are commonly coarse-textured and have very high hydraulic conductivity or are very shallow. They are not suited to crop production unless irrigated.

Somewhat excessively drained (SE). Water is removed from the soil rapidly. Internal free water occurrence commonly is very rare or very deep. The soils are commonly coarse-textured and have high saturated hydraulic conductivity or are very shallow. Without irrigation, only a narrow range of crops can be grown and yields are low.

Well drained (W). Water is removed from the soil readily but not rapidly. Internal free water occurrence commonly is deep or very deep; annual duration is not specified. Water is available to plants throughout most of the growing season in humid regions. Wetness does not inhibit growth of roots for significant periods during most growing seasons.

Moderately well drained (MW). Water is removed from the soil somewhat slowly during some periods of the year. Internal free water occurrence commonly is moderately deep and transitory through permanent. The soils are wet for only a short time within the rooting depth during the growing season, but long enough that most mesophytic crops are affected. They commonly have a moderately low or lower saturated hydraulic conductivity in a layer within the upper 1 m, periodically receive high rainfall, or both.

Somewhat poorly drained (SP). Water is removed slowly so that the soil is wet at a shallow depth for significant periods during the growing season. The occurrence of internal free water commonly is shallow to moderately deep and transitory to permanent. Wetness markedly restricts the growth of mesophytic crops, unless artificial drainage is provided. The soils commonly have one or more of the following characteristics: low or very low saturated hydraulic conductivity, a high water table, additional water from seepage, or nearly continuous rainfall.

Poorly drained (P). Water is removed so slowly that the soil is wet at shallow depths periodically during the growing season or remains wet for long periods. The occurrence of internal free water is shallow or very shallow and common or persistent. Free water is commonly at or near the surface long enough during the growing season so that most mesophytic crops cannot be grown, unless the soil is artificially drained. The soil, however, is not continuously wet directly below plow-depth. Free water at shallow depth is usually present. This water table is commonly the result of low or very low saturated hydraulic conductivity of nearly continuous rainfall, or of a combination of these.

Very poorly drained (VP). Water is removed from the soil so slowly that free water remains at or very near the ground surface during much of the growing season. The occurrence of internal free water is very shallow and persistent or permanent. Unless the soil is artificially drained, most mesophytic crops cannot be grown. The soils are commonly level or depressed and frequently ponded. If rainfall is high or nearly continuous, slope gradients may be greater.

Soil Hydrologic Group

Group A – Soils that have low runoff potential and high infiltration rates even when thoroughly wetted. They consist chiefly of deep, well to excessively drained sands and gravels. These soils have a high rate of water transmission (greater than 0.30 in/hr).

Group B – Soils that have moderate infiltration rates when thoroughly wetted. They consist chiefly of moderately deep to deep, moderately well to well drained soils with moderately fine to moderately coarse textures. These soils have a moderate rate of water transmission (greater than 0.15 – 0.30 in/hr).

Group C – Soils that have low infiltration rates when thoroughly wetted. They consist chiefly of soils with a layer that impedes downward movement of water and soils with moderately fine to fine texture. These soils have a low rate of water transmission (greater than 0.05 - 0.15 in/hr).

Group D – Soils that have high runoff potential. They have very low infiltration rates when thoroughly wetted. They consist chiefly of clay soils with high swelling potential, soils with a permanent high water table, soils with a claypan or clay layer at or near the surface, and shallow soils over impervious material. These soils have a very low rate of water transmission (greater than 0.0 - 0.05 in/hr).

Soil Permeability Class

Very Rapid:	20.0 to 100.0 inches/hour
Rapid:	6.0 to 20.0 inches/hour
Moderately Rapid:	2.0 to 6.0 inches/hour
Moderate:	0.6 to 2.0 inches/hour
Moderately Slow:	0.2 to 0.6 inches/hour
Slow:	0.06 to 0.20 inches
Very Slow:	0.0015 to 0.06 inches/hour
Impermeable:	0.0000 to 0.0015 inches/hour

Soil Texture Modifiers, Texture Class and Terms Used in Lieu of Texture.

Texture Modifiers		Texture Class		Terms used in lieu of texture	
ASHY	Ashy	C	Clay	BR	Bedrock
BY	Bouldery	CL	Clay loam	BY	Boulders
BYV	Very bouldery	COS	Coarse sand	CB	Cobbles
BYX	Extremely bouldery	COSL	Coarse sandy loam	CN	Channers
CB	Cobbly	FS	Fine sand	DUR	Duripan
CBV	Very cobbly	FSL	Fine sandy loam	FL	Flagstones
CBX	Extremely cobbly	L	Loam	G	Gravel
CN	Channery	LCOS	Loamy coarse sand	HPM	Highly Decomposed plant material
CNV	Very channery	LFS	Loamy fine sand	MAT	Material
CNX	Extremely channery	LS	Loamy sand	MPM	Moderately Decomposed plant material
COP	Coprogenous	LVFS	Loamy very fine sand	MPT	Mucky peat
DIA	Diatomaceous	S	Sand	MUCK	Muck
FL	Flaggy	SC	Sandy clay	OR	Ortstein
FLV	Very flaggy	SCL	Sandy clay loam	PBY	Paraboulders
FLX	Extremely flaggy	SI	Silt	PC	Petrocalcic
GR	Gravelly	SIC	Silty clay	PCB	Paracobbles
GRC	Coarse gravelly	SICL	Silty clay loam	PCN	Parachanners
GRF	Fine gravelly	SIL	Silt loam	PEAT	Peat
GRM	Medium gravelly	SL	Sandy loam	PF	Petroferric
GRV	Very gravelly	VFS	Very fine sand	PFL	Paraflagstones
GRX	Extremely gravelly	VFSL	Very fine sandy loam	PG	Paragravel
GS	Grassy			PGP	Petrogypsic
GYP	Gypsiferous			PL	Placic
HB	Herbaceous			PST	Parastones
HYDR	Hydrous			SPM	Slightly Decomposed plant material
MEDL	Medial			ST	Stones
MK	Mucky			W	Water
MR	Marly				

MS	Mossy
PBY	Parabouldery
PBYV	Very Parabouldery
PBYX	Extremely Parabouldery
PCB	Paracobbly
PCBV	Very Paracobbly
PCBX	Extremely Paracobbly
PCN	Parachannery
PCNV	Very Parachannery
PCNX	Extremely Parachannery
PF	Permanently frozen
PFL	Paraflaggy
PFLV	Very Paraflaggy
PFLX	Extremely Paraflaggy
PGR	Paragravelly
PGRV	Very Paragravelly
PGRX	Extremely Paragravelly
PST	Parastony
PSTV	Very Parastony
PSTX	Extremely Parastony
PT	Peaty
ST	Stony
STV	Very stony
STX	Extremely stony
WD	Woody

Appendix B: NUTRIENT RISK ANALYSIS

Phosphorus Runoff Risk Assessment

FIELD: Field 19
Overall Risk Rating: Very High
Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus

Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 79

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: Surface applied no incorporation

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to

sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: Pasture
Overall Risk Rating: Very High
Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 73.2

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: Very High

Manure Application Method: N/A

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.
Comments: No Data

Runoff Best Management Practices Rating: Low
List best management practices that mitigate runoff(See Appendix B)
Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High
Distance to Surface Water Body: 0
Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

Nutrient Leaching Risk Assessment

FIELD: Field 19
Overall Risk Rating: Medium
Leaching losses may be contributing to soluble nutrient leaching below the root zone during some years.
Percolation Rating: Very Low or N.A.
Deep Percolation (as % of Evapotranspiration): <5% Over ET
Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.
Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very High

Comments: Due to the low irrigation efficiency on this field, conversion to a more efficient irrigation system like Sprinkler or Drip Irrigation should be considered. If this is not possible consider shorter set times to minimize runoff and/or the length of run to minimize leaching. A Tail water Recovery & Pumpback System will help to reduce or eliminate runoff. An additional consideration is to incorporate a Surge Irrigation that will help to reduce runoff and deep percolation losses. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth Rating: High

Comments: Because the water table is near the surface (and/or the soil is shallow), this field is vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a significant concern.

FIELD: Pasture

Overall Risk Rating: Medium

Leaching losses may be contributing to soluble nutrient leaching below the root zone during some years.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very High

Comments: Due to the low irrigation efficiency on this field, conversion to a more efficient irrigation system like Sprinkler or Drip Irrigation should be considered. If this is not possible consider shorter set times to minimize runoff and/or the length of run to minimize leaching. A Tail water Recovery & Pumpback System will help to reduce or eliminate runoff. An additional consideration is to incorporate a Surge Irrigation that will help to reduce runoff and deep percolation losses. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth Rating: High

Comments: Because the water table is near the surface (and/or the soil is shallow), this field is vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a significant concern.

NUTRIENT RISK ANALYSIS Legend

BMP	Definition	Purpose
Buffer Strip	Contour buffer strips are strips of perennial grass alternated with wider cultivated strips that are farmed on the contour.	Contour buffer strips slow runoff water and trap sediment. Consequently, soil erosion is generally reduced significantly by this practice. Sediments, nutrients, pesticides, and other potential pollutants are filtered out as water flows through the grass strips. The grass strips also provide food and cover for wildlife.
Channel Vegetation	Establishing and maintaining adequate plants on channel banks, berms, spoil, and associated areas.	To stabilize channel banks and adjacent areas and reduce erosion and sedimentation. To maintain or enhance the quality of the environment, including visual aspects and fish and wildlife habitat.

Chiseling and Sub soiling	Loosening the soil, without inverting and with a minimum of mixing of the surface soil, to shatter restrictive layers below normal plow depth that inhibit water movement or root development.	To improve water and root penetration and aeration.
Composting Facility	A composting facility is installed for biological stabilization of waste organic material.	The purpose of this practice is to biologically treat waste organic material and produce humus-like material that can be recycled as a soil amendment or organic fertilizer. The material may also be used by other acceptable methods of recycling that comply with laws, rules and regulations.
Conservation Cover	This practice involves establishing and maintaining a protective cover of perennial vegetation on land retired from agriculture production.	This practice reduces soil erosion, associated sedimentation, improves water quality, and creates or enhances wildlife habitat.
Conservation Cropping Sequence	Growing crops in a recurring sequence on the same field.	This practice may be applied as part of a best management practice to support one or more of the following: Reduce sheet and rill erosion, Reduce irrigation induced erosion, Reduce soil erosion from wind, Maintain or improve soil organic matter content, Manage deficient or excess plant nutrients, Improve water use efficiency, Manage saline seeps, Manage plant pests (weeds, insects, diseases), Provide food for domestic livestock, and Provide food

		and cover for wildlife.
Contour Farming	Farming sloping land in such a way that preparing land, planting, and cultivating are done on the contours. (This includes following established grades of terraces or diversion.)	To reduce erosion and control water.
Cover and Green Manure Crop	A crop of close-growing, legumes, or small grain grown primarily for seasonal protection and soil improvement. It usually is grown for 1 year or less, except where there is permanent cover as in orchards.	To control erosion during periods when the major crops do not furnish adequate cover; add organic material to the soil; and improve infiltration, aeration, and tilth.
Critical Area Planting	Planting vegetation on critically eroding areas that require extraordinary treatment.	This practice is used on highly erodible areas that cannot be stabilized by ordinary planting techniques and if left untreated may cause severe erosion or sediment damage. Examples of critical areas include the following: 1) Dams, dikes, levees, and other construction sites with very steep slopes, 2) Mine spoil and surface mined land with poor quality soil and possibly chemical problems, and 3) Agriculture land with severe gullies requiring specialized planting techniques and management.
Dike or Berm	An embankment constructed of earth or other suitable materials to protect land against overflow or to regulate water.	Dikes are used to: Permit improvement of agricultural land by preventing overflow and better use of drainage facilities, Prevent damage to land and property, Facilitate water storage and control in connection with wildlife and

		other developments, and Protect natural areas, scenic features and archeological sites from damage.
Diversion	A channel constructed across the slope with a supporting ridge on the lower side.	To divert excess water from one area for use or safe disposal in other areas.
Drip Irrigation	A planned irrigation system in which all necessary facilities are installed for efficiently applying water directly to the root zone of plants by means of applicators (orifices, emitters, porous tubing, and perforated pipe) operated under low pressure. The applicators can be placed on or below the surface of the ground.	To efficiently apply water directly to the plant root zone to maintain soil moisture within the range for good plant growth and without excessive water loss, erosion, reduction in water quality, or salt accumulation.
Filter Strip	A strip or area of vegetation for removing pollutants water.	A filter strip reduces pollution by filtration, deposition, infiltration, absorption, adsorption, decomposition, and volatilization of sediment, organic matter, and other pollutants from runoff and waste water.
Fish Stream Improvement	Fish Stream Improvement is improving a stream channel to make or enhance fish habitat.	The purpose of the practice is to increase production of desired species of fish. The practice involves improving food supplies, shelter, spawning areas, water quality, and other elements of fish habitat.
Grade Stabilization Construction	A structure used to control the grade and head cutting in natural or artificial channels.	These structures are to: Stabilize the grade and control erosion in natural or artificial channels, prevent the formation or advance of

		gullies, enhance environmental quality, and reduce pollution hazards.
Grassed Waterway	A natural or constructed channel that is shaped or graded to required dimensions and established in suitable vegetation for the stable conveyance of runoff.	Grassed waterways convey runoff from terraces, diversions, or other water concentrations without causing erosion or flooding and to improve water quality.
Grazing Land Mechanical Treatment	Modifying physical soil and/or plant conditions with mechanical tools by treatments such as; pitting, contour furrowing, and ripping or sub-soiling.	This practice should be applied as part of a best management practice to support one or more of the following purposes: Fracture compacted soil layers and improve soil permeability, Reduce water runoff and increase infiltration, Break up sod bound conditions and thatch to increase plant vigor, and Renovate and stimulate plant community for greater productivity and yield.
Heavy Use Area Protection	Protecting heavily used areas by establishing vegetative cover, by surfacing with suitable materials, or by installing needed structures.	To stabilize urban, recreation, or facility areas frequently and intensely used by people, animals, or vehicles.
Irrigation Land Leveling	Reshaping the surface of land to be irrigated to planned grades.	To permit uniform and efficient application of irrigation water without causing erosion, loss of water quality, or damage to land by water logging and at the same time to provide for adequate surface drainage.
Irrigation Water Management	Irrigation water management is the process of determining and	Irrigation water management is applied as part of a

	controlling the volume, frequency, and application rate of irrigation water in a planned, efficient manner.	conservation management system to support one or more of the following: Manage soil Moisture to promote desired crop response; Optimize use of available water supplies; Minimize irrigation induced soil erosion; Decrease non-point source pollution of surface and groundwater resources; Manage salts in the crop root zone; Manage air, soil, or plant micro-climate.
Mulching	Applying plant residues or other suitable materials not produced on the site to the soil surface.	To conserve moisture; prevent surface compaction or crusting; reduce runoff and erosion; control weeds; and help establish plant cover.
Polyacrylamide (PAM)	Polyacrylamide is an organic polymer formulated to stabilize soil when applied in irrigation water.	Water applied with PAM stabilizes soil aggregates which can then resist the erosive forces of water. If correctly applied, PAM will produce clear runoff water and residue erosion within the field by over 90 percent.
Prescribed Grazing	Prescribed grazing is the controlled harvest of vegetation with grazing animals, managed with the intent to achieve a specific objective.	Application of this practice will manipulate the intensity, frequency, duration, and season of grazing to: 1) Improve water infiltration, 2) maintain or improve riparian and upland area vegetation, 3) protect stream banks from erosion, 4) manage for deposition of fecal material away from water bodies, and 5) promote ecological and economically stable plant communities which meet

		landowner objectives.
Residue Management (Conservation Tillage)	Managing the amount, orientation, and distribution of crop and other plant residue on the soil surface.	This practice may be applied as part of a conservation system to support one or more of the following: Reduce sheet and rill erosion. Reduce wind erosion. Maintain or improve soil organic matter content and tilth. Conserve soil moisture. Manage snow to increase plant available moisture. Provide food and escape cover for wildlife.
Riparian Forest Buffer	A riparian forest buffer is an area of trees and/or shrubs located adjacent to a body of water. The vegetation extends outward from the water body for a specified distance necessary to provide a minimum level of protection and/or enhancement.	The riparian forest buffer is a multi-purpose practice design to accomplish one or more of the following: Create shade to lower water temperatures and improve habitat for aquatic animals, Provide a source of debris necessary for healthy robust populations of aquatic organisms and wildlife, and Act as a buffer to filter out sediment, organic material, fertilizer, pesticides and other pollutants that may adversely impact the water body, including shallow ground water.
Sediment Basin	A basin constructed to collect and store debris or sediment.	A sediment basin may have the following uses: Preserve the capacity of reservoirs, ditches, canals, diversion, waterways, and streams, Prevent undesirable deposition on bottom lands and developed areas, Trap sediment originating from construction sites, and Reduce

		or abate pollution by providing basins for deposition and storage of silt, sand, gravel, stone, agricultural wastes, and other detritus.
Sprinkler System	A planned irrigation system in which all necessary facilities are installed for efficiently applying water by means of perforated pipes or nozzles operated under pressure.	To efficiently and uniformly apply irrigation water to maintain adequate soil moisture for optimum plant growth without causing excessive water loss, erosion, or reduced water quality.
Stream Channel Stabilization	Stabilizing the channel of a stream with suitable structures.	To control aggradation or degradation in a stream channel.
Stream bank Protection	Using vegetation or structures to stabilize and protect banks of streams, lakes, estuaries, or excavated channels against scour and erosion.	To stabilize or protect banks of streams, lakes, estuaries, or excavated channels for one or more of the following purposes: Prevent the loss of land or damage to utilities, roads, buildings, or other facilities adjacent to the banks, Maintain the capacity of the channel, Control channel meander that would adversely affect downstream facilities, Reduce sediment loads causing downstream damages and pollution, and Improve the stream for recreation or as a habitat for fish and wildlife.
Strip-cropping, Contour	Growing crops in a systematic arrangement of strips or bands on the contour to reduce water erosion. The crops are arranged so that a strip of grass or close-growing crop is alternated with a	To reduce sheet and rill erosion and/or to reduce transport of sediment and other water-borne contaminants.

	strip of clean-tilled crop or fallow or a strip of grass is alternated with a close-growing crop.	
Strip-cropping, Field	Growing crops in a systematic arrangement of strips or bands across the general slope (not on the contour) to reduce water erosion. The crops are arranged so that a strip of grass or a close-growing crop is alternated with a clean-tilled crop or fallow.	To help control erosion and runoff on sloping cropland where contour strip-cropping is not practical.
Subsurface Drains	A Subsurface Drain is a conduit, such as corrugated plastic tubing, tile, or pipe, installed beneath the ground surface to collect and/or convey drainage water.	The purpose of a subsurface drain is to: Improve the environment for vegetation, Reduce erosion, Improve water quality, Collect ground water for beneficial use, Remove water from heavy use areas such as recreation areas, or around buildings, and Regulate water to control health hazards caused by pests.
Surge Irrigation	Surge irrigation is the intermittent application of water to furrows, corrugates, or borders creating a series of on and off periods of constant or variable time spans.	Surge allows a lighter application of water with a higher efficiency. The result is less deep percolation of water at the upper end of the field and a more uniform application.
Tail water Recovery & Pumpback System	A facility to collect, store, and transport irrigation tail water for reuse in a farm irrigation distribution system.	To conserve farm irrigation water supplies and water quality by collecting the water that runs off the field surface for reuse on the farm.
Terraces	An earth embankment, a channel, or a combination ridge and	Reduce slope length, reduce sediment content in runoff

	channel constructed across the slope.	water, reduce erosion, Improve water quality, intercept and conduct surface runoff at a non-erosive velocity to a stable outlet, retain runoff for moisture conservation, prevent gully development, reform the land surface, improve farmability, and reduce flooding.
Use Exclusion	Excluding animals, people or vehicles from an area.	To protect, maintain, or improve the quantity and quality of the plant, animal, soil, air, water, and aesthetics resources and human health and safety.
Water and Sediment Control Basin	An earth embankment or a combination ridge and channel generally constructed across the slope and minor watercourses to form a sediment trap and water detention basin.	To improve farmability of sloping land, reduce watercourse and gully erosion, trap sediment, reduce and manage onsite and downstream runoff, and improve downstream water quality.
Watering Facility	A device (tank, trough, or other watertight container) for providing animal access to water.	To provide watering facilities for livestock and/or wildlife at selected locations in order to: 1) protect and enhance vegetative cover through proper distribution of grazing; 2) provide erosion control through better grassland management; or 3) protect streams, ponds and water supplies from contamination by providing alternative access to water.
Wetland	The construction or restoration of	To develop or restore hydric

Development/Restoration	a wetland facility to provide the hydrological and biological benefits of a wetland.	soil conditions, hydrologic conditions, hydrophytic plant communities, and wetland functions.

Appendix C: CROP SPECIFIC GUIDELINES

Corn-Field Grain, Irrigated South ID

NITROGEN

Nitrogen rates depend upon some of the following factors: previous crop, past fertilizer use, soil type and leaching hazard and realistic yield goal for the grower and the area. Adequate N is necessary for maximum economic production of irrigated field corn used for silage or grain. Fertilizer N represents by far the largest share of the fertilizer costs for field corn in Idaho. The amount of N required depends on many factors that influence total corn production and quality. These factors include length of growing season, corn hybrid, previous crop, past fertilizer use, soil type, leaching hazard and previous manuring. Estimates of both the N available to corn during the season and the yield potential of the crop should be considered when determining N fertilizer rates.

TOTAL N REQUIREMENTS BASED ON POTENTIAL YIELD

Fertilizer N rates should be used which correspond to the yield growers can reasonably expect under their soil and management conditions. The historical field corn yield obtained by a grower in a specific field or area generally provides a fair approximation of yield potential given a grower's traditional crop management. Projected changes in crop management (i.e. improved variety, better disease and weed control) designed to appreciably increase production may require adjustment of yield potential upward. Research has shown that the available N required to produce a good field corn yield depends on a variety of crop management practices. Factors such as weed, insect and disease control as well as irrigation, planting date and soil type can influence the N required by triticale for maximum yield.

AVAILABLE NITROGEN

Available N in the soil includes mineralizable N (released from organic matter during the growing season) inorganic N as nitrate (N03-N) and ammonium (NH4-N), and N credits from previous cropping or manures. Each component of available N must be estimated for accurate determination of optimum fertilizer N rates.

MINERALIZABLE NITROGEN - Soils vary in their capacity to release N from organic matter during the growing season. The amount of N released depends on such factors as soil type, soil moisture, soil temperature, previous crop, and the history of fertilizer N applied. While soil organic matter content is frequently used to estimate annual mineralizable N contributions, in southern Idaho irrigated soils organic matter does not accurately predict the amount of N that is mineralized.

INORGANIC NITROGEN - Residual soil inorganic N (N03, NH4) can be evaluated most effectively with a soil test. Soil samples should be collected in foot increments to a depth of two feet, unless roots are restricted by dense soil layers or high water tables.

Ammonium is generally low in pre-plant soil samples and thus contributes little to available N. However, it can be as high or higher than N03-N. NH4-N should be determined along with N03-N, especially when there is reason to expect the presence of appreciable NH4-N, such as recent ammonium N fertilizer applications. Soil samples should be collected before seeding in the spring to represent the area to be fertilized.

NITROGEN FROM PREVIOUS CROP RESIDUES - Nitrogen associated with decomposition of previous crop residues should also be considered when estimating available N. Residues that require additional N for decomposition include cereal straw and mature corn stalks. Research has shown that 15 pounds of additional N are needed per ton of straw returned to the soil, up to a maximum of 50 pounds. For more information on compensating for cereal residues, refer to CIS 825, "Wheat Straw Management and Nitrogen Fertilizer Requirements."

Row crop residues (potatoes, sugar beets, onions) generally do not require additional N for decomposition. Consequently, these residues have little effect on the N needs of field corn.

Legume residues from beans, peas, and alfalfa can release appreciable N during the following crop season that may not be reflected by the pre-plant soil test. This N is derived from the decomposition of both plant tops and nodulated root systems.

NITROGEN FROM MANURES - Soils in which field corn is grown occasionally receive animal manures or lagoon wastes. Nutrient contributions from these sources should also be taken into consideration when estimating available N for the next season. Manures can preclude the need for any fertilizer, depending on the rate applied and their nutrient composition.

Manures can vary appreciably depending on the animal, how the manure is processed, and the kind and extent of bedding material. For the most accurate estimate of fertilizer equivalent values, the manure should be analyzed for its nutrient content.

IRRIGATION WATER - Irrigation waters derived from deep wells are generally low in N. More shallow wells can have significant levels of nitrogen because of leaching of nitrogen from impacts from commercial fertilizer use, animal waste, and improperly functioning septic systems. Irrigation waters from most districts are also low in N when diverted from its source. Background levels of N from original sources are generally about 2 parts per million (ppm). The more return flow included in diverted water sources, the higher the N content. Return flows may include N dissolved when irrigation waters pass through fields high in residual or recently added fertilizer N as well as from soluble fertilizer N applied with the irrigation water.

Most irrigation districts should know the N content of the water they divert. Contact them for this information to determine the levels of N added with your irrigation water. However, since irrigation water N levels are influenced by upstream management, if you use irrigation water that receives runoff after it is diverted, only a water test can accurately evaluate the N added with irrigation waters.

For each ppm or milligrams per liter (mg/L) of N reported in the water sample, multiply by 2.7 to get the N added per acre foot of water applied. For example, if the water sample contained 10 ppm of N, 3 acre feet of water applied would be the equivalent of 81 pounds of N per acre. Typically, of the water applied with furrow irrigation only 50 percent is retained on the field and the rest runs off the end. The net retention of N applied with furrow irrigation would, therefore, be about half of the water applied or about 40 pounds

per acre in this example. If more or less of the irrigation water is retained with each wetting, then growers should adjust the water N contribution accordingly.

Excessive irrigation by any method reduces N availability to field corn. Additional N may be needed under these conditions. Growers should not use aqua or anhydrous N through a sprinkler irrigation system.

Water running soluble N sources with a furrow irrigation system can be an effective means of adding N. Two limitations of this practice are that (1) the application of the N with this method may not be as uniform as desired and (2) runoff containing the N may contaminate downstream surface waters. Growers can minimize the loss of N by shutting off the injection unit before the irrigation water reaches the end of the furrow. This practice should not substitute for careful consideration of N needs while N can be side dressed.

CALCULATION OF N APPLICATION RATES

To calculate the fertilizer N application rate, the following equation is used:

Fertilizer application rate (deficit) or Over application of Nitrogen =
(Total N required to produce a given yield) - (Mineralizable N) - (Inorganic N measured by the soil test) - (previous crop/residue management) - (Manure Nitrogen) - (Irrigation Water)

TIMING OF NITROGEN APPLICATION

Coarse-textured soils, including sandy loams, loamy soils and sands, may lose N from leaching. For these soils, side dress a portion of the N at the time of the last cultivation.

Sprinkler irrigation of corn under center pivots provides increased flexibility for providing N during the season. With sprinklers N can be injected into the system and applied with the water. On silt loam soils, split applications of N have not proven more effective as long as pre-plant N is adequately incorporated.

High N rates (approaching 300 pounds per acre) broadcast and incorporated before planting may reduce early season corn growth. If high N rates are needed, split applications should be considered.

High plant populations (above 28,000 to 30,000) and early plantings of longer season hybrids in the Treasure Valley will respond to high N rates provided there are no other limiting factors. High N rates will not compensate for reductions in stand or delayed plantings. High plant populations of field corn are more susceptible to N shortages because of greater competition among plants for limited N.

Side dressing may cause root pruning depending on plant size, distance of shank from the row and placement depth. High N rates (above 300 pounds per acre) broadcast and incorporated before planting may reduce early season corn growth. If high N rates are needed, split applications should be considered. On sandy textured soils subject to leaching, side dress a portion of the N at the time of the last cultivation. Under sprinkler irrigations, N can be injected through the lines throughout the season. On silt loam soils, split applications of N have not proven more effective as long as pre-plant N is adequately incorporated.

PHOSPHORUS

Adequate phosphorus (P) is necessary for maximum production of field corn. The soil test for P is based on samples collected from the first foot of soil. The soil is extracted with sodium bicarbonate.

Economic response to fertilizer P is more likely with cooler soil temperatures and soils with high lime content, particularly when planting long season hybrids. Phosphorus is an immobile nutrient that does not move appreciably from where it is placed. It should be mixed into the seedbed or banded within easy reach of the seedling roots before or during the planting operation.

POTASSIUM

Field corn requires adequate potassium (K) for optimum growth. Soil test K can be useful in determining the need for K fertilizers. The soil sample is taken from the first foot of soil and extracted with sodium bicarbonate. Fertilizer K rates are based on soil test.

MICRONUTRIENTS

Zinc (Zn) deficiencies occur primarily on soils that are eroded, leveled or where the exposed subsoil is higher in lime. The DTPA test on soil samples collected from the first foot can be used for identifying Zn fertilizer needs. Apply 10 pounds of Zn per acre when the soil test measures less than 0.6 ppm.

Other micronutrients have not been shown to limit corn production. "Shotgun" applications of micronutrient mixtures containing boron (B), copper (Cu), iron (Fe) and manganese (Mn) "for insurance" have not been shown to be economical and are not recommended.

SULFUR (S)

The major corn-growing regions in Idaho should not experience shortages of S. Areas with S deficiencies include some irrigated areas where both the soil and irrigation water are low in S. Snake River water is known to have high S concentrations. Coarse-textured soils including sandy loams, loamy sands and sands would be more susceptible to S deficiencies than silt loam soils. Where the need for S is evident, use 30 pounds per acre of sulfate-sulfur (S04).

SALINITY (SALTS)

Field corn has a low to moderate tolerance to accumulated salts. Soils with total salt readings above 3 or 4 mmhos/cm can be cropped effectively. Readings up to 6 are also satisfactory although more careful water management may be required.

Pasture, Irrigated South ID - Good Condition Root Depth 4 feet

Lack of adequate fertilizer, improper irrigation management, poor stands, non-adapted plant species and poor grazing management are the major causes of low forage production in irrigated pastures. When properly managed, pastures will respond to fertilization and produce large quantities of high-quality forage and livestock products. Irrigated pastures are typically composed either of grass-legume mixtures or grasses alone. The composition of the pasture can be changed by fertilizer management and grazing method. Adapted and high-quality grasses for irrigated pastures include

bromegrass and orchard grass for well-drained soil, fescue and wheatgrass for saline soils and creeping meadow foxtail and reed canary grass for wet soil. These grasses make excellent summer re-growth. Highest producing grass-legume mixtures usually include one or more of the above grasses with a well-adapted legume variety. An adapted legume variety should have good winter hardiness and resistance to insects and diseases.

NITROGEN

Nitrogen rates depend upon some of the following factors: previous crop, past fertilizer use, soil type and leaching hazard and realistic yield goal for the grower and the area. Grass pastures have responded well to nitrogen (N) fertilizer applications up to 150 pounds N per acre. The N rate depends upon the length of frost-free growing season and the number of cuttings or grazing periods. Production potential increases as the frost-free growing period is extended. Split applications of N fertilizer maintain a more uniform level of forage production through summer and fall. Broadcast 30 to 50 pounds N per acre per application after each cutting or grazing cycle, and irrigate to move N into the plant root zone. As the amount of legume increases in a grass/legume mixture, the need for N fertilizer decreases. When the legume composes over 60 percent of the mixture, responses from N are limited. Nitrogen applications will reduce the quantity of legume in a mixed species stand. Inoculation of legumes when the stand is established will reduce the need for N fertilization when legumes dominate the stand composition.

PHOSPHORUS

Intensively managed, high-producing pasture may respond to phosphorus (P) fertilization. Grasses generally have a low P requirement, and legumes generally have a high P requirement. Thus, P fertilizer applications tend to encourage legumes. Phosphorus movement in soils is limited, so P fertilizer needs to be placed in the rooting zone. Apply phosphorus during seedbed preparation whenever possible. Top-dress established pastures with P fertilizer, preferably in the fall.

POTASSIUM

Grasses have moderate potassium (K) requirements, and legumes have high K requirements. Idaho soils are usually high in natural K. Irrigation water contains K except in mountain streams. Potassium movement in soils is limited, though not to the same extent as that of phosphorus. Incorporate K during seedbed preparation or broadcast in the fall on established stands.

SULFUR

Sulfur (S) demand is greater for legumes than grasses. Sulfur requirements for grass and legumes will vary with soil texture, leaching losses, S soil test and S content of irrigation water. Apply 30 pounds of S to soil testing less than 10 ppm sulfate-sulfur (S04-S) in the plow layer. Areas irrigated with water from the Snake River and other streams fed by return flow should have adequate S. High rainfall areas, mountain valleys and foothill areas are likely areas for S deficiencies. Sulfur sources should be carefully selected due to variation in its availability to plants. Elemental sulfur must be converted so sulfate (S04) form by soil micro-organisms before it can be taken up by plants. Conversion of elemental S to S04 may take several months in warm moist soils. Elemental S fertilizers

cannot supply adequate levels of S the year of application. However, these elemental S sources can supply considerable S the year after the initial application. Sulfate-sulfur sources are recommended to alleviate deficiencies the year of application.

MICRONUTRIENTS

Deficiencies of micronutrients such as zinc (Zn), copper (Cu), manganese (Mn) and iron (Fe) have not been observed on irrigated pastures in southern Idaho. Grasses and legumes are not sensitive to low levels of micronutrients as are row crops such as beans and corn. Boron (B) deficiencies may be observed on legumes in gravelly textured soils. If the soil tests less than 0.25 ppm B, apply 1 to 3 pounds of B per acre. Do not use higher rates because B is toxic to plants in excessive amounts.

GENERAL COMMENTS

Nitrogen and phosphorus are the elements needed most on Idaho irrigated pastures. Potassium, sulfur, zinc and boron may be needed. Their need is best determined by soil and plant tissue tests.

Legume population in a grass-legume mixture is reduced by nitrogen fertilization and increased by phosphorus and potassium addition when these nutrients are low in the soil.

Forage from properly fertilized grass or mixed grass-legume pastures has higher protein, providing higher quality livestock feed than unfertilized pastures.

Irrigated pastures make good use of sloping land, stony soils and shallow soils which are less desirable for row crops. Pastures reduce soil erosion during irrigation on sloping land.

Fertilizers are only one part of pasture management. Pastures are most profitable when plant selection, irrigation and harvest techniques are not limiting production.

Rotational grazing will provide more forage and greater returns than continuous grazing.

Contact your County Extension Agent if you have any questions regarding the interpretation of this information or for further information on your local needs.

The above fertilizer guidelines are based on relationships established between University of Idaho soil test and crop yield response research. In this research, crop response to fertilizers was evaluated at several sites where the response to fertilizer differed. The recommendations reflect the general or overall response to fertilizers at specific soil test values and the response in individual fields can differ appreciably from the general table recommendation. Some sites will require less than the general recommendation, other sites more. Unfortunately, the science has not developed to the point where the table recommendations can account for all the unknown variables influencing the effectiveness

of applied fertilizers at individual sites. The table fertilizer recommendations can only be used as general guides rather than specific recommendations for each and every field.

Furthermore, soil variability can sharply reduce the accuracy composite soil test values for individual fields. That is why large contiguous areas within fields should be sampled separately when they are known to differ in crop growth or soil characteristics known to influence the response to fertilizer. But soil variability frequently does not occur conveniently in large areas that can be sampled separately or fertilized differently. The fertilizer recommendations in most cases do not account for this variability. Soil test based recommendations may be excessive in some field areas and inadequate in other areas of the same field. The recommendations then will be appropriate only to the degree that the composite soil test values for fields actually represent the field. Thus, for fields that are highly variable, the fertilizer recommendations should be considered conservative estimates of fertilizers needed. All the more reason to consider the table fertilizer recommendations as general guides rather than specific recommendations for each and every field.

The fertilizer rates suggested in the tables will support above average yields if other factors are not limiting production. Therefore the recommendations assume that good crop management practices will be used, i.e. insect, disease, and weed control. Nutrient requirements can be met using either commercial fertilizers or equivalent organic matter sources, such as manure or compost, provided their nutrient content and relative availability are known or can be estimated from published literature. Soil test based recommended rates will not be appropriate if the soil samples are improperly taken or do not represent the area to be fertilized. For nitrogen in particular, recommendations will be most accurate when crop history is taken into account and projected yields are reasonable estimates based on long term records.

General Comments:

- Over irrigation and nutrient loss is a hazard. Optimum irrigation management is necessary to meet crop water use needs and avoid loss of nutrients through leaching beyond the root zone and runoff with irrigation tail water.

- Nitrogen leaching is particularly a concern on sandy soils. Optimum management may require split Nitrogen applications to meet crop needs.

- Weed, insect, and disease control significantly influence the efficiency and effectiveness of your fertilizer applications and ultimately crop yield and farm profitability.

- Phosphorus, potassium, and zinc nutrients can be effectively fall-applied as they are not readily leached over winter.

- Phosphorus can be budgeted for a crop rotation.

• If you have questions regarding the interpretation of this information, please contact your Extension Agricultural agent, Crop consultant, or your commodity company fieldsman.

• Both farm profitability and water quality can be improved with efficient nutrient use. The following are recommendations in nutrient management, which will optimize nutrient use for crop production while protecting water quality:

1) Avoid the application of nutrient sources in close proximity to streams, wetlands, drainage ditches, areas of very shallow soils, and sinkholes.

2) Accurately calibrate nutrient application equipment to insure that recommended rates are applied.

3) Nitrogen recommendations for many crops are based on yield goals for the crops. It is important to establish realistic yield goals for each field based upon historical yield data, county averages, and your management practices to avoid unnecessary fertilizer costs and minimize potential water quality impairments.

Appendix D: SOIL TEST DATA

Field: No Data **Date of Test:** No Data

Parameter	Units	0-12"	12-24"	18-24"
Soil Texture		No Data	No Data	
EC	mmhos	No Data	No Data	
PH		No Data	No Data	
%Lime	%	No Data	No Data	
OM	%	No Data	No Data	
CEC	meq	No Data	No Data	
Nitrate-N	ppm	No Data	No Data	
Ammonia-N	ppm	No Data	No Data	
P	ppm	No Data	No Data	No Data
K	ppm	No Data	No Data	
Z	ppm	No Data	No Data	
Mn	ppm	No Data	No Data	
Fe	ppm	No Data	No Data	
Cu	ppm	No Data	No Data	
Ca	ppm	No Data	No Data	
Mg	ppm	No Data	No Data	
Na	ppm	No Data	No Data	

Grandview McCune

Nutrient Management Plan

Agriculture . . .

Launching into the Future

Nutrient Management Plan Prepared For:
Grandview Farms
(208) 834-2231
McCune Farm

Certified Planner:
Michael Mitchell
Professional Engineer, EAC Engineering, Inc
(559) 381-0607

Producer Signature: _____ Certificated Planner Signature: _____

Date Completed: 10-02-07

The information provided by those using the "Idaho OnePlan" shall be deemed to be trade secrets, production records, or other proprietary information and shall be kept confidential and shall be exempt from enclosure pursuant to section 9-340D, Idaho Code. (Title 22 Chapter 27 17D6)

MC CUNE FARM
Producer Summary

Farm Summary

McCune Farm is an existing farm located 1.5 miles northeast of Grandview, Idaho. The farm is owned by Grandview Farms and managed by Mike Usabel. The farm consists of two fields irrigated with handlines totaling 141 acres available for accepting imported manure/compost from Simplot/Grandview Feedlot.

Farm Resource Concerns

McCune Farm located in the Watershed Basin of the Middle Snake Succor (#17050103). The facility is found at 116W 04'03" 43N '00' 25" using GPS Coordinates. The primary resource concern for McCune Farm is ground water quality. No canals or laterals run through the property. Solid waste is applied to all of the fields and incorporated within seven days of application.

Nutrient Management Plan Requirements

Producer will maintain field application records for a minimum of five years and make them available for review at routine inspections by ISDA personnel. These records must include (where applicable):

1. Fertilizer application rates
2. Manure/Compost application rates
3. On each field, keep a record of manure and chemical fertilizer applications, crop information, and soil and manure test results.
4. Fields to which the nutrients are applied
5. Spring soil test for nitrogen (required annually)
   0-12" and 12-24" nitrogen test

Crop Nutrient Requirement	
Crop	**Pounds of P205 per acres**
Alfalfa	86
Sugarbeets	48

Manure/Compost field application requirement (tons)							
Acres x crop nutrient requirement ÷ manure p205 value* = Tons required							
Example	Corn - 250(acres)	X	75 (crop requirement)		÷	16.85	
Corn	250	X	79**	= 19750	÷ 16.85*	=	1172 tons

*based on manure test values for P205
**pounds of p205 required per acre

Irrigation Management Plan Recommendations

Irrigation water management is very important in nutrient management. If irrigation water is applied at a rate over the crop needs, there is potential for runoff and/or leaching of nutrients. If irrigation water is under-applied, the crop will not have optimal growth conditions. Crop irrigation water requirements changes through the growing season depending on climate

conditions and crop Evapotranspiration rate. Proper irrigation water management responds to these crop demands. It is recommended that:

- Irrigation schedules continue to be managed by your irrigation specialist.
- Continual inspection and maintenance of irrigation equipment will prevent unwarranted waste discharges into surface or ground water.

Nutrient Management Plan Recommendations

Land application of manure at agronomic rates, along with irrigation scheduling, is the most effective way to obtain maximum nutrient benefits from manure, condition the soil, and avoid potential water quality problems downstream. Cattle manure is a valuable resource, which will also improve soil properties such as water holding capacity, infiltration, tilth, structure, porosity, and nutrient retention and release. If animal manure and/or commercial fertilizers are not properly managed, contaminants may impact surface and/or groundwater.

Application of manure applied at an agronomic rate is a sustainable practice and is always allowed under ISDA regulations. Regardless of the rate prescribed by this nutrient management plan, soil testing at the 0-12 inch and 12-24 inch soil depths is required for nitrogen management.

- Set realistic crop yield goals in order to provide an accurate account of the plant nitrogen needs.
- Apply N so that it is available during peak plant demand.
- Apply fertilizer to cool season crop in the spring rather than the previous fall. This will prevent fertilizer leaching through the soil profile and provide the crop with the necessary levels of nutrients.
- Use split or multiple fertilizer applications in order to provide the crop with a pre-plant treatment and the needed nutrient levels throughout the growing season until the point of major nutrient uptake.
- Avoid the application of nutrient sources in close proximity to streams, wetlands, drainage ditches, areas of very shallow soils, and sinkholes.

McCune Farm

ANALYSIS OF RESOURCE CONCERNS

INTRODUCTION

The purpose of this nutrient management plan is to meet agricultural production goals and to certify that manure and nutrients are properly managed to minimize adverse impact to surface or groundwater. Plans are written in cooperation with the producer to:

1) assure proper containment of animal manure and process waste water

2) assess resource concerns which exist on the property

3) budget nutrient sources to optimize crop water and nutrient needs. Nutrient sources include commercial fertilizers, animal manure, mineralization of previous crop soil organic matter, accounting of residues, and irrigation water.

4) When applicable, assess irrigation water management to minimize movement of nutrients beyond the root zone or with runoff.

If animal manure and/or commercial fertilizers are not properly managed, contaminants may negatively impact surface and/or groundwater. Some water resource contaminants associated with poorly managed animal manure and fertilizers are:

Phosphorus in the soil readily adsorbs to soil particles; thus, erosion of soil by surface runoff is the general mode of phosphorus transport. Even at very low concentrations, phosphorus can result in plant and algae blooms in surface water bodies. Alga blooms are a nuisance to boaters, irrigators, and others. Toxins released by certain algae can be lethal to livestock or other animals that drink the water. Dissolved oxygen in the water is depleted as algae die and decompose, sometimes causing fish kills.

Nitrogen in the form of nitrate (NO_3^-) is highly water-soluble and will move with water, particularly down the soil profile past the root zone if not utilized by plants (thus becoming a groundwater contamination issue).Nitrates are toxic to infants under 6 months, and to livestock at high concentrations. In surface water, excess nitrogen, like phosphorus, can result in nuisance plant and algae growth.

Organic matter in high load decreases dissolved oxygen in a surface water body when it decomposes. Low levels of dissolved oxygen is harmful or even fatal to fish and other aquatic life.

Bacteria and microorganism illnesses (pathogens) potentially transmitted through water by animal manure include Giardia, Typhoid Fever, Cryptosporidium, and Cholera. Pathogens from animal waste can negatively impact surface and groundwater quality.

FACILITY DESCRIPTION

Owner Information

Owner (1):	Grandview Farms
Address:	1301 Hwy 67 , Grandview, ID 83624
Phone:	(208) 834-2231 N/A
	N/A

Location

Site Map: Facility site plan illustrated in Figure 1

Soil Conservation District:	Elmore
County:	Elmore
Watershed Basin:	Middle Snake-succor (USGS Hydrologic Unit Code # 17050103)

ANALYSIS OF RESOURCE CONCERNS

Farm Resource Concerns

McCune Farm is located in a watershed containing water quality limited stream segments listed according to the Clean Water Act. Stream segments are listed because a water quality parameter prevents the attainment of the "Fishable/Swimmable" goal of the Clean Water Act.

WATERBODY	BOUNDARIES	BACT	CHAN STAB	DO	FLOW ALT	HAB ALT	MET HG	MET	NH3	NUTR	O_G	ORG	PEST	PH	SAL	SED	TDG	TEMP	UNKN	*
Snake River	CJ Strike Res to Castle Creek	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	

McCune Farm is not located in a critical Nitrate-Nitrogen management area. Nitrate Management Areas are designated based upon ground water quality sampling results. Two priority groups exist as follows:

Priority 1 is designated because at least 25% of the ground water sampling locations within the area exceed 5-milligrams/liter nitrate. This is one-half of the maximum contaminant level of 10-milligrams/liter nitrate. This nitrate concentration is considered evidence of significant degradation. Public drinking water systems are required to increase monitoring frequency when this level is reached.

Priority 2 is designated because at least 50% of the ground water sampling locations within the area exceed 2-milligrams/liter nitrate. This concentration threshold provides an indication of human-caused (anthropogenic) impacts. The upper limit for naturally occurring (background) concentrations of nitrate is considered to be about 2 mg/l.

McCune Farm is located in a sole source aquifer area - Western Snake River Plain Aquifer.

Field Resource Concerns

- **Drain Tile Outlet** - Subsurface drains can deliver nutrients to surface water. Subsurface drains run the risk of decreased time for contact of the nutrients to adsorb onto soil particles or to be utilized by the crop. Irrigation management is also affected because shallow soils have a lower water holding capacity.

Depth Limiting Subsurface Features

Field Name	Subsurface Feature	Depth from Surface (in)
Field 20	Fractured Bedrock	20
	Water Table	48
Field 21	Fractured Bedrock	20
	Water Table	48

Well Testing Results (See back of page):

Well	Date	Hardness	EC	PH	K	Nitrates	Nitrites	NH3	Na	Carbonate	Bicarbonate
No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data

ISDA REGULATIONS AND THE IDAHO NUTRIENT MANAGEMENT STANDARD

Nutrient management plans for animal agricultural operations regulated by the Idaho State Department of Agriculture (ISDA) must be approved by the Idaho State Department of Agriculture and must follow the Natural Resource Conservation Service (NRCS) Agriculture Waste Management Field Handbook and the Idaho Nutrient Management Standard. ISDA regulation and the Standard use soil test phosphorus as the indicator for environmental impact from agricultural production practices. The Idaho Nutrient Management Standard is based on a threshold soil test phosphorus level (TH), above which there is no agronomic advantage to application of phosphorus.

The Idaho Nutrient Management Standard categorizes fields as a surface water concern or a groundwater concern. A surface water concern indicates that runoff leaves the contiguous operating unit from normal

storm events, rain on snow, frozen ground, or irrigation. The soil phosphorus threshold for a field with a surface water concern is 40 ppm phosphorus for soils alkaline (ph > 6) tested with the Olsen method and 60 ppm phosphorus for acidic (ph < 6.5) soils tested with the Bray method (0-12"Soil Sample Depth).

A groundwater resource concern indicates that runoff does not leave the contiguous operating unit from normal storm events, rain on snow, frozen ground, or irrigation. There are two sub-categories for fields identified as having a groundwater concern. The first category applies to fields with a resource concern within the first five feet of the soil profile. A resource concern could be shallow soils, gravel, cobble, bedrock, high groundwater table, or a drained field. These fields are indicated as a groundwater concern <5'. The soil phosphorus threshold for a field with a groundwater concern <5' is 20 ppm phosphorus for soils tested with the Olsen method and 25 ppm phosphorus for soils tested with the Bray method(18-24" Soil Sample Depth).

If a field is not classified as having a surface water concern or a groundwater <5' concern, by default it is classified as having a groundwater concern >5'. The soil phosphorus threshold for a field with a groundwater concern >5' is 30 ppm phosphorus for soils tested with the Olsen method and 45 ppm phosphorus for soils tested with the Bray method(18-24" Soil Sample Depth).

Field Phosphorus Threshold

Field	Resource Concern	P Threshold (ppm)	P Threshold Soil Test Depth
Field 20	Groundwater < 5'	20	18 - 24"
Field 21	Groundwater < 5'	20	18 - 24"

Farm Location

Idaho Transverse Mercator

Coordinates of the farm center (meters): X = 2331384.50808435, Y = 1313936.0095847

Map Scale: 1 : 116

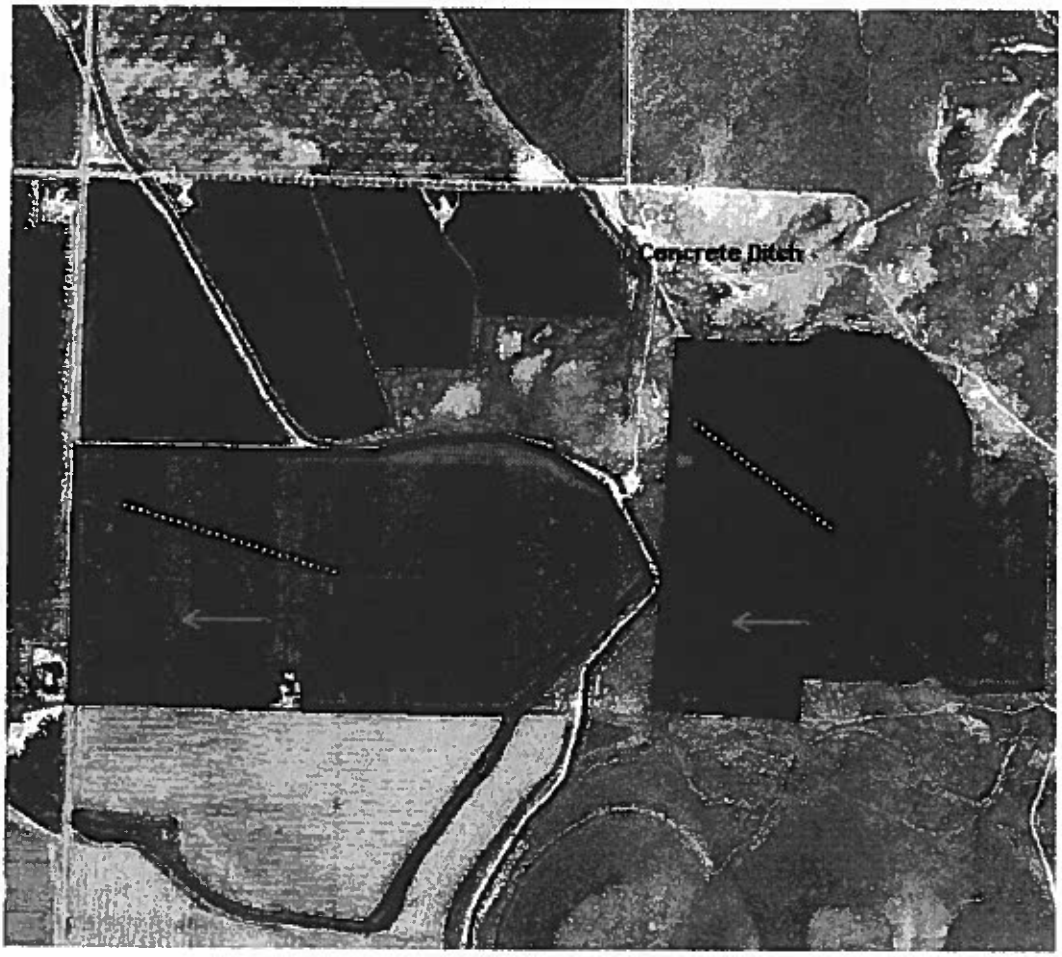


Figure 1. Base Map

Farm Location

Idaho Transverse Mercator

Coordinates of the farm center (meters): X = 2331384.50808435, Y = 1313936.0095847

Map Scale: 1 : 120

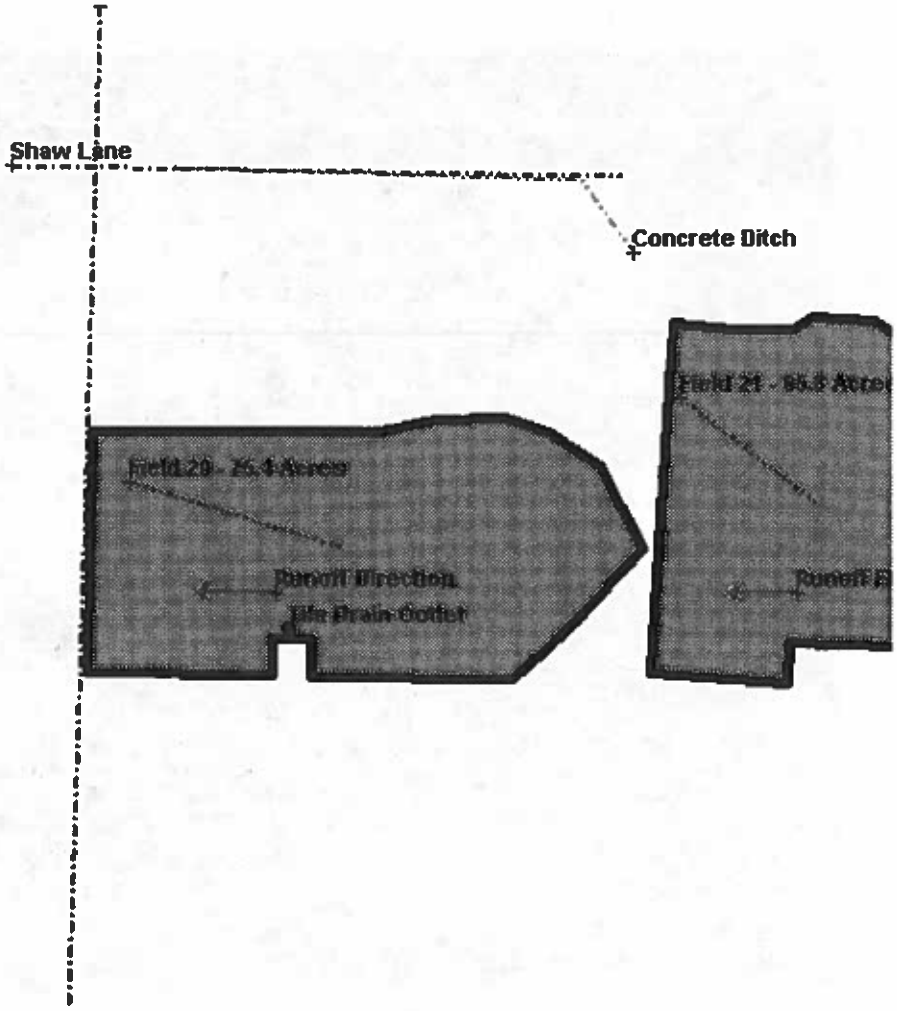


Figure 2. Farmstead Map

NUTRIENT MANAGEMENT REQUIREMENTS/RECOMMENDATIONS

Manure Application Rate Requirement By Year

FIELD: Field 20

Name	Man App		Imported Nutrients	Mineralization		Total	
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	Y		5 T/ac				
		N	59	N	0	N	59
		P	86			P	86
		K	330			K	330
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2005)	Y		5 T/ac				
		N	59	N	33	N	92
		P	86			P	86
		K	330			K	330
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2006)	Y		5 T/ac				
		N	59	N	33	N	92
		P	86			P	86
		K	330			K	330
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2007)	Y		5 T/ac				
		N	59	N	33	N	92
		P	86			P	86
		K	330			K	330

FIELD: Field 21

Name	Man App		Imported Nutrients	Mineralization		Total	
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	Y		3 T/ac				
		N	38	N	0	N	38
		P	55			P	55
		K	212			K	212
Sugarbeets(2005)	Y		3 T/ac				
		N	38	N	86	N	124
		P	55			P	55
		K	212			K	212
Sugarbeets(2006)	Y		3 T/ac				
		N	38	N	21	N	59
		P	55			P	55
		K	212			K	212
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2007)	Y		3 T/ac				
		N	38	N	21	N	59
		P	55			P	55
		K	212			K	212

Minimum Acres Required for Manure Application

Manure Group	Acres

Imported Nutrients	112

The acreage in the table is based on an average crop uptake of 100 lbs P_2O_5 per acre. These acreage numbers are for estimating export acreage needed. Wastewater application should begin with the first irrigation of the season and end with the last irrigation of the season. Rates should be designed to supply uniform application. When applying wastewater outside of the irrigation window you must contact the Department of Agriculture, Division of Animal Industries.

Hydraulic Balance

Field	Date
Field 20	April 15
Field 21	April 15

0.5" of wastewater may be applied to fields after the hydraulic balance date to remain in compliance with this nutrient management plan.

Spring Soil Test
Spring soils tests must be taken every year from every field to determine a commercial fertilization rate. If commercial fertilizer isn't applied (for a perennial crop), spring soil samples are not required. If you do not apply commercial fertilizer, a complete soil analysis will need to be conducted initially to determine the nutrient baseline.

Record Keeping For each field keep a record of annual manure and chemical fertilizer applications. Include nutrient source, date, time, rate and application method.

ANNUAL NUTRIENT BUDGET

The following crop nutrient budget is based on soil test data and cropping information. It is for one year for the following field and specified crop information:

Nutrient Budget Summary

Field: Field 20 **Crop:** Alfalfa Hay, Irrigated South ID-Cut Mid Bloom **Yield:** 7.5

	N	P205	K20
Crop Nutrient Requirement	364	86	351
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	0		
from Prior Bio-Nutrients	33		
from Irrigation Water	0		0
Nutrient Balance from above	332.5	85.9	351
Imported Nutrients	59	86	330
Estimated Remaining Nutrients Required	273	0	22
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	273	0	22

Acceptable: Sustainable agronomic rate.

Field: Field 21 **Crop:** Sugarbeets **Yield:** 35

	N	P205	K20
Crop Nutrient Requirement	290	48	118
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	65		
from Prior Bio-Nutrients	21		
from Irrigation Water	0		0
Nutrient Balance from above	204.8	48.1	117.6
Imported Nutrients	38	55	212
Estimated Remaining Nutrients Required	167	-7	-94
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	167	-7	-94

Unacceptable Rate: May be a resource risk.
Acceptable: Sustainable agronomic rate.

BIO-NUTRIENT EXPORT INFO

Exported Bio-Nutrient Summary					
Bio-Nutrient Group Name	**Amount**	**Consumer**	**Consumer's Address**	**Telephone**	**Acres**
No Nutrients exported from facility					

Appendix B: NUTRIENT RISK ANALYSIS

Phosphorus Runoff Risk Assessment

FIELD: Field 20
Overall Risk Rating: Very High
Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0
Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High
Phosphorus Application Method: N/A
Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium
Manure Application Rate: 85.9
Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High
Manure Application Method: Surface applied no incorporation
Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.
Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.
Comments: No Data

Runoff Best Management Practices Rating: Low
List best management practices that mitigate runoff(See Appendix B)
Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High
Distance to Surface Water Body: 0
Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: Field 21
Overall Risk Rating: Very High
Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 55.2

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: N/A

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler

irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

Nutrient Leaching Risk Assessment

FIELD: Field 20
Overall Risk Rating: Low
Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very Low or N.A.

Comments: Good apparent irrigation water management, but if crop requirements are not being met crop yields may suffer from a water shortage. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth Rating: High

Comments: Because the water table is near the surface (and/or the soil is shallow), this field is vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a significant concern.

FIELD: Field 21
Overall Risk Rating: Low
Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very Low or N.A.

Comments: Good apparent irrigation water management, but if crop requirements are not being met crop yields may suffer from a water shortage. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

NUTRIENT RISK ANALYSIS Legend

BMP	Definition	Purpose
Buffer Strip	Contour buffer strips are strips of perennial grass alternated with wider cultivated strips that are farmed on the contour.	Contour buffer strips slow runoff water and trap sediment. Consequently, soil erosion is generally reduced significantly by this practice. Sediments, nutrients, pesticides, and other potential pollutants are filtered out as water flows through the grass strips. The grass strips also provide food and cover for wildlife.
Channel Vegetation	Establishing and maintaining adequate plants on channel banks, berms, spoil, and associated areas.	To stabilize channel banks and adjacent areas and reduce erosion and sedimentation. To maintain or enhance the quality of the environment, including visual aspects and fish and wildlife habitat.
Chiseling and Sub soiling	Loosening the soil, without inverting and with a minimum of mixing of the surface soil, to shatter restrictive layers below normal plow depth that inhibit water movement or root development.	To improve water and root penetration and aeration.
Composting Facility	A composting facility is installed for biological stabilization of waste organic material.	The purpose of this practice is to biologically treat waste organic material and produce humus-like material that can be recycled as a soil amendment or organic fertilizer. The material may also be used by other acceptable methods of recycling that comply with laws, rules and regulations.
Conservation Cover	This practice involves establishing and maintaining a protective cover of perennial vegetation on land	This practice reduces soil erosion, associated sedimentation, improves water quality, and creates or

	retired from agriculture production.	enhances wildlife habitat.
Conservation Cropping Sequence	Growing crops in a recurring sequence on the same field.	This practice may be applied as part of a best management practice to support one or more of the following: Reduce sheet and rill erosion, Reduce irrigation induced erosion, Reduce soil erosion from wind, Maintain or improve soil organic matter content, Manage deficient or excess plant nutrients, Improve water use efficiency, Manage saline seeps, Manage plant pests (weeds, insects, diseases), Provide food for domestic livestock, and Provide food and cover for wildlife.
Contour Farming	Farming sloping land in such a way that preparing land, planting, and cultivating are done on the contours. (This includes following established grades of terraces or diversion.)	To reduce erosion and control water.
Cover and Green Manure Crop	A crop of close-growing, legumes, or small grain grown primarily for seasonal protection and soil improvement. It usually is grown for 1 year or less, except where there is permanent cover as in orchards.	To control erosion during periods when the major crops do not furnish adequate cover; add organic material to the soil; and improve infiltration, aeration, and tilth.
Critical Area Planting	Planting vegetation on critically eroding areas that require extraordinary treatment.	This practice is used on highly erodible areas that cannot be stabilized by ordinary planting techniques and if left untreated may cause severe erosion or sediment damage. Examples of critical areas include the following: 1) Dams, dikes, levees, and other construction sites with very steep slopes, 2) Mine spoil and surface mined land with poor quality soil and possibly chemical problems, and 3) Agriculture land with severe gullies requiring specialized

		planting techniques and management.
Dike or Berm	An embankment constructed of earth or other suitable materials to protect land against overflow or to regulate water.	Dikes are used to: Permit improvement of agricultural land by preventing overflow and better use of drainage facilities, Prevent damage to land and property, Facilitate water storage and control in connection with wildlife and other developments, and Protect natural areas, scenic features and archeological sites from damage.
Diversion	A channel constructed across the slope with a supporting ridge on the lower side.	To divert excess water from one area for use or safe disposal in other areas.
Drip Irrigation	A planned irrigation system in which all necessary facilities are installed for efficiently applying water directly to the root zone of plants by means of applicators (orifices, emitters, porous tubing, perforated pipe) operated under low pressure. The applicators can be placed on or below the surface of the ground.	To efficiently apply water directly to the plant root zone to maintain soil moisture within the range for good plant growth and without excessive water loss, erosion, reduction in water quality, or salt accumulation.
Filter Strip	A strip or area of vegetation for removing pollutants water.	A filter strip reduces pollution by filtration, deposition, infiltration, absorption, adsorption, decomposition, and volatilization of sediment, organic matter, and other pollutants from runoff and waste water.
Fish Stream Improvement	Fish Stream Improvement is improving a stream channel to make or enhance fish habitat.	The purpose of the practice is to increase production of desired species of fish. The practice involves improving food supplies, shelter, spawning areas, water quality, and other elements of fish habitat.
Grade Stabilization Construction	A structure used to control the grade and head cutting in natural	These structures are to: Stabilize the grade and control erosion in

	or artificial channels.	natural or artificial channels, prevent the formation or advance of gullies, enhance environmental quality, and reduce pollution hazards.
Grassed Waterway	A natural or constructed channel that is shaped or graded to required dimensions and established in suitable vegetation for the stable conveyance of runoff.	Grassed waterways convey runoff from terraces, diversions, or other water concentrations without causing erosion or flooding and to improve water quality.
Grazing Land Mechanical Treatment	Modifying physical soil and/or plant conditions with mechanical tools by treatments such as; pitting, contour furrowing, and ripping or sub-soiling.	This practice should be applied as part of a best management practice to support one or more of the following purposes: Fracture compacted soil layers and improve soil permeability, Reduce water runoff and increase infiltration, Break up sod bound conditions and thatch to increase plant vigor, and Renovate and stimulate plant community for greater productivity and yield.
Heavy Use Area Protection	Protecting heavily used areas by establishing vegetative cover, by surfacing with suitable materials, or by installing needed structures.	To stabilize urban, recreation, or facility areas frequently and intensely used by people, animals, or vehicles.
Irrigation Land Leveling	Reshaping the surface of land to be irrigated to planned grades.	To permit uniform and efficient application of irrigation water without causing erosion, loss of water quality, or damage to land by water logging and at the same time to provide for adequate surface drainage.
Irrigation Water Management	Irrigation water management is the process of determining and controlling the volume, frequency, and application rate of irrigation water in a planned, efficient manner.	Irrigation water management is applied as part of a conservation management system to support one or more of the following: Manage soil Moisture to promote desired crop response; Optimize use of available water supplies; Minimize irrigation induced soil erosion;

		Decrease non-point source pollution of surface and groundwater resources; Manage salts in the crop root zone; Manage air, soil, or plant micro-climate.
Mulching	Applying plant residues or other suitable materials not produced on the site to the soil surface.	To conserve moisture; prevent surface compaction or crusting; reduce runoff and erosion; control weeds; and help establish plant cover.
Polyacrylamide (PAM)	Polyacrylamide is an organic polymer formulated to stabilize soil when applied in irrigation water.	Water applied with PAM stabilizes soil aggregates which can then resist the erosive forces of water. If correctly applied, PAM will produce clear runoff water and residue erosion within the field by over 90 percent.
Prescribed Grazing	Prescribed grazing is the controlled harvest of vegetation with grazing animals, managed with the intent to achieve a specific objective.	Application of this practice will manipulate the intensity, frequency, duration, and season of grazing to: 1) Improve water infiltration, 2) maintain or improve riparian and upland area vegetation, 3) protect stream banks from erosion, 4) manage for deposition of fecal material away from water bodies, and 5) promote ecological and economically stable plant communities which meet landowner objectives.
Residue Management (Conservation Tillage)	Managing the amount, orientation, and distribution of crop and other plant residue on the soil surface.	This practice may be applied as part of a conservation system to support one or more of the following: Reduce sheet and rill erosion. Reduce wind erosion. Maintain or improve soil organic matter content and tilth. Conserve soil moisture. Manage snow to increase plant available moisture. Provide food and escape cover for wildlife.
Riparian Forest Buffer	A riparian forest buffer is an area	The riparian forest buffer is a

	of trees and/or shrubs located adjacent to a body of water. The vegetation extends outward from the water body for a specified distance necessary to provide a minimum level of protection and/or enhancement.	multi-purpose practice design to accomplish one or more of the following: Create shade to lower water temperatures and improve habitat for aquatic animals, Provide a source of debris necessary for healthy robust populations of aquatic organisms and wildlife, and Act as a buffer to filter out sediment, organic material, fertilizer, pesticides and other pollutants that may adversely impact the water body, including shallow ground water.
Sediment Basin	A basin constructed to collect and store debris or sediment.	A sediment basin may have the following uses: Preserve the capacity of reservoirs, ditches, canals, diversion, waterways, and streams, Prevent undesirable deposition on bottom lands and developed areas, Trap sediment originating from construction sites, and Reduce or abate pollution by providing basins for deposition and storage of silt, sand, gravel, stone, agricultural wastes, and other detritus.
Sprinkler System	A planned irrigation system in which all necessary facilities are installed for efficiently applying water by means of perforated pipes or nozzles operated under pressure.	To efficiently and uniformly apply irrigation water to maintain adequate soil moisture for optimum plant growth without causing excessive water loss, erosion, or reduced water quality.
Stream Channel Stabilization	Stabilizing the channel of a stream with suitable structures.	To control aggradations or degradation in a stream channel.
Stream bank Protection	Using vegetation or structures to stabilize and protect banks of streams, lakes, estuaries, or excavated channels against scour and erosion.	To stabilize or protect banks of streams, lakes, estuaries, or excavated channels for one or more of the following purposes: Prevent the loss of land or damage to utilities, roads, buildings, or other facilities adjacent to the banks, Maintain the capacity of the channel, Control channel meander

		that would adversely affect downstream facilities, Reduce sediment loads causing downstream damages and pollution, and Improve the stream for recreation or as a habitat for fish and wildlife.
Strip-cropping, Contour	Growing crops in a systematic arrangement of strips or bands on the contour to reduce water erosion. The crops are arranged so that a strip of grass or close-growing crop is alternated with a strip of clean-tilled crop or fallow or a strip of grass is alternated with a close-growing crop.	To reduce sheet and rill erosion and/or to reduce transport of sediment and other water-borne contaminants.
Strip-cropping, Field	Growing crops in a systematic arrangement of strips or bands across the general slope (not on the contour) to reduce water erosion. The crops are arranged so that a strip of grass or a close-growing crop is alternated with a clean-tilled crop or fallow.	To help control erosion and runoff on sloping cropland where contour strip-cropping is not practical.
Subsurface Drains	A Subsurface Drain is a conduit, such as corrugated plastic tubing, tile, or pipe, installed beneath the ground surface to collect and/or convey drainage water.	The purpose of a subsurface drain is to: Improve the environment for vegetation, Reduce erosion, Improve water quality, Collect ground water for beneficial use, Remove water from heavy use areas such as recreation areas, or around buildings, and Regulate water to control health hazards caused by pests.
Surge Irrigation	Surge irrigation is the intermittent application of water to furrows, corrugates, or borders creating a series of on and off periods of constant or variable time spans.	Surge allows a lighter application of water with a higher efficiency. The result is less deep percolation of water at the upper end of the field and a more uniform application.
Tailwater Recovery & Pumpback System	A facility to collect, store, and transport irrigation tailwater for	To conserve farm irrigation water supplies and water quality by

	reuse in a farm irrigation distribution system.	collecting the water that runs off the field surface for reuse on the farm.
Terraces	An earth embankment, a channel, or a combination ridge and channel constructed across the slope.	Reduce slope length, reduce sediment content in runoff water, reduce erosion, Improve water quality, intercept and conduct surface runoff at a non-erosive velocity to a stable outlet, retain runoff for moisture conservation, prevent gully development, reform the land surface, improve farmability, and reduce flooding.
Use Exclusion	Excluding animals, people or vehicles from an area.	To protect, maintain, or improve the quantity and quality of the plant, animal, soil, air, water, and aesthetics resources and human health and safety.
Water and Sediment Control Basin	An earth embankment or a combination ridge and channel generally constructed across the slope and minor watercourses to form a sediment trap and water detention basin.	To improve farmability of sloping land, reduce watercourse and gully erosion, trap sediment, reduce and manage onsite and downstream runoff, and improve downstream water quality.
Watering Facility	A device (tank, trough, or other watertight container) for providing animal access to water.	To provide watering facilities for livestock and/or wildlife at selected locations in order to: 1) protect and enhance vegetative cover through proper distribution of grazing; 2) provide erosion control through better grassland management; or 3) protect streams, ponds and water supplies from contamination by providing alternative access to water.
Wetland Development/Restoration	The construction or restoration of a wetland facility to provide the hydrological and biological benefits of a wetland.	To develop or restore hydric soil conditions, hydrologic conditions, hydrophytic plant communities, and wetland functions.

Appendix C: CROP SPECIFIC GUIDELINES

Alfalfa Hay, Irrigated South ID-Cut Mid Bloom

NITROGEN

Nitrogen (N) fertilizer is generally not needed for alfalfa since a healthy alfalfa stand is capable of fixing adequate levels of N. Responses to applied N usually indicate the alfalfa stand is not effectively nodulated due to lack of proper seed inoculation at planting, or that the stand is aging.

Soils containing 20 to 30 pounds (4 to 7.5 ppm) of nitrate-nitrogen (NO3-N) in the top 12 inches have sufficient N to establish a stand of alfalfa seeded alone. Adding fertilizer N at establishment reduces nodule number and nodule activity.

Establishing alfalfa with a companion crop is not recommended because the alfalfa stand typically is reduced by the excessive competition from the companion plantings. When growers plant alfalfa with a companion crop, both crops compete for the N. Under these conditions, N rates of 30 to 40 pounds per acre are suggested to establish alfalfa stands.

PHOSPHORUS

Alfalfa responds well to applied phosphorus (P). The need for P fertilization can be determined by a soil test. Phosphorus materials should be broadcast and incorporated into the seedbed before planting. For best results, P fertilizers should be applied on established stands in the fall. The University of Idaho recommended application should be sufficient for 2 years of production.

POTASSIUM

Alfalfa has a high potassium (K) requirement. Recommended K fertilization levels are determined by soil test. Broadcast and incorporate K at establishment or apply in the fall or early spring on established stands.

SULFUR

Mountain valleys and foothill areas that receive higher amounts of precipitation and/or that are irrigated with low sulfur-containing water are likely areas for sulfur (S) deficiency. Areas irrigated with water from the Snake River or any water containing the sulfate (SO4) form of sulfur should have an adequate amount of S.

Alfalfa and other legumes require more S than grasses. Plant tissue testing is an excellent tool for detecting S-deficient alfalfa. Samples should be analyzed for total N and total S. These values are used to calculated the nitrogen/sulfur ratio, which should be less than 15. When the ratio is greater than 15, an S deficiency is suspected.

Soils testing less than 8 ppm SO4-S for 0- to 12-inch soil depth should receive 40 pounds S per acre. This rate of application should provide adequate sulfur for 2 years of production. Many southern Idaho soils contain accumulated S below the 12-inch depth. Although the 0- to 12-inch soil zone may be low in S (8 ppm), the soil below 12 inches may supply enough S for alfalfa production. Thus, testing the soil at both 0- to 12- and 12- to 24-inch depths is advised for good S recommendation.

Fertilizer S sources include gypsum (CaS04) and elemental sulfur. S is also included in some N, P and K fertilizer materials. Elemental S must be biologically converted to the S04 form to be used by the plant. The rate of conversion depends on soil temperature, soil water content and particle size of the elemental S applied. To correct a S deficiency, the year of application use a fertilizer containing S04 as the readily available S source. Elemental S can be used to provide long term S release.

MICRONUTRIENTS

Zinc (Zn) deficiencies on alfalfa have not been observed in Idaho. Crops such as beans, corn, potatoes, and onions would normally exhibit Zn deficiency before alfalfa. Zinc applied to any of those crops would have sufficient residual for alfalfa.

BORON

Alfalfa is sensitive to low soil boron (B). Boron deficiencies have been observed in southern Idaho, but they are not widespread. Deficiencies normally occur on acidic soils (pH less than 7.0) and droughty (gravelly and sandy) soils. If the soil tests less than 0.25 ppm B, apply 1 to 3 pounds per acre of B. Do not use higher rates because B in excessive amounts is toxic to plants.

GENERAL COMMENTS

Complete information on cultural practices necessary for alfalfa production is contained in University of Idaho Current Information Series 144, "Producing maximum Yields of Irrigated Alfalfa hay."

Irrigation, weeds, and insects can influence the effectiveness of a fertilizer application.

Alfalfa fields in southern Idaho frequently become yellow during the regrowth of the second and third crop. These fields have not responded to applications of fertilizer to correct this temporary yellowing condition.

Alfalfa can become a cash crop in the rotation by the application of needed management inputs such as water, fertilizer and pesticides and by timely harvesting. Alfalfa quality is enhanced by cutting at the early bud stage and more frequently during the growing season. This practice will reduce stand life, however.

Alfalfa hay should be analyzed to determine P content. Phosphorus is important for animal nutrition and can greatly influence animal performance and animal health. Fertilization can increase P content of forage.

Applications of S have been shown to reduce alfalfa selenium (Se) concentrations on soils low in available Se. Levels of Se above 0.1 ppm in the dry forage are considered adequate to prevent white muscle disease and other disorders related to limited Se forage.

Sugarbeets

NITROGEN

Nitrogen rates depend upon some of the following factors: previous crop, past fertilizer use, soil type and leaching hazard and realistic yield goal for the grower and the area.

Controlling the amount of N available to the sugar beet is critical in producing high beet tonnage with high sugar percentage. Nitrogen in excess can reduce sugar percentage and gross income per acre.

TOTAL N REQUIREMENTS BASED ON POTENTIAL YIELD

Fertilizer N rates should be used which correspond to the yield growers can reasonably expect under their soil and management conditions. The historical sugar beet yield obtained by a grower in a specific field or area generally provides a fair approximation of yield potential given a grower's traditional crop management. Projected changes in crop management (i.e. improved variety, better disease and weed control) designed to appreciably increase production may require adjustment of yield potential upward.

AVAILABLE NITROGEN

Available N in the soil includes mineralizable N (released from organic matter during the growing season) inorganic N as nitrate (N03-N) and ammonium (NH4-N), and N credits from previous cropping or manures. Each component of available N must be estimated for accurate determination of optimum fertilizer N rates.

MINERALIZABLE NITROGEN - Soils vary in their capacity to release N from organic matter during the growing season. The amount of N released depends on such factors as soil type, soil moisture, soil temperature, previous crop, and the history of fertilizer N applied. Soils that retain moisture tend to mineralize more N than soils such as sandy loams, which dry out more rapidly. Mineralization of N is limited by cooler soil temperatures that limit soil biological activity.

While soil organic matter content is frequently used to estimate annual mineralizable N contributions, in southern Idaho irrigated soils organic matter does not accurately predict the amount of N that is mineralized.

INORGANIC NITROGEN - Residual soil inorganic N (N03, NH4) can be evaluated most effectively with a soil test. Accurate soil sampling and analysis in a high value crop like sugar beets is one of the best investments that can be made and is highly recommended. A soil test measures the residual N carryover from the previous crop and provides the necessary information for accurate fertilizer application. Nitrate nitrogen (NO3-N) is mobile in the soil. Soil samples, therefore, should be taken from the 0- to 12-inch and 12- to 24-inch soil depths or the effective root zone. These depths should be sampled and kept separate for analysis.

If the first foot is low in N (less than 5 ppm) but the sum of the first 2 feet is adequate, 20 to 40 pound sof N per acre may be applied to provide N until root growth is sufficient to reach the N in the second foot (about 4 to 5 weeks after emergence).

NITROGEN FROM PREVIOUS CROP RESIDUES - Nitrogen associated with decomposition of previous crop residues should also be considered when estimating available N. Residues that require additional N for decomposition include cereal straw and mature corn stalks. Research has shown that 15 pounds of additional N are needed per ton of straw returned to the soil, up to a maximum of 50 pounds. For more information on compensating for cereal residues, refer to CIS 825, "Wheat Straw Management and Nitrogen Fertilizer Requirements."

Non-cereal residues (potatoes, sugar beets, onions, beans, mint, and sweet corn) generally do not require additional N for decomposition. Consequently, these residues have little effect on the N needs of sugar beets.

Legume residues from beans, peas, and alfalfa can release appreciable N during the following crop season that may not be reflected by the preplant soil test. This N is derived from the decomposition of both plant tops and nodulated root systems.

NITROGEN FROM MANURES - Very few soils used for sugar beets receive animal manures or lagoon wastes. Nutrient contributions from these sources should also be taken into consideration when estimating available N for the next season. Manures can preclude the need for any fertilizer, depending on the rate applied and their nutrient composition.

Manures can vary appreciably depending on the animal, how the manure is processed, and the kind and extent of bedding material. For the most accurate estimate of fertilizer equivalent values, the manure should be analyzed for its nutrient content.

IRRIGATION WATER - Irrigation waters derived from deep wells are generally low in N. More shallow wells can have significant levels of nitrogen because of leaching of nitrogen from impacts from commercial fertilizer use, animal waste, and improperly functioning septic systems. Irrigation waters from most districts are also low in N when diverted from its source. Background levels of N from original sources are generally about 2 parts per million (ppm). The more return flow included in diverted water sources, the higher the N content. Return flows may include N dissolved when irrigation waters pass through fields high in residual or recently added fertilizer N as well as from soluble fertilizer N applied with the irrigation water.

Most irrigation districts should know the N content of the water they divert. Contact them for this information to determine the levels of N added with your irrigation water. However, since irrigation water N levels are influenced by upstream management, if you use irrigation water that receives runoff after it is diverted, only a water test can accurately evaluate the N added with irrigation waters.

For each ppm or milligrams per liter (mg/L) of N reported in the water sample, multiply by 2.7 to get the N added per acre foot of water applied. For example, if the water sample contained 10 ppm of N, 3 acre feet of water applied would be the equivalent of 81 pounds of N per acre. Typically, of the water applied with furrow irrigation only 50 percent is retained on the field and the rest runs off the end. The net retention of N applied with furrow irrigation would, therefore, be about half of the water applied or about 40 pounds per acre in this example. If more or less of the irrigation water is retained with each wetting, then growers should adjust the water N contribution accordingly.

Excessive irrigation by any method reduces N availability to sugar beets. Additional N may be needed under these conditions. Growers should not use aqua or anhydrous N through a sprinkler irrigation system.

Water running soluble N sources with a furrow irrigation system can be an effective means of adding N. Two limitations of this practice are that (1) the application of the N with this method may not be as uniform as desired and (2) runoff containing the N may contaminate downstream surface waters. Growers can minimize the loss of N by shutting off the injection unit before the irrigation water reaches the end of the furrow. This practice should not substitute for careful consideration of N needs while N can be side dressed.

CALCULATION OF N APPLICATION RATES

To calculate the fertilizer N application rate, the following equation is used:

Fertilizer application rate (deficit) or Over application of Nitrogen =
(Total N required to produce a given yield) - (Mineralizable N) - (Inorganic N measured by the soil test) - (previous crop/residue management) - (Manure Nitrogen) - (Irrigation Water)

TIMING OF NITROGEN APPLICATION

Nitrogen fertilizers can be fall applied on loam, silt loam, and clay soils. Winter leaching of N from the soil profile can be reduced to a minimum by applying N in the ammonium or urea forms when soil temperature is below 45 F. Greater efficiency may be obtained from preplant application in spring or by side dressing before July 1. Nitrogen applied after July 1 stimulates vegetative growth, lowers sugar percentage and extractability and contributes little to total sugar yield.

On sandy soils where over-irrigation and leaching of nitrogen are likely, side dressing or applications of nitrogen through irrigation water before July 1 are suggested for at least half of the rate used.

Split N applications often increase nitrogen use efficiency, sugar beet tonnage, and sugar production. Research conducted at the Kimberly R & E Center during 1992-1994 showed that split N fertilization generally increased estimated recoverable sugar and net economic return/acre compared to applying all N preplant. However, growers need to avoid applying significant amounts of N late in the growing season, which can stimulate top growth at the expense of sugar production.

The practice of placing starter fertilizer with the seed is not recommended because it will reduce germination and result in poor stands.

PHOSPHORUS

Sugarbeets will respond to P fertilizer if soil test levels are low. The soil test is based on extractable P present in the upper 12 inches of the soil.

Phosphorus should be plowed down or applied to rough-plowed ground and worked into the seedbed. High rates should not be placed with or immediately below the seed. Side dressing is recommended when late applications are necessary.

POTASSIUM

Sugarbeets require less K than potatoes or alfalfa but will respond to K fertilization if soil test levels are low. The soil test is based on the extractable K present in the upper 12 inches of the soil. Potassium should be incorporated into the seedbed.

MICRONUTRIENTS

Deficiencies of Zn are not widespread in sugar beets. When the soil test for Zn is below 0.6 ppm in the upper 12 inches of the soil, or where land leveling has exposed white, limey subsoil, apply Zn fertilizer at a rate that supplies 10 pounds of zinc per acre or equivalent.

"Shotgun" applications of micronutrient mixtures "for insurance" have not been necessary or economical; therefore, they are not recommended.

SULFUR

Sulfur is generally not deficient in the major sugar beet-growing region of Idaho where the Snake River is

the source of irrigation water. In areas known to be S deficient or where the soil test is less than 8 ppm in the 0- to 12-inch soil sample, apply 30 pounds S per acre.

GENERAL COMMENTS

Uniform plant populations (110 to 130 plants per 100 feet of row) after thinning have produced the highest root yields and sugar percentages.

The above fertilizer guidelines are based on relationships established between University of Idaho soil test and crop yield response research. In this research, crop response to fertilizers was evaluated at several sites where the response to fertilizer differed. The recommendations reflect the general or overall response to fertilizers at specific soil test values and the response in individual fields can differ appreciably from the general table recommendation. Some sites will require less than the general recommendation, other sites more. Unfortunately, the science has not developed to the point where the table recommendations can account for all the unknown variables influencing the effectiveness of applied fertilizers at individual sites. The table fertilizer recommendations can only be used as general guides rather than specific recommendations for each and every field.

Furthermore, soil variability can sharply reduce the accuracy composite soil test values for individual fields. That is why large contiguous areas within fields should be sampled separately when they are known to differ in crop growth or soil characteristics known to influence the response to fertilizer. But soil variability frequently does not occur conveniently in large areas that can be sampled separately or fertilized differently. The fertilizer recommendations in most cases do not account for this variability. Soil test based recommendations may be excessive in some field areas and inadequate in other areas of the same field. The recommendations then will be appropriate only to the degree that the composite soil test values for fields actually represent the field. Thus, for fields that are highly variable, the fertilizer recommendations should be considered conservative estimates of fertilizers needed. All the more reason to consider the table fertilizer recommendations as general guides rather than specific recommendations for each and every field.

The fertilizer rates suggested in the tables will support above average yields if other factors are not limiting production. Therefore the recommendations assume that good crop management practices will be used, i.e. insect, disease, and weed control. Nutrient requirements can be met using either commercial fertilizers or equivalent organic matter sources, such as manure or compost, provided their nutrient content and relative availability are known or can be estimated from published literature. Soil test based recommended rates will not be appropriate if the soil samples are improperly taken or do not represent the area to be fertilized. For nitrogen in particular, recommendations will be most accurate when crop history is taken into account and projected yields are reasonable estimates based on long term records.

General Comments:

- Over irrigation and nutrient loss is a hazard. Optimum irrigation management is necessary to meet crop water use needs and avoid loss of nutrients through leaching beyond the root zone and runoff with irrigation tail water.
- Nitrogen leaching is particularly a concern on sandy soils. Optimum management may require split Nitrogen applications to meet crop needs.
- Weed, insect, and disease control significantly influence the efficiency and effectiveness of your fertilizer applications and ultimately crop yield and farm profitability.
- Phosphorus, potassium, and zinc nutrients can be effectively fall-applied as they are not readily leached over winter.
- Phosphorus can be budgeted for a crop rotation.

- If you have questions regarding the interpretation of this information, please contact your Extension Agricultural agent, Crop consultant, or your commodity company fieldman.
- Both farm profitability and water quality can be improved with efficient nutrient use. The following are recommendations in nutrient management, which will optimize nutrient use for crop production while protecting water quality:

1) Avoid the application of nutrient sources in close proximity to streams, wetlands, drainage ditches, areas of very shallow soils, and sinkholes.

2) Accurately calibrate nutrient application equipment to insure that recommended rates are applied.

3) Nitrogen recommendations for many crops are based on yield goals for the crops. It is important to establish realistic yield goals for each field based upon historical yield data, county averages, and your management practices to avoid unnecessary fertilizer costs and minimize potential water quality impairments.

Appendix D: SOIL TEST DATA

Field: No Data **Date of Test:** No Data

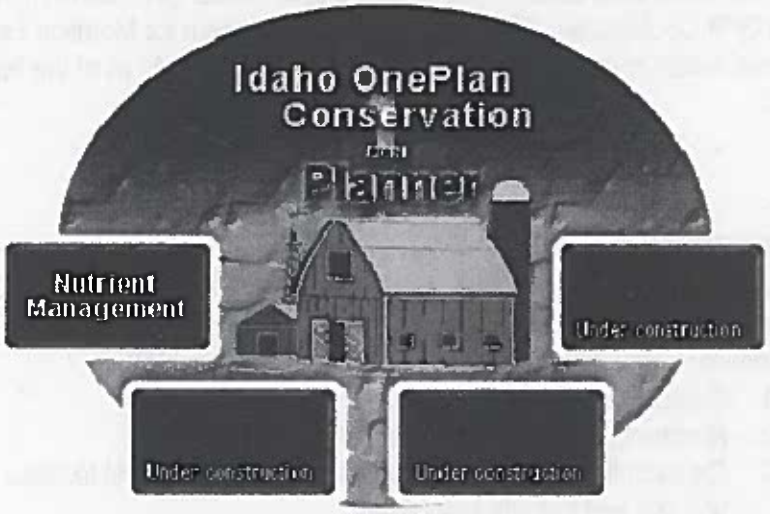
Parameter	Units	0-12"	12-24"	18-24"
Soil Texture		No Data	No Data	
EC	mmhos	No Data	No Data	
PH		No Data	No Data	
%Lime	%	No Data	No Data	
OM	%	No Data	No Data	
CEC	meq	No Data	No Data	
Nitrate-N	ppm	No Data	No Data	
Ammonia-N	ppm	No Data	No Data	
P	ppm	No Data	No Data	No Data
K	ppm	No Data	No Data	
Z	ppm	No Data	No Data	
Mn	ppm	No Data	No Data	
Fe	ppm	No Data	No Data	
Cu	ppm	No Data	No Data	
Ca	ppm	No Data	No Data	
Mg	ppm	No Data	No Data	
Na	ppm	No Data	No Data	

Grandview Morrison Farm

Nutrient Management Plan

Agriculture . . .

Launching into the Future



Nutrient Management Plan Prepared For:
Grandview Farms
(208) 834-2231
Morrison Farm

Certified Planner:
Michael Mitchell
Professional Engineer, EAC Engineering, Inc
(559) 381-0607

Producer Signature: _____ Certificated Planner Signature: _____

Date Completed: 10-02-07

The information provided by those using the "Idaho OnePlan" shall be deemed to be trade secrets, production records, or other proprietary information and shall be kept confidential and shall be exempt from enclosure pursuant to section 9-340D, Idaho Code. (Title 22 Chapter 27 17D6)

7

MORRISON FARM
Producer Summary

Farm Summary

Morrison Farm is an existing farm located 10 miles southwest of Mountain Home Air Force Base. The farm is owned by Grandview Farms and managed by Mike Usabel. The farm consists of six fields irrigated with handlines totaling 371 acres available for accepting imported manure/compost from Simplot/Grandview Feedlot.

Farm Resource Concerns

Morrison Farm located in the Watershed Basin of the Middle Snake Succor (#17050101). The facility is found at 115W 57'04" 42N '54' 31" using GPS Coordinates. The primary resource concern for Morrison Farm is ground water quality. One drainage ditch runs between fields 21 and 22. Fields.. Solid waste is applied to all of the fields and incorporated within seven days of application.

Nutrient Management Plan Requirements

Producer will maintain field application records for a minimum of five years and make them available for review at routine inspections by ISDA personnel. These records must include (where applicable):

1. Fertilizer application rates
2. Manure/Compost application rates
3. On each field, keep a record of manure and chemical fertilizer applications, crop information and soil and manure test results.
4. Fields to which the nutrients are applied
5. Spring soil test for nitrogen (required annually)
   0-12" and 12-24" nitrogen test

Crop Nutrient Requirement	
Crop	**Pounds of P205 per acres**
Alfalfa	86
Wheat	60

Manure/Compost field application requirement (tons)						
Acres x crop nutrient requirement ÷ manure p205 value* = Tons required						
Example	Corn - 250(acres)	X	75 (crop requirement)	÷	16.85	
Corn	250	X	79** = 19750	÷ 16.85*	=	1172 tons

*based on manure test values for P205
**pounds of p205 required per acre

Irrigation Management Plan Recommendations

Irrigation water management is very important in nutrient management. If irrigation water is applied at a rate over the crop needs, there is potential for runoff and/or leaching of nutrients. If irrigation water is under-applied, the crop will not have optimal growth conditions. Crop irrigation water requirements changes through the growing season depending on climate

conditions and crop Evapotranspiration rate. Proper irrigation water management responds to these crop demands. It is recommended that:

- Irrigation schedules continue to be managed by your irrigation specialist.
- Continual inspection and maintenance of irrigation equipment will prevent unwarranted waste discharges into surface or ground water.

Nutrient Management Plan Recommendations

Land application of manure at agronomic rates, along with irrigation scheduling, is the most effective way to obtain maximum nutrient benefits from manure, condition the soil, and avoid potential water quality problems downstream. Cattle manure is a valuable resource, which will also improve soil properties such as water holding capacity, infiltration, tilth, structure, porosity, and nutrient retention and release. If animal manure and/or commercial fertilizers are not properly managed, contaminants may impact surface and/or groundwater.

Application of manure applied at an agronomic rate is a sustainable practice and is always allowed under ISDA regulations. Regardless of the rate prescribed by this nutrient management plan, soil testing at the 0-12 inch and 12-24 inch soil depths is required for nitrogen management.

- Set realistic crop yield goals in order to provide an accurate account of the plant nitrogen needs.
- Apply N so that it is available during peak plant demand.
- Apply fertilizer to cool season crop in the spring rather than the previous fall. This will prevent fertilizer leaching through the soil profile and provide the crop with the necessary levels of nutrients.
- Use split or multiple fertilizer applications in order to provide the crop with a pre-plant treatment and the needed nutrient levels throughout the growing season until the point of major nutrient uptake.
- Avoid the application of nutrient sources in close proximity to streams, wetlands, drainage ditches, areas of very shallow soils, and sinkholes.

Morrison Farm

ANALYSIS OF RESOURCE CONCERNS

INTRODUCTION

The purpose of this nutrient management plan is to meet agricultural production goals and to certify that manure and nutrients are properly managed to minimize adverse impact to surface or groundwater. Plans are written in cooperation with the producer to:

1) assure proper containment of animal manure and process waste water

2) assess resource concerns which exist on the property

3) budget nutrient sources to optimize crop water and nutrient needs. Nutrient sources include commercial fertilizers, animal manure, mineralization of previous crop soil organic matter, accounting of residues, and irrigation water.

4) When applicable, assess irrigation water management to minimize movement of nutrients beyond the root zone or with runoff.

If animal manure and/or commercial fertilizers are not properly managed, contaminants may negatively impact surface and/or groundwater. Some water resource contaminants associated with poorly managed animal manure and fertilizers are:

Phosphorus in the soil readily adsorbs to soil particles; thus, erosion of soil by surface runoff is the general mode of phosphorus transport. Even at very low concentrations, phosphorus can result in plant and algae blooms in surface water bodies. Alga blooms are a nuisance to boaters, irrigators, and others. Toxins released by certain algae can be lethal to livestock or other animals that drink the water. Dissolved oxygen in the water is depleted as algae die and decompose, sometimes causing fish kills.

Nitrogen in the form of nitrate (NO_3^-) is highly water-soluble and will move with water, particularly down the soil profile past the root zone if not utilized by plants (thus becoming a groundwater contamination issue).Nitrates are toxic to infants under 6 months, and to livestock at high concentrations. In surface water, excess nitrogen, like phosphorus, can result in nuisance plant and algae growth.

Organic matter in high load decreases dissolved oxygen in a surface water body when it decomposes. Low levels of dissolved oxygen is harmful or even fatal to fish and other aquatic life.

Bacteria and microorganism illnesses (pathogens) potentially transmitted through water by animal manure include Giardia, Typhoid Fever, Cryptosporidium, and Cholera. Pathogens from animal waste can negatively impact surface and groundwater quality.

FACILITY DESCRIPTION

Owner Information

Owner (1):	Grandview Farms
Address:	1301 Hwy 67 , Grandview, ID 83624
Phone:	(208) 834-2231 N/A
	(000) 000-0000 N/A

Location

Site Map: Facility site plan illustrated in Figure 1

Soil Conservation District:	Bruneau River
County:	Owyhee
Watershed Basin:	C. J. Strike Reservoir (USGS Hydrologic Unit Code # 17050101)

ANALYSIS OF RESOURCE CONCERNS

Farm Resource Concerns

Morrison Farm is located in a watershed containing water quality limited stream segments listed according to the Clean Water Act. Stream segments are listed because a water quality parameter prevents the attainment of the "Fishable/Swimmable" goal of the Clean Water Act.

WATERBODY	BOUNDARIES	BACT	CHAN STAB	DO	FLOW ALT	HAB ALT	MET HG	MET	NH3	NUTR	O_G	ORG	PEST	PH	SAL	SED	TDG	TEMP	UNKN	*
C J Strike Res	N/A	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	X

Morrison Farm is not located in a critical Nitrate-Nitrogen management area. Nitrate Management Areas are designated based upon ground water quality sampling results. Two priority groups exist as follows:

Priority 1 is designated because at least 25% of the ground water sampling locations within the area exceed 5-milligrams/liter nitrate. This is one-half of the maximum contaminant level of 10-milligrams/liter nitrate. This nitrate concentration is considered evidence of significant degradation. Public drinking water systems are required to increase monitoring frequency when this level is reached.

Priority 2 is designated because at least 50% of the ground water sampling locations within the area exceed 2-milligrams/liter nitrate. This concentration threshold provides an indication of human-caused (anthropogenic) impacts. The upper limit for naturally occurring (background) concentrations of nitrate is considered to be about 2 mg/l.

Morrison Farm is located in a sole source aquifer area - Western Snake River Plain Aquifer.

Field Resource Concerns

- Open Irrigation Water Conveyances - Irrigation tail water can deliver nutrients to surface water via open canals. Nutrient loading of open canals can have a detrimental affect on the health of receiving waters.

Depth Limiting Subsurface Features

Field Name	Subsurface Feature	Depth from Surface (in)
Field 20	Cobbles	13
	Fractured Bedrock	20
	Water Table	>72
Field 21	Fractured Bedrock	20
	Water Table	>72
Field 22	Cobbles	13
	Fractured Bedrock	20
	Water Table	>72
Field 23	Cobbles	13
	Fractured Bedrock	20
	Water Table	>72
Field 24	Cobbles	26
	Fractured Bedrock	20
	Water Table	>72
Field 25	Cobbles	13
	Fractured Bedrock	20
	Water Table	>72

Well Testing Results (See back of page):

Well	Date	Hardness	EC	PH	K	Nitrates	Nitrites	NH3	Na	Carbonate	Bicarbonate
No	No	No Data	No	No	No	No	No	No Data	No Data	No Data	No Data

Data	Data		Data	Data	Data	Data	Data				

ISDA REGULATIONS AND THE IDAHO NUTRIENT MANAGEMENT STANDARD

Nutrient management plans for animal agricultural operations regulated by the Idaho State Department of Agriculture (ISDA) must be approved by the Idaho State Department of Agriculture and must follow the Natural Resource Conservation Service (NRCS) Agriculture Waste Management Field Handbook and the Idaho Nutrient Management Standard. ISDA regulation and the Standard use soil test phosphorus as the indicator for environmental impact from agricultural production practices. The Idaho Nutrient Management Standard is based on a threshold soil test phosphorus level (TH), above which there is no agronomic advantage to application of phosphorus.

The Idaho Nutrient Management Standard categorizes fields as a surface water concern or a groundwater concern. A surface water concern indicates that runoff leaves the contiguous operating unit from normal storm events, rain on snow, frozen ground, or irrigation. The soil phosphorus threshold for a field with a surface water concern is 40 ppm phosphorus for soils alkaline (ph > 6) tested with the Olsen method and 60 ppm phosphorus for acidic (ph < 6.5) soils tested with the Bray method (0-12"Soil Sample Depth).

A groundwater resource concern indicates that runoff does not leave the contiguous operating unit from normal storm events, rain on snow, frozen ground, or irrigation. There are two sub-categories for fields identified as having a groundwater concern. The first category applies to fields with a resource concern within the first five feet of the soil profile. A resource concern could be shallow soils, gravel, cobble, bedrock, high groundwater table, or a drained field. These fields are indicated as a groundwater concern <5'. The soil phosphorus threshold for a field with a groundwater concern <5' is 20 ppm phosphorus for soils tested with the Olsen method and 25 ppm phosphorus for soils tested with the Bray method(18-24" Soil Sample Depth).

If a field is not classified as having a surface water concern or a groundwater <5' concern, by default it is classified as having a groundwater concern >5'. The soil phosphorus threshold for a field with a groundwater concern >5' is 30 ppm phosphorus for soils tested with the Olsen method and 45 ppm phosphorus for soils tested with the Bray method(18-24" Soil Sample Depth).

Field Phosphorus Threshold

Field	Resource Concern	P Threshold (ppm)	P Threshold Soil Test Depth
Field 20	Groundwater < 5'	20	18 - 24"
Field 21	Groundwater < 5'	20	18 - 24"
Field 22	Groundwater < 5'	20	18 - 24"
Field 23	Groundwater < 5'	20	18 - 24"
Field 24	Groundwater < 5'	20	18 - 24"
Field 25	Groundwater < 5'	20	18 - 24"

Farm Location

Idaho Transverse Mercator

Coordinates of the farm center (meters): X = 2340423.57832607, Y = 1302630.16712183

Map Scale: 1 : 161

Figure 1. Base Map

Farm Location

Idaho Transverse Mercator

Coordinates of the farm center (meters): X = 2340423.57832607, Y = 1302630.16712183

Map Scale: 1 : 142

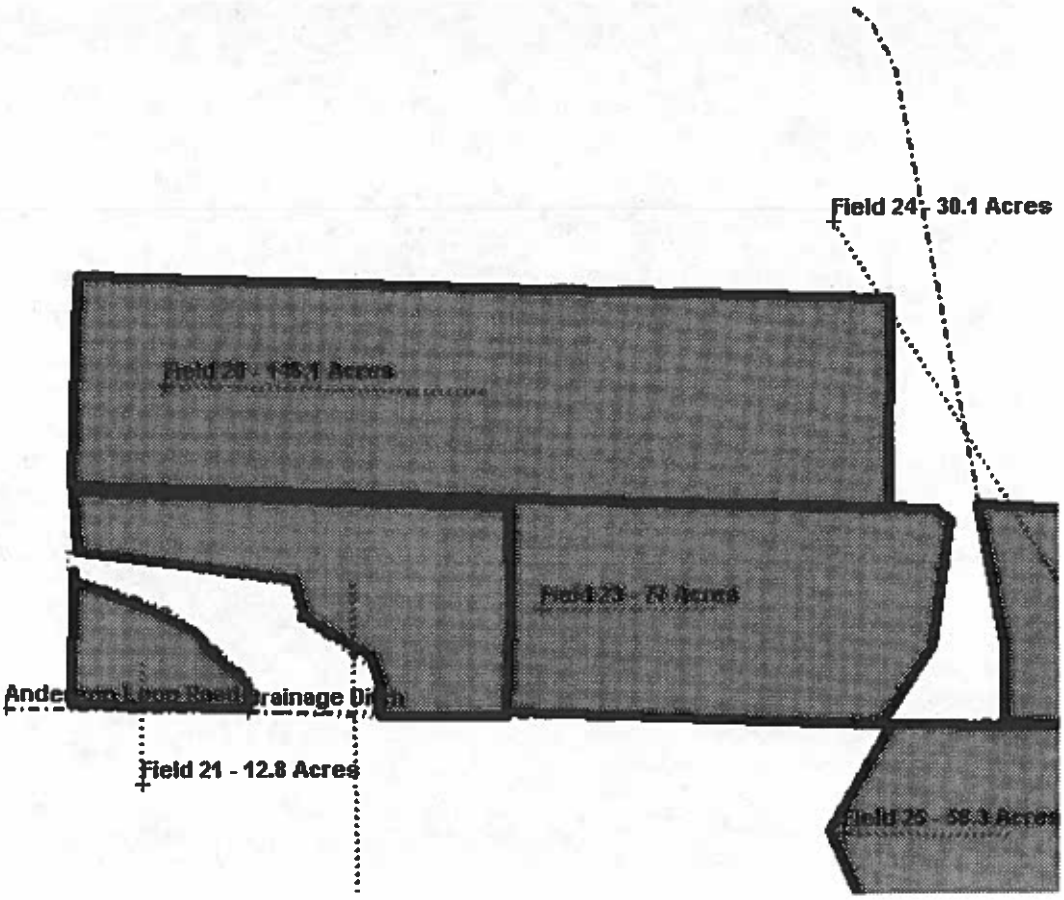


Figure 2. Farmstead Map

NUTRIENT MANAGEMENT REQUIREMENTS/RECOMMENDATIONS

Manure Application Rate Requirement By Year

FIELD: Field 20

Name	Man App		Imported Nutrients	Mineralization		Total	
Potatoes(2003)	Y		5 T/ac				
		N	57	N	0	N	57
		P	82			P	82
		K	316			K	316
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	Y		5 T/ac				
		N	57	N	32	N	89
		P	82			P	82
		K	316			K	316
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2005)	Y		5 T/ac				
		N	57	N	32	N	89
		P	82			P	82
		K	316			K	316
Potatoes(2006)	Y		5 T/ac				
		N	57	N	32	N	89
		P	82			P	82
		K	316			K	316

FIELD: Field 21

Name	Man App		Imported Nutrients	Mineralization		Total	
Wheat-Spring, Irrigated South ID(2003)	Y		4 T/ac				
		N	41	N	45	N	86
		P	60			P	60
		K	230			K	230
Wheat-Spring, Irrigated South ID(2004)	Y		4 T/ac				
		N	41	N	30	N	71
		P	60			P	60
		K	230			K	230
Wheat-Spring, Irrigated South ID(2005)	Y		4 T/ac				
		N	41	N	30	N	71
		P	60			P	60
		K	230			K	230
Wheat-Spring, Irrigated South ID(2006)	Y		4 T/ac				
		N	41	N	68	N	109
		P	60			P	60
		K	230			K	230

FIELD: Field 22

Name	Man App		Imported Nutrients	Mineralization		Total	
			4 T/ac				
'heat-Spring, Irrigated South ID(2003)	Y	N	41	N	45	N	86
		P	60			P	60
		K	230			K	230
			4 T/ac				
Wheat-Spring, Irrigated South ID(2004)	Y	N	41	N	30	N	71
		P	60			P	60
		K	230			K	230
			4 T/ac				
Wheat-Spring, Irrigated South ID(2005)	Y	N	41	N	30	N	71
		P	60			P	60
		K	230			K	230
			4 T/ac				
Wheat-Spring, Irrigated South ID(2006)	Y	N	41	N	68	N	109
		P	60			P	60
		K	230			K	230

FIELD: Field 23

Name	Man App		Imported Nutrients	Mineralization		Total	
			5 T/ac				
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2003)	Y	N	59	N	0	N	59
		P	86			P	86
		K	330			K	330
			5 T/ac				
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	Y	N	59	N	33	N	92
		P	86			P	86
		K	330			K	330
			5 T/ac				
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2005)	Y	N	59	N	33	N	92
		P	86			P	86
		K	330			K	330
			5 T/ac				
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2006)	Y	N	59	N	33	N	92
		P	86			P	86
		K	330			K	330

FIELD: Field 24

Name	Man App		Imported Nutrients	Mineralization		Total	
			5 T/ac				
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2003)	Y	N	59	N	0	N	59
		P	86			P	86
		K	330			K	330
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	Y		5 T/ac				
		N	59	N	33	N	92
		P	86			P	86

		K	330			K	330
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2005)	Y		5 T/ac				
		N	59	N	33	N	92
		P	86			P	86
		K	330			K	330
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2006)	Y		5 T/ac				
		N	59	N	33	N	92
		P	86			P	86
		K	330			K	330

FIELD: Field 25

Name	Man App		Imported Nutrients	Mineralization		Total	
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2003)	Y		5 T/ac				
		N	59	N	0	N	59
		P	86			P	86
		K	330			K	330
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	Y		5 T/ac				
		N	59	N	33	N	92
		P	86			P	86
		K	330			K	330
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2005)	Y		5 T/ac				
		N	59	N	33	N	92
		P	86			P	86
		K	330			K	330
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2006)	Y		5 T/ac				
		N	59	N	33	N	92
		P	86			P	86
		K	330			K	330

Minimum Acres Required for Manure Application

Manure Group	Acres
Imported Nutrients	337

The acreage in the table is based on an average crop uptake of 100 lbs P_2O_5 per acre. These acreage numbers are for estimating export acreage needed. Wastewater application should begin with the first irrigation of the season and end with the last irrigation of the season. Rates should be designed to supply uniform application. When applying wastewater outside of the irrigation window you must contact the Department of Agriculture, Division of Animal Industries.

Hydraulic Balance

Field	Date
Field 20	April 15
Field 21	April 1
Field 22	April 1
Field 23	April 1

Field 24	April 1
Field 25	April 1

).5" of wastewater may be applied to fields after the hydraulic balance date to remain in compliance with this nutrient management plan.

Spring Soil Test
Spring soils tests must be taken every year from every field to determine a commercial fertilization rate. If commercial fertilizer isn't applied (for a perennial crop), spring soil samples are not required. If you do not apply commercial fertilizer, a complete soil analysis will need to be conducted initially to determine the nutrient baseline.

Record Keeping For each field keep a record of annual manure and chemical fertilizer applications. Include nutrient source, date, time, rate and application method.

ANNUAL NUTRIENT BUDGET

The following crop nutrient budget is based on soil test data and cropping information. It is for one year for the following field and specified crop information:

Nutrient Budget Summary

Field: Field 20 **Crop:** Alfalfa Hay, Irrigated South ID-Cut Mid Bloom **Yield:** 7.5

	N	P205	K20
Crop Nutrient Requirement	364	86	351
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	0		
from Prior Bio-Nutrients	32		
from Irrigation Water	0		0
Nutrient Balance from above	333.8	85.9	351
Imported Nutrients	57	82	316
Estimated Remaining Nutrients Required	277	4	35
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	277	4	35

Acceptable: Sustainable agronomic rate.

Field: Field 21 **Crop:** Wheat-Spring, Irrigated South ID **Yield:** 81.7

	N	P205	K20
Crop Nutrient Requirement	160	60	41
Nutrients From Soil	?		
from Mineralized Nitrogen	45		
from Prior Crops	-38		
from Prior Bio-Nutrients	23		
from Irrigation Water	0		0
Nutrient Balance from above		59.9	40.8
Imported Nutrients	41	60	230
Estimated Remaining Nutrients Required	90	0	-189
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	90	0	-189

Caution Rate is either deficit or is approaching an amount that may potentially contribute to an environmental risk.

Acceptable: Sustainable agronomic rate.

Field: Field 22 **Crop:** Wheat-Spring, Irrigated South ID **Yield:** 81.7

	N	P205	K20
Crop Nutrient Requirement	160	60	41
Nutrients From Soil	?		
from Mineralized Nitrogen	45		
from Prior Crops	-38		

from Prior Bio-Nutrients	23		
from Irrigation Water	0		0
Nutrient Balance from above		59.9	40.8
Imported Nutrients	41	60	230
Estimated Remaining Nutrients Required	90	0	-189
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	90	0	-189

Rate is either deficit or is approaching an amount that may potentially contribute to an environmental risk.

Acceptable: Sustainable agronomic rate.

Field: Field 23 **Crop:** Alfalfa Hay, Irrigated South ID-Cut Mid Bloom **Yield:** 7.5

	N	P205	K20
Crop Nutrient Requirement	364	86	351
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	0		
from Prior Bio-Nutrients	33		
from Irrigation Water	0		0
Nutrient Balance from above	332.5	85.9	351
Imported Nutrients	59	86	330
Estimated Remaining Nutrients Required	273	0	22
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	273	0	22

Acceptable: Sustainable agronomic rate.

Field: Field 24 **Crop:** Alfalfa Hay, Irrigated South ID-Cut Mid Bloom **Yield:** 7.5

	N	P205	K20
Crop Nutrient Requirement	364	86	351
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	0		
from Prior Bio-Nutrients	33		
from Irrigation Water	0		0
Nutrient Balance from above	332.5	85.9	351
Imported Nutrients	59	86	330
Estimated Remaining Nutrients Required	273	0	22
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	273	0	22

Acceptable: Sustainable agronomic rate.

Field: Field 25 **Crop:** Alfalfa Hay, Irrigated South ID-Cut Mid Bloom **Yield:** 7.5

	N	P205	K20
Crop Nutrient Requirement	364	86	351
Nutrients From Soil	?		

from Mineralized Nitrogen	0		
from Prior Crops	0		
from Prior Bio-Nutrients	33		
from Irrigation Water	0		0
Nutrient Balance from above	332.5	85.9	351
Imported Nutrients	59	86	330
Estimated Remaining Nutrients Required	273	0	22
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	273	0	22

Acceptable: Sustainable agronomic rate.

BIO-NUTRIENT EXPORT INFO

Exported Bio-Nutrient Summary					
Bio-Nutrient Group Name	**Amount**	**Consumer**	**Consumer's Address**	**Telephone**	**Acres**
No nutrients exported from this facility					

Appendix B: NUTRIENT RISK ANALYSIS

Phosphorus Runoff Risk Assessment

FIELD: Field 20
Overall Risk Rating: Very High
Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 82.4

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: N/A

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: Field 21

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 59.9

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: N/A

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: Field 22

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 59.9

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: N/A

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: Field 23

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0
Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High
Phosphorus Application Method: N/A
Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium
Manure Application Rate: 85.9
Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating:
Manure Application Method: Surface applied no incorporation
Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.
Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.
Comments: No Data

Runoff Best Management Practices Rating: Low
List best management practices that mitigate runoff(See Appendix B)
Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High
Distance to Surface Water Body: 0
Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: Field 24
Overall Risk Rating: Very High
Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning special and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 85.9

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: Surface applied no incorporation

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: Field 25

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 85.9

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: Surface applied no incorporation

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

Nutrient Leaching Risk Assessment

FIELD: Field 20
Overall Risk Rating: Low
Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very Low or N.A.

Comments: Good apparent irrigation water management, but if crop requirements are not being met crop yields may suffer from a water shortage. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: Field 21
Overall Risk Rating: Low
Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being appl to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very Low or N.A.

Comments: Good apparent irrigation water management, but if crop requirements are not being met crop yields may suffer from a water shortage. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: Field 22

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very Low or N.A.

Comments: Good apparent irrigation water management, but if crop requirements are not being met crop yields may suffer from a water shortage. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth Rating: Low

Comments: Because the dominant soils have slow infiltration rates and water transmission, this field will probably not contribute to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water should be minimal.

FIELD: Field 23

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very Low or N.A.

Comments: Good apparent irrigation water management, but if crop requirements are not being met crop yields may suffer from a water shortage. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth Rating: Low

Comments: Because the dominant soils have slow infiltration rates and water transmission, this field will probably not contribute to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water should be minimal.

FIELD: Field 24

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and

the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very Low or N.A.

Comments: Good apparent irrigation water management, but if crop requirements are not being met crop yields may suffer from a water shortage. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth Rating: Low

Comments: Because the dominant soils have slow infiltration rates and water transmission, this field will probably not contribute to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water should be minimal.

FIELD: Field 25

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very Low or N.A.

Comments: Good apparent irrigation water management, but if crop requirements are not being met crop yields may suffer from a water shortage. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to

assure that crop growth requirements are being adequately met.

Soil/Water Table Depth Rating: Low

Comments: Because the dominant soils have slow infiltration rates and water transmission, this field will probably not contribute to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water should be minimal.

NUTRIENT RISK ANALYSIS Legend

BMP	Definition	Purpose
Buffer Strip	Contour buffer strips are strips of perennial grass alternated with wider cultivated strips that are farmed on the contour.	Contour buffer strips slow runoff water and trap sediment. Consequently, soil erosion is generally reduced significantly by this practice. Sediments, nutrients, pesticides, and other potential pollutants are filtered out as water flows through the grass strips. The grass strips also provide food and cover for wildlife.
Channel Vegetation	Establishing and maintaining adequate plants on channel banks, berms, spoil, and associated areas.	To stabilize channel banks and adjacent areas and reduce erosion and sedimentation. To maintain or enhance the quality of the environment, including visual aspects and fish and wildlife habitat.
Chiseling and Sub soiling	Loosening the soil, without inverting and with a minimum of mixing of the surface soil, to shatter restrictive layers below normal plow depth that inhibit water movement or root development.	To improve water and root penetration and aeration.
Composting Facility	A composting facility is installed for biological stabilization of waste organic material.	The purpose of this practice is to biologically treat waste organic material and produce humus-like material that can be recycled as a soil amendment or organic fertilizer. The material may also be used by other acceptable methods of recycling that comply with laws, rules and regulations.
Conservation Cover	This practice involves establishing and maintaining a protective cover of perennial vegetation on land	This practice reduces soil erosion, associated sedimentation, improves water quality, and creates or

	retired from agriculture production.	enhances wildlife habitat.
Conservation Cropping Sequence	Growing crops in a recurring sequence on the same field.	This practice may be applied as part of a best management practice to support one or more of the following: Reduce sheet and rill erosion, Reduce irrigation induced erosion, Reduce soil erosion from wind, Maintain or improve soil organic matter content, Manage deficient or excess plant nutrients, Improve water use efficiency, Manage saline seeps, Manage plant pests (weeds, insects, diseases), Provide food for domestic livestock, and Provide food and cover for wildlife.
Contour Farming	Farming sloping land in such a way that preparing land, planting, and cultivating are done on the contours. (This includes following established grades of terraces or diversion.)	To reduce erosion and control water.
Cover and Green Manure Crop	A crop of close-growing, legumes, or small grain grown primarily for seasonal protection and soil improvement. It usually is grown for 1 year or less, except where there is permanent cover as in orchards.	To control erosion during periods when the major crops do not furnish adequate cover; add organic material to the soil; and improve infiltration, aeration, and tilth.
Critical Area Planting	Planting vegetation on critically eroding areas that require extraordinary treatment.	This practice is used on highly erodible areas that cannot be stabilized by ordinary planting techniques and if left untreated may cause severe erosion or sediment damage. Examples of critical areas include the following: 1) Dams, dikes, levees, and other construction sites with very steep slopes, 2) Mine spoil and surface mined land with poor quality soil and possibly chemical problems, and 3) Agriculture land with severe gullies requiring specialized

		planting techniques and management.
Dike or Berm	An embankment constructed of earth or other suitable materials to protect land against overflow or to regulate water.	Dikes are used to: Permit improvement of agricultural land by preventing overflow and better use of drainage facilities, Prevent damage to land and property, Facilitate water storage and control in connection with wildlife and other developments, and Protect natural areas, scenic features and archeological sites from damage.
Diversion	A channel constructed across the slope with a supporting ridge on the lower side.	To divert excess water from one area for use or safe disposal in other areas.
Drip Irrigation	A planned irrigation system in which all necessary facilities are installed for efficiently applying water directly to the root zone of plants by means of applicators (orifices, emitters, porous tubing, perforated pipe) operated under low pressure. The applicators can be placed on or below the surface of the ground.	To efficiently apply water directly to the plant root zone to maintain soil moisture within the range for good plant growth and without excessive water loss, erosion, reduction in water quality, or salt accumulation.
Filter Strip	A strip or area of vegetation for removing pollutants water.	A filter strip reduces pollution by filtration, deposition, infiltration, absorption, adsorption, decomposition, and volatilization of sediment, organic matter, and other pollutants from runoff and waste water.
Fish Stream Improvement	Fish Stream Improvement is improving a stream channel to make or enhance fish habitat.	The purpose of the practice is to increase production of desired species of fish. The practice involves improving food supplies, shelter, spawning areas, water quality, and other elements of fish habitat.
Grade Stabilization Construction	A structure used to control the grade and head cutting in natural	These structures are to: Stabilize the grade and control erosion in

	or artificial channels.	natural or artificial channels, prevent the formation or advance of gullies, enhance environmental quality, and reduce pollution hazards.
Grassed Waterway	A natural or constructed channel that is shaped or graded to required dimensions and established in suitable vegetation for the stable conveyance of runoff.	Grassed waterways convey runoff from terraces, diversions, or other water concentrations without causing erosion or flooding and to improve water quality.
Grazing Land Mechanical Treatment	Modifying physical soil and/or plant conditions with mechanical tools by treatments such as; pitting, contour furrowing, and ripping or sub-soiling.	This practice should be applied as part of a best management practice to support one or more of the following purposes: Fracture compacted soil layers and improve soil permeability, Reduce water runoff and increase infiltration, Break up sod bound conditions and thatch to increase plant vigor, and Renovate and stimulate plant community for greater productivity and yield.
Heavy Use Area Protection	Protecting heavily used areas by establishing vegetative cover, by surfacing with suitable materials, or by installing needed structures.	To stabilize urban, recreation, or facility areas frequently and intensely used by people, animals, or vehicles.
Irrigation Land Leveling	Reshaping the surface of land to be irrigated to planned grades.	To permit uniform and efficient application of irrigation water without causing erosion, loss of water quality, or damage to land by water logging and at the same time to provide for adequate surface drainage.
Irrigation Water Management	Irrigation water management is the process of determining and controlling the volume, frequency, and application rate of irrigation water in a planned, efficient manner.	Irrigation water management is applied as part of a conservation management system to support one or more of the following: Manage soil Moisture to promote desired crop response; Optimize use of available water supplies; Minimize irrigation induced soil erosion;

		Decrease non-point source pollution of surface and groundwater resources; Manage salts in the crop root zone; Manage air, soil, or plant micro-climate.
Mulching	Applying plant residues or other suitable materials not produced on the site to the soil surface.	To conserve moisture; prevent surface compaction or crusting; reduce runoff and erosion; control weeds; and help establish plant cover.
Polyacrylamide (PAM)	Polyacrylamide is an organic polymer formulated to stabilize soil when applied in irrigation water.	Water applied with PAM stabilizes soil aggregates which can then resist the erosive forces of water. If correctly applied, PAM will produce clear runoff water and residue erosion within the field by over 90 percent.
Prescribed Grazing	Prescribed grazing is the controlled harvest of vegetation with grazing animals, managed with the intent to achieve a specific objective.	Application of this practice will manipulate the intensity, frequency, duration, and season of grazing to: 1) Improve water infiltration, 2) maintain or improve riparian and upland area vegetation, 3) protect stream banks from erosion, 4) manage for deposition of fecal material away from water bodies, and 5) promote ecological and economically stable plant communities which meet landowner objectives.
Residue Management (Conservation Tillage)	Managing the amount, orientation, and distribution of crop and other plant residue on the soil surface.	This practice may be applied as part of a conservation system to support one or more of the following: Reduce sheet and rill erosion. Reduce wind erosion. Maintain or improve soil organic matter content and tilth. Conserve soil moisture. Manage snow to increase plant available moisture. Provide food and escape cover for wildlife.
Riparian Forest Buffer	A riparian forest buffer is an area	The riparian forest buffer is a

	of trees and/or shrubs located adjacent to a body of water. The vegetation extends outward from the water body for a specified distance necessary to provide a minimum level of protection and/or enhancement.	multi-purpose practice design to accomplish one or more of the following: Create shade to lower water temperatures and improve habitat for aquatic animals, Provide a source of debris necessary for healthy robust populations of aquatic organisms and wildlife, and Act as a buffer to filter out sediment, organic material, fertilizer, pesticides and other pollutants that may adversely impact the water body, including shallow ground water.
Sediment Basin	A basin constructed to collect and store debris or sediment.	A sediment basin may have the following uses: Preserve the capacity of reservoirs, ditches, canals, diversion, waterways, and streams, Prevent undesirable deposition on bottom lands and developed areas, Trap sediment originating from construction sites, and Reduce or abate pollution by providing basins for deposition and storage of silt, sand, gravel, stone, agricultural wastes, and other detritus.
Sprinkler System	A planned irrigation system in which all necessary facilities are installed for efficiently applying water by means of perforated pipes or nozzles operated under pressure.	To efficiently and uniformly apply irrigation water to maintain adequate soil moisture for optimum plant growth without causing excessive water loss, erosion, or reduced water quality.
Stream Channel Stabilization	Stabilizing the channel of a stream with suitable structures.	To control aggradations or degradation in a stream channel.
Stream bank Protection	Using vegetation or structures to stabilize and protect banks of streams, lakes, estuaries, or excavated channels against scour and erosion.	To stabilize or protect banks of streams, lakes, estuaries, or excavated channels for one or more of the following purposes: Prevent the loss of land or damage to utilities, roads, buildings, or other facilities adjacent to the banks, Maintain the capacity of the channel, Control channel meander

		that would adversely affect downstream facilities, Reduce sediment loads causing downstream damages and pollution, and Improve the stream for recreation or as a habitat for fish and wildlife.
Strip-cropping, Contour	Growing crops in a systematic arrangement of strips or bands on the contour to reduce water erosion. The crops are arranged so that a strip of grass or close-growing crop is alternated with a strip of clean-tilled crop or fallow or a strip of grass is alternated with a close-growing crop.	To reduce sheet and rill erosion and/or to reduce transport of sediment and other water-borne contaminants.
Strip-cropping, Field	Growing crops in a systematic arrangement of strips or bands across the general slope (not on the contour) to reduce water erosion. The crops are arranged so that a strip of grass or a close-growing crop is alternated with a clean-tilled crop or fallow.	To help control erosion and runoff on sloping cropland where contour strip-cropping is not practical.
Subsurface Drains	A Subsurface Drain is a conduit, such as corrugated plastic tubing, tile, or pipe, installed beneath the ground surface to collect and/or convey drainage water.	The purpose of a subsurface drain is to: Improve the environment for vegetation, Reduce erosion, Improve water quality, Collect ground water for beneficial use, Remove water from heavy use areas such as recreation areas, or around buildings, and Regulate water to control health hazards caused by pests.
Surge Irrigation	Surge irrigation is the intermittent application of water to furrows, corrugates, or borders creating a series of on and off periods of constant or variable time spans.	Surge allows a lighter application of water with a higher efficiency. The result is less deep percolation of water at the upper end of the field and a more uniform application.
Tailwater Recovery & Pumpback System	A facility to collect, store, and transport irrigation tailwater for	To conserve farm irrigation water supplies and water quality by

	reuse in a farm irrigation distribution system.	collecting the water that runs off the field surface for reuse on the farm.
Terraces	An earth embankment, a channel, or a combination ridge and channel constructed across the slope.	Reduce slope length, reduce sediment content in runoff water, reduce erosion, Improve water quality, intercept and conduct surface runoff at a non-erosive velocity to a stable outlet, retain runoff for moisture conservation, prevent gully development, reform the land surface, improve farmability, and reduce flooding.
Use Exclusion	Excluding animals, people or vehicles from an area.	To protect, maintain, or improve the quantity and quality of the plant, animal, soil, air, water, and aesthetics resources and human health and safety.
Water and Sediment Control Basin	An earth embankment or a combination ridge and channel generally constructed across the slope and minor watercourses to form a sediment trap and water detention basin.	To improve farmability of sloping land, reduce watercourse and gully erosion, trap sediment, reduce and manage onsite and downstream runoff, and improve downstream water quality.
Watering Facility	A device (tank, trough, or other watertight container) for providing animal access to water.	To provide watering facilities for livestock and/or wildlife at selected locations in order to: 1) protect and enhance vegetative cover through proper distribution of grazing; 2) provide erosion control through better grassland management; or 3) protect streams, ponds and water supplies from contamination by providing alternative access to water.
Wetland Development/Restoration	The construction or restoration of a wetland facility to provide the hydrological and biological benefits of a wetland.	To develop or restore hydric soil conditions, hydrologic conditions, hydrophytic plant communities, and wetland functions.

Appendix C: CROP SPECIFIC GUIDELINES

Alfalfa Hay, Irrigated South ID-Cut Mid Bloom

NITROGEN

Nitrogen (N) fertilizer is generally not needed for alfalfa since a healthy alfalfa stand is capable of fixing adequate levels of N. Responses to applied N usually indicate the alfalfa stand is not effectively nodulated due to lack of proper seed inoculation at planting, or that the stand is aging.

Soils containing 20 to 30 pounds (4 to 7.5 ppm) of nitrate-nitrogen (NO3-N) in the top 12 inches have sufficient N to establish a stand of alfalfa seeded alone. Adding fertilizer N at establishment reduces nodule number and nodule activity.

Establishing alfalfa with a companion crop is not recommended because the alfalfa stand typically is reduced by the excessive competition from the companion plantings. When growers plant alfalfa with a companion crop, both crops compete for the N. Under these conditions, N rates of 30 to 40 pounds per acre are suggested to establish alfalfa stands.

PHOSPHORUS

Alfalfa responds well to applied phosphorus (P). The need for P fertilization can be determined by a soil test. Phosphorus materials should be broadcast and incorporated into the seedbed before planting. For best results, P fertilizers should be applied on established stands in the fall. The University of Idaho recommended application should be sufficient for 2 years of production.

POTASSIUM

Alfalfa has a high potassium (K) requirement. Recommended K fertilization levels are determined by soil test. Broadcast and incorporate K at establishment or apply in the fall or early spring on established stands.

SULFUR

Mountain valleys and foothill areas that receive higher amounts of precipitation and/or that are irrigated with low sulfur-containing water are likely areas for sulfur (S) deficiency. Areas irrigated with water from the Snake River or any water containing the sulfate (SO4) form of sulfur should have an adequate amount of S.

Alfalfa and other legumes require more S than grasses. Plant tissue testing is an excellent tool for detecting S-deficient alfalfa. Samples should be analyzed for total N and total S. These values are used to calculated the nitrogen/sulfur ratio, which should be less than 15. When the ratio is greater than 15, an S deficiency is suspected.

Soils testing less than 8 ppm SO4-S for 0- to 12-inch soil depth should receive 40 pounds S per acre. This rate of application should provide adequate sulfur for 2 years of production. Many southern Idaho soils contain accumulated S below the 12-inch depth. Although the 0- to 12-inch soil zone may be low in S (8 ppm), the soil below 12 inches may supply enough S for alfalfa production. Thus, testing the soil at both 0- to 12- and 12- to 24-inch depths is advised for good S recommendation.

Fertilizer S sources include gypsum (CaS04) and elemental sulfur. S is also included in some N, P and K fertilizer materials. Elemental S must be biologically converted to the S04 form to be used by the plant. The rate of conversion depends on soil temperature, soil water content and particle size of the elemental S applied. To correct a S deficiency, the year of application use a fertilizer containing S04 as the readily available S source. Elemental S can be used to provide long term S release.

MICRONUTRIENTS

Zinc (Zn) deficiencies on alfalfa have not been observed in Idaho. Crops such as beans, corn, potatoes, and onions would normally exhibit Zn deficiency before alfalfa. Zinc applied to any of those crops would have sufficient residual for alfalfa.

BORON

Alfalfa is sensitive to low soil boron (B). Boron deficiencies have been observed in southern Idaho, but they are not widespread. Deficiencies normally occur on acidic soils (pH less than 7.0) and droughty (gravelly and sandy) soils. If the soil tests less than 0.25 ppm B, apply 1 to 3 pounds per acre of B. Do not use higher rates because B in excessive amounts is toxic to plants.

GENERAL COMMENTS

Complete information on cultural practices necessary for alfalfa production is contained in University of Idaho Current Information Series 144, "Producing maximum Yields of Irrigated Alfalfa hay."

Irrigation, weeds, and insects can influence the effectiveness of a fertilizer application.

Alfalfa fields in southern Idaho frequently become yellow during the regrowth of the second and third crop. These fields have not responded to applications of fertilizer to correct this temporary yellowing condition.

Alfalfa can become a cash crop in the rotation by the application of needed management inputs such as water, fertilizer and pesticides and by timely harvesting. Alfalfa quality is enhanced by cutting at the early bud stage and more frequently during the growing season. This practice will reduce stand life, however.

Alfalfa hay should be analyzed to determine P content. Phosphorus is important for animal nutrition and can greatly influence animal performance and animal health. Fertilization can increase P content of forage.

Applications of S have been shown to reduce alfalfa selenium (Se) concentrations on soils low in available Se. Levels of Se above 0.1 ppm in the dry forage are considered adequate to prevent white muscle disease and other disorders related to limited Se forage.

Potatoes

NITROGEN

Nitrogen rates depend upon some of the following factors: previous crop, past fertilizer use, soil type and leaching hazard and realistic yield goal for the grower and the area.

Most Idaho potato fields will respond to fertilizer nitrogen (N). The N rate used, along with other management factors, particularly irrigation, can have a marked effect on the yield and quality of the potato crop.

TOTAL N REQUIREMENTS BASED ON POTENTIAL YIELD

Fertilizer N rates should be used which correspond to the yield growers can reasonably expect under their soil and management conditions. The historical potato yield obtained by a grower in a specific field or area generally provides a fair approximation of yield potential given a grower's traditional crop management. Projected changes in crop management (i.e. improved variety, better disease and weed control) designed to appreciably increase production may require adjustment of yield potential upward.

Research has shown that the available N required to produce a good potato yield depends on a variety of crop management practices. Factors such as weed, insect and disease control as well as irrigation, planting date and soil type can influence the N required by potatoes for maximum yield.

AVAILABLE NITROGEN

Available N in the soil includes mineralizable N (released from organic matter during the growing season) inorganic N as nitrate (N03-N) and ammonium (NH4-N), and N credits from previous cropping or manures. Each component of available N must be estimated for accurate determination of optimum fertilizer N rates.

MINERALIZABLE NITROGEN - Soils vary in their capacity to release N from organic matter during the growing season. The amount of N released depends on such factors as soil type, soil moisture, soil temperature, previous crop, and the history of fertilizer N applied. While soil organic matter content is frequently used to estimate annual mineralizable N contributions, in southern Idaho irrigated soils organic matter does not accurately predict the amount of N that is mineralized.

INORGANIC NITROGEN - Residual soil inorganic N (N03, NH4) can be evaluated most effectively with a soil test. Soil samples should be collected in foot increments to a depth of two feet, unless roots are restricted by dense soil layers or high water tables. Ammonium is generally low in preplant soil samples and thus contributes little to available N. However, it can be as high or higher than N03-N. NH4-N should be determined along with N03-N, especially when there is reason to expect the presence of appreciable NH4-N, such as recent ammonium

N fertilizer applications. Soil samples should be collected before seeding in the spring to represent the area to be fertilized.

NITROGEN FROM PREVIOUS CROP RESIDUES - Nitrogen associated with decomposition of previous crop residues should also be considered when estimating available N. Residues that require additional N for decomposition include cereal straw and mature corn stalks. Research has shown that 15 pounds of additional N are needed per ton of straw returned to the soil, up to a maximum of 50 pounds. For more information on compensating for cereal residues, refer to CIS 825, "Wheat Straw Management and Nitrogen Fertilizer Requirements."

Row crop residues (potatoes, sugar beets, onions) generally do not require additional N for decomposition. Consequently, these residues have little effect on the N needs of potatoes.

Legume residues from beans, peas, and alfalfa can release appreciable N during the following crop season that may not be reflected by the preplant soil test. This N is derived from the decomposition of both plant tops and nodulated root systems.

NITROGEN FROM MANURES - Soils in which potatoes are grown rarely receive animal manures or lagoon wastes. Nutrient contributions from these sources should also be taken into consideration when estimating available N for the next season. Manures can preclude the need for any fertilizer, depending on the rate applied and their nutrient composition.

Manures can vary appreciably depending on the animal, how the manure is processed, and the kind and extent of bedding material. For the most accurate estimate of fertilizer equivalent values, the manure should be analyzed for its nutrient content.

IRRIGATION WATER - Irrigation waters derived from deep wells are generally low in N. More shallow wells can have significant levels of nitrogen because of leaching of nitrogen from impacts from commercial fertilizer use, animal waste, and improperly functioning septic systems. Irrigation waters from most districts are also low in N when diverted from its source. Background levels of N from original sources are generally about 2 parts per million (ppm). The more return flow included in diverted water sources, the higher the N content. Return flows may include N dissolved when irrigation waters pass through fields high in residual or recently added fertilizer N as well as from soluble fertilizer N applied with the irrigation water.

Most irrigation districts should know the N content of the water they divert. Contact them for this information to determine the levels of N added with your irrigation water. However, since irrigation water N levels are influenced by upstream management, if you use irrigation water that receives runoff after it is diverted, only a water test can accurately evaluate the N added with irrigation waters.

For each ppm or milligrams per liter (mg/L) of N reported in the water sample, multiply by 2.7 to get the N added per acre foot of water applied. For example, if the water sample contained 10 ppm of N, 3 acre feet of water applied would be the equivalent of 81 pounds of N per acre. Typically, of the water applied with furrow irrigation only 50 percent is retained on the field and the rest runs off the end. The net retention of N applied with furrow irrigation would, therefore, be about half of the water applied or about 40 pounds per acre in this example. If more or less of the irrigation water is retained with each wetting, then growers should adjust the water N contribution accordingly.

Excessive irrigation by any method reduces N availability to potatoes. Additional N may be needed under these conditions. Growers should not use aqua or anhydrous N through a sprinkler irrigation system.

Water running soluble N sources with a furrow irrigation system can be an effective means of adding N. Two limitations of this practice are that (1) the application of the N with this method may not be as uniform as desired and (2) runoff containing the N may contaminate downstream surface waters. Growers can minimize the loss of N by shutting off the injection unit before the irrigation water reaches the end of the furrow. This practice should not substitute for careful consideration of N needs while N can be side dressed.

CALCULATION OF N APPLICATION RATES

To calculate the fertilizer N application rate, the following equation is used:

Fertilizer application rate (deficit) or Over application of Nitrogen =
(Total N required to produce a given yield) - (Mineralizable N) - (Inorganic N measured by the soil test) -

(previous crop/residue management) - (Manure Nitrogen) -(Irrigation Water)

TIMING OF NITROGEN APPLICATION

Nitrogen fertilizer recommendations are for Russet Burbank potatoes grown on sandy loam soils. Adjustments are made for very sandy soils (add 30 lb N/acre) and silt loam soils (subtract 40 lb N/acre) to account for differences in nitrogen mineralization rates and nitrogen use efficiency. To maximize yield and quality, growers should aim to have about 40 to 45% of their total N supply applied by row closure. Nitrogen applications made during tuber bulking should be guided by petiole sampling to maintain at least 15,000 ppm N03-N in the fourth petiole from the growing tip.

Excess levels of soil N at or before tuberization can delay tuber growth, reduce yields and lower tuber specific gravity. Excess N in late summer and fall can delay maturity of the tubers. This delayed tuber maturity can adversely affect tuber storability and quality.

The N needs of the potato crop are best met by split-application of N fertilizer. This involves applying lower rates of N fertilizer preplant and at planting, with the remainder of the crop's N needs applied with the irrigation water. Some cropping systems - for example, furrow irrigation - make it difficult to apply N fertilizer and get efficient plant uptake. Under these conditions most of the crop N needs are applied to the soil before planting. Nitrogen applied with irrigation water is an effective way to supplement the crop during the growing season. Do not use aqua or anhydrous ammonia in sprinkler system applications. Applications through a sprinkler system are not folar fertilization.

PHOSPHORUS

Potato plants need phosphorus (P) for plant growth and will respond to P fertilizer if the soil test concentration is low. Phosphorus soil test for potatoes is based on an extraction with sodium bicarbonate. Soil samples for a phosphorus soil test should be taken from 0- to 12-inch depths. This depth of sampling is critical to achieve an accurate soil test P level. Deviation in sampling depth from the 12-inch depth may drastically alter soil test results.

Phosphorus is immobile in soil and therefore does not move from where it is placed. Applied P fertilizer must be mixed into the seedbed before planting for best results. Banding P fertilizer along side plants has not been as effective as P fertilizer that has been broadcast and incorporated. Eroded or scraped areas, commonly referred to as "white soil" areas, may be low in available P because of its high content of "free lime." These areas should be tested and fertilized separately. To compensate for low P availability when free lime is present in the soil, rates of P are increased with increasing levels of free lime. Total phosphorus concentrations should be kept above 0.22% in the fourth petiole during tuber bulking.

POTASSIUM

Potatoes require high levels of available potassium (K). Potassium is relatively immobile in the soil. For best results, K fertilizers should be applied preplant and mixed into the seedbed. Banding beside the plants has been used successfully but is not as effective as K fertilizer which has been broadcast and incorporated.

Potassium fertilizer applications reduce specific gravity of harvested tubers. Potassium chloride fertilizer (KCl or muriate of potash) lowers specific gravity of tubers more than potassium sulfate fertilizer (K2SO4 or sulfate of potash). Growers should avoid over-fertilization of potatoes with K fertilizers. When specific gravity of tubers is important, potassium sulfate is the preferred K fertilizer source. Total potassium concentrations should be kept above 7.0% in the fourth petiole during tuber bulking.

SULFUR

Potatoes generally do not respond to sulfur (S) fertilization. Sulfur response is most likely to occur in sandy soils and in areas where irrigation water sources are low in S. Water low in S includes mountain streams and some well waters. The more irrigation return-flow in the water source the greater the amount of dissolved, plant-available sulfate (S04) form. Elemental sulfur is not recommended because it is not immediately available to plants. Elemental sulfur will require several months from time of application until it is converted to plant-available form.

MICRONUTRIENTS

"Shotgun" application of micronutrients - I.e. complete mixes containing boron (B), copper (Cu), iron (Fe), manganese (Mn) and zinc (Zn) - "for insurance" are not recommended since these elements have not been shown to give an economical response. Soil tests for individual micronutrients are available and concentrations in the 0- to 1-inch soil sample are: B = 0.5 ppm, Cu = 0.2 ppm, Fe = 4.0 ppm, Mn = 2.0 ppm, Zn = 0.5 ppm. Critical concentrations represent values below which a response from the application of that micronutrient may be obtained.

Zinc deficiencies have not been widespread on potatoes although some crops in certain areas of southern Idaho do show a Zn deficiency. When the soil test for Zn is below the critical concentration or where land leveling or erosion has exposed white subsoil containing free lime, apply Zn fertilizer at a rate which will supply 10 pounds of Zn per acre or equivalent. This amount of Zn should be sufficient for 4 to 6 years of crop production.

GENERAL COMMENTS

The P, K, and Zn nutritional status of the plant should also be monitored during the growing season. The same petiole sample used for N03-N concentrations can also be used for this purpose. Guidelines for adequate concentrations of these and other nutrients in the petiole can be obtained from your county agricultural Extension agent, consultant, or fieldman.

Fertilizer materials containing P, K and Zn should be thoroughly incorporated into the root zone. These materials can be effectively applied in the fall.

Wheat-Spring, Irrigated South ID

SOIL SAMPLING

Spring soil sampling is critical for producing economical yields of high quality irrigated spring wheat. Soil fertility varies among and within fields. Therefore, each soil sample submitted to a soil test laboratory should consist of sub samples collected from at least 20 individual sites within a uniform area. Collect separate samples from the 0-to 12-inch and 12-to 24-inch depths. Skip areas that do not represent the majority of the field such as gravelly areas, saline or sodic areas, wet spots, and turn rows. Thoroughly mix the 20 sub samples in a clean plastic bucket, keeping the first-foot samples separate from the second-foot samples. Place about one pound of the mixed soil in a plastic-lined soil sample bag. Fill out all required information (name, field number, date, depths, and crop history). Do not store samples under warm conditions because microbial activity can change the extractable N in the soil sample. Send soil samples to the laboratory for analysis as quickly as possible. For more detailed information about soil sampling, refer to EXT 704, Soil Sampling. If sizable areas within fields differ visually or in productivity, these areas may need to be sampled separately and managed differently. Precision ag technology and variable rate applicators now provide options for differentially fertilizing these areas. For information on mapping soil variability and treating mapping units differently, contact an extension soil fertility specialist, your local county ag extension educator, or a fertilizer dealer/consultant.

NITROGEN (N)

Adequate N is necessary for maximum production of irrigated spring wheat. The amount of fertilizer N required to produce the maximum economic return depends on many factors. These factors include the yield estimate, amount of inorganic N remaining from the previous crop, mineralizable N, other N sources, and the previous crop residues.

TOTAL N REQUIREMENTS BASED ON ESTIMATED YIELD

Fertilizer N rates should correspond to the yield growers can reasonably expect for their soil conditions and management. Historical yields for a specific field or area will generally provide a fair approximation of yield potential, given the grower's traditional crop management. Projected changes in crop management (water management, variety, lodging control, disease and weed control) designed to appreciably increase or reduce production may require adjustment of yield estimates. Areas of fields known to differ considerably in yield,

based on previous long-term observations or yield mapping, may also require adjustment of the total N required. The available N from all sources required to produce a bushel (60 pounds) of irrigated spring wheat depends on several crop management practices. Factors such as weed, insect, and disease control as well as irrigation, planting date, water management, and soil type can influence the N required for maximum yield. Results of field trials suggest that two pounds of available N per bushel are required for irrigated spring wheat ranging in yield from 80 to 120 bushels (bu) per acre. Nitrogen requirements per bushel may be greater for yields below 80 bu per acre, but less than two pounds N per bu for yields above 120 bu per acre.

AVAILABLE NITROGEN

Available nitrogen (N) in the soil includes inorganic N measured as nitrate (NO 3 -N) and ammonium (NH 4 - N), mineralizable N (released from organic matter during the growing season), N credits from previous cropping or manures, and in some cases the N in irrigation water. Each component of available N must be estimated for accurate determination of optimum fertilizer N rates.

INORGANIC NITROGEN

Residual soil inorganic N (NO3 , NH4) can be evaluated most effectively with a soil test. Soil samples should be collected in foot increments to a depth of two feet, unless roots are restricted by dense soil layers or high water tables. Research indicates that soil test inorganic N is used as effectively as fertilizer N. Ammonium N (NH4-N) is generally low in spring preplant soil samples and thus contributes little to available N. However, NH4-N should be determined along with NO3-N when there is reason to expect appreciable NH4-N from previous ammonium N fertilizer applications. To convert soil test NO3-N and NH4-N values to pounds (lb) N per acre, sum the N expressed in parts per million (ppm) for each foot increment of sampling depth and multiply times four. A preplant soil sample is often only collected from the first foot of soil. Although this information is not as complete and reliable as would be provided by deeper sampling, residual N measurements from the first foot of soil can be combined with estimates of residual N in the second foot to predict N requirements for irrigated spring wheat. Preplant soil test NO3-N in the second foot of the soil is commonly only one-half to two-thirds as high as in the first foot of soil, unless previous crop irrigation or over winter precipitation has leached N from the surface foot. Basing N rates on estimates rather than actual measurements of residual N in the second foot increases the risk of recommending either too little or too much N.

NITROGEN FROM PREVIOUS CROP RESIDUE

Nitrogen associated with decomposition of previous crop residues should also be considered when estimating available N. Residues that require additional N for decomposition include cereal straw and mature corn stalks. Research has shown that 15 pounds of additional N are needed per ton of residue returned to the soil, up to a maximum of 50 pounds. For more information on compensating for cereal residues, refer to CIS 825, Wheat Straw Management and Nitrogen Fertilizer Requirements. Row crop residues (potatoes, sugar beets, onions) generally do not require additional N for decomposition. Consequently, these residues have little effect on the N needs of spring wheat. Sweet corn residues typically are higher in N content than mature field corn residues. In addition, they are returned to the soil earlier and decompose more rapidly, therefore releasing more N to subsequent spring wheat than mature corn stalks. Legume residues are typically rich in N and can release appreciable N for spring wheat. Bean and pea residues are fairly rapidly decomposed and the N release from them should be reflected in the preplant spring soil test for N. Alfalfa residues decompose less rapidly and the N release is not typically indicated by the preplant soil test.

MINERALIZED NITROGEN

Soils vary in their capacity to release N from organic matter during the growing season. Measurements of mineralizable N for spring cereals typically range from 30 to 60 lb per acre. Unless the capacity of a specific soil to release N is known, use a midpoint mineralizable N value of 45 lb N per acre for irrigated spring wheat. While soil organic matter content is frequently used to estimate annual mineralizable N contributions, organic matter does not accurately predict the amount of N that is mineralized in southern Idaho irrigated soils.

NITROGEN FROM MANURE AND WATER

Fields used for spring wheat occasionally receive animal manures or lagoon wastes. Nutrient contributions from these sources can be appreciable and should be taken into consideration when estimating available N. Manure can vary in nutrient content depending on the animal source, how the manure is processed, and the quality and quantity of bedding material included. For the most accurate estimate of fertilizer equivalent values, the manure should be analyzed for its nutrient content. For more detailed information on animal manures and their nutrient contributions to soils, refer to PNW 239, How to Calculate Manure Application Rates in the Pacific Northwest. Irrigation waters other than lagoon effluents can also contain appreciable N. While most well and surface waters used for irrigation have low N concentrations, irrigation waters that receive appreciable return flows from other districts are likely to be higher in N. To convert the N content of each acre foot of irrigation water applied to the lb N per acre fertilizer equivalent, multiply the ppm or milligrams per liter (mg/l) N concentration by 2.7. Preplant applied N is easily leached beyond developing seedling root systems with early season irrigation. If early season irrigation is necessary to ensure proper vegetative development, consider reducing the time for each set. Set time can be lengthened as the root system develops more fully. Nitrogen located below the developing root system is not taken up as readily by the plant or used as effectively for yield.

CALCULATION OF N APPLICATION RATES

To calculate the fertilizer N application rate, several available N components must be estimated: (1) total N needed for a given yield, (2)mineralized N, (3) inorganic N (NO3 + NH4) as measured by the soil test, (4) previous crop/residue management, and (5) manuring practice or irrigation water N concentration.

NITROGEN AND LODGING

Irrigated spring wheat is more susceptible to lodging at high available N levels than winter wheat. Lodging can reduce both grain yield and quality, as well as increase harvest costs. Varieties differ in straw strength, plant height, and their susceptibility to lodging. For descriptions of varieties and their susceptibility to lodging, refer to PR327, 2000 Idaho Certified Seed Selection Guide for Some Varieties of Spring Wheat. Ethephon (Cerone®)is a growth regulator commonly used to shorten small grains, stiffen straw, and reduce lodging. Growers should consider using this growth regulator for wheat in soils with high available N if lodging is historically a problem.

MANAGING NITROGEN FOR HIGH PROTIEN HARD WHEAT

The hard wheat market, both red and white, often pays a premium for high protein. Hard spring wheat varieties can differ in grain protein. However, the most critical factor for producing high protein irrigated wheat is the amount and timing of N fertilization. To produce high protein wheat, first determine the total fertilizer N required to maximize yield. High protein generally is not realized unless available N matches or exceeds that required for maximum yield. The nitrogen applied for maximizing yield should be applied preplant. Split applications of N can increase wheat protein, but even split applied N may not raise protein to acceptable levels if the total N available is not sufficient for maximum yield. Between boot and flowering is the best time to influence grain protein with delayed applications. The optimum N rate for increasing protein to 14 percent may vary depending on the final yield. Higher yields increase and lower yields reduce the optimal delayed N rate. Flag leaf N testing can be useful for determining the need for later applied N. Research indicates that there is little protein increase with subsequent applied N when flag leaf total N concentration at heading is 4.2 to 4.3 percent or greater. The required N rate increases as flag leaf N values decrease below the critical value. If flag leaf N at heading is above 3.8 percent, no more than 40 lb N per acre should be needed to increase protein to 14 percent. If flag leaf N is below 3.8 percent, higher N rates may be needed.

PHOSPHORUS (P)

Irrigated spring wheat requires adequate soil P for maximum economic yields. Soil testing for P provides a reasonable estimate of available P. Optimum P fertilizer rates depend on both soil test P and soil lime content. Plant maturity may be delayed when soil test P concentrations are low and free lime content is greater than 10

percent. However, grain yields are usually unaffected when the growing season is sufficient. When banding an ammonium P source (11-52-0) at rates above 20 lb per acre, separate the seed and the fertilizer material by two inches to avoid seedling damage from salts. For a detailed discussion of banding refer to PNW 283, No-Till and Minimum Tillage Farming: Fertilizer Band Location for Cereal Root Access. Incorporate P fertilizer during s seedbed preparation. Solution P, such as ammonium polyphosphate, may be applied through a sprinkler irrigation system. Check the compatibility of the irrigation water and the P material. If precipitates form, decrease the fertilizer concentration or increase the injection time.

POTASSIUM (K) AND CHLORIDE (Cl)

Soil test K is a reasonable indication of available K in southern Idaho soils. Incorporate K during seedbed preparation. Potassium chloride increases yields where take-all root rot is prevalent, regardless of the soil test K level. This response is due primarily to the chloride component. Wheat yield may also increase when not infected with take-all if extractable soil Cl is below 30 lb per acre in the first two feet. Low soil Cl has been associated with physiological leaf spot. Soil Cl can be measured with a soil test. If soil test Cl is less than 8 ppm for the first two feet combined, apply 40 lb Cl per acre in the form of potassium chloride. Do not drill band Cl with the seed as germinating seed may be injured by excessive salts.

SULFUR (S)

Sulfur fertilizer requirements for spring wheat depend primarily on the S content of irrigation water and the S soil test. Coarse-textured soils are more likely to be low in S than fine-textured soils. Wheat irrigated with Snake River water or waters consisting of significant runoff from other fields should not require fertilizer S. Soils should be tested for S to a depth of two feet as the available form of S, or sulfate, is mobile. Soils low in S (less than 35 lb per acre in the 0-to 24-inch depth) should receive 20 to 40 lb of S per acre. Use S fertilizers containing readily available sulfate rather than elemental S to rapidly correct S shortages.

MICRONUTRIENTS (Fe, Mn, Zn, Cu, B)

Spring wheat yield responses to iron (Fe), manganese (Mn), zinc (Zn), copper (Cu), boron (B), and other micronutrients are rarely observed in southern Idaho. Micronutrient applications may be needed occasionally on severely scraped or eroded areas.

Contact your County Extension Agent if you have any questions regarding the interpretation of this information or for further information on your local needs.

The above fertilizer guidelines are based on relationships established between University of Idaho soil test and crop yield response research. In this research, crop response to fertilizers was evaluated at several sites where the response to fertilizer differed. The recommendations reflect the general or overall response to fertilizers at specific soil test values and the response in individual fields can differ appreciably from the general table recommendation. Some sites will require less than the general recommendation, other sites more. Unfortunately, the science has not developed to the point where the table recommendations can account for all the unknown variables influencing the effectiveness of applied fertilizers at individual sites. The table fertilizer recommendations can only be used as general guides rather than specific recommendations for each and every field.

Furthermore, soil variability can sharply reduce the accuracy composite soil test values for individual fields. That is why large contiguous areas within fields should be sampled separately when they are known to differ in crop growth or soil characteristics known to influence the response to fertilizer. But soil variability frequently does not occur conveniently in large areas that can be sampled separately or fertilized differently. The fertilizer recommendations in most cases do not account for this variability. Soil test based recommendations may be excessive in some field areas and inadequate in other areas of the same field. The recommendations then will be

appropriate only to the degree that the composite soil test values for fields actually represent the field. Thus, for fields that are highly variable, the fertilizer recommendations should be considered conservative estimates of fertilizers needed. All the more reason to consider the table fertilizer recommendations as general guides rather han specific recommendations for each and every field.

The fertilizer rates suggested in the tables will support above average yields if other factors are not limiting production. Therefore the recommendations assume that good crop management practices will be used, i.e. insect, disease, and weed control. Nutrient requirements can be met using either commercial fertilizers or equivalent organic matter sources, such as manure or compost, provided their nutrient content and relative availability are known or can be estimated from published literature. Soil test based recommended rates will not be appropriate if the soil samples are improperly taken or do not represent the area to be fertilized. For nitrogen in particular, recommendations will be most accurate when crop history is taken into account and projected yields are reasonable estimates based on long term records.

General Comments:

- Over irrigation and nutrient loss is a hazard. Optimum irrigation management is necessary to meet crop water use needs and avoid loss of nutrients through leaching beyond the root zone and runoff with irrigation tail water.
- Nitrogen leaching is particularly a concern on sandy soils. Optimum management may require split Nitrogen applications to meet crop needs.
- Weed, insect, and disease control significantly influence the efficiency and effectiveness of your fertilizer applications and ultimately crop yield and farm profitability.
- Phosphorus, potassium, and zinc nutrients can be effectively fall-applied as they are not readily leached over winter.
- Phosphorus can be budgeted for a crop rotation.
- If you have questions regarding the interpretation of this information, please contact your Extension Agricultural agent, Crop consultant, or your commodity company fieldman.
- Both farm profitability and water quality can be improved with efficient nutrient use. The following are recommendations in nutrient management, which will optimize nutrient use for crop production while protecting water quality:

1) Avoid the application of nutrient sources in close proximity to streams, wetlands, drainage ditches, areas of very shallow soils, and sinkholes.

2) Accurately calibrate nutrient application equipment to insure that recommended rates are applied.

3) Nitrogen recommendations for many crops are based on yield goals for the crops. It is important to establish realistic yield goals for each field based upon historical yield data, county averages, and your management practices to avoid unnecessary fertilizer costs and minimize potential water quality impairments.

Appendix D: SOIL TEST DATA

Field: No Data **Date of Test:** No Data

Parameter	Units	0-12"	12-24"	18-24"
Soil Texture		No Data	No Data	
EC	mmhos	No Data	No Data	

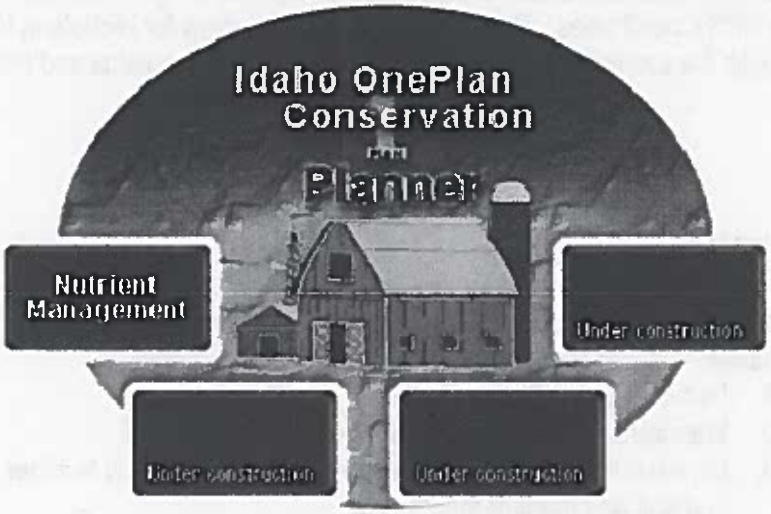
PH		No Data	No Data	
%Lime	%	No Data	No Data	
OM	%	No Data	No Data	
CEC	meq	No Data	No Data	
Nitrate-N	ppm	No Data	No Data	
Ammonia-N	ppm	No Data	No Data	
P	ppm	No Data	No Data	No Data
K	ppm	No Data	No Data	
Z	ppm	No Data	No Data	
Mn	ppm	No Data	No Data	
Fe	ppm	No Data	No Data	
Cu	ppm	No Data	No Data	
Ca	ppm	No Data	No Data	
Mg	ppm	No Data	No Data	
Na	ppm	No Data	No Data	

Grandview Nicholson Farm

Nutrient Management Plan

Agriculture . . .

Launching into the Future



Nutrient Management Plan Prepared For:
Grandview Farms
(208) 834-2231
Nicholson Farm

Certified Planner:
Michael Mitchell
Professional Engineer, EAC Engineering, Inc
(559) 381-0607

Producer Signature: _____ Certificated Planner Signature: _____

Date Completed: 10-02-07

The information provided by those using the "Idaho OnePlan" shall be deemed to be trade secrets, production records, or other proprietary information and shall be kept confidential and shall be exempt from enclosure pursuant to section 9-340D, Idaho Code. (Title 22 Chapter 27.17D6)

8

NICHOLSON FARM
Producer Summary

Farm Summary

Nicholson Farm is an existing farm located 7.5 miles west of Mountain Home Air Force Base. The farm is owned by Grandview Farms and managed by Mike Usabel. The farm consists of seven pivot irrigated fields and eight fields irrigated with handlines totaling 1158 acres available for accepting imported manure/compost from Simplot/Grandview Feedlot.

Farm Resource Concerns

Nicholson Farm located in the Watershed Basin of the Middle Snake Succor (#17050103). The facility is found at 116W 00'29" 43N '01' 55" using GPS Coordinates. The primary resource concern for Nicholson Farm is ground water quality. No canals or laterals run through the property. Solid waste is applied to all of the fields and incorporated within seven days of application.

Nutrient Management Plan Requirements

Producer will maintain field application records for a minimum of five years and make them available for review at routine inspections by ISDA personnel. These records must include (where applicable):

1. Fertilizer application rates
2. Manure/Compost application rates
3. On each field, keep a record of manure and chemical fertilizer applications, crop information and soil and manure test results.
4. Fields to which the nutrients are applied
5. Spring soil test for nitrogen (required annually)
   0-12" and 12-24" nitrogen test

Crop Nutrient Requirement	
Crop	Pounds of P205 per acres
Wheat	90

Manure/Compost field application requirement (tons)						
Acres x crop nutrient requirement ÷ manure p205 value* = Tons required						
Example	Corn - 250(acres)	X	75 (crop requirement)		÷ 16.85	
Corn	250	X	79**	= 19750	÷ 16.85* =	1172 tons

*based on manure test values for P205
**pounds of p205 required per acre

Irrigation Management Plan Recommendations

Irrigation water management is very important in nutrient management. If irrigation water is applied at a rate over the crop needs, there is potential for runoff and/or leaching of nutrients. If irrigation water is under-applied, the crop will not have optimal growth conditions. Crop irrigation water requirements changes through the growing season depending on climate conditions and crop Evapotranspiration rate. Proper irrigation water management responds to these crop demands. It is recommended that:

- Irrigation schedules continue to be managed by your irrigation specialist.

- Continual inspection and maintenance of irrigation equipment will prevent unwarranted waste discharges into surface or ground water.

Iutrient Management Plan Recommendations

Land application of manure at agronomic rates, along with irrigation scheduling, is the most effective way to obtain maximum nutrient benefits from manure, condition the soil, and avoid potential water quality problems downstream. Cattle manure is a valuable resource, which will also improve soil properties such as water holding capacity, infiltration, tilth, structure, porosity, and nutrient retention and release. If animal manure and/or commercial fertilizers are not properly managed, contaminants may impact surface and/or groundwater.

Application of manure applied at an agronomic rate is a sustainable practice and is always allowed under ISDA regulations. Regardless of the rate prescribed by this nutrient management plan, soil testing at the 0-12 inch and 12-24 inch soil depths is required for nitrogen management.

- Set realistic crop yield goals in order to provide an accurate account of the plant nitrogen needs.
- Apply N so that it is available during peak plant demand.
- Apply fertilizer to cool season crop in the spring rather than the previous fall. This will prevent fertilizer leaching through the soil profile and provide the crop with the necessary levels of nutrients.
- Use split or multiple fertilizer applications in order to provide the crop with a pre-plant treatment and the needed nutrient levels throughout the growing season until the point of major nutrient uptake.
- Avoid the application of nutrient sources in close proximity to streams, wetlands, drainage ditches, areas of very shallow soils, and sinkholes.

Nicholson Farm
ANALYSIS OF RESOURCE CONCERNS

INTRODUCTION

The purpose of this nutrient management plan is to meet agricultural production goals and to certify that manure and nutrients are properly managed to minimize adverse impact to surface or groundwater. Plans are written in cooperation with the producer to:

1) assure proper containment of animal manure and process waste water

2) assess resource concerns which exist on the property

3) budget nutrient sources to optimize crop water and nutrient needs. Nutrient sources include commercial fertilizers, animal manure, mineralization of previous crop soil organic matter, accounting of residues, and irrigation water.

4) When applicable, assess irrigation water management to minimize movement of nutrients beyond the root zone or with runoff.

If animal manure and/or commercial fertilizers are not properly managed, contaminants may negatively impact surface and/or groundwater. Some water resource contaminants associated with poorly managed animal manure and fertilizers are:

Phosphorus in the soil readily adsorbs to soil particles; thus, erosion of soil by surface runoff is the general mode of phosphorus transport. Even at very low concentrations, phosphorus can result in plant and algae blooms in surface water bodies. Alga blooms are a nuisance to boaters, irrigators, and others. Toxins released by certain algae can be lethal to livestock or other animals that drink the water. Dissolved oxygen in the water is depleted as algae die and decompose, sometimes causing fish kills.

Nitrogen in the form of nitrate (NO_3^-) is highly water-soluble and will move with water, particularly down the soil profile past the root zone if not utilized by plants (thus becoming a groundwater contamination issue).Nitrates are toxic to infants under 6 months, and to livestock at high concentrations. In surface water, excess nitrogen, like phosphorus, can result in nuisance plant and algae growth.

Organic matter in high load decreases dissolved oxygen in a surface water body when it decomposes. Low levels of dissolved oxygen is harmful or even fatal to fish and other aquatic life.

Bacteria and microorganism illnesses (pathogens) potentially transmitted through water by animal manure include Giardia, Typhoid Fever, Cryptosporidium, and Cholera. Pathogens from animal waste can negatively impact surface and groundwater quality.

FACILITY DESCRIPTION

Owner Information

Owner (1): Grandview Farms
Address: 1301 Hwy 67 , Grandview, ID 83624
Phone: (208) 834-2231 N/A
N/A

Location

Site Map: Facility site plan illustrated in Figure 1

Soil Conservation District: Elmore
County: Elmore
Watershed Basin: Middle Snake-succor (USGS Hydrologic Unit Code # 17050103)

ANALYSIS OF RESOURCE CONCERNS

Farm Resource Concerns

Nicholson Farm is located in a watershed containing water quality limited stream segments listed according to the Clean Water Act. Stream segments are listed because a water quality parameter prevents the attainment of the "Fishable/Swimmable" goal of the Clean Water Act.

WATERBODY	BOUNDARIES	BACT	CHAN STAB	DO	FLOW ALT	HAB ALT	MET HG	MET	NH3	NUTR	O_G	ORG	PEST	PH	SAL	SED	TDG	TEMP	UNKN	*
Snake River	CJ Strike Res to Castle Creek	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	X

Nicholson Farm is not located in a critical Nitrate-Nitrogen management area. Nitrate Management Areas are designated based upon ground water quality sampling results. Two priority groups exist as follows:

Priority 1 is designated because at least 25% of the ground water sampling locations within the area exceed 5-milligrams/liter nitrate. This is one-half of the maximum contaminant level of 10-milligrams/liter nitrate. This nitrate concentration is considered evidence of significant degradation. Public drinking water systems are required to increase monitoring frequency when this level is reached.

Priority 2 is designated because at least 50% of the ground water sampling locations within the area exceed 2-milligrams/liter nitrate. This concentration threshold provides an indication of human-caused (anthropogenic) impacts. The upper limit for naturally occurring (background) concentrations of nitrate is considered to be about 2 mg/l.

Nicholson Farm is located in a sole source aquifer area - Western Snake River Plain Aquifer.

Field Resource Concerns

- No Resource Concerns -

Depth Limiting Subsurface Features

Field Name	Subsurface Feature	Depth from Surface (in)
Field 1	Cobbles	30
	Fractured Bedrock	8
	Water Table	>72
Field 10	Cobbles	30
	Fractured Bedrock	8
	Water Table	>72
Field 11	Cobbles	30
	Fractured Bedrock	8
	Water Table	>72
Field 12	Cobbles	30
	Fractured Bedrock	8
	Water Table	>72
Field 13	Cobbles	30
	Fractured Bedrock	8
	Water Table	>72
Field 14	Cobbles	30
	Fractured Bedrock	8
	Water Table	>72
Field 15	Cobbles	30
	Fractured Bedrock	8
	Water Table	>72
Field 2	Cobbles	30
	Fractured Bedrock	8
	Water Table	>72
Field 3	Cobbles	30
	Fractured Bedrock	8

	Water Table	>72
Field 4	Cobbles	30
	Fractured Bedrock	8
	Water Table	>72
Field 5	Cobbles	30
	Fractured Bedrock	8
	Water Table	>72
Field 6	Cobbles	30
	Fractured Bedrock	8
	Water Table	>72
Field 7	Cobbles	30
	Fractured Bedrock	8
	Water Table	>72
Field 8	Cobbles	30
	Fractured Bedrock	8
	Water Table	>72
Field 9	Cobbles	30
	Fractured Bedrock	8
	Water Table	>72

Well Testing Results (See back of page):

Well	Date	Hardness	EC	PH	K	Nitrates	Nitrites	NH3	Na	Carbonate	Bicarbonate
No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data

ISDA REGULATIONS AND THE IDAHO NUTRIENT MANAGEMENT STANDARD

Nutrient management plans for animal agricultural operations regulated by the Idaho State Department of Agriculture (ISDA) must be approved by the Idaho State Department of Agriculture and must follow the Natural Resource Conservation Service (NRCS) Agriculture Waste Management Field Handbook and the Idaho Nutrient Management Standard. ISDA regulation and the Standard use soil test phosphorus as the indicator for environmental impact from agricultural production practices. The Idaho Nutrient Management Standard is based on a threshold soil test phosphorus level (TH), above which there is no agronomic advantage to application of phosphorus.

The Idaho Nutrient Management Standard categorizes fields as a surface water concern or a groundwater concern. A surface water concern indicates that runoff leaves the contiguous operating unit from normal storm events, rain on snow, frozen ground, or irrigation. The soil phosphorus threshold for a field with a surface water concern is 40 ppm phosphorus for soils alkaline (ph > 6) tested with the Olsen method and 60 ppm phosphorus for acidic (ph < 6.5) soils tested with the Bray method (0-12"Soil Sample Depth).

A groundwater resource concern indicates that runoff does not leave the contiguous operating unit from normal storm events, rain on snow, frozen ground, or irrigation. There are two sub-categories for fields identified as having a groundwater concern. The first category applies to fields with a resource concern within the first five feet of the soil profile. A resource concern could be shallow soils, gravel, cobble, bedrock, high groundwater table, or a drained field. These fields are indicated as a groundwater concern <5'. The soil phosphorus threshold for a field with a groundwater concern <5' is 20 ppm phosphorus for soils tested with the Olsen method and 25 ppm phosphorus for soils tested with the Bray method(18-24" Soil Sample Depth).

If a field is not classified as having a surface water concern or a groundwater <5' concern, by default it is classified as having a groundwater concern >5'. The soil phosphorus threshold for a field with a groundwater concern >5' is 30 ppm phosphorus for soils tested with the Olsen method and 45 ppm phosphorus for soils tested with the Bray method(18-24" Soil Sample Depth).

Field Phosphorus Threshold

Field	Resource Concern	P Threshold (ppm)	P Threshold Soil Test Depth
Field 1	Groundwater < 5'	20	18 - 24"
Field 10	Groundwater < 5'	20	18 - 24"
Field 11	Groundwater < 5'	20	18 - 24"
Field 12	Groundwater < 5'	20	18 - 24"
Field 13	Groundwater < 5'	20	18 - 24"
Field 14	Groundwater < 5'	20	18 - 24"
Field 15	Groundwater < 5'	20	18 - 24"
Field 2	Groundwater < 5'	20	18 - 24"
Field 3	Groundwater < 5'	20	18 - 24"
Field 4	Groundwater < 5'	20	18 - 24"
Field 5	Groundwater < 5'	20	18 - 24"
Field 6	Groundwater < 5'	20	18 - 24"
Field 7	Groundwater < 5'	20	18 - 24"
Field 8	Groundwater < 5'	20	18 - 24"
Field 9	Groundwater < 5'	20	18 - 24"

Farm Location

Idaho Transverse Mercator

Coordinates of the farm center (meters): X = 2336251.28413563, Y = 1315010.02910357

Map Scale: 1 : 221

Figure 1. Base Map

Farm Location

Idaho Transverse Mercator

Coordinates of the farm center (meters): X = 2336251.28413563, Y = 1315010.02910357

Map Scale: 1 : 153

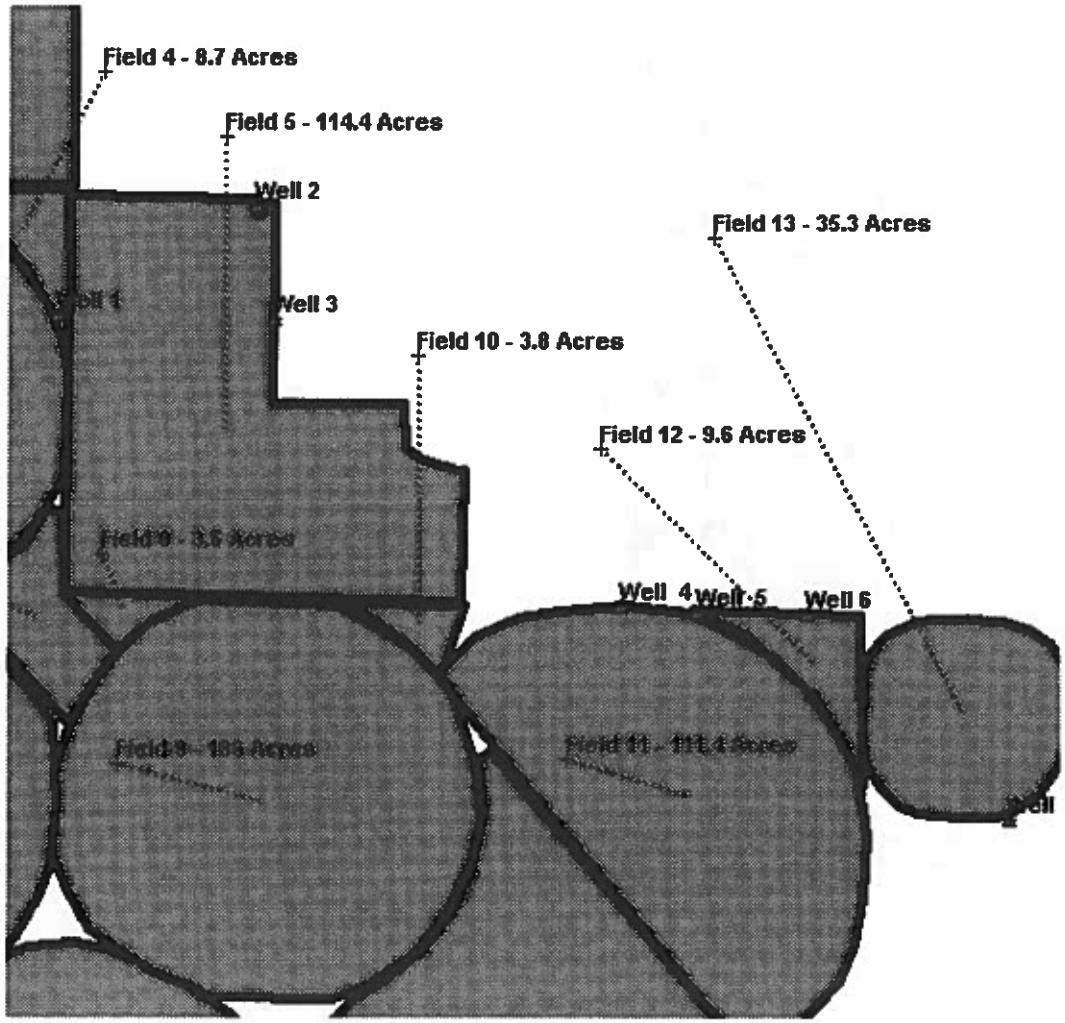


Figure 2. Farmstead Map

NUTRIENT MANAGEMENT REQUIREMENTS/RECOMMENDATIONS

Manure Application Rate Requirement By Year

FIELD: Field 1

Name	Man App		Imported Nutrients	Mineralization		Total	
			5 T/ac				
Wheat-Spring, Irrigated South ID(2004)	Y	N	62	N	45	N	107
		P	90			P	90
		K	344			K	344
			5 T/ac				
Wheat-Spring, Irrigated South ID(2005)	Y	N	62	N	42	N	104
		P	90			P	90
		K	344			K	344
			5 T/ac				
Wheat-Spring, Irrigated South ID(2006)	Y	N	62	N	42	N	104
		P	90			P	90
		K	344			K	344
			5 T/ac				
Wheat-Spring, Irrigated South ID(2007)	Y	N	62	N	80	N	142
		P	90			P	90
		K	344			K	344

FIELD: Field 10

Name	Man App		Imported Nutrients	Mineralization		Total	
			5 T/ac				
Wheat-Spring, Irrigated South ID(2004)	Y	N	62	N	45	N	107
		P	90			P	90
		K	344			K	344
			5 T/ac				
Wheat-Spring, Irrigated South ID(2005)	Y	N	62	N	42	N	104
		P	90			P	90
		K	344			K	344
			5 T/ac				
Wheat-Spring, Irrigated South ID(2006)	Y	N	62	N	42	N	104
		P	90			P	90
		K	344			K	344
			5 T/ac				
Wheat-Spring, Irrigated South ID(2007)	Y	N	62	N	80	N	142
		P	90			P	90
		K	344			K	344

FIELD: Field 11

Name	Man App		Imported Nutrients	Mineralization		Total	
Wheat-Spring, Irrigated South ID(2004)	Y		5 T/ac				
		N	62	N	45	N	107
		P	90			P	90
		K	344			K	344
Wheat-Spring, Irrigated South ID(2005)	Y		5 T/ac				
		N	62	N	42	N	104
		P	90			P	90
		K	344			K	344
Wheat-Spring, Irrigated South ID(2006)	Y		5 T/ac				
		N	62	N	42	N	104
		P	90			P	90
		K	344			K	344
Wheat-Spring, Irrigated South ID(2007)	Y		5 T/ac				
		N	62	N	80	N	142
		P	90			P	90
		K	344			K	344

FIELD: Field 12

Name	Man App		Imported Nutrients	Mineralization		Total	
Wheat-Spring, Irrigated South ID(2004)	Y		5 T/ac				
		N	62	N	45	N	107
		P	90			P	90
		K	344			K	344
Wheat-Spring, Irrigated South ID(2005)	Y		5 T/ac				
		N	62	N	42	N	104
		P	90			P	90
		K	344			K	344
Wheat-Spring, Irrigated South ID(2006)	Y		5 T/ac				
		N	62	N	42	N	104
		P	90			P	90
		K	344			K	344
Wheat-Spring, Irrigated South ID(2007)	Y		5 T/ac				
		N	62	N	80	N	142
		P	90			P	90
		K	344			K	344

FIELD: Field 13

Name	Man App		Imported Nutrients	Mineralization		Total	
Wheat-Spring, Irrigated South ID(2004)	Y		5 T/ac				
		N	62	N	45	N	107
		P	90			P	90
		K	344			K	344
Wheat-Spring, Irrigated South ID(2005)	Y		5 T/ac				
		N	62	N	42	N	104
		P	90			P	90

		K	344			K	344
Wheat-Spring, Irrigated South ID(2006)	Y		5 T/ac				
		N	62	N	42	N	104
		P	90			P	90
		K	344			K	344
Wheat-Spring, Irrigated South ID(2007)	Y		5 T/ac				
		N	62	N	80	N	142
		P	90			P	90
		K	344			K	344

FIELD: Field 14

Name	Man App		Imported Nutrients	Mineralization		Total	
Wheat-Spring, Irrigated South ID(2004)	Y		5 T/ac				
		N	62	N	45	N	107
		P	90			P	90
		K	344			K	344
Wheat-Spring, Irrigated South ID(2005)	Y		5 T/ac				
		N	62	N	42	N	104
		P	90			P	90
		K	344			K	344
Wheat-Spring, Irrigated South ID(2006)	Y		5 T/ac				
		N	62	N	42	N	104
		P	90			P	90
		K	344			K	344
Wheat-Spring, Irrigated South ID(2007)	Y		5 T/ac				
		N	62	N	80	N	142
		P	90			P	90
		K	344			K	344

FIELD: Field 15

Name	Man App		Imported Nutrients	Mineralization		Total	
Wheat-Spring, Irrigated South ID(2004)	Y		5 T/ac				
		N	62	N	45	N	107
		P	90			P	90
		K	344			K	344
Wheat-Spring, Irrigated South ID(2005)	Y		5 T/ac				
		N	62	N	42	N	104
		P	90			P	90
		K	344			K	344
Wheat-Spring, Irrigated South ID(2006)	Y		5 T/ac				
		N	62	N	42	N	104
		P	90			P	90
		K	344			K	344
Wheat-Spring, Irrigated South ID(2007)	Y		5 T/ac				
		N	62	N	80	N	142
		P	90			P	90
		K	344			K	344

FIELD: Field 2

Name	Man App		Imported Nutrients	Mineralization		Total	
Wheat-Spring, Irrigated South ID(2004)	Y		5 T/ac				
		N	62	N	45	N	107
		P	90			P	90
		K	344			K	344
Wheat-Spring, Irrigated South ID(2005)	Y		5 T/ac				
		N	62	N	42	N	104
		P	90			P	90
		K	344			K	344
Wheat-Spring, Irrigated South ID(2006)	Y		5 T/ac				
		N	62	N	42	N	104
		P	90			P	90
		K	344			K	344
Wheat-Spring, Irrigated South ID(2007)	Y		5 T/ac				
		N	62	N	80	N	142
		P	90			P	90
		K	344			K	344

FIELD: Field 3

Name	Man App		Imported Nutrients	Mineralization		Total	
Wheat-Spring, Irrigated South ID(2004)	Y		5 T/ac				
		N	62	N	45	N	107
		P	90			P	90
		K	344			K	344
Wheat-Spring, Irrigated South ID(2005)	Y		5 T/ac				
		N	62	N	42	N	104
		P	90			P	90
		K	344			K	344
Wheat-Spring, Irrigated South ID(2006)	Y		5 T/ac				
		N	62	N	42	N	104
		P	90			P	90
		K	344			K	344
Wheat-Spring, Irrigated South ID(2007)	Y		5 T/ac				
		N	62	N	80	N	142
		P	90			P	90
		K	344			K	344

FIELD: Field 4

Name	Man App		Imported Nutrients	Mineralization		Total	
Wheat-Spring, Irrigated South ID(2004)	Y		5 T/ac				
		N	62	N	45	N	107
		P	90			P	90
		K	344			K	344
Wheat-Spring, Irrigated South ID(2005)	Y		5 T/ac				

		N	62	N	42	N	104
		P	90			P	90
		K	344			K	344
Wheat-Spring, Irrigated South ID(2006)	Y		5 T/ac				
		N	62	N	42	N	104
		P	90			P	90
		K	344			K	344
Wheat-Spring, Irrigated South ID(2007)	Y		5 T/ac				
		N	62	N	80	N	142
		P	90			P	90
		K	344			K	344

FIELD: Field 5

Name	Man App		Imported Nutrients	Mineralization		Total	
Wheat-Spring, Irrigated South ID(2004)	Y		5 T/ac				
		N	62	N	45	N	107
		P	90			P	90
		K	344			K	344
Wheat-Spring, Irrigated South ID(2005)	Y		5 T/ac				
		N	62	N	42	N	104
		P	90			P	90
		K	344			K	344
Wheat-Spring, Irrigated South ID(2006)	Y		5 T/ac				
		N	62	N	42	N	104
		P	90			P	90
		K	344			K	344
Wheat-Spring, Irrigated South ID(2007)	Y		5 T/ac				
		N	62	N	80	N	142
		P	90			P	90
		K	344			K	344

FIELD: Field 6

Name	Man App		Imported Nutrients	Mineralization		Total	
Wheat-Spring, Irrigated South ID(2004)	Y		5 T/ac				
		N	62	N	45	N	107
		P	90			P	90
		K	344			K	344
Wheat-Spring, Irrigated South ID(2005)	Y		5 T/ac				
		N	62	N	42	N	104
		P	90			P	90
		K	344			K	344
Wheat-Spring, Irrigated South ID(2006)	Y		5 T/ac				
		N	62	N	42	N	104
		P	90			P	90
		K	344			K	344
Wheat-Spring, Irrigated South ID(2007)	Y		5 T/ac				
		N	62	N	80	N	142

		P	90			P	90
		K	344			K	344

FIELD: Field 7

Name	Man App		Imported Nutrients	Mineralization		Total	
Wheat-Spring, Irrigated South ID(2004)	Y		5 T/ac				
		N	62	N	45	N	107
		P	90			P	90
		K	344			K	344
Wheat-Spring, Irrigated South ID(2005)	Y		5 T/ac				
		N	62	N	42	N	104
		P	90			P	90
		K	344			K	344
Wheat-Spring, Irrigated South ID(2006)	Y		5 T/ac				
		N	62	N	42	N	104
		P	90			P	90
		K	344			K	344
Wheat-Spring, Irrigated South ID(2007)	Y		5 T/ac				
		N	62	N	80	N	142
		P	90			P	90
		K	344			K	344

FIELD: Field 8

Name	Man App		Imported Nutrients	Mineralization		Total	
Wheat-Spring, Irrigated South ID(2004)	Y		5 T/ac				
		N	62	N	45	N	107
		P	90			P	90
		K	344			K	344
Wheat-Spring, Irrigated South ID(2005)	Y		5 T/ac				
		N	62	N	42	N	104
		P	90			P	90
		K	344			K	344
Wheat-Spring, Irrigated South ID(2006)	Y		5 T/ac				
		N	62	N	42	N	104
		P	90			P	90
		K	344			K	344
Wheat-Spring, Irrigated South ID(2007)	Y		5 T/ac				
		N	62	N	80	N	142
		P	90			P	90
		K	344			K	344

FIELD: Field 9

Name	Man App		Imported Nutrients	Mineralization		Total	
Wheat-Spring, Irrigated South ID(2004)	Y		5 T/ac				
		N	62	N	45	N	107

		P	90			P	90
		K	344			K	344
Wheat-Spring, Irrigated South ID(2005)	Y		5 T/ac				
		N	62	N	42	N	104
		P	90			P	90
		K	344			K	344
Wheat-Spring, Irrigated South ID(2006)	Y		5 T/ac				
		N	62	N	42	N	104
		P	90			P	90
		K	344			K	344
Wheat-Spring, Irrigated South ID(2007)	Y		5 T/ac				
		N	62	N	80	N	142
		P	90			P	90
		K	344			K	344

Minimum Acres Required for Manure Application

Manure Group	Acres
Imported Nutrients	1158

The acreage in the table is based on an average crop uptake of 100 lbs P_2O_5 per acre. These acreage numbers are for estimating export acreage needed. Wastewater application should begin with the first irrigation of the season and end with the last irrigation of the season. Rates should be designed to supply uniform application. When applying wastewater outside of the irrigation window you must contact the Department of Agriculture, Division of Animal Industries.

Hydraulic Balance

Field	Date
Field 1	March 15
Field 10	March 15
Field 11	March 15
Field 12	March 15
Field 13	March 15
Field 14	March 15
Field 15	March 15
Field 2	January 1
Field 3	March 15
Field 4	March 15
Field 5	March 15
Field 6	March 15
Field 7	March 15
Field 8	March 15
Field 9	March 15

0.5" of wastewater may be applied to fields after the hydraulic balance date to remain in compliance with this nutrient management plan.

Spring Soil Test
Spring soils tests must be taken every year from every field to determine a commercial fertilization rate. If commercial fertilizer isn't applied (for a perennial crop), spring soil samples are not required. If you do not apply commercial fertilizer, a complete soil analysis will need to be conducted initially to determine the nutrient baseline.

Record Keeping For each field keep a record of annual manure and chemical fertilizer applications. Include nutrient source, date, time, rate and application method.

ANNUAL NUTRIENT BUDGET

The following crop nutrient budget is based on soil test data and cropping information. It is for one year for the following field and specified crop information:

Nutrient Budget Summary

Field: Field 1 **Crop:** Wheat-Spring, Irrigated South ID **Yield:** 98

	N	P205	K20
Crop Nutrient Requirement	200	90	61
Nutrients From Soil	?		
from Mineralized Nitrogen	45		
from Prior Crops	-38		
from Prior Bio-Nutrients	35		
from Irrigation Water	0		0
Nutrient Balance from above	159.5	89.8	61.2
Imported Nutrients	62	90	344
Estimated Remaining Nutrients Required	98	0	-284
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	98	0	-284

Unacceptable Rate: May be a resource risk.
Acceptable: Sustainable agronomic rate.

Field: Field 10 **Crop:** Wheat-Spring, Irrigated South ID **Yield:** 98

	N	P205	K20
Crop Nutrient Requirement	200	90	61
Nutrients From Soil	?		
from Mineralized Nitrogen	45		
from Prior Crops	-38		
from Prior Bio-Nutrients	35		
from Irrigation Water	0		0
Nutrient Balance from above	159.5	89.8	61.2
Imported Nutrients	62	90	344
Estimated Remaining Nutrients Required	98	0	-284
Commercial Fertilizer Application	0	0	0

Final Nutrient Balance	98	0	-284

Unacceptable Rate: May be a resource risk.
Acceptable: Sustainable agronomic rate.

Field: Field 11 **Crop:** Wheat-Spring, Irrigated South ID **Yield:** 98

	N	P205	K20
Crop Nutrient Requirement	200	90	61
Nutrients From Soil	?		
from Mineralized Nitrogen	45		
from Prior Crops	-38		
from Prior Bio-Nutrients	35		
from Irrigation Water	0		0
Nutrient Balance from above	159.5	89.8	61.2
Imported Nutrients	62	90	344
Estimated Remaining Nutrients Required	98	0	-284
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	98	0	-284

Unacceptable Rate: May be a resource risk.
Acceptable: Sustainable agronomic rate.

Field: Field 12 **Crop:** Wheat-Spring, Irrigated South ID **Yield:** 98

	N	P205	K20
Crop Nutrient Requirement	200	90	61
Nutrients From Soil	?		
from Mineralized Nitrogen	45		
from Prior Crops	-38		
from Prior Bio-Nutrients	35		
from Irrigation Water	0		0
Nutrient Balance from above	159.5	89.8	61.2
Imported Nutrients	62	90	344
Estimated Remaining Nutrients Required	98	0	-284
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	98	0	-284

Unacceptable Rate: May be a resource risk.
Acceptable: Sustainable agronomic rate.

Field: Field 13 **Crop:** Wheat-Spring, Irrigated South ID **Yield:** 98

	N	P205	K20
Crop Nutrient Requirement	200	90	61
Nutrients From Soil	?		
from Mineralized Nitrogen	45		
from Prior Crops	-38		
from Prior Bio-Nutrients	35		
from Irrigation Water	0		0
Nutrient Balance from above	159.5	89.8	61.2

Imported Nutrients	62	90	344
Estimated Remaining Nutrients Required	98	0	-284
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	98	0	-284

Unacceptable Rate: May be a resource risk.
Acceptable: Sustainable agronomic rate.

Field: Field 14 **Crop:** Wheat-Spring, Irrigated South ID **Yield:** 98

	N	P205	K20
Crop Nutrient Requirement	200	90	61
Nutrients From Soil	?		
from Mineralized Nitrogen	45		
from Prior Crops	-38		
from Prior Bio-Nutrients	35		
from Irrigation Water	0		0
Nutrient Balance from above	159.5	89.8	61.2
Imported Nutrients	62	90	344
Estimated Remaining Nutrients Required	98	0	-284
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	98	0	-284

Unacceptable Rate: May be a resource risk.
Acceptable: Sustainable agronomic rate.

Field: Field 15 **Crop:** Wheat-Spring, Irrigated South ID **Yield:** 98

	N	P205	K20
Crop Nutrient Requirement	200	90	61
Nutrients From Soil	?		
from Mineralized Nitrogen	45		
from Prior Crops	-38		
from Prior Bio-Nutrients	35		
from Irrigation Water	0		0
Nutrient Balance from above	159.5	89.8	61.2
Imported Nutrients	62	90	344
Estimated Remaining Nutrients Required	98	0	-284
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	98	0	-284

Unacceptable Rate: May be a resource risk.
Acceptable: Sustainable agronomic rate.

Field: Field 2 **Crop:** Wheat-Spring, Irrigated South ID **Yield:** 98

	N	P205	K20
Crop Nutrient Requirement	200	90	61
Nutrients From Soil	?		
from Mineralized Nitrogen	45		
from Prior Crops	-38		

from Prior Bio-Nutrients	35		
from Irrigation Water	0		0
Nutrient Balance from above	159.5	89.8	61.2
Imported Nutrients	62	90	344
Estimated Remaining Nutrients Required	98	0	-284
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	98	0	-284

Unacceptable Rate: May be a resource risk.
Acceptable: Sustainable agronomic rate.

Field: Field 3 **Crop:** Wheat-Spring, Irrigated South ID **Yield:** 98

	N	P205	K20
Crop Nutrient Requirement	200	90	61
Nutrients From Soil	?		
from Mineralized Nitrogen	45		
from Prior Crops	-38		
from Prior Bio-Nutrients	35		
from Irrigation Water	0		0
Nutrient Balance from above	159.5	89.8	61.2
Imported Nutrients	62	90	344
Estimated Remaining Nutrients Required	98	0	-284
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	98	0	-284

Unacceptable Rate: May be a resource risk.
Acceptable: Sustainable agronomic rate.

Field: Field 4 **Crop:** Wheat-Spring, Irrigated South ID **Yield:** 98

	N	P205	K20
Crop Nutrient Requirement	200	90	61
Nutrients From Soil	?		
from Mineralized Nitrogen	45		
from Prior Crops	-38		
from Prior Bio-Nutrients	35		
from Irrigation Water	0		0
Nutrient Balance from above	159.5	89.8	61.2
Imported Nutrients	62	90	344
Estimated Remaining Nutrients Required	98	0	-284
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	98	0	-284

Unacceptable Rate: May be a resource risk.
Acceptable: Sustainable agronomic rate.

Field: Field 5 **Crop:** Wheat-Spring, Irrigated South ID **Yield:** 98

	N	P205	K20
Crop Nutrient Requirement	200	90	61

Nutrients From Soil	?		
from Mineralized Nitrogen	45		
from Prior Crops	-38		
from Prior Bio-Nutrients	35		
from Irrigation Water	0		0
Nutrient Balance from above	159.5	89.8	61.2
Imported Nutrients	62	90	344
Estimated Remaining Nutrients Required	98	0	-284
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	98	0	-284

Unacceptable Rate: May be a resource risk.
Acceptable: Sustainable agronomic rate.

Field: Field 6 **Crop:** Wheat-Spring, Irrigated South ID **Yield:** 98

	N	P205	K20
Crop Nutrient Requirement	200	90	61
Nutrients From Soil	?		
from Mineralized Nitrogen	45		
from Prior Crops	-38		
from Prior Bio-Nutrients	35		
from Irrigation Water	0		0
Nutrient Balance from above	159.5	89.8	61.2
Imported Nutrients	62	90	344
Estimated Remaining Nutrients Required	98	0	-284
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	98	0	-284

Unacceptable Rate: May be a resource risk.
Acceptable: Sustainable agronomic rate.

Field: Field 7 **Crop:** Wheat-Spring, Irrigated South ID **Yield:** 98

	N	P205	K20
Crop Nutrient Requirement	200	90	61
Nutrients From Soil	?		
from Mineralized Nitrogen	45		
from Prior Crops	-38		
from Prior Bio-Nutrients	35		
from Irrigation Water	0		0
Nutrient Balance from above	159.5	89.8	61.2
Imported Nutrients	62	90	344
Estimated Remaining Nutrients Required	98	0	-284
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	98	0	-284

Unacceptable Rate: May be a resource risk.
Acceptable: Sustainable agronomic rate.

Field: Field 8 **Crop:** Wheat-Spring, Irrigated South ID **Yield:** 98

	N	P205	K20
Crop Nutrient Requirement	200	90	61
Nutrients From Soil	?		
from Mineralized Nitrogen	45		
from Prior Crops	-38		
from Prior Bio-Nutrients	35		
from Irrigation Water	0		0
Nutrient Balance from above	159.5	89.8	61.2
Imported Nutrients	62	90	344
Estimated Remaining Nutrients Required	98	0	-284
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	98	0	-284

Unacceptable Rate: May be a resource risk.
Acceptable: Sustainable agronomic rate.

Field: Field 9 **Crop:** Wheat-Spring, Irrigated South ID **Yield:** 98

	N	P205	K20
Crop Nutrient Requirement	200	90	61
Nutrients From Soil	?		
from Mineralized Nitrogen	45		
from Prior Crops	-38		
from Prior Bio-Nutrients	35		
from Irrigation Water	0		0
Nutrient Balance from above	159.5	89.8	61.2
Imported Nutrients	62	90	344
Estimated Remaining Nutrients Required	98	0	-284
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	98	0	-284

Unacceptable Rate: May be a resource risk.
Acceptable: Sustainable agronomic rate.

BIO-NUTRIENT EXPORT INFO

Exported Bio-Nutrient Summary					
Bio-Nutrient Group Name	**Amount**	**Consumer**	**Consumer's Address**	**Telephone**	**Acres**
No Data	No Data	No Data	No Data	No Data	No Data

Appendix B: NUTRIENT RISK ANALYSIS

Phosphorus Runoff Risk Assessment

FIELD: Field 1
Overall Risk Rating: Very High
Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 89.8

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: Surface applied no incorporation

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: Field 10

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 89.8

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: Surface applied no incorporation

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: Field 11

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 89.8

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: Surface applied no incorporation

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: Field 12

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 89.8

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: Surface applied no incorporation

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: Field 13

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 89.8

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: Surface applied no incorporation

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: Field 14

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 89.8

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: Surface applied no incorporation

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: Field 15

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 89.8

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: Surface applied no incorporation

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: Field 2

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 89.8

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: Surface applied no incorporation

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basins sho be installed to minimize offsite transport and loss of Phosphorus.

FIELD: Field 3

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 89.8

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: Surface applied no incorporation

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: Field 4

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is

successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 89.8

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: Surface applied no incorporation

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: Field 5

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist

and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 89.8

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: Surface applied no incorporation

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: Field 6
Overall Risk Rating: Very High
Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 89.8

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: Surface applied no incorporation

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: Field 7

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 89.8

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: Surface applied no incorporation

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as

possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: Field 8

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 89.8

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: Surface applied no incorporation

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: Field 9

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 89.8

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: Surface applied no incorporation

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tailwater recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

Nutrient Leaching Risk Assessment

FIELD: Field 1

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very Low or N.A.

Comments: Good apparent irrigation water management, but if crop requirements are not being met crop yields may suffer from a water shortage. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: Field 10

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very Low or N.A.

Comments: Good apparent irrigation water management, but if crop requirements are not being met crop yields

may suffer from a water shortage. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: Field 11
Overall Risk Rating: Low
Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very Low or N.A.

Comments: No Data

Soil/Water Table Depth Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: Field 12
Overall Risk Rating: Low
Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very Low or N.A.

Comments: Good apparent irrigation water management, but if crop requirements are not being met crop yields may suffer from a water shortage. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: Field 13

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very Low or N.A.

Comments: No Data

Soil/Water Table Depth Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: Field 14

Overall Risk Rating: Low
Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very Low or N.A.

Comments: No Data

Soil/Water Table Depth Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transpo to ground water and interconnected surface water may be a concern.

FIELD: Field 15
Overall Risk Rating: Low
Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very Low or N.A.

Comments: No Data

Soil/Water Table Depth Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: Field 2

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very Low or N.A.

Comments: Good apparent irrigation water management, but if crop requirements are not being met crop yields may suffer from a water shortage. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: Field 3

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very Low or N.A.

Comments: No Data

Soil/Water Table Depth Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: Field 4

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very Low or N.A.

Comments: Good apparent irrigation water management, but if crop requirements are not being met crop yields may suffer from a water shortage. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: Field 5
Overall Risk Rating: Low
Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very Low or N.A.

Comments: Good apparent irrigation water management, but if crop requirements are not being met crop yields may suffer from a water shortage. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: Field 6
Overall Risk Rating: Low
Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very Low or N.A.

Comments: No Data

Soil/Water Table Depth Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: Field 7

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very Low or N.A.

Comments: Good apparent irrigation water management, but if crop requirements are not being met crop yields may suffer from a water shortage. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: Field 8

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and

the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very Low or N.A.

Comments: Good apparent irrigation water management, but if crop requirements are not being met crop yields may suffer from a water shortage. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: Field 9

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very Low or N.A.

Comments: No Data

Soil/Water Table Depth Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport .o ground water and interconnected surface water may be a concern.

NUTRIENT RISK ANALYSIS Legend

BMP	Definition	Purpose
Buffer Strip	Contour buffer strips are strips of perennial grass alternated with wider cultivated strips that are farmed on the contour.	Contour buffer strips slow runoff water and trap sediment. Consequently, soil erosion is generally reduced significantly by this practice. Sediments, nutrients, pesticides, and other potential pollutants are filtered out as water flows through the grass strips. The grass strips also provide food and cover for wildlife.
Channel Vegetation	Establishing and maintaining adequate plants on channel banks, berms, spoil, and associated areas.	To stabilize channel banks and adjacent areas and reduce erosion and sedimentation. To maintain or enhance the quality of the environment, including visual aspects and fish and wildlife habitat.
Chiseling and Sub soiling	Loosening the soil, without inverting and with a minimum of mixing of the surface soil, to shatter restrictive layers below normal plow depth that inhibit water movement or root development.	To improve water and root penetration and aeration.
Composting Facility	A composting facility is installed for biological stabilization of waste organic material.	The purpose of this practice is to biologically treat waste organic material and produce humus-like material that can be recycled as a soil amendment or organic fertilizer. The material may also be used by other acceptable methods of recycling that comply with laws, rules and regulations.
Conservation Cover	This practice involves establishing and maintaining a protective cover of perennial vegetation on land	This practice reduces soil erosion, associated sedimentation, improves water quality, and creates or

	retired from agriculture production.	enhances wildlife habitat.
Conservation Cropping Sequence	Growing crops in a recurring sequence on the same field.	This practice may be applied as part of a best management practice to support one or more of the following: Reduce sheet and rill erosion, Reduce irrigation induced erosion, Reduce soil erosion from wind, Maintain or improve soil organic matter content, Manage deficient or excess plant nutrients, Improve water use efficiency, Manage saline seeps, Manage plant pests (weeds, insects, diseases), Provide food for domestic livestock, and Provide food and cover for wildlife.
Contour Farming	Farming sloping land in such a way that preparing land, planting, and cultivating are done on the contours. (This includes following established grades of terraces or diversion.)	To reduce erosion and control water.
Cover and Green Manure Crop	A crop of close-growing, legumes, or small grain grown primarily for seasonal protection and soil improvement. It usually is grown for 1 year or less, except where there is permanent cover as in orchards.	To control erosion during periods when the major crops do not furnish adequate cover; add organic material to the soil; and improve infiltration, aeration, and tilth.
Critical Area Planting	Planting vegetation on critically eroding areas that require extraordinary treatment.	This practice is used on highly erodible areas that cannot be stabilized by ordinary planting techniques and if left untreated may cause severe erosion or sediment damage. Examples of critical areas include the following: 1) Dams, dikes, levees, and other construction sites with very steep slopes, 2) Mine spoil and surface mined land with poor quality soil and possibly chemical problems, and 3) Agriculture land with severe gullies requiring specialized

		planting techniques and management.
Dike or Berm	An embankment constructed of earth or other suitable materials to protect land against overflow or to regulate water.	Dikes are used to: Permit improvement of agricultural land by preventing overflow and better use of drainage facilities, Prevent damage to land and property, Facilitate water storage and control in connection with wildlife and other developments, and Protect natural areas, scenic features and archeological sites from damage.
Diversion	A channel constructed across the slope with a supporting ridge on the lower side.	To divert excess water from one area for use or safe disposal in other areas.
Drip Irrigation	A planned irrigation system in which all necessary facilities are installed for efficiently applying water directly to the root zone of plants by means of applicators (orifices, emitters, porous tubing, perforated pipe) operated under low pressure. The applicators can be placed on or below the surface of the ground.	To efficiently apply water directly to the plant root zone to maintain soil moisture within the range for good plant growth and without excessive water loss, erosion, reduction in water quality, or salt accumulation.
Filter Strip	A strip or area of vegetation for removing pollutants water.	A filter strip reduces pollution by filtration, deposition, infiltration, absorption, adsorption, decomposition, and volatilization of sediment, organic matter, and other pollutants from runoff and waste water.
Fish Stream Improvement	Fish Stream Improvement is improving a stream channel to make or enhance fish habitat.	The purpose of the practice is to increase production of desired species of fish. The practice involves improving food supplies, shelter, spawning areas, water quality, and other elements of fish habitat.
Grade Stabilization Construction	A structure used to control the grade and head cutting in natural	These structures are to: Stabilize the grade and control erosion in

	or artificial channels.	natural or artificial channels, prevent the formation or advance of gullies, enhance environmental quality, and reduce pollution hazards.
Grassed Waterway	A natural or constructed channel that is shaped or graded to required dimensions and established in suitable vegetation for the stable conveyance of runoff.	Grassed waterways convey runoff from terraces, diversions, or other water concentrations without causing erosion or flooding and to improve water quality.
Grazing Land Mechanical Treatment	Modifying physical soil and/or plant conditions with mechanical tools by treatments such as; pitting, contour furrowing, and ripping or sub-soiling.	This practice should be applied as part of a best management practice to support one or more of the following purposes: Fracture compacted soil layers and improve soil permeability, Reduce water runoff and increase infiltration, Break up sod bound conditions and thatch to increase plant vigor, and Renovate and stimulate plant community for greater productivity and yield.
Heavy Use Area Protection	Protecting heavily used areas by establishing vegetative cover, by surfacing with suitable materials, or by installing needed structures.	To stabilize urban, recreation, or facility areas frequently and intensely used by people, animals, or vehicles.
Irrigation Land Leveling	Reshaping the surface of land to be irrigated to planned grades.	To permit uniform and efficient application of irrigation water without causing erosion, loss of water quality, or damage to land by water logging and at the same time to provide for adequate surface drainage.
Irrigation Water Management	Irrigation water management is the process of determining and controlling the volume, frequency, and application rate of irrigation water in a planned, efficient manner.	Irrigation water management is applied as part of a conservation management system to support one or more of the following: Manage soil Moisture to promote desired crop response; Optimize use of available water supplies; Minimize irrigation induced soil erosion;

		Decrease non-point source pollution of surface and groundwater resources; Manage salts in the crop root zone; Manage air, soil, or plant micro-climate.
Mulching	Applying plant residues or other suitable materials not produced on the site to the soil surface.	To conserve moisture; prevent surface compaction or crusting; reduce runoff and erosion; control weeds; and help establish plant cover.
Polyacrylamide (PAM)	Polyacrylamide is an organic polymer formulated to stabilize soil when applied in irrigation water.	Water applied with PAM stabilizes soil aggregates which can then resist the erosive forces of water. If correctly applied, PAM will produce clear runoff water and residue erosion within the field by over 90 percent.
Prescribed Grazing	Prescribed grazing is the controlled harvest of vegetation with grazing animals, managed with the intent to achieve a specific objective.	Application of this practice will manipulate the intensity, frequency, duration, and season of grazing to: 1) Improve water infiltration, 2) maintain or improve riparian and upland area vegetation, 3) protect stream banks from erosion, 4) manage for deposition of fecal material away from water bodies, and 5) promote ecological and economically stable plant communities which meet landowner objectives.
Residue Management (Conservation Tillage)	Managing the amount, orientation, and distribution of crop and other plant residue on the soil surface.	This practice may be applied as part of a conservation system to support one or more of the following: Reduce sheet and rill erosion. Reduce wind erosion. Maintain or improve soil organic matter content and tilth. Conserve soil moisture. Manage snow to increase plant available moisture. Provide food and escape cover for wildlife.
Riparian Forest Buffer	A riparian forest buffer is an area	The riparian forest buffer is a

	of trees and/or shrubs located adjacent to a body of water. The vegetation extends outward from the water body for a specified distance necessary to provide a minimum level of protection and/or enhancement.	multi-purpose practice design to accomplish one or more of the following: Create shade to lower water temperatures and improve habitat for aquatic animals, Provide a source of debris necessary for healthy robust populations of aquatic organisms and wildlife, and Act as a buffer to filter out sediment, organic material, fertilizer, pesticides and other pollutants that may adversely impact the water body, including shallow ground water.
Sediment Basin	A basin constructed to collect and store debris or sediment.	A sediment basin may have the following uses: Preserve the capacity of reservoirs, ditches, canals, diversion, waterways, and streams, Prevent undesirable deposition on bottom lands and developed areas, Trap sediment originating from construction sites, and Reduce or abate pollution by providing basins for deposition and storage of silt, sand, gravel, stone, agricultural wastes, and other detritus.
Sprinkler System	A planned irrigation system in which all necessary facilities are installed for efficiently applying water by means of perforated pipes or nozzles operated under pressure.	To efficiently and uniformly apply irrigation water to maintain adequate soil moisture for optimum plant growth without causing excessive water loss, erosion, or reduced water quality.
Stream Channel Stabilization	Stabilizing the channel of a stream with suitable structures.	To control aggradations or degradation in a stream channel.
Stream bank Protection	Using vegetation or structures to stabilize and protect banks of streams, lakes, estuaries, or excavated channels against scour and erosion.	To stabilize or protect banks of streams, lakes, estuaries, or excavated channels for one or more of the following purposes: Prevent the loss of land or damage to utilities, roads, buildings, or other facilities adjacent to the banks, Maintain the capacity of the channel, Control channel meander

		that would adversely affect downstream facilities, Reduce sediment loads causing downstream damages and pollution, and Improve the stream for recreation or as a habitat for fish and wildlife.
Strip-cropping, Contour	Growing crops in a systematic arrangement of strips or bands on the contour to reduce water erosion. The crops are arranged so that a strip of grass or close-growing crop is alternated with a strip of clean-tilled crop or fallow or a strip of grass is alternated with a close-growing crop.	To reduce sheet and rill erosion and/or to reduce transport of sediment and other water-borne contaminants.
Strip-cropping, Field	Growing crops in a systematic arrangement of strips or bands across the general slope (not on the contour) to reduce water erosion. The crops are arranged so that a strip of grass or a close-growing crop is alternated with a clean-tilled crop or fallow.	To help control erosion and runoff on sloping cropland where contour strip-cropping is not practical.
Subsurface Drains	A Subsurface Drain is a conduit, such as corrugated plastic tubing, tile, or pipe, installed beneath the ground surface to collect and/or convey drainage water.	The purpose of a subsurface drain is to: Improve the environment for vegetation, Reduce erosion, Improve water quality, Collect ground water for beneficial use, Remove water from heavy use areas such as recreation areas, or around buildings, and Regulate water to control health hazards caused by pests.
Surge Irrigation	Surge irrigation is the intermittent application of water to furrows, corrugates, or borders creating a series of on and off periods of constant or variable time spans.	Surge allows a lighter application of water with a higher efficiency. The result is less deep percolation of water at the upper end of the field and a more uniform application.
Tailwater Recovery & Pumpback System	A facility to collect, store, and transport irrigation tailwater for	To conserve farm irrigation water supplies and water quality by

	reuse in a farm irrigation distribution system.	collecting the water that runs off the field surface for reuse on the farm.
Terraces	An earth embankment, a channel, or a combination ridge and channel constructed across the slope.	Reduce slope length, reduce sediment content in runoff water, reduce erosion, Improve water quality, intercept and conduct surface runoff at a non-erosive velocity to a stable outlet, retain runoff for moisture conservation, prevent gully development, reform the land surface, improve farmability, and reduce flooding.
Use Exclusion	Excluding animals, people or vehicles from an area.	To protect, maintain, or improve the quantity and quality of the plant, animal, soil, air, water, and aesthetics resources and human health and safety.
Water and Sediment Control Basin	An earth embankment or a combination ridge and channel generally constructed across the slope and minor watercourses to form a sediment trap and water detention basin.	To improve farmability of sloping land, reduce watercourse and gully erosion, trap sediment, reduce and manage onsite and downstream runoff, and improve downstream water quality.
Watering Facility	A device (tank, trough, or other watertight container) for providing animal access to water.	To provide watering facilities for livestock and/or wildlife at selected locations in order to: 1) protect and enhance vegetative cover through proper distribution of grazing; 2) provide erosion control through better grassland management; or 3) protect streams, ponds and water supplies from contamination by providing alternative access to water.
Wetland Development/Restoration	The construction or restoration of a wetland facility to provide the hydrological and biological benefits of a wetland.	To develop or restore hydric soil conditions, hydrologic conditions, hydrophytic plant communities, and wetland functions.

Appendix C: CROP SPECIFIC GUIDELINES

Wheat-Spring, Irrigated South ID

SOIL SAMPLING

Spring soil sampling is critical for producing economical yields of high quality irrigated spring wheat. Soil fertility varies among and within fields. Therefore, each soil sample submitted to a soil test laboratory should consist of sub samples collected from at least 20 individual sites within a uniform area. Collect separate samples from the 0-to 12-inch and 12-to 24-inch depths. Skip areas that do not represent the majority of the field such as gravelly areas, saline or sodic areas, wet spots, and turn rows. Thoroughly mix the 20 sub samples in a clean plastic bucket, keeping the first-foot samples separate from the second-foot samples. Place about one pound of the mixed soil in a plastic-lined soil sample bag. Fill out all required information (name, field number, date, depths, and crop history). Do not store samples under warm conditions because microbial activity can change the extractable N in the soil sample. Send soil samples to the laboratory for analysis as quickly as possible. For more detailed information about soil sampling, refer to EXT 704, Soil Sampling. If sizable areas within fields differ visually or in productivity, these areas may need to be sampled separately and managed differently. Precision ag technology and variable rate applicators now provide options for differentially fertilizing these areas. For information on mapping soil variability and treating mapping units differently, contact an extension soil fertility specialist, your local county ag extension educator, or a fertilizer dealer/consultant.

NITROGEN (N)

Adequate N is necessary for maximum production of irrigated spring wheat. The amount of fertilizer N required to produce the maximum economic return depends on many factors. These factors include the yield estimate, amount of inorganic N remaining from the previous crop, mineralizable N, other N sources, and the previous crop residues.

TOTAL N REQUIREMENTS BASED ON ESTIMATED YIELD

Fertilizer N rates should correspond to the yield growers can reasonably expect for their soil conditions and management. Historical yields for a specific field or area will generally provide a fair approximation of yield potential, given the grower's traditional crop management. Projected changes in crop management (water management, variety, lodging control, disease and weed control) designed to appreciably increase or reduce production may require adjustment of yield estimates. Areas of fields known to differ considerably in yield, based on previous long-term observations or yield mapping, may also require adjustment of the total N required. The available N from all sources required to produce a bushel (60 pounds) of irrigated spring wheat depends on several crop management practices. Factors such as weed, insect, and disease control as well as irrigation, planting date, water management, and soil type can influence the N required for maximum yield. Results of field trials suggest that two pounds of available N per bushel are required for irrigated spring wheat ranging in yield from 80 to 120 bushels (bu) per acre. Nitrogen requirements per bushel may be greater for yields below 80 bu per acre, but less than two pounds N per bu for yields above 120 bu per acre.

AVAILABLE NITROGEN

Available nitrogen (N) in the soil includes inorganic N measured as nitrate (NO 3 -N) and ammonium (NH 4 - N), mineralizable N (released from organic matter during the growing season), N credits from previous cropping or manures, and in some cases the N in irrigation water. Each component of available N must be estimated for accurate determination of optimum fertilizer N rates.

INORGANIC NITROGEN

Residual soil inorganic N (NO3 , NH4) can be evaluated most effectively with a soil test. Soil samples should be collected in foot increments to a depth of two feet, unless roots are restricted by dense soil layers or high

water tables. Research indicates that soil test inorganic N is used as effectively as fertilizer N. Ammonium N (NH4-N) is generally low in spring preplant soil samples and thus contributes little to available N. However, NH4-N should be determined along with NO3-N when there is reason to expect appreciable NH4-N from previous ammonium N fertilizer applications. To convert soil test NO3-N and NH4-N values to pounds (lb) per acre, sum the N expressed in parts per million (ppm) for each foot increment of sampling depth and multiply times four. A preplant soil sample is often only collected from the first foot of soil. Although this information is not as complete and reliable as would be provided by deeper sampling, residual N measurements from the first foot of soil can be combined with estimates of residual N in the second foot to predict N requirements for irrigated spring wheat. Preplant soil test NO3-N in the second foot of the soil is commonly only one-half to two-thirds as high as in the first foot of soil, unless previous crop irrigation or over winter precipitation has leached N from the surface foot. Basing N rates on estimates rather than actual measurements of residual N in the second foot increases the risk of recommending either too little or too much N.

NITROGEN FROM PREVIOUS CROP RESIDUE

Nitrogen associated with decomposition of previous crop residues should also be considered when estimating available N. Residues that require additional N for decomposition include cereal straw and mature corn stalks. Research has shown that 15 pounds of additional N are needed per ton of residue returned to the soil, up to a maximum of 50 pounds. For more information on compensating for cereal residues, refer to CIS 825, Wheat Straw Management and Nitrogen Fertilizer Requirements. Row crop residues (potatoes, sugar beets, onions) generally do not require additional N for decomposition. Consequently, these residues have little effect on the N needs of spring wheat. Sweet corn residues typically are higher in N content than mature field corn residues. In addition, they are returned to the soil earlier and decompose more rapidly, therefore releasing more N to subsequent spring wheat than mature corn stalks. Legume residues are typically rich in N and can release appreciable N for spring wheat. Bean and pea residues are fairly rapidly decomposed and the N release from them should be reflected in the preplant spring soil test for N. Alfalfa residues decompose less rapidly and the N release is not typically indicated by the preplant soil test.

MINERALIZED NITROGEN

Soils vary in their capacity to release N from organic matter during the growing season. Measurements of mineralizable N for spring cereals typically range from 30 to 60 lb per acre. Unless the capacity of a specific soil to release N is known, use a midpoint mineralizable N value of 45 lb N per acre for irrigated spring wheat. While soil organic matter content is frequently used to estimate annual mineralizable N contributions, organic matter does not accurately predict the amount of N that is mineralized in southern Idaho irrigated soils.

NITROGEN FROM MANURE AND WATER

Fields used for spring wheat occasionally receive animal manures or lagoon wastes. Nutrient contributions from these sources can be appreciable and should be taken into consideration when estimating available N. Manures can vary in nutrient content depending on the animal source, how the manure is processed, and the quality and quantity of bedding material included. For the most accurate estimate of fertilizer equivalent values, the manure should be analyzed for its nutrient content. For more detailed information on animal manures and their nutrient contributions to soils, refer to PNW 239, How to Calculate Manure Application Rates in the Pacific Northwest. Irrigation waters other than lagoon effluents can also contain appreciable N. While most well and surface waters used for irrigation have low N concentrations, irrigation waters that receive appreciable return flows from other districts are likely to be higher in N. To convert the N content of each acre foot of irrigation water applied to the lb N per acre fertilizer equivalent, multiply the ppm or milligrams per liter (mg/l) N concentration by 2.7. Preplant applied N is easily leached beyond developing seedling root systems with early season irrigation. If early season irrigation is necessary to ensure proper vegetative development, consider reducing the time for each set. Set time can be lengthened as the root system develops more fully. Nitrogen located below the developing root system is not taken up as readily by the plant or used as effectively for yield.

CALCULATION OF N APPLICATION RATES

To calculate the fertilizer N application rate, several available N components must be estimated: (1) total N needed for a given yield, (2)mineralized N, (3) inorganic N (NO3 + NH4) as measured by the soil test, (4) previous crop/residue management, and (5) manuring practice or irrigation water N concentration.

NITROGEN AND LODGING

Irrigated spring wheat is more susceptible to lodging at high available N levels than winter wheat. Lodging can reduce both grain yield and quality, as well as increase harvest costs. Varieties differ in straw strength, plant height, and their susceptibility to lodging. For descriptions of varieties and their susceptibility to lodging, refer to PR327, 2000 Idaho Certified Seed Selection Guide for Some Varieties of Spring Wheat. Ethephon (Cerone ®)is a growth regulator commonly used to shorten small grains, stiffen straw, and reduce lodging. Growers should consider using this growth regulator for wheat in soils with high available N if lodging is historically a problem.

MANAGING NITROGEN FOR HIGH PROTIEN HARD WHEAT

The hard wheat market, both red and white, often pays a premium for high protein. Hard spring wheat varieties can differ in grain protein. However, the most critical factor for producing high protein irrigated wheat is the amount and timing of N fertilization. To produce high protein wheat, first determine the total fertilizer N required to maximize yield. High protein generally is not realized unless available N matches or exceeds that required for maximum yield. The nitrogen applied for maximizing yield should be applied preplant. Split applications of N can increase wheat protein, but even split applied N may not raise protein to acceptable levels if the total N available is not sufficient for maximum yield. Between boot and flowering is the best time to influence grain protein with delayed applications. The optimum N rate for increasing protein to 14 percent may vary depending on the final yield. Higher yields increase and lower yields reduce the optimal delayed N rate. Flag leaf N testing can be useful for determining the need for later applied N. Research indicates that there is little protein increase with subsequent applied N when flag leaf total N concentration at heading is 4.2 to 4.3 percent or greater. The required N rate increases as flag leaf N values decrease below the critical value. If flag leaf N at heading is above 3.8 percent, no more than 40 lb N per acre should be needed to increase protein to 14 percent. If flag leaf N is below 3.8 percent, higher N rates may be needed.

PHOSPHORUS (P)

Irrigated spring wheat requires adequate soil P for maximum economic yields. Soil testing for P provides a reasonable estimate of available P. Optimum P fertilizer rates depend on both soil test P and soil lime content. Plant maturity may be delayed when soil test P concentrations are low and free lime content is greater than 10 percent. However, grain yields are usually unaffected when the growing season is sufficient. When banding an ammonium P source (11-52-0) at rates above 20 lb per acre, separate the seed and the fertilizer material by two inches to avoid seedling damage from salts. For a detailed discussion of banding refer to PNW 283, No-Till and Minimum Tillage Farming: Fertilizer Band Location for Cereal Root Access. Incorporate P fertilizer during seedbed preparation. Solution P, such as ammonium polyphosphate, may be applied through a sprinkler irrigation system. Check the compatibility of the irrigation water and the P material. If precipitates form, decrease the fertilizer concentration or increase the injection time.

POTASSIUM (K) AND CHLORIDE (Cl)

Soil test K is a reasonable indication of available K in southern Idaho soils. Incorporate K during seedbed preparation. Potassium chloride increases yields where take-all root rot is prevalent, regardless of the soil test K level. This response is due primarily to the chloride component. Wheat yield may also increase when not infected with take-all if extractable soil Cl is below 30 lb per acre in the first two feet. Low soil Cl has been associated with physiological leaf spot. Soil Cl can be measured with a soil test. If soil test Cl is less than 8 ppm for the first two feet combined, apply 40 lb Cl per acre in the form of potassium chloride. Do not drill band Cl with the seed as germinating seed may be injured by excessive salts.

SULFUR (S)

Sulfur fertilizer requirements for spring wheat depend primarily on the S content of irrigation water and the S soil test. Coarse-textured soils are more likely to be low in S than fine-textured soils. Wheat irrigated with Snake River water or waters consisting of significant runoff from other fields should not require fertilizer S. Soils should be tested for S to a depth of two feet as the available form of S, or sulfate, is mobile. Soils low in (less than 35 lb per acre in the 0-to 24-inch depth) should receive 20 to 40 lb of S per acre. Use S fertilizers containing readily available sulfate rather than elemental S to rapidly correct S shortages.

MICRONUTRIENTS (Fe, Mn, Zn, Cu, B)

Spring wheat yield responses to iron (Fe), manganese (Mn), zinc (Zn), copper (Cu), boron (B), and other micronutrients are rarely observed in southern Idaho. Micronutrient applications may be needed occasionally on severely scraped or eroded areas.

Contact your County Extension Agent if you have any questions regarding the interpretation of this information or for further information on your local needs.

The above fertilizer guidelines are based on relationships established between University of Idaho soil test and crop yield response research. In this research, crop response to fertilizers was evaluated at several sites where the response to fertilizer differed. The recommendations reflect the general or overall response to fertilizers at specific soil test values and the response in individual fields can differ appreciably from the general table recommendation. Some sites will require less than the general recommendation, other sites more. Unfortunately, the science has not developed to the point where the table recommendations can account for all the unknown variables influencing the effectiveness of applied fertilizers at individual sites. The table fertilizer recommendations can only be used as general guides rather than specific recommendations for each and every field.

Furthermore, soil variability can sharply reduce the accuracy composite soil test values for individual fields. That is why large contiguous areas within fields should be sampled separately when they are known to differ in crop growth or soil characteristics known to influence the response to fertilizer. But soil variability frequently does not occur conveniently in large areas that can be sampled separately or fertilized differently. The fertilizer recommendations in most cases do not account for this variability. Soil test based recommendations may be excessive in some field areas and inadequate in other areas of the same field. The recommendations then will be appropriate only to the degree that the composite soil test values for fields actually represent the field. Thus, for fields that are highly variable, the fertilizer recommendations should be considered conservative estimates of fertilizers needed. All the more reason to consider the table fertilizer recommendations as general guides rather than specific recommendations for each and every field.

The fertilizer rates suggested in the tables will support above average yields if other factors are not limiting production. Therefore the recommendations assume that good crop management practices will be used, i.e. insect, disease, and weed control. Nutrient requirements can be met using either commercial fertilizers or equivalent organic matter sources, such as manure or compost, provided their nutrient content and relative availability are known or can be estimated from published literature. Soil test based recommended rates will not be appropriate if the soil samples are improperly taken or do not represent the area to be fertilized. For nitrogen in particular, recommendations will be most accurate when crop history is taken into account and projected yields are reasonable estimates based on long term records.

General Comments:

- Over irrigation and nutrient loss is a hazard. Optimum irrigation management is necessary to meet crop water use needs and avoid loss of nutrients through leaching beyond the root zone and runoff with irrigation tail water.
- Nitrogen leaching is particularly a concern on sandy soils. Optimum management may require split Nitrogen applications to meet crop needs.
- Weed, insect, and disease control significantly influence the efficiency and effectiveness of your fertilizer applications and ultimately crop yield and farm profitability.
- Phosphorus, potassium, and zinc nutrients can be effectively fall-applied as they are not readily leached over winter.
- Phosphorus can be budgeted for a crop rotation.
- If you have questions regarding the interpretation of this information, please contact your Extension Agricultural agent, Crop consultant, or your commodity company fieldman.
- Both farm profitability and water quality can be improved with efficient nutrient use. The following are recommendations in nutrient management, which will optimize nutrient use for crop production while protecting water quality:

1) Avoid the application of nutrient sources in close proximity to streams, wetlands, drainage ditches, areas of very shallow soils, and sinkholes.

2) Accurately calibrate nutrient application equipment to insure that recommended rates are applied.

3) Nitrogen recommendations for many crops are based on yield goals for the crops. It is important to establish realistic yield goals for each field based upon historical yield data, county averages, and your management practices to avoid unnecessary fertilizer costs and minimize potential water quality impairments.

Appendix D: SOIL TEST DATA

Field: No Data **Date of Test:** No Data

Parameter	Units	0-12"	12-24"	18-24"
Soil Texture		No Data	No Data	
EC	mmhos	No Data	No Data	
PH		No Data	No Data	
%Lime	%	No Data	No Data	
OM	%	No Data	No Data	
CEC	meq	No Data	No Data	
Nitrate-N	ppm	No Data	No Data	
Ammonia-N	ppm	No Data	No Data	
P	ppm	No Data	No Data	No Data
K	ppm	No Data	No Data	
Z	ppm	No Data	No Data	
Mn	ppm	No Data	No Data	
Fe	ppm	No Data	No Data	
Cu	ppm	No Data	No Data	
Ca	ppm	No Data	No Data	
Mg	ppm	No Data	No Data	

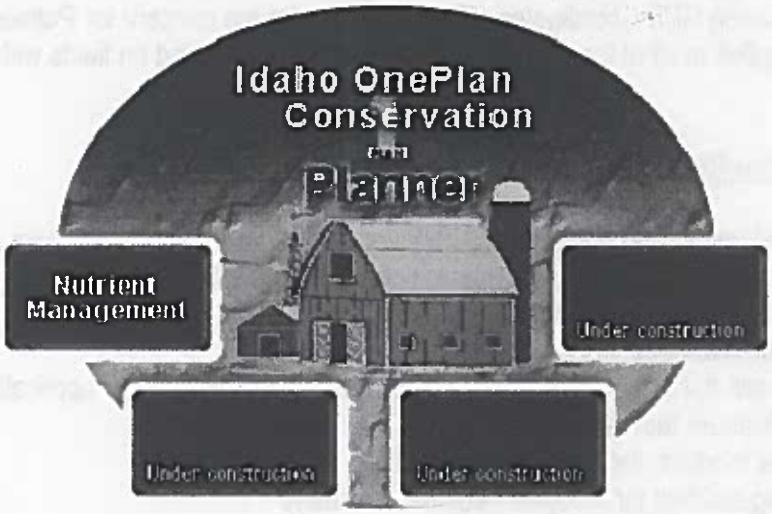
Na	ppm	No Data	No Data	

Grandview Palmer - Lopez

Nutrient Management Plan

Agriculture . . .

Launching into the Future



Nutrient Management Plan Prepared For:
Grandview Farms
(208) 834-2231
Palmer – Lopez Farm

Certified Planner:
Michael Mitchell
Professional Engineer, EAC Engineering, Inc
(559) 381-0607

Producer Signature: _____ Certificated Planner Signature: _____

Date Completed: 10-02-07

The information provided by those using the "Idaho OnePlan" shall be deemed to be trade secrets, production records, or other proprietary information and shall be kept confidential and shall be exempt from enclosure pursuant to section 9-340D, Idaho Code. (Title 22 Chapter 27 17D6)

PALMER – LOPEZ FARM
Producer Summary

Farm Summary

Palmer – Lopez Farm is an existing farm located 1.3 miles east of Grandview, Idaho. The farm is owned by Grandview Farms and managed by Mike Usabel. The farm consists of three handline irrigated fields for a total of 246 acres available for accepting imported manure/compost from Simplot/Grandview Feedlot.

Farm Resource Concerns

Palmer – Lopez Farm is located in the Watershed Basin of the Middle Snake Succor (#17050103). The facility is found at 116W 04'38" 43N 00'12" using GPS Coordinates. The primary resource concern for Palmer – Lopez Farm is ground water quality. Solid waste is applied to all of the fields and pasture and incorporated on fields within seven days of application.

Nutrient Management Plan Requirements

Producer will maintain field application records for a minimum of five years and make them available for review at routine inspections by ISDA personnel. These records must include (where applicable):

1. Fertilizer application rates
2. Manure/Compost application rates
3. On each field, keep a record of manure and chemical fertilizer applications, crop information, and soil and manure test results.
4. Fields to which the nutrients are applied
5. Spring soil test for nitrogen (required annually)
   0-12" and 12-24" nitrogen test

Crop Nutrient Requirement	
Crop	Pounds of P205 per acres
Alfalfa	86

Manure/Compost field application requirement (tons)						
Acres x crop nutrient requirement ÷ manure p205 value* = Tons required						
Example	Corn - 250(acres)	X	75 (crop requirement)	÷	16.85	
Corn	250	X	65** = 18750	÷ 16.85*	=	1112.76 tons

*based on manure test values for P205
**pounds of p205 required per acre

Irrigation Management Plan Recommendations

Irrigation water management is very important in nutrient management. If irrigation water is applied at a rate over the crop needs, there is potential for runoff and/or leaching of nutrients. If irrigation water is under-applied, the crop will not have optimal growth conditions. Crop irrigation water requirements changes through the growing season depending on climate conditions and crop Evapotranspiration rate. Proper irrigation water management responds these crop demands. It is recommended that:

- Irrigation schedules continue to be managed by your irrigation specialist.

- Continual inspection and maintenance of irrigation equipment will prevent unwarranted waste discharges into surface or ground water.

Nutrient Management Plan Recommendations

Land application of manure at agronomic rates, along with irrigation scheduling, is the most effective way to obtain maximum nutrient benefits from manure, condition the soil, and avoid potential water quality problems downstream. Cattle manure is a valuable resource, which will also improve soil properties such as water holding capacity, infiltration, tilth, structure, porosity, and nutrient retention and release. If animal manure and/or commercial fertilizers are not properly managed, contaminants may impact surface and/or groundwater.

Application of manure applied at an agronomic rate is a sustainable practice and is always allowed under ISDA regulations. Regardless of the rate prescribed by this nutrient management plan, soil testing at the 0-12 inch and 12-24 inch soil depths is required for nitrogen management.

- Set realistic crop yield goals in order to provide an accurate account of the plant nitrogen needs.
- Apply N so that it is available during peak plant demand.
- Apply fertilizer to cool season crop in the spring rather than the previous fall. This will prevent fertilizer leaching through the soil profile and provide the crop with the necessary levels of nutrients.
- Use split or multiple fertilizer applications in order to provide the crop with a pre-plant treatment and the needed nutrient levels throughout the growing season until the point of major nutrient uptake.
- Avoid the application of nutrient sources in close proximity to streams, wetlands, drainage ditches, areas of very shallow soils, and sinkholes.

Palmer - Lopez Farm
ANALYSIS OF RESOURCE CONCERNS

INTRODUCTION

The purpose of this nutrient management plan is to meet agricultural production goals and to certify that manure and nutrients are properly managed to minimize adverse impact to surface or groundwater. Plans are written in cooperation with the producer to:

1) Assure proper containment of animal manure and process waste water

2) Assess resource concerns which exist on the property

3) Budget nutrient sources to optimize crop water and nutrient needs. Nutrient sources include commercial fertilizers, animal manure, mineralization of previous crop soil organic matter, accounting of residues, and irrigation water.

4) When applicable, assess irrigation water management to minimize movement of nutrients beyond the root zone or with runoff.

If animal manure and/or commercial fertilizers are not properly managed, contaminants may negatively impact surface and/or groundwater. Some water resource contaminants associated with poorly managed animal manure and fertilizers are:

Phosphorus in the soil readily adsorbs to soil particles; thus, erosion of soil by surface runoff is the general mode of phosphorus transport. Even at very low concentrations, phosphorus can result in plant and algae blooms in surface water bodies. Alga blooms are a nuisance to boaters, irrigators, and others. Toxins released by certain algae can be lethal to livestock or other animals that drink the water. Dissolved oxygen in the water is depleted as algae die and decompose, sometimes causing fish kills.

Nitrogen in the form of nitrate (NO_3^-) is highly water-soluble and will move with water, particularly down the soil profile past the root zone if not utilized by plants (thus becoming a groundwater contamination issue).Nitrates are toxic to infants under 6 months, and to livestock at high concentrations. In surface water, excess nitrogen, like phosphorus, can result in nuisance plant and algae growth.

Organic matter in high load decreases dissolved oxygen in a surface water body when it decomposes. Low levels of dissolved oxygen is harmful or even fatal to fish and other aquatic life.

Bacteria and microorganism illnesses (pathogens) potentially transmitted through water by animal manure include Giardia, Typhoid Fever, Cryptosporidium, and Cholera. Pathogens from animal waste can negatively impact surface and groundwater quality.

FACILITY DESCRIPTION

Owner Information

Owner (1): Grandview Farms
Address: 1301 Hwy 67 , Grandview, ID 83624
Phone: (208) 834-2231 N/A

Location

Site Map: Facility site plan illustrated in Figure 1

Soil Conservation District: Bruneau River, Elmore
County: Elmore
Watershed Basin: Middle Snake-succor (USGS Hydrologic Unit Code # 17050103)

ANALYSIS OF RESOURCE CONCERNS

Farm Resource Concerns

Palmer - Lopez Farm is located in a watershed containing water quality limited stream segments listed according to the Clean Water Act. Stream segments are listed because a water quality parameter prevents the attainment of the "Fishable/Swimmable" goal of the Clean Water Act.

WATERBODY	BOUNDARIES	BACT	CHAN STAB	DO	FLOW ALT	HAB ALT	MET HG	MET	NH3	NUTR	O_G	ORG	PEST	PH	SAL	SED	TDG	TEMP	UNKN	*
Snake River	CJ Strike Res to Castle Creek	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	X

Palmer - Lopez Farm is not located in a critical Nitrate-Nitrogen management area. Nitrate Management Areas are designated based upon ground water quality sampling results. Two priority groups exist as follows:

'riority 1 is designated because at least 25% of the ground water sampling locations within the area exceed 5-milligrams/liter nitrate. This is one-half of the maximum contaminant level of 10-milligrams/liter nitrate. This nitrate concentration is considered evidence of significant degradation. Public drinking water systems are required to increase monitoring frequency when this level is reached.

Priority 2 is designated because at least 50% of the ground water sampling locations within the area exceed 2-milligrams/liter nitrate. This concentration threshold provides an indication of human-caused (anthropogenic) impacts. The upper limit for naturally occurring (background) concentrations of nitrate is considered to be about 2 mg/l.

Palmer - Lopez Farm is located in a sole source aquifer area - Western Snake River Plain Aquifer.

Field Resource Concerns

• Open Irrigation Water Conveyances - Irrigation tail water can deliver nutrients to surface water via open canals. Nutrient loading of open canals can have a detrimental affect on the health of receiving waters.

Depth Limiting Subsurface Features

Field Name	Subsurface Feature	Depth from Surface (in)
Field 1	Water Table	36
Field 2	Water Table	48
Field 3	Fractured Bedrock	20
	Water Table	36

Well Testing Results (See back of page):

Well	Date	Hardness	EC	PH	K	Nitrates	Nitrites	NH3	Na	Carbonate	Bicarbonate
No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data

ISDA REGULATIONS AND THE IDAHO NUTRIENT MANAGEMENT STANDARD

Nutrient management plans for animal agricultural operations regulated by the Idaho State Department of Agriculture (ISDA) must be approved by the Idaho State Department of Agriculture and must follow the Natural Resource Conservation Service (NRCS) Agriculture Waste Management Field Handbook and the Idaho Nutrient Management Standard. ISDA regulation and the Standard use soil test phosphorus as the indicator for environmental impact from agricultural production practices. The Idaho Nutrient Management Standard is based on a threshold soil test phosphorus level (TH), above which there is no agronomic advantage to application of phosphorus.

The Idaho Nutrient Management Standard categorizes fields as a surface water concern or a groundwater concern. A surface water concern indicates that runoff leaves the contiguous operating unit from normal storm events, rain on snow, frozen ground, or irrigation. The soil phosphorus threshold for a field with a surface water concern is 40 ppm phosphorus for soils alkaline (ph > 6) tested with the Olsen method and 60 ppm phosphorus for acidic (ph < 6.5) soils tested with the Bray method (0-12"Soil Sample Depth).

A groundwater resource concern indicates that runoff does not leave the contiguous operating unit from normal storm events, rain on snow, frozen ground, or irrigation. There are two sub-categories for fields identified as

having a groundwater concern. The first category applies to fields with a resource concern within the first five feet of the soil profile. A resource concern could be shallow soils, gravel, cobble, bedrock, high groundwater table, or a drained field. These fields are indicated as a groundwater concern <5'. The soil phosphorus threshold for a field with a groundwater concern <5' is 20 ppm phosphorus for soils tested with the Olsen method and 25 ppm phosphorus for soils tested with the Bray method(18-24" Soil Sample Depth).

If a field is not classified as having a surface water concern or a groundwater <5' concern, by default it is classified as having a groundwater concern >5'. The soil phosphorus threshold for a field with a groundwater concern >5' is 30 ppm phosphorus for soils tested with the Olsen method and 45 ppm phosphorus for soils tested with the Bray method(18-24" Soil Sample Depth).

Field Phosphorus Threshold

Field	Resource Concern	P Threshold (ppm)	P Threshold Soil Test Depth
Field 1	Groundwater < 5'	20	18 - 24"
Field 2	Groundwater < 5'	20	18 - 24"
Field 3	Groundwater < 5'	20	18 - 24"

Farm Location

Idaho Transverse Mercator

Coordinates of the farm center (meters): X = 2330726.43914455, Y = 1313249.97753118

Map Scale: 1 : 131

Figure 1. Base Map

Farm Location

Idaho Transverse Mercator

Coordinates of the farm center (meters): X = 2330726.43914455, Y = 1313249.97753118

Map Scale: 1 : 135

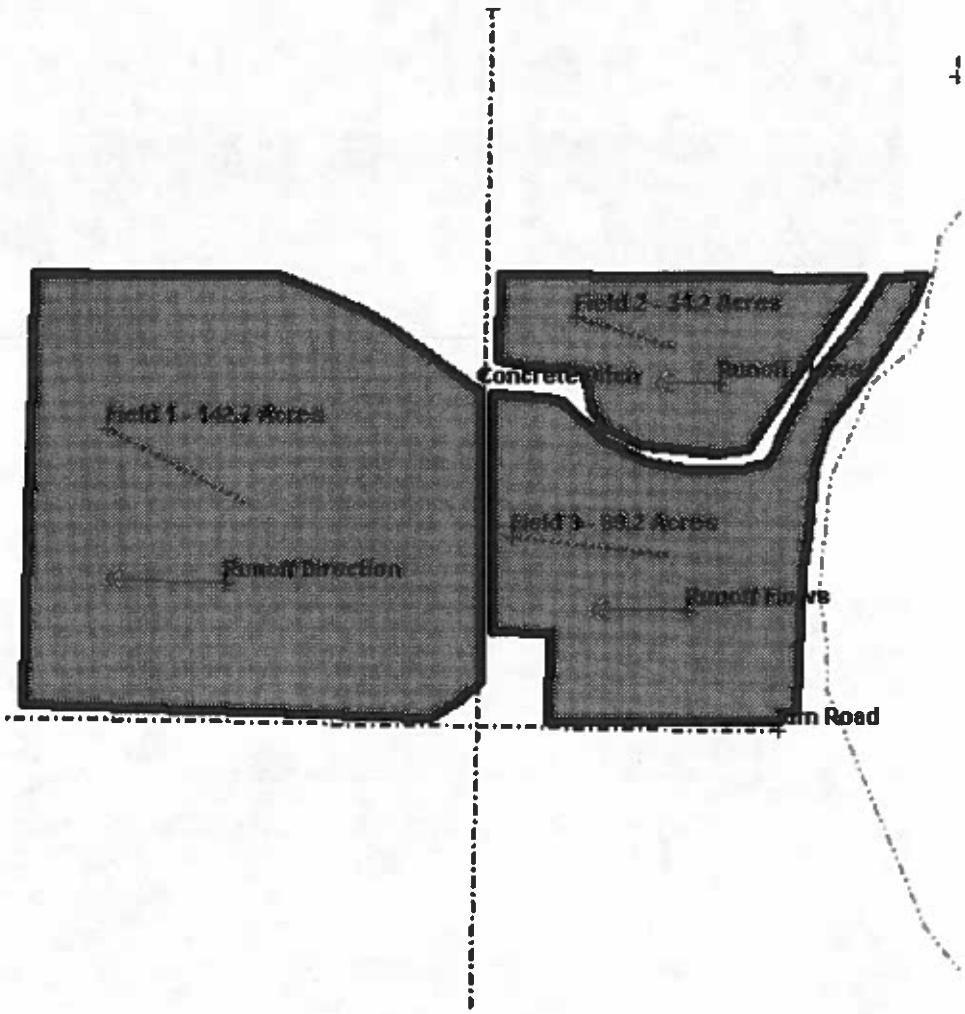


Figure 2. Farmstead Map

NUTRIENT MANAGEMENT REQUIREMENTS/RECOMMENDATIONS

Manure Application Rate Requirement By Year

FIELD: Field 1

Name	Man App		Imported Nutrients	Mineralization		Total	
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	Y		5 T/ac				
		N	59	N	0	N	59
		P	86			P	86
		K	330			K	330
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2005)	Y		5 T/ac				
		N	59	N	33	N	92
		P	86			P	86
		K	330			K	330
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2006)	Y		5 T/ac				
		N	59	N	33	N	92
		P	86			P	86
		K	330			K	330
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2007)	Y		5 T/ac				
		N	59	N	33	N	92
		P	86			P	86
		K	330			K	330

FIELD: Field 2

Name	Man App		Imported Nutrients	Mineralization		Total	
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	Y		5 T/ac				
		N	59	N	0	N	59
		P	86			P	86
		K	330			K	330
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2005)	Y		5 T/ac				
		N	59	N	33	N	92
		P	86			P	86
		K	330			K	330
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2006)	Y		5 T/ac				
		N	59	N	33	N	92
		P	86			P	86
		K	330			K	330
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2007)	Y		5 T/ac				
		N	59	N	33	N	92
		P	86			P	86
		K	330			K	330

FIELD: Field 3

Name	Man App		Imported Nutrients	Mineralization		Total	
			5 T/ac				
lfalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	Y	N	59	N	0	N	59
		P	86			P	86
		K	330			K	330
			5 T/ac				
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2005)	Y	N	59	N	33	N	92
		P	86			P	86
		K	330			K	330
			5 T/ac				
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2006)	Y	N	59	N	33	N	92
		P	86			P	86
		K	330			K	330
			5 T/ac				
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2007)	Y	N	59	N	33	N	92
		P	86			P	86
		K	330			K	330

Minimum Acres Required for Manure Application

Manure Group	Acres
Imported Nutrients	239

The acreage in the table is based on an average crop uptake of 100 lbs P_2O_5 per acre. These acreage numbers are for estimating export acreage needed. Wastewater application should begin with the first irrigation of the season and end with the last irrigation of the season. Rates should be designed to supply uniform application. When applying wastewater outside of the irrigation window you must contact the Department of Agriculture, Division of Animal Industries.

Hydraulic Balance

Field	Date
Field 1	April 1
Field 2	April 15
Field 3	April 1

0.5" of wastewater may be applied to fields after the hydraulic balance date to remain in compliance with this nutrient management plan.

Spring Soil Test

Spring soils tests must be taken every year from every field to determine a commercial fertilization rate. If commercial fertilizer isn't applied (for a perennial crop), spring soil samples are not required. If you do not apply commercial fertilizer, a complete soil analysis will need to be conducted initially to determine the nutrient baseline.

Record Keeping - For each field keep a record of annual manure and chemical fertilizer applications. Include nutrient source, date, time, rate and application method.

ANNUAL NUTRIENT BUDGET

The following crop nutrient budget is based on soil test data and cropping information. It is for one year for the following field and specified crop information:

Nutrient Budget Summary

Field: Field 1 **Crop:** Alfalfa Hay, Irrigated South ID-Cut Mid Bloom **Yield:** 7.5

	N	P205	K20
Crop Nutrient Requirement	364	86	351
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	0		
from Prior Bio-Nutrients	33		
from Irrigation Water	0		0
Nutrient Balance from above	332.5	85.9	351
Imported Nutrients	59	86	330
Estimated Remaining Nutrients Required	273	0	22
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	273	0	22

Acceptable: Sustainable agronomic rate.

Field: Field 2 **Crop:** Alfalfa Hay, Irrigated South ID-Cut Mid Bloom **Yield:** 7.5

	N	P205	K20
Crop Nutrient Requirement	364	86	351
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	0		
from Prior Bio-Nutrients	33		
from Irrigation Water	0		0
Nutrient Balance from above	332.5	85.9	351
Imported Nutrients	59	86	330
Estimated Remaining Nutrients Required	273	0	22
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	273	0	22

Acceptable: Sustainable agronomic rate.

Field: Field 3 **Crop:** Alfalfa Hay, Irrigated South ID-Cut Mid Bloom **Yield:** 7.5

	N	P205	K20
Crop Nutrient Requirement	364	86	351
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	0		
from Prior Bio-Nutrients	33		
from Irrigation Water	0		0

Nutrient Balance from above	332.5	85.9	351
Imported Nutrients	59	86	330
Estimated Remaining Nutrients Required	273	0	22
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	273	0	22

Acceptable: Sustainable agronomic rate.

BIO-NUTRIENT EXPORT INFO

Exported Bio-Nutrient Summary					
Bio-Nutrient Group Name	**Amount**	**Consumer**	**Consumer's Address**	**Telephone**	**Acres**
No nutrients exported					

Appendix B: NUTRIENT RISK ANALYSIS

Phosphorus Runoff Risk Assessment

FIELD: Field 1
Overall Risk Rating: Very High
Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 85.9

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: Surface applied no incorporation

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: Field 2

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 85.9

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: Surface applied no incorporation

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: Field 3

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 85.9

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: Surface applied no incorporation

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

Nutrient Leaching Risk Assessment

FIELD: Field 1
Overall Risk Rating: Low
Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very Low or N.A.

Comments: Good apparent irrigation water management, but if crop requirements are not being met crop yields may suffer from a water shortage. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth Rating: High

Comments: Because the water table is near the surface (and/or the soil is shallow), this field is vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a significant concern.

FIELD: Field 2
Overall Risk Rating: Low
Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate

fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very Low or N.A.

Comments: Good apparent irrigation water management, but if crop requirements are not being met crop yields may suffer from a water shortage. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth Rating: High

Comments: Because the water table is near the surface (and/or the soil is shallow), this field is vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a significant concern.

FIELD: Field 3

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very Low or N.A.

Comments: Good apparent irrigation water management, but if crop requirements are not being met crop yields may suffer from a water shortage. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth Rating: High

Comments: Because the water table is near the surface (and/or the soil is shallow), this field is vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a significant concern.

NUTRIENT RISK ANALYSIS Legend

BMP	Definition	Purpose
Buffer Strip	Contour buffer strips are strips of perennial grass alternated with wider cultivated strips that are farmed on the contour.	Contour buffer strips slow runoff water and trap sediment. Consequently, soil erosion is generally reduced significantly by this practice. Sediments, nutrients, pesticides, and other potential pollutants are filtered out as water flows through the grass strips. The grass strips also provide food and cover for wildlife.
Channel Vegetation	Establishing and maintaining adequate plants on channel banks, berms, spoil, and associated areas.	To stabilize channel banks and adjacent areas and reduce erosion and sedimentation. To maintain or enhance the quality of the environment, including visual aspects and fish and wildlife habitat.
Chiseling and Sub soiling	Loosening the soil, without inverting and with a minimum of mixing of the surface soil, to shatter restrictive layers below normal plow depth that inhibit water movement or root development.	To improve water and root penetration and aeration.
Composting Facility	A composting facility is installed for biological stabilization of waste organic material.	The purpose of this practice is to biologically treat waste organic material and produce humus-like material that can be recycled as a soil amendment or organic fertilizer. The material may also be used by other acceptable methods of recycling that comply with laws, rules and regulations.
Conservation Cover	This practice involves establishing and maintaining a protective cover of perennial vegetation on land	This practice reduces soil erosion, associated sedimentation, improves water quality, and creates or

	retired from agriculture production.	enhances wildlife habitat.
Conservation Cropping Sequence	Growing crops in a recurring sequence on the same field.	This practice may be applied as part of a best management practice to support one or more of the following: Reduce sheet and rill erosion, Reduce irrigation induced erosion, Reduce soil erosion from wind, Maintain or improve soil organic matter content, Manage deficient or excess plant nutrients, Improve water use efficiency, Manage saline seeps, Manage plant pests (weeds, insects, diseases), Provide food for domestic livestock, and Provide food and cover for wildlife.
Contour Farming	Farming sloping land in such a way that preparing land, planting, and cultivating are done on the contours. (This includes following established grades of terraces or diversion.)	To reduce erosion and control water.
Cover and Green Manure Crop	A crop of close-growing, legumes, or small grain grown primarily for seasonal protection and soil improvement. It usually is grown for 1 year or less, except where there is permanent cover as in orchards.	To control erosion during periods when the major crops do not furnish adequate cover; add organic material to the soil; and improve infiltration, aeration, and tilth.
Critical Area Planting	Planting vegetation on critically eroding areas that require extraordinary treatment.	This practice is used on highly erodible areas that cannot be stabilized by ordinary planting techniques and if left untreated may cause severe erosion or sediment damage. Examples of critical areas include the following: 1) Dams, dikes, levees, and other construction sites with very steep slopes, 2) Mine spoil and surface mined land with poor quality soil and possibly chemical problems, and 3) Agriculture land with severe gullies requiring specialized

		planting techniques and management.
Dike or Berms	An embankment constructed of earth or other suitable materials to protect land against overflow or to regulate water.	Dikes are used to: Permit improvement of agricultural land by preventing overflow and better use of drainage facilities, Prevent damage to land and property, Facilitate water storage and control in connection with wildlife and other developments, and Protect natural areas, scenic features and archeological sites from damage.
Diversion	A channel constructed across the slope with a supporting ridge on the lower side.	To divert excess water from one area for use or safe disposal in other areas.
Drip Irrigation	A planned irrigation system in which all necessary facilities are installed for efficiently applying water directly to the root zone of plants by means of applicators (orifices, emitters, porous tubing, and perforated pipe) operated under low pressure. The applicators can be placed on or below the surface of the ground.	To efficiently apply water directly to the plant root zone to maintain soil moisture within the range for good plant growth and without excessive water loss, erosion, reduction in water quality, or salt accumulation.
Filter Strip	A strip or area of vegetation for removing pollutants water.	A filter strip reduces pollution by filtration, deposition, infiltration, absorption, adsorption, decomposition, and volatilization of sediment, organic matter, and other pollutants from runoff and waste water.
Fish Stream Improvement	Fish Stream Improvement is improving a stream channel to make or enhance fish habitat.	The purpose of the practice is to increase production of desired species of fish. The practice involves improving food supplies, shelter, spawning areas, water quality, and other elements of fish habitat.
Grade Stabilization Construction	A structure used to control the grade and head cutting in natural	These structures are to: Stabilize the grade and control erosion in

	or artificial channels.	natural or artificial channels, prevent the formation or advance of gullies, enhance environmental quality, and reduce pollution hazards.
Grassed Waterway	A natural or constructed channel that is shaped or graded to required dimensions and established in suitable vegetation for the stable conveyance of runoff.	Grassed waterways convey runoff from terraces, diversions, or other water concentrations without causing erosion or flooding and to improve water quality.
Grazing Land Mechanical Treatment	Modifying physical soil and/or plant conditions with mechanical tools by treatments such as; pitting, contour furrowing, and ripping or sub-soiling.	This practice should be applied as part of a best management practice to support one or more of the following purposes: Fracture compacted soil layers and improve soil permeability, Reduce water runoff and increase infiltration, Break up sod bound conditions and thatch to increase plant vigor, and Renovate and stimulate plant community for greater productivity and yield.
Heavy Use Area Protection	Protecting heavily used areas by establishing vegetative cover, by surfacing with suitable materials, or by installing needed structures.	To stabilize urban, recreation, or facility areas frequently and intensely used by people, animals, or vehicles.
Irrigation Land Leveling	Reshaping the surface of land to be irrigated to planned grades.	To permit uniform and efficient application of irrigation water without causing erosion, loss of water quality, or damage to land by water logging and at the same time to provide for adequate surface drainage.
Irrigation Water Management	Irrigation water management is the process of determining and controlling the volume, frequency, and application rate of irrigation water in a planned, efficient manner.	Irrigation water management is applied as part of a conservation management system to support one or more of the following: Manage soil Moisture to promote desired crop response; Optimize use of available water supplies; Minimize irrigation induced soil erosion;

		Decrease non-point source pollution of surface and groundwater resources; Manage salts in the crop root zone; Manage air, soil, or plant micro-climate.
Mulching	Applying plant residues or other suitable materials not produced on the site to the soil surface.	To conserve moisture; prevent surface compaction or crusting; reduce runoff and erosion; control weeds; and help establish plant cover.
Polyacrylamide (PAM)	Polyacrylamide is an organic polymer formulated to stabilize soil when applied in irrigation water.	Water applied with PAM stabilizes soil aggregates which can then resist the erosive forces of water. If correctly applied, PAM will produce clear runoff water and residue erosion within the field by over 90 percent.
Prescribed Grazing	Prescribed grazing is the controlled harvest of vegetation with grazing animals, managed with the intent to achieve a specific objective.	Application of this practice will manipulate the intensity, frequency, duration, and season of grazing to: 1) Improve water infiltration, 2) maintain or improve riparian and upland area vegetation, 3) protect stream banks from erosion, 4) manage for deposition of fecal material away from water bodies, and 5) promote ecological and economically stable plant communities which meet landowner objectives.
Residue Management (Conservation Tillage)	Managing the amount, orientation, and distribution of crop and other plant residue on the soil surface.	This practice may be applied as part of a conservation system to support one or more of the following: Reduce sheet and rill erosion. Reduce wind erosion. Maintain or improve soil organic matter content and tilth. Conserve soil moisture. Manage snow to increase plant available moisture. Provide food and escape cover for wildlife.
Riparian Forest Buffer	A riparian forest buffer is an area	The riparian forest buffer is a

	of trees and/or shrubs located adjacent to a body of water. The vegetation extends outward from the water body for a specified distance necessary to provide a minimum level of protection and/or enhancement.	multi-purpose practice design to accomplish one or more of the following: Create shade to lower water temperatures and improve habitat for aquatic animals, Provide a source of debris necessary for healthy robust populations of aquatic organisms and wildlife, and Act as a buffer to filter out sediment, organic material, fertilizer, pesticides and other pollutants that may adversely impact the water body, including shallow ground water.
Sediment Basin	A basin constructed to collect and store debris or sediment.	A sediment basin may have the following uses: Preserve the capacity of reservoirs, ditches, canals, diversion, waterways, and streams, Prevent undesirable deposition on bottom lands and developed areas, Trap sediment originating from construction sites, and Reduce or abate pollution by providing basins for deposition and storage of silt, sand, gravel, stone, agricultural wastes, and other detritus.
Sprinkler System	A planned irrigation system in which all necessary facilities are installed for efficiently applying water by means of perforated pipes or nozzles operated under pressure.	To efficiently and uniformly apply irrigation water to maintain adequate soil moisture for optimum plant growth without causing excessive water loss, erosion, or reduced water quality.
Stream Channel Stabilization	Stabilizing the channel of a stream with suitable structures.	To control aggradations or degradation in a stream channel.
Stream bank Protection	Using vegetation or structures to stabilize and protect banks of streams, lakes, estuaries, or excavated channels against scour and erosion.	To stabilize or protect banks of streams, lakes, estuaries, or excavated channels for one or more of the following purposes: Prevent the loss of land or damage to utilities, roads, buildings, or other facilities adjacent to the banks, Maintain the capacity of the channel, Control channel meander

		that would adversely affect downstream facilities, Reduce sediment loads causing downstream damages and pollution, and Improve the stream for recreation or as a habitat for fish and wildlife.
Strip-cropping, Contour	Growing crops in a systematic arrangement of strips or bands on the contour to reduce water erosion. The crops are arranged so that a strip of grass or close-growing crop is alternated with a strip of clean-tilled crop or fallow or a strip of grass is alternated with a close-growing crop.	To reduce sheet and rill erosion and/or to reduce transport of sediment and other water-borne contaminants.
Strip-cropping, Field	Growing crops in a systematic arrangement of strips or bands across the general slope (not on the contour) to reduce water erosion. The crops are arranged so that a strip of grass or a close-growing crop is alternated with a clean-tilled crop or fallow.	To help control erosion and runoff on sloping cropland where contour strip-cropping is not practical.
Subsurface Drains	A Subsurface Drain is a conduit, such as corrugated plastic tubing, tile, or pipe, installed beneath the ground surface to collect and/or convey drainage water.	The purpose of a subsurface drain is to: Improve the environment for vegetation, Reduce erosion, Improve water quality, Collect ground water for beneficial use, Remove water from heavy use areas such as recreation areas, or around buildings, and Regulate water to control health hazards caused by pests.
Surge Irrigation	Surge irrigation is the intermittent application of water to furrows, corrugates, or borders creating a series of on and off periods of constant or variable time spans.	Surge allows a lighter application of water with a higher efficiency. The result is less deep percolation of water at the upper end of the field and a more uniform application.
Tail water Recovery & Pumpback System	A facility to collect, store, and transport irrigation tail water for	To conserve farm irrigation water supplies and water quality by

	reuse in a farm irrigation distribution system.	collecting the water that runs off the field surface for reuse on the farm.
Terraces	An earth embankment, a channel, or a combination ridge and channel constructed across the slope.	Reduce slope length, reduce sediment content in runoff water, reduce erosion, Improve water quality, intercept and conduct surface runoff at a non-erosive velocity to a stable outlet, retain runoff for moisture conservation, prevent gully development, reform the land surface, improve farmability, and reduce flooding.
Use Exclusion	Excluding animals, people or vehicles from an area.	To protect, maintain, or improve the quantity and quality of the plant, animal, soil, air, water, and aesthetics resources and human health and safety.
Water and Sediment Control Basin	An earth embankment or a combination ridge and channel generally constructed across the slope and minor watercourses to form a sediment trap and water detention basin.	To improve farmability of sloping land, reduce watercourse and gully erosion, trap sediment, reduce and manage onsite and downstream runoff, and improve downstream water quality.
Watering Facility	A device (tank, trough, or other watertight container) for providing animal access to water.	To provide watering facilities for livestock and/or wildlife at selected locations in order to: 1) protect and enhance vegetative cover through proper distribution of grazing; 2) provide erosion control through better grassland management; or 3) protect streams, ponds and water supplies from contamination by providing alternative access to water.
Wetland Development/Restoration	The construction or restoration of a wetland facility to provide the hydrological and biological benefits of a wetland.	To develop or restore hydric soil conditions, hydrologic conditions, hydrophytic plant communities, and wetland functions.

Appendix C: CROP SPECIFIC GUIDELINES

Alfalfa Hay, Irrigated South ID-Cut Mid Bloom

NITROGEN

Nitrogen (N) fertilizer is generally not needed for alfalfa since a healthy alfalfa stand is capable of fixing adequate levels of N. Responses to applied N usually indicate the alfalfa stand is not effectively nodulated due to lack of proper seed inoculation at planting, or that the stand is aging.

Soils containing 20 to 30 pounds (4 to 7.5 ppm) of nitrate-nitrogen (NO3-N) in the top 12 inches have sufficient N to establish a stand of alfalfa seeded alone. Adding fertilizer N at establishment reduces nodule number and nodule activity.

Establishing alfalfa with a companion crop is not recommended because the alfalfa stand typically is reduced by the excessive competition from the companion plantings. When growers plant alfalfa with a companion crop, both crops compete for the N. Under these conditions, N rates of 30 to 40 pounds per acre are suggested to establish alfalfa stands.

PHOSPHORUS

Alfalfa responds well to applied phosphorus (P). The need for P fertilization can be determined by a soil test. Phosphorus materials should be broadcast and incorporated into the seedbed before planting. For best results, P fertilizers should be applied on established stands in the fall. The University of Idaho recommended application should be sufficient for 2 years of production.

POTASSIUM

Alfalfa has a high potassium (K) requirement. Recommended K fertilization levels are determined by soil test. Broadcast and incorporate K at establishment or apply in the fall or early spring on established stands.

SULFUR

Mountain valleys and foothill areas that receive higher amounts of precipitation and/or that are irrigated with low sulfur-containing water are likely areas for sulfur (S) deficiency. Areas irrigated with water from the Snake River or any water containing the sulfate (SO4) form of sulfur should have an adequate amount of S. Alfalfa and other legumes require more S than grasses. Plant tissue testing is an excellent tool for detecting S-deficient alfalfa. Samples should be analyzed for total N and total S. These values are used to calculate the nitrogen/sulfur ratio, which should be less than 15. When the ratio is greater than 15, an S deficiency is suspected.

Soils testing less than 8 ppm SO4-S for 0- to 12-inch soil depth should receive 40 pounds S per acre. This rate of application should provide adequate sulfur for 2 years of production. Many southern Idaho soils contain accumulated S below the 12-inch depth. Although the 0- to 12-inch soil zone may be low in S (8 ppm), the soil below 12 inches may supply enough S for alfalfa production. Thus, testing the soil at both 0- to 12- and 12- to 24-inch depths is advised for good S recommendation.

Fertilizer S sources include gypsum (CaS04) and elemental sulfur. S is also included in some N, P and K fertilizer materials. Elemental S must be biologically converted to the S04 form to be used by the plant. The rate of conversion depends on soil temperature, soil water content and particle size of the elemental S applied. To correct an S deficiency, the year of application use a fertilizer containing S04 as the readily available S source. Elemental S can be used to provide long term S release.

MICRONUTRIENTS

Zinc (Zn) deficiencies on alfalfa have not been observed in Idaho. Crops such as beans, corn, potatoes, and onions would normally exhibit Zn deficiency before alfalfa. Zinc applied to any of those crops would have sufficient residual for alfalfa.

BORON

Alfalfa is sensitive to low soil boron (B). Boron deficiencies have been observed in southern Idaho, but they are not widespread. Deficiencies normally occur on acidic soils (pH less than 7.0) and droughty (gravelly and sandy) soils. If the soil tests less than 0.25 ppm B, apply 1 to 3 pounds per acre of B. Do not use higher rates because B in excessive amounts is toxic to plants.

GENERAL COMMENTS

Complete information on cultural practices necessary for alfalfa production is contained in University of Idaho Current Information Series 144, "Producing maximum Yields of Irrigated Alfalfa hay."

Irrigation, weeds, and insects can influence the effectiveness of a fertilizer application.

Alfalfa fields in southern Idaho frequently become yellow during the re-growth of the second and third crop. These fields have not responded to applications of fertilizer to correct this temporary yellowing condition.

Alfalfa can become a cash crop in the rotation by the application of needed management inputs such as water, fertilizer and pesticides and by timely harvesting. Alfalfa quality is enhanced by cutting at the early bud stage and more frequently during the growing season. This practice will reduce stand life, however.

Alfalfa hay should be analyzed to determine P content. Phosphorus is important for animal nutrition and can greatly influence animal performance and animal health. Fertilization can increase P content of forage.

Applications of S have been shown to reduce alfalfa selenium (Se) concentrations on soils low in available Se. Levels of Se above 0.1 ppm in the dry forage are considered adequate to prevent white muscle disease and other disorders related to limited Se forage.

The above fertilizer guidelines are based on relationships established between University of Idaho soil test and crop yield response research. In this research, crop response to fertilizers was evaluated at several sites where the response to fertilizer differed. The recommendations reflect the general or overall response to fertilizers at specific soil test values and the response in individual fields can differ appreciably from the general table recommendation. Some sites will require less than the general recommendation, other sites more. Unfortunately, the science has not developed to the point where the table recommendations can account for all the unknown variables influencing the effectiveness of applied fertilizers at individual sites. The table fertilizer recommendations can only be used as general guides rather than specific recommendations for each and every field.

Furthermore, soil variability can sharply reduce the accuracy composite soil test values for individual fields. That is why large contiguous areas within fields should be sampled separately when they are known to differ in crop growth or soil characteristics known to influence the response to fertilizer. But soil variability frequently does not occur conveniently in large areas that can be sampled separately or fertilized differently. The fertilizer recommendations in most cases do not account for this variability. Soil test based recommendations may be excessive in some field areas and inadequate in other areas of the same field. The recommendations then will be appropriate only to the degree that the composite soil test values for fields actually represent the field. Thus, for fields that are highly variable, the fertilizer recommendations should be considered conservative estimates of fertilizers needed. All the more reason to consider the table fertilizer recommendations as general guides rather than specific recommendations for each and every field.

The fertilizer rates suggested in the tables will support above average yields if other factors are not limiting production. Therefore the recommendations assume that good crop management practices will be used, i.e. insect, disease, and weed control. Nutrient requirements can be met using either commercial fertilizers or equivalent organic matter sources, such as manure or compost, provided their nutrient content and relative availability are known or can be estimated from published literature. Soil test based recommended rates will not be appropriate if the soil samples are improperly taken or do not represent the area to be fertilized. For nitrogen in particular, recommendations will be most accurate when crop history is taken into account and projected yields are reasonable estimates based on long term records.

General Comments:

- Over irrigation and nutrient loss is a hazard. Optimum irrigation management is necessary to meet crop water use needs and avoid loss of nutrients through leaching beyond the root zone and runoff with irrigation tail water.
- Nitrogen leaching is particularly a concern on sandy soils. Optimum management may require split Nitrogen applications to meet crop needs.
- Weed, insect, and disease control significantly influence the efficiency and effectiveness of your fertilizer applications and ultimately crop yield and farm profitability.
- Phosphorus, potassium, and zinc nutrients can be effectively fall-applied as they are not readily leached over winter.
- Phosphorus can be budgeted for a crop rotation.
- If you have questions regarding the interpretation of this information, please contact your Extension Agricultural agent, Crop consultant, or your commodity company fieldman.
- Both farm profitability and water quality can be improved with efficient nutrient use. The following are recommendations in nutrient management, which will optimize nutrient use for crop production while protecting water quality:

1) Avoid the application of nutrient sources in close proximity to streams, wetlands, drainage ditches, areas of very shallow soils, and sinkholes.

2) Accurately calibrate nutrient application equipment to insure that recommended rates are applied.

3) Nitrogen recommendations for many crops are based on yield goals for the crops. It is important to establish realistic yield goals for each field based upon historical yield data, county averages, and your management practices to avoid unnecessary fertilizer costs and minimize potential water quality impairments.

Appendix D: SOIL TEST DATA

Field: No Data **Date of Test:** No Data

Parameter	Units	0-12"	12-24"	18-24"
Soil Texture		No Data	No Data	
EC	mmhos	No Data	No Data	
PH		No Data	No Data	
%Lime	%	No Data	No Data	
OM	%	No Data	No Data	
CEC	meq	No Data	No Data	
Nitrate-N	ppm	No Data	No Data	
Ammonia-N	ppm	No Data	No Data	
P	ppm	No Data	No Data	No Data
K	ppm	No Data	No Data	
Z	ppm	No Data	No Data	
Mn	ppm	No Data	No Data	
Fe	ppm	No Data	No Data	
Cu	ppm	No Data	No Data	

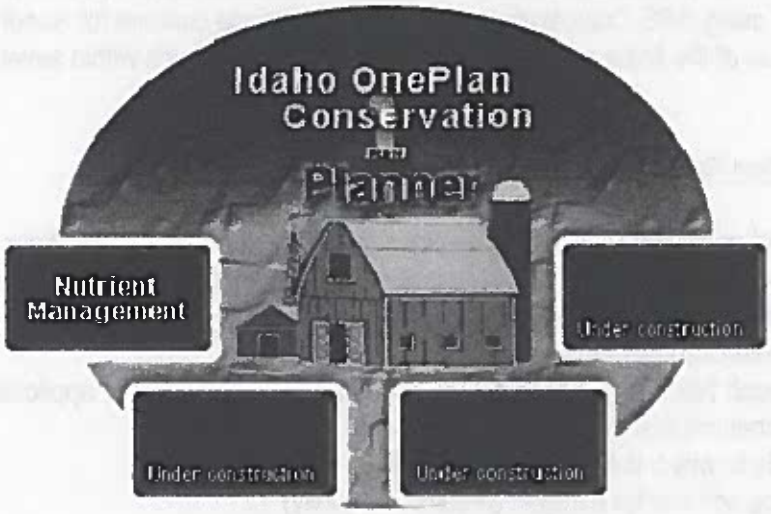
Ca	ppm	No Data	No Data	
Mg	ppm	No Data	No Data	
Na	ppm	No Data	No Data	

Grandview Sandhill

Nutrient Management Plan

Agriculture . . .

Launching into the Future



Nutrient Management Plan Prepared For:
Grandview Farms
(208) 834-2231
Sandhill Farm

Certified Planner:
Michael Mitchell
Professional Engineer, EAC Engineering, Inc
(559) 381-0607

Producer Signature: _____ Certificated Planner Signature: _____

Date Completed: 10-02-07

The information provided by those using the "Idaho OnePlan" shall be deemed to be trade secrets, production records, or other proprietary information and shall be kept confidential and shall be exempt from enclosure pursuant to section 9-340D, Idaho Code. (Title 22 Chapter 27 17D6)

SANDHILL FARM
Producer Summary

Farm Summary

Sandhill Farm is an existing farm located mile east of Grandview, Idaho. The farm is owned by Grandview Farms and managed by Mike Usabel. The farm consists of nine pivot irrigated fields for a total of 1160.50 acres available for accepting imported manure/compost from Simplot/Grandview Feedlot.

Farm Resource Concerns

Sandhill Farm is located in the Watershed Basin of the Middle Snake Succor (#17050103). The facility is found at 116W 05'14.55" 42N 57' 38.40" using GPS Coordinates. The primary resource concern for Sandhill Farm is ground water quality. Solid waste is applied to all of the fields and pasture and incorporated on fields within seven days of application.

Nutrient Management Plan Requirements

Producer will maintain field application records for a minimum of five years and make them available for review at routine inspections by ISDA personnel. These records must include (where applicable):

1. Fertilizer application rates
2. Manure/Compost application rates
3. On each field, keep a record of manure and chemical fertilizer applications, crop information, and soil and manure test results.
4. Fields to which the nutrients are applied
5. Spring soil test for nitrogen (required annually)
   0-12" and 12-24" nitrogen test

Crop Nutrient Requirement	
Crop	**Pounds of P205 per acres**
Sugarbeets	48
Wheat	60
Potatoes	76
Corn	75

Manure/Compost field application requirement (tons)						
Acres x crop nutrient requirement ÷ manure p205 value* = Tons required						
Example	Corn - 250(acres)	X	75 (crop requirement)		÷ 16.85	
Corn	250	X	75** = 18750		÷ 16.85* =	1112.76 tons

*based on manure test values for P205
**pounds of p205 required per acre

Irrigation Management Plan Recommendations

Irrigation water management is very important in nutrient management. If irrigation water is applied at a rate over the crop needs, there is potential for runoff and/or leaching of nutrients. If irrigation water is under-applied, the crop will not have optimal growth conditions. Crop irrigation water requirements changes through the growing season depending on climate conditions and crop Evapotranspiration rate. Proper irrigation water management responds to these crop demands. It is recommended that:

- Irrigation schedules continue to be managed by your irrigation specialist.
- Continual inspection and maintenance of irrigation equipment will prevent unwarranted waste discharges into surface or ground water.

Nutrient Management Plan Recommendations

Land application of manure at agronomic rates, along with irrigation scheduling, is the most effective way to obtain maximum nutrient benefits from manure, condition the soil, and avoid potential water quality problems downstream. Cattle manure is a valuable resource, which will also improve soil properties such as water holding capacity, infiltration, tilth, structure, porosity, and nutrient retention and release. If animal manure and/or commercial fertilizers are not properly managed, contaminants may impact surface and/or groundwater.

Application of manure applied at an agronomic rate is a sustainable practice and is always allowed under ISDA regulations. Regardless of the rate prescribed by this nutrient management plan, soil testing at the 0-12 inch and 12-24 inch soil depths is required for nitrogen management.

- Set realistic crop yield goals in order to provide an accurate account of the plant nitrogen needs.
- Apply N so that it is available during peak plant demand.
- Apply fertilizer to cool season crop in the spring rather than the previous fall. This will prevent fertilizer leaching through the soil profile and provide the crop with the necessary levels of nutrients.
- Use split or multiple fertilizer applications in order to provide the crop with a pre-plant treatment and the needed nutrient levels throughout the growing season until the point of major nutrient uptake.
- Avoid the application of nutrient sources in close proximity to streams, wetlands, drainage ditches, areas of very shallow soils, and sinkholes.

Sandhill Farm
ANALYSIS OF RESOURCE CONCERNS

INTRODUCTION

The purpose of this nutrient management plan is to meet agricultural production goals and to certify that manure and nutrients are properly managed to minimize adverse impact to surface or groundwater. Plans are written in cooperation with the producer to:

1) assure proper containment of animal manure and process waste water

2) assess resource concerns which exist on the property

3) budget nutrient sources to optimize crop water and nutrient needs. Nutrient sources include commercial fertilizers, animal manure, mineralization of previous crop soil organic matter, accounting of residues, and irrigation water.

4) When applicable, assess irrigation water management to minimize movement of nutrients beyond the root zone or with runoff.

If animal manure and/or commercial fertilizers are not properly managed, contaminants may negatively impact surface and/or groundwater. Some water resource contaminants associated with poorly managed animal manure and fertilizers are:

Phosphorus in the soil readily adsorbs to soil particles; thus, erosion of soil by surface runoff is the general mode of phosphorus transport. Even at very low concentrations, phosphorus can result in plant and algae blooms in surface water bodies. Alga blooms are a nuisance to boaters, irrigators, and others. Toxins released by certain algae can be lethal to livestock or other animals that drink the water. Dissolved oxygen in the water is depleted as algae die and decompose, sometimes causing fish kills.

Nitrogen in the form of nitrate (NO_3^-) is highly water-soluble and will move with water, particularly down the soil profile past the root zone if not utilized by plants (thus becoming a groundwater contamination issue).Nitrates are toxic to infants under 6 months, and to livestock at high concentrations. In surface water, excess nitrogen, like phosphorus, can result in nuisance plant and algae growth.

Organic matter in high load decreases dissolved oxygen in a surface water body when it decomposes. Low levels of dissolved oxygen is harmful or even fatal to fish and other aquatic life.

Bacteria and microorganism illnesses (pathogens) potentially transmitted through water by animal manure include Giardia, Typhoid Fever, Cryptosporidium, and Cholera. Pathogens from animal waste can negatively impact surface and groundwater quality.

FACILITY DESCRIPTION

Owner Information

Owner (1):	Grandview Farms
Address:	1301 Hwy 67 , Grandview, ID 83624
Phone:	(208) 834-2231 N/A
	N/A

Location

Site Map: Facility site plan illustrated in Figure 1

Soil Conservation District:	Bruneau River
County:	Owyhee
Watershed Basin:	Middle Snake-succor (USGS Hydrologic Unit Code # 17050103)

ANALYSIS OF RESOURCE CONCERNS

Farm Resource Concerns

Sandhill Farm is located in a watershed containing water quality limited stream segments listed according to the Clean Water Act. Stream segments are listed because a water quality parameter prevents the attainment of the "Fishable/Swimmable" goal of the Clean Water Act.

WATERBODY	BOUNDARIES	BACT	CHAN STAB	DO	FLOW ALT	HAB ALT	MET HG	MET	NH3	NUTR	O_G	ORG	PEST	PH	SAL	SED	TDG	TEMP	UNKN	*
Snake River	CJ Strike Res to Castle Creek	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	X

Sandhill Farm is not located in a critical Nitrate-Nitrogen management area. Nitrate Management Areas are designated based upon ground water quality sampling results. Two priority groups exist as follows:

Priority 1 is designated because at least 25% of the ground water sampling locations within the area exceed 5-milligrams/liter nitrate. This is one-half of the maximum contaminant level of 10-milligrams/liter nitrate. This nitrate concentration is considered evidence of significant degradation. Public drinking water systems are required to increase monitoring frequency when this level is reached.

Priority 2 is designated because at least 50% of the ground water sampling locations within the area exceed 2-milligrams/liter nitrate. This concentration threshold provides an indication of human-caused (anthropogenic) impacts. The upper limit for naturally occurring (background) concentrations of nitrate is considered to be about 2 mg/l.

Sandhill Farm is located in a sole source aquifer area - Western Snake River Plain Aquifer.

Field Resource Concerns

- No Resource Concerns -

Depth Limiting Subsurface Features

Field Name	Subsurface Feature	Depth from Surface (in)
Field 1	Cobbles	13
	Water Table	>72
Field 2	Cobbles	13
	Water Table	>72
Field 3	Cobbles	13
	Water Table	>72
Field 4	Cobbles	13
	Water Table	>72
Field 5	Cobbles	13
	Water Table	>72
Field 6	Cobbles	13
	Water Table	>72
Field 7	Cobbles	13
	Water Table	>72
Field 8	Cobbles	13
	Water Table	>72
Field 9	Cobbles	13
	Fractured Bedrock	20
	Water Table	>72

Well Testing Results (See back of page):

Well	Date	Hardness	EC	PH	K	Nitrates	Nitrites	NH3	Na	Carbonate	Bicarbonate
No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data

ISDA REGULATIONS AND THE IDAHO NUTRIENT MANAGEMENT STANDARD

Nutrient management plans for animal agricultural operations regulated by the Idaho State Department of Agriculture (ISDA) must be approved by the Idaho State Department of Agriculture and must follow the Natural Resource Conservation Service (NRCS) Agriculture Waste Management Field Handbook and the Idaho Nutrient Management Standard. ISDA regulation and the Standard use soil test phosphorus as the indicator for environmental impact from agricultural production practices. The Idaho Nutrient Management Standard is based on a threshold soil test phosphorus level (TH), above which there is no agronomic advantage to application of phosphorus.

The Idaho Nutrient Management Standard categorizes fields as a surface water concern or a groundwater concern. A surface water concern indicates that runoff leaves the contiguous operating unit from normal storm events, rain on snow, frozen ground, or irrigation. The soil phosphorus threshold for a field with a surface water concern is 40 ppm phosphorus for soils alkaline (ph > 6) tested with the Olsen method and 60 ppm phosphorus for acidic (ph < 6.5) soils tested with the Bray method (0-12"Soil Sample Depth).

A groundwater resource concern indicates that runoff does not leave the contiguous operating unit from normal storm events, rain on snow, frozen ground, or irrigation. There are two sub-categories for fields identified as having a groundwater concern. The first category applies to fields with a resource concern within the first five feet of the soil profile. A resource concern could be shallow soils, gravel, cobble, bedrock, high groundwater table, or a drained field. These fields are indicated as a groundwater concern <5'. The soil phosphorus threshold for a field with a groundwater concern <5' is 20 ppm phosphorus for soils tested with the Olsen method and [illegible] ppm phosphorus for soils tested with the Bray method(18-24" Soil Sample Depth).

If a field is not classified as having a surface water concern or a groundwater <5' concern, by default it is classified as having a groundwater concern >5'. The soil phosphorus threshold for a field with a groundwater concern >5' is 30 ppm phosphorus for soils tested with the Olsen method and 45 ppm phosphorus for soils tested with the Bray method(18-24" Soil Sample Depth).

Field Phosphorus Threshold

Field	Resource Concern	P Threshold (ppm)	P Threshold Soil Test Depth
Field 1	Groundwater < 5'	20	18 - 24"
Field 2	Groundwater < 5'	20	18 - 24"
Field 3	Groundwater < 5'	20	18 - 24"
Field 4	Groundwater < 5'	20	18 - 24"
Field 5	Groundwater < 5'	20	18 - 24"
Field 6	Groundwater < 5'	20	18 - 24"
Field 7	Groundwater < 5'	20	18 - 24"
Field 8	Groundwater < 5'	20	18 - 24"
Field 9	Groundwater < 5'	20	18 - 24"

Farm Location

Idaho Transverse Mercator

Coordinates of the farm center (meters): X = 2329136.17623987, Y = 1309242.85617164

Map Scale: 1 : 241

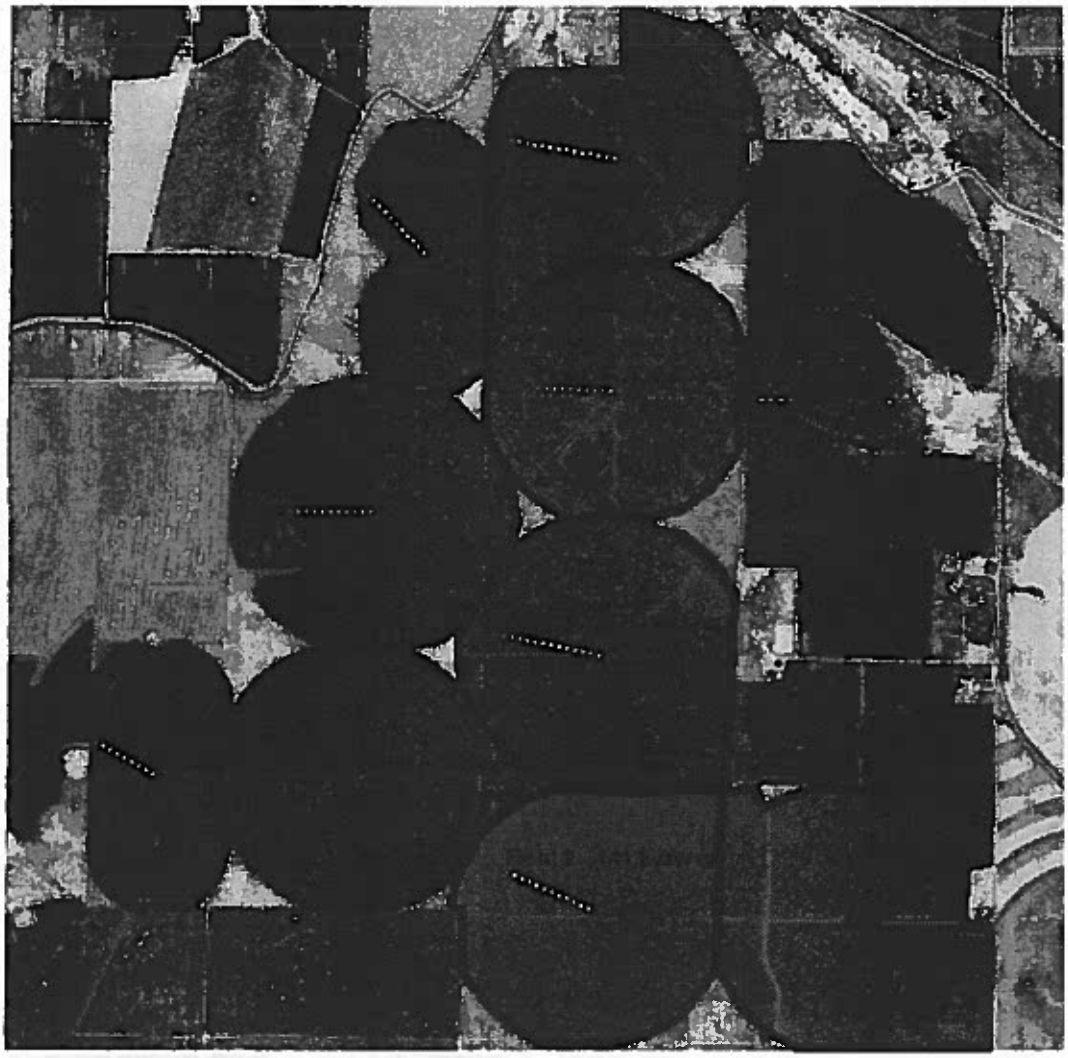


Figure 1. Base Map

Farm Location

Idaho Transverse Mercator

Coordinates of the farm center (meters): X = 2329136.17623987, Y = 1309242.85617164

Map Scale: 1 : 241

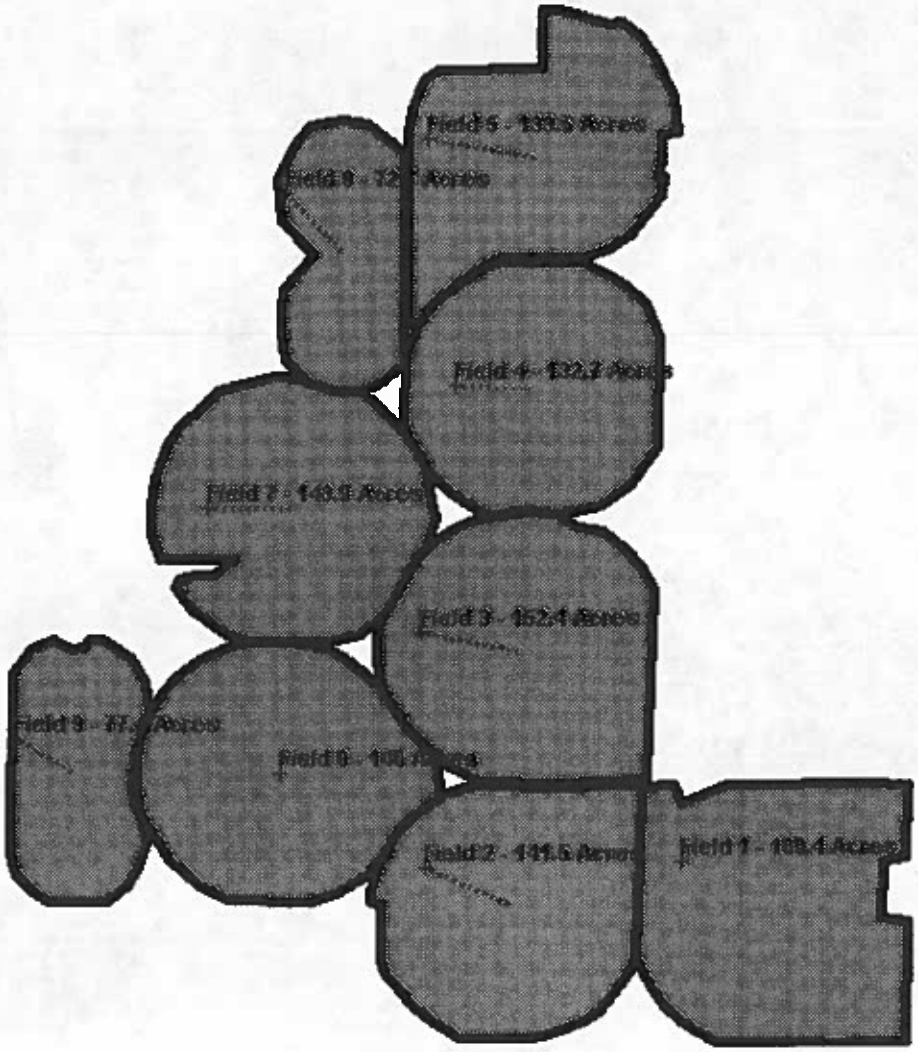


Figure 2. Farmstead Map

NUTRIENT MANAGEMENT REQUIREMENTS/RECOMMENDATIONS

Manure Application Rate Requirement By Year

FIELD: Field 1

Name	Man App		Imported Nutrients	Mineralization		Total	
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	Y		4 T/ac				
		N	49	N	0	N	49
		P	71			P	71
		K	272			K	272
Sugarbeets(2005)	Y		4 T/ac				
		N	49	N	92	N	141
		P	71			P	71
		K	272			K	272
Sugarbeets(2006)	Y		4 T/ac				
		N	49	N	27	N	76
		P	71			P	71
		K	272			K	272
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2007)	Y		4 T/ac				
		N	49	N	27	N	76
		P	71			P	71
		K	272			K	272
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2008)	Y		4 T/ac				
		N	49	N	27	N	76
		P	71			P	71
		K	272			K	272
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2009)	Y		4 T/ac				
		N	49	N	27	N	76
		P	71			P	71
		K	272			K	272

FIELD: Field 2

Name	Man App		Imported Nutrients	Mineralization		Total	
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	Y		4 T/ac				
		N	49	N	0	N	49
		P	71			P	71
		K	272			K	272
Sugarbeets(2005)	Y		4 T/ac				
		N	49	N	92	N	141
		P	71			P	71
		K	272			K	272
Sugarbeets(2006)	Y		4 T/ac				
		N	49	N	27	N	76
		P	71			P	71

		K	272			K	272
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2007)	Y		4 T/ac				
		N	49	N	27	N	76
		P	71			P	71
		K	272			K	272
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2008)	Y		4 T/ac				
		N	49	N	27	N	76
		P	71			P	71
		K	272			K	272
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2009)	Y		4 T/ac				
		N	49	N	27	N	76
		P	71			P	71
		K	272			K	272

FIELD: Field 3

Name	Man App		Imported Nutrients	Mineralization		Total	
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	Y		5 T/ac				
		N	58	N	0	N	58
		P	84			P	84
		K	322			K	322
Potatoes(2005)	Y		5 T/ac				
		N	58	N	97	N	155
		P	84			P	84
		K	322			K	322
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2006)	Y		5 T/ac				
		N	58	N	32	N	90
		P	84			P	84
		K	322			K	322
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2007)	Y		5 T/ac				
		N	58	N	32	N	90
		P	84			P	84
		K	322			K	322
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2008)	Y		5 T/ac				
		N	58	N	32	N	90
		P	84			P	84
		K	322			K	322
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2009)	Y		5 T/ac				
		N	58	N	32	N	90
		P	84			P	84
		K	322			K	322

FIELD: Field 4

Name	Man App		Imported Nutrients	Mineralization		Total	
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	Y		5 T/ac				
		N	54	N	0	N	54
		P	79			P	79
		K	302			K	302

Corn-Field Grain, Irrigated South ID(2005)	Y		5 T/ac				
		N	54	N	84	N	138
		P	79			P	79
		K	302			K	302
Wheat-Winter, Irrigated South ID(2006)	Y		5 T/ac				
		N	54	N	25	N	79
		P	79			P	79
		K	302			K	302
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2007)	Y		5 T/ac				
		N	54	N	30	N	84
		P	79			P	79
		K	302			K	302
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2008)	Y		5 T/ac				
		N	54	N	30	N	84
		P	79			P	79
		K	302			K	302
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2009)	Y		5 T/ac				
		N	54	N	30	N	84
		P	79			P	79
		K	302			K	302

FIELD: Field 5

Name	Man App		Imported Nutrients	Mineralization		Total	
Potatoes(2004)	Y		5 T/ac				
		N	54	N	0	N	54
		P	79			P	79
		K	302			K	302
Wheat-Winter, Irrigated South ID(2005)	Y		5 T/ac				
		N	54	N	75	N	129
		P	79			P	79
		K	302			K	302
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2006)	Y		5 T/ac				
		N	54	N	-8	N	46
		P	79			P	79
		K	302			K	302
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2007)	Y		5 T/ac				
		N	54	N	30	N	84
		P	79			P	79
		K	302			K	302
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2008)	Y		5 T/ac				
		N	54	N	30	N	84
		P	79			P	79
		K	302			K	302
Potatoes(2009)	Y		5 T/ac				
		N	54	N	30	N	84
		P	79			P	79
		K	302			K	302

FIELD: Field 6

Name	Man App		Imported Nutrients	Mineralization		Total	
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	Y		5 T/ac				
		N	54	N	0	N	54
		P	79			P	79
		K	302			K	302
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2005)	Y		5 T/ac				
		N	54	N	30	N	84
		P	79			P	79
		K	302			K	302
Corn-Field Grain, Irrigated South ID(2006)	Y		5 T/ac				
		N	54	N	30	N	84
		P	79			P	79
		K	302			K	302
Wheat-Winter, Irrigated South ID(2007)	Y		5 T/ac				
		N	54	N	75	N	129
		P	79			P	79
		K	302			K	302
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2008)	Y		5 T/ac				
		N	54	N	30	N	84
		P	79			P	79
		K	302			K	302
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2009)	Y		5 T/ac				
		N	54	N	30	N	84
		P	79			P	79
		K	302			K	302

FIELD: Field 7

Name	Man App		Imported Nutrients	Mineralization		Total	
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	Y		5 T/ac				
		N	58	N	0	N	58
		P	84			P	84
		K	322			K	322
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2005)	Y		5 T/ac				
		N	58	N	32	N	90
		P	84			P	84
		K	322			K	322
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2006)	Y		5 T/ac				
		N	58	N	32	N	90
		P	84			P	84
		K	322			K	322
Potatoes(2007)	Y		5 T/ac				
		N	58	N	32	N	90
		P	84			P	84
		K	322			K	322
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2008)	Y		5 T/ac				

		N	58	N	32	N	90
		P	84			P	84
		K	322			K	322
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2009)	Y		5 T/ac				
		N	58	N	32	N	90
		P	84			P	84
		K	322			K	322

FIELD: Field 8

Name	Man App		Imported Nutrients	Mineralization		Total	
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	Y		5 T/ac				
		N	54	N	0	N	54
		P	79			P	79
		K	302			K	302
Potatoes(2005)	Y		5 T/ac				
		N	54	N	95	N	149
		P	79			P	79
		K	302			K	302
Wheat-Winter, Irrigated South ID(2006)	Y		5 T/ac				
		N	54	N	75	N	129
		P	79			P	79
		K	302			K	302
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2007)	Y		5 T/ac				
		N	54	N	30	N	84
		P	79			P	79
		K	302			K	302
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2008)	Y		5 T/ac				
		N	54	N	30	N	84
		P	79			P	79
		K	302			K	302
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2009)	Y		5 T/ac				
		N	54	N	30	N	84
		P	79			P	79
		K	302			K	302

FIELD: Field 9

Name	Man App		Imported Nutrients	Mineralization		Total	
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	Y		5 T/ac				
		N	58	N	0	N	58
		P	84			P	84
		K	322			K	322
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2005)	Y		5 T/ac				
		N	58	N	32	N	90
		P	84			P	84
		K	322			K	322
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2006)	Y		5 T/ac				
		N	58	N	32	N	90

		P	84			P	84
		K	322			K	322
Potatoes(2007)	Y		5 T/ac				
		N	58	N	32	N	90
		P	84			P	84
		K	322			K	322
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2008)	Y		5 T/ac				
		N	58	N	32	N	90
		P	84			P	84
		K	322			K	322
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2009)	Y		5 T/ac				
		N	58	N	32	N	90
		P	84			P	84
		K	322			K	322

Minimum Acres Required for Manure Application

Manure Group	Acres
Imported Nutrients	1011

The acreage in the table is based on an average crop uptake of 100 lbs P_2O_5 per acre. These acreage numbers are for estimating export acreage needed. Wastewater application should begin with the first irrigation of the season and end with the last irrigation of the season. Rates should be designed to supply uniform application. When applying wastewater outside of the irrigation window you must contact the Department of Agriculture, Division of Animal Industries.

Hydraulic Balance

Field	Date
Field 1	May 1
Field 2	May 1
Field 3	May 1
Field 4	May 1
Field 5	May 1
Field 6	May 1
Field 7	May 1
Field 8	May 1
Field 9	May 1

0.5" of wastewater may be applied to fields after the hydraulic balance date to remain in compliance with this nutrient management plan.

Spring Soil Test

Spring soils tests must be taken every year from every field to determine a commercial fertilization rate. If commercial fertilizer isn't applied (for a perennial crop), spring soil samples are not required. If you do not apply commercial fertilizer, a complete soil analysis will need to be conducted initially to determine the nutrie baseline.

Record Keeping For each field keep a record of annual manure and chemical fertilizer applications. Include nutrient source, date, time, rate and application method.

ANNUAL NUTRIENT BUDGET

The following crop nutrient budget is based on soil test data and cropping information. It is for one year for the following field and specified crop information:

Nutrient Budget Summary

Field: Field 1 **Crop:** Sugarbeets **Yield:** 35

	N	P205	K20
Crop Nutrient Requirement	290	48	118
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	65		
from Prior Bio-Nutrients	27		
from Irrigation Water	0		0
Nutrient Balance from above	198.8	48.1	117.6
Imported Nutrients	49	71	272
Estimated Remaining Nutrients Required	150	-23	-154
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	150	-23	-154

Unacceptable Rate: May be a resource risk.
Acceptable: Sustainable agronomic rate.

Field: Field 2 **Crop:** Sugarbeets **Yield:** 35

	N	P205	K20
Crop Nutrient Requirement	290	48	118
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	65		
from Prior Bio-Nutrients	27		
from Irrigation Water	0		0
Nutrient Balance from above	198.8	48.1	117.6
Imported Nutrients	49	71	272
Estimated Remaining Nutrients Required	150	-23	-154
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	150	-23	-154

Unacceptable Rate: May be a resource risk.
Acceptable: Sustainable agronomic rate.

Field: Field 3 **Crop:** Potatoes **Yield:** 550

	N	P205	K20
Crop Nutrient Requirement	330	76	343
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	65		

from Prior Bio-Nutrients	32		
from Irrigation Water	0		0
Nutrient Balance from above	233.8	75.6	343.2
Imported Nutrients	58	84	322
Estimated Remaining Nutrients Required	176	-8	21
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	176	-8	21

Unacceptable Rate: May be a resource risk.
Acceptable: Sustainable agronomic rate.

Field: Field 4 **Crop:** Corn-Field Grain, Irrigated South ID **Yield:** 210

	N	P205	K20
Crop Nutrient Requirement	300	75	56
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	54		
from Prior Bio-Nutrients	30		
from Irrigation Water	0		0
Nutrient Balance from above	216.7	75.4	56.4
Imported Nutrients	54	79	302
Estimated Remaining Nutrients Required	162	-4	-246
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	162	-4	-246

Unacceptable Rate: May be a resource risk.
Acceptable: Sustainable agronomic rate.

Field: Field 5 **Crop:** Wheat-Winter, Irrigated South ID **Yield:** 110

	N	P205	K20
Crop Nutrient Requirement	220	60	41
Nutrients From Soil	?		
from Mineralized Nitrogen	45		
from Prior Crops	0		
from Prior Bio-Nutrients	30		
from Irrigation Water	0		0
Nutrient Balance from above	145.7	60.5	41.2
Imported Nutrients	54	79	302
Estimated Remaining Nutrients Required	92	-19	-261
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	92	-19	-261

Unacceptable Rate: May be a resource risk.
Acceptable: Sustainable agronomic rate.

Field: Field 6 **Crop:** Alfalfa Hay, Irrigated South ID-Cut Mid Bloom **Yield:** 7.5

	N	P205	K20
Crop Nutrient Requirement	364	86	351

Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	0		
from Prior Bio-Nutrients	30		
from Irrigation Water	0		0
Nutrient Balance from above	335.2	85.9	351
Imported Nutrients	54	79	302
Estimated Remaining Nutrients Required	280	7	49
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	280	7	49

Acceptable: Sustainable agronomic rate.

Field: Field 7 **Crop:** Alfalfa Hay, Irrigated South ID-Cut Mid Bloom **Yield:** 7.5

	N	P205	K20
Crop Nutrient Requirement	364	86	351
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	0		
from Prior Bio-Nutrients	32		
from Irrigation Water	0		0
Nutrient Balance from above	333.3	85.9	351
Imported Nutrients	58	84	322
Estimated Remaining Nutrients Required	275	2	29
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	275	2	29

Acceptable: Sustainable agronomic rate.

Field: Field 8 **Crop:** Potatoes **Yield:** 550

	N	P205	K20
Crop Nutrient Requirement	330	76	343
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	65		
from Prior Bio-Nutrients	30		
from Irrigation Water	0		0
Nutrient Balance from above	235.7	75.6	343.2
Imported Nutrients	54	79	302
Estimated Remaining Nutrients Required	182	-3	41
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	182	-3	41

Unacceptable Rate: May be a resource risk.
Acceptable: Sustainable agronomic rate.

Field: Field 9 **Crop:** Alfalfa Hay, Irrigated South ID-Cut Mid Bloom **Yield:** 7.5

	N	P205	K20

Crop Nutrient Requirement	364	86	351
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	0		
from Prior Bio-Nutrients	32		
from Irrigation Water	0		0
Nutrient Balance from above	333.3	85.9	351
Imported Nutrients	58	84	322
Estimated Remaining Nutrients Required	275	2	29
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	275	2	29

Acceptable: Sustainable agronomic rate.

BIO-NUTRIENT EXPORT INFO

Exported Bio-Nutrient Summary					
Bio-Nutrient Group Name	**Amount**	**Consumer**	**Consumer's Address**	**Telephone**	**Acres**
No nutrients exported from facility					

Appendix B: NUTRIENT RISK ANALYSIS

Phosphorus Runoff Risk Assessment

FIELD: Field 1
Overall Risk Rating: Very High
Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 70.8

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: N/A

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: Field 2

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 70.8

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: N/A

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: Field 3

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 83.8

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating:

Manure Application Method: Surface applied no incorporation

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: Field 4

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0
Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High
Phosphorus Application Method: N/A
Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium
Manure Application Rate: 78.7
Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High
Manure Application Method: N/A
Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.
Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.
Comments: No Data

Runoff Best Management Practices Rating: Low
List best management practices that mitigate runoff(See Appendix B)
Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High
Distance to Surface Water Body: 0
Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: Field 5
Overall Risk Rating: Very High
Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning speciali and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 78.7

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: N/A

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: Field 6
Overall Risk Rating: Very High
Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 78.7

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: N/A

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: Field 7

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 83.8

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: Surface applied no incorporation

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: Field 8

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 78.7

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: N/A

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: Field 9

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 83.8

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: Surface applied no incorporation

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

Nutrient Leaching Risk Assessment

FIELD: Field 1

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium

Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very Low or N.A.

Comments: No Data

Soil/Water Table Depth Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: Field 2

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very Low or N.A.

Comments: No Data

Soil/Water Table Depth Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: Field 3
Overall Risk Rating: Low
Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very Low or N.A.

Comments: No Data

Soil/Water Table Depth Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: Field 4
Overall Risk Rating: Low
Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very Low or N.A.

Comments: No Data

Soil/Water Table Depth Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: Field 5

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very Low or N.A.

Comments: No Data

Soil/Water Table Depth Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: Field 6

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very Low or N.A.

Comments: No Data

Soil/Water Table Depth Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: Field 7

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very Low or N.A.

Comments: No Data

Soil/Water Table Depth Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: Field 8

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very Low or N.A.

Comments: No Data

Soil/Water Table Depth Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: Field 9

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very Low or N.A.

Comments: No Data

Soil/Water Table Depth Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

NUTRIENT RISK ANALYSIS Legend

BMP	Definition	Purpose
Buffer Strip	Contour buffer strips are strips of perennial grass alternated with wider cultivated strips that are farmed on the contour.	Contour buffer strips slow runoff water and trap sediment. Consequently, soil erosion is generally reduced significantly by this practice. Sediments, nutrients, pesticides, and other potential pollutants are filtered out as water flows through the grass strips. The grass strips also provide food and cover for wildlife.
Channel Vegetation	Establishing and maintaining adequate plants on channel banks, berms, spoil, and associated areas.	To stabilize channel banks and adjacent areas and reduce erosion and sedimentation. To maintain or enhance the quality of the environment, including visual aspects and fish and wildlife habitat.
Chiseling and Sub soiling	Loosening the soil, without inverting and with a minimum of mixing of the surface soil, to shatter restrictive layers below normal plow depth that inhibit water movement or root development.	To improve water and root penetration and aeration.
Composting Facility	A composting facility is installed for biological stabilization of waste organic material.	The purpose of this practice is to biologically treat waste organic material and produce humus-like material that can be recycled as a soil amendment or organic fertilizer. The material may also be used by other acceptable methods of recycling that comply with laws, rules and regulations.
Conservation Cover	This practice involves establishing and maintaining a protective cover of perennial vegetation on land	This practice reduces soil erosion, associated sedimentation, improves water quality, and creates or

	retired from agriculture production.	enhances wildlife habitat.
Conservation Cropping Sequence	Growing crops in a recurring sequence on the same field.	This practice may be applied as part of a best management practice to support one or more of the following: Reduce sheet and rill erosion, Reduce irrigation induced erosion, Reduce soil erosion from wind, Maintain or improve soil organic matter content, Manage deficient or excess plant nutrients, Improve water use efficiency, Manage saline seeps, Manage plant pests (weeds, insects, diseases), Provide food for domestic livestock, and Provide food and cover for wildlife.
Contour Farming	Farming sloping land in such a way that preparing land, planting, and cultivating are done on the contours. (This includes following established grades of terraces or diversion.)	To reduce erosion and control water.
Cover and Green Manure Crop	A crop of close-growing, legumes, or small grain grown primarily for seasonal protection and soil improvement. It usually is grown for 1 year or less, except where there is permanent cover as in orchards.	To control erosion during periods when the major crops do not furnish adequate cover; add organic material to the soil; and improve infiltration, aeration, and tilth.
Critical Area Planting	Planting vegetation on critically eroding areas that require extraordinary treatment.	This practice is used on highly erodible areas that cannot be stabilized by ordinary planting techniques and if left untreated may cause severe erosion or sediment damage. Examples of critical areas include the following: 1) Dams, dikes, levees, and other construction sites with very steep slopes, 2) Mine spoil and surface mined land with poor quality soil and possibly chemical problems, and 3) Agriculture land with severe gullies requiring specialized

		planting techniques and management.
Dike or Berm	An embankment constructed of earth or other suitable materials to protect land against overflow or to regulate water.	Dikes are used to: Permit improvement of agricultural land by preventing overflow and better use of drainage facilities, Prevent damage to land and property, Facilitate water storage and control in connection with wildlife and other developments, and Protect natural areas, scenic features and archeological sites from damage.
Diversion	A channel constructed across the slope with a supporting ridge on the lower side.	To divert excess water from one area for use or safe disposal in other areas.
Drip Irrigation	A planned irrigation system in which all necessary facilities are installed for efficiently applying water directly to the root zone of plants by means of applicators (orifices, emitters, porous tubing, perforated pipe) operated under low pressure. The applicators can be placed on or below the surface of the ground.	To efficiently apply water directly to the plant root zone to maintain soil moisture within the range for good plant growth and without excessive water loss, erosion, reduction in water quality, or salt accumulation.
Filter Strip	A strip or area of vegetation for removing pollutants water.	A filter strip reduces pollution by filtration, deposition, infiltration, absorption, adsorption, decomposition, and volatilization of sediment, organic matter, and other pollutants from runoff and waste water.
Fish Stream Improvement	Fish Stream Improvement is improving a stream channel to make or enhance fish habitat.	The purpose of the practice is to increase production of desired species of fish. The practice involves improving food supplies, shelter, spawning areas, water quality, and other elements of fish habitat.
Grade Stabilization Construction	A structure used to control the grade and head cutting in natural	These structures are to: Stabilize the grade and control erosion in

	or artificial channels.	natural or artificial channels, prevent the formation or advance of gullies, enhance environmental quality, and reduce pollution hazards.
Grassed Waterway	A natural or constructed channel that is shaped or graded to required dimensions and established in suitable vegetation for the stable conveyance of runoff.	Grassed waterways convey runoff from terraces, diversions, or other water concentrations without causing erosion or flooding and to improve water quality.
Grazing Land Mechanical Treatment	Modifying physical soil and/or plant conditions with mechanical tools by treatments such as; pitting, contour furrowing, and ripping or sub-soiling.	This practice should be applied as part of a best management practice to support one or more of the following purposes: Fracture compacted soil layers and improve soil permeability, Reduce water runoff and increase infiltration, Break up sod bound conditions and thatch to increase plant vigor, and Renovate and stimulate plant community for greater productivity and yield.
Heavy Use Area Protection	Protecting heavily used areas by establishing vegetative cover, by surfacing with suitable materials, or by installing needed structures.	To stabilize urban, recreation, or facility areas frequently and intensely used by people, animals, or vehicles.
Irrigation Land Leveling	Reshaping the surface of land to be irrigated to planned grades.	To permit uniform and efficient application of irrigation water without causing erosion, loss of water quality, or damage to land by water logging and at the same time to provide for adequate surface drainage.
Irrigation Water Management	Irrigation water management is the process of determining and controlling the volume, frequency, and application rate of irrigation water in a planned, efficient manner.	Irrigation water management is applied as part of a conservation management system to support one or more of the following: Manage soil Moisture to promote desired crop response; Optimize use of available water supplies; Minimize irrigation induced soil erosion;

		Decrease non-point source pollution of surface and groundwater resources; Manage salts in the crop root zone; Manage air, soil, or plant micro-climate.
Mulching	Applying plant residues or other suitable materials not produced on the site to the soil surface.	To conserve moisture; prevent surface compaction or crusting; reduce runoff and erosion; control weeds; and help establish plant cover.
Polyacrylamide (PAM)	Polyacrylamide is an organic polymer formulated to stabilize soil when applied in irrigation water.	Water applied with PAM stabilizes soil aggregates which can then resist the erosive forces of water. If correctly applied, PAM will produce clear runoff water and residue erosion within the field by over 90 percent.
Prescribed Grazing	Prescribed grazing is the controlled harvest of vegetation with grazing animals, managed with the intent to achieve a specific objective.	Application of this practice will manipulate the intensity, frequency, duration, and season of grazing to: 1) Improve water infiltration, 2) maintain or improve riparian and upland area vegetation, 3) protect stream banks from erosion, 4) manage for deposition of fecal material away from water bodies, and 5) promote ecological and economically stable plant communities which meet landowner objectives.
Residue Management (Conservation Tillage)	Managing the amount, orientation, and distribution of crop and other plant residue on the soil surface.	This practice may be applied as part of a conservation system to support one or more of the following: Reduce sheet and rill erosion. Reduce wind erosion. Maintain or improve soil organic matter content and tilth. Conserve soil moisture. Manage snow to increase plant available moisture. Provide food and escape cover for wildlife.
Riparian Forest Buffer	A riparian forest buffer is an area	The riparian forest buffer is a

	of trees and/or shrubs located adjacent to a body of water. The vegetation extends outward from the water body for a specified distance necessary to provide a minimum level of protection and/or enhancement.	multi-purpose practice design to accomplish one or more of the following: Create shade to lower water temperatures and improve habitat for aquatic animals, Provide a source of debris necessary for healthy robust populations of aquatic organisms and wildlife, and Act as a buffer to filter out sediment, organic material, fertilizer, pesticides and other pollutants that may adversely impact the water body, including shallow ground water.
Sediment Basin	A basin constructed to collect and store debris or sediment.	A sediment basin may have the following uses: Preserve the capacity of reservoirs, ditches, canals, diversion, waterways, and streams, Prevent undesirable deposition on bottom lands and developed areas, Trap sediment originating from construction sites, and Reduce or abate pollution by providing basins for deposition and storage of silt, sand, gravel, stone, agricultural wastes, and other detritus.
Sprinkler System	A planned irrigation system in which all necessary facilities are installed for efficiently applying water by means of perforated pipes or nozzles operated under pressure.	To efficiently and uniformly apply irrigation water to maintain adequate soil moisture for optimum plant growth without causing excessive water loss, erosion, or reduced water quality.
Stream Channel Stabilization	Stabilizing the channel of a stream with suitable structures.	To control aggradations or degradation in a stream channel.
Stream bank Protection	Using vegetation or structures to stabilize and protect banks of streams, lakes, estuaries, or excavated channels against scour and erosion.	To stabilize or protect banks of streams, lakes, estuaries, or excavated channels for one or more of the following purposes: Prevent the loss of land or damage to utilities, roads, buildings, or other facilities adjacent to the banks, Maintain the capacity of the channel, Control channel meander

		that would adversely affect downstream facilities, Reduce sediment loads causing downstream damages and pollution, and Improve the stream for recreation or as a habitat for fish and wildlife.
Strip-cropping, Contour	Growing crops in a systematic arrangement of strips or bands on the contour to reduce water erosion. The crops are arranged so that a strip of grass or close-growing crop is alternated with a strip of clean-tilled crop or fallow or a strip of grass is alternated with a close-growing crop.	To reduce sheet and rill erosion and/or to reduce transport of sediment and other water-borne contaminants.
Strip-cropping, Field	Growing crops in a systematic arrangement of strips or bands across the general slope (not on the contour) to reduce water erosion. The crops are arranged so that a strip of grass or a close-growing crop is alternated with a clean-tilled crop or fallow.	To help control erosion and runoff on sloping cropland where contour strip-cropping is not practical.
Subsurface Drains	A Subsurface Drain is a conduit, such as corrugated plastic tubing, tile, or pipe, installed beneath the ground surface to collect and/or convey drainage water.	The purpose of a subsurface drain is to: Improve the environment for vegetation, Reduce erosion, Improve water quality, Collect ground water for beneficial use, Remove water from heavy use areas such as recreation areas, or around buildings, and Regulate water to control health hazards caused by pests.
Surge Irrigation	Surge irrigation is the intermittent application of water to furrows, corrugates, or borders creating a series of on and off periods of constant or variable time spans.	Surge allows a lighter application of water with a higher efficiency. The result is less deep percolation of water at the upper end of the field and a more uniform application.
Tail water Recovery & Pumpback System	A facility to collect, store, and transport irrigation tail water for	To conserve farm irrigation water supplies and water quality by

	reuse in a farm irrigation distribution system.	collecting the water that runs off the field surface for reuse on the farm.
Terraces	An earth embankment, a channel, or a combination ridge and channel constructed across the slope.	Reduce slope length, reduce sediment content in runoff water, reduce erosion, Improve water quality, intercept and conduct surface runoff at a non-erosive velocity to a stable outlet, retain runoff for moisture conservation, prevent gully development, reform the land surface, improve farmability, and reduce flooding.
Use Exclusion	Excluding animals, people or vehicles from an area.	To protect, maintain, or improve the quantity and quality of the plant, animal, soil, air, water, and aesthetics resources and human health and safety.
Water and Sediment Control Basin	An earth embankment or a combination ridge and channel generally constructed across the slope and minor watercourses to form a sediment trap and water detention basin.	To improve farmability of sloping land, reduce watercourse and gully erosion, trap sediment, reduce and manage onsite and downstream runoff, and improve downstream water quality.
Watering Facility	A device (tank, trough, or other watertight container) for providing animal access to water.	To provide watering facilities for livestock and/or wildlife at selected locations in order to: 1) protect and enhance vegetative cover through proper distribution of grazing; 2) provide erosion control through better grassland management; or 3) protect streams, ponds and water supplies from contamination by providing alternative access to water.
Wetland Development/Restoration	The construction or restoration of a wetland facility to provide the hydrological and biological benefits of a wetland.	To develop or restore hydric soil conditions, hydrologic conditions, hydrophytic plant communities, and wetland functions.

Appendix C: CROP SPECIFIC GUIDELINES

Alfalfa Hay, Irrigated South ID-Cut Mid Bloom

NITROGEN

Nitrogen (N) fertilizer is generally not needed for alfalfa since a healthy alfalfa stand is capable of fixing adequate levels of N. Responses to applied N usually indicate the alfalfa stand is not effectively nodulated due to lack of proper seed inoculation at planting, or that the stand is aging.

Soils containing 20 to 30 pounds (4 to 7.5 ppm) of nitrate-nitrogen (NO3-N) in the top 12 inches have sufficient N to establish a stand of alfalfa seeded alone. Adding fertilizer N at establishment reduces nodule number and nodule activity.

Establishing alfalfa with a companion crop is not recommended because the alfalfa stand typically is reduced by the excessive competition from the companion plantings. When growers plant alfalfa with a companion crop, both crops compete for the N. Under these conditions, N rates of 30 to 40 pounds per acre are suggested to establish alfalfa stands.

PHOSPHORUS

Alfalfa responds well to applied phosphorus (P). The need for P fertilization can be determined by a soil test. Phosphorus materials should be broadcast and incorporated into the seedbed before planting. For best results, P fertilizers should be applied on established stands in the fall. The University of Idaho recommended application should be sufficient for 2 years of production.

POTASSIUM

Alfalfa has a high potassium (K) requirement. Recommended K fertilization levels are determined by soil test. Broadcast and incorporate K at establishment or apply in the fall or early spring on established stands.

SULFUR

Mountain valleys and foothill areas that receive higher amounts of precipitation and/or that are irrigated with low sulfur-containing water are likely areas for sulfur (S) deficiency. Areas irrigated with water from the Snake River or any water containing the sulfate (SO4) form of sulfur should have an adequate amount of S.

Alfalfa and other legumes require more S than grasses. Plant tissue testing is an excellent tool for detecting S-deficient alfalfa. Samples should be analyzed for total N and total S. These values are used to calculate the nitrogen/sulfur ratio, which should be less than 15. When the ratio is greater than 15, an S deficiency is suspected.

Soils testing less than 8 ppm SO4-S for 0- to 12-inch soil depth should receive 40 pounds S per acre. This rate of application should provide adequate sulfur for 2 years of production. Many southern Idaho soils contain accumulated S below the 12-inch depth. Although the 0- to 12-inch soil zone may be low in S (8 ppm), the soil below 12 inches may supply enough S for alfalfa production. Thus, testing the soil at both 0- to 12- and 12- to 24-inch depths is advised for good S recommendation.

Fertilizer S sources include gypsum (CaS04) and elemental sulfur. S is also included in some N, P and K fertilizer materials. Elemental S must be biologically converted to the S04 form to be used by the plant. The rate of conversion depends on soil temperature, soil water content and particle size of the elemental S applied. To correct a S deficiency, the year of application use a fertilizer containing S04 as the readily available S source. Elemental S can be used to provide long term S release.

MICRONUTRIENTS

Zinc (Zn) deficiencies on alfalfa have not been observed in Idaho. Crops such as beans, corn, potatoes, and onions would normally exhibit Zn deficiency before alfalfa. Zinc applied to any of those crops would have sufficient residual for alfalfa.

BORON

Alfalfa is sensitive to low soil boron (B). Boron deficiencies have been observed in southern Idaho, but they are not widespread. Deficiencies normally occur on acidic soils (pH less than 7.0) and droughty (gravelly and sandy) soils. If the soil tests less than 0.25 ppm B, apply 1 to 3 pounds per acre of B. Do not use higher rates because B in excessive amounts is toxic to plants.

GENERAL COMMENTS

Complete information on cultural practices necessary for alfalfa production is contained in University of Idaho Current Information Series 144, "Producing maximum Yields of Irrigated Alfalfa hay."

Irrigation, weeds, and insects can influence the effectiveness of a fertilizer application.

Alfalfa fields in southern Idaho frequently become yellow during the re-growth of the second and third crop. These fields have not responded to applications of fertilizer to correct this temporary yellowing condition.

Alfalfa can become a cash crop in the rotation by the application of needed management inputs such as water, fertilizer and pesticides and by timely harvesting. Alfalfa quality is enhanced by cutting at the early bud stage and more frequently during the growing season. This practice will reduce stand life, however.

Alfalfa hay should be analyzed to determine P content. Phosphorus is important for animal nutrition and can greatly influence animal performance and animal health. Fertilization can increase P content of forage.

Applications of S have been shown to reduce alfalfa selenium (Se) concentrations on soils low in available Se. Levels of Se above 0.1 ppm in the dry forage are considered adequate to prevent white muscle disease and other disorders related to limited Se forage.

Corn-Field Grain, Irrigated South ID

NITROGEN

Nitrogen rates depend upon some of the following factors: previous crop, past fertilizer use, soil type and leaching hazard and realistic yield goal for the grower and the area.

Adequate N is necessary for maximum economic production of irrigated field corn used for silage or grain. Fertilizer N represents by far the largest share of the fertilizer costs for field corn in Idaho. The amount of N required depends on many factors that influence total corn production and quality. These factors include length of growing season, corn hybrid, previous crop, past fertilizer use, soil type, leaching hazard and previous manuring. Estimates of both the N available to corn during the season and the yield potential of the crop should be considered when determining N fertilizer rates.

TOTAL N REQUIREMENTS BASED ON POTENTIAL YIELD

Fertilizer N rates should be used which correspond to the yield growers can reasonably expect under their soil and management conditions. The historical field corn yield obtained by a grower in a specific field or area generally provides a fair approximation of yield potential given a grower's traditional crop management. Projected changes in crop management (i.e. improved variety, better disease and weed control) designed to appreciably increase production may require adjustment of yield potential upward.

Research has shown that the available N required to produce a good field corn yield depends on a variety of crop management practices. Factors such as weed, insect and disease control as well as irrigation, planting date and soil type can influence the N required by triticale for maximum yield.

AVAILABLE NITROGEN

Available N in the soil includes mineralizable N (released from organic matter during the growing season) inorganic N as nitrate (N03-N) and ammonium (NH4-N), and N credits from previous cropping or manures. Each component of available N must be estimated for accurate determination of optimum fertilizer N rates.

MINERALIZABLE NITROGEN - Soils vary in their capacity to release N from organic matter during the growing season. The amount of N released depends on such factors as soil type, soil moisture, soil temperature, previous crop, and the history of fertilizer N applied. While soil organic matter content is frequently used to estimate annual mineralizable N contributions, in southern Idaho irrigated soils organic matter does not accurately predict the amount of N that is mineralized.

INORGANIC NITROGEN - Residual soil inorganic N (N03, NH4) can be evaluated most effectively with a

soil test. Soil samples should be collected in foot increments to a depth of two feet, unless roots are restricted by dense soil layers or high water tables. Ammonium is generally low in pre-plant soil samples and thus contributes little to available N. However, it can be as high or higher than N03-N. NH4-N should be determined along with N03-N, especially when there is reason to expect the presence of appreciable NH4-N, such as recent ammonium N fertilizer applications. Soil samples should be collected before seeding in the spring to represent the area to be fertilized.

NITROGEN FROM PREVIOUS CROP RESIDUES - Nitrogen associated with decomposition of previous crop residues should also be considered when estimating available N. Residues that require additional N for decomposition include cereal straw and mature corn stalks. Research has shown that 15 pounds of additional N are needed per ton of straw returned to the soil, up to a maximum of 50 pounds. For more information on compensating for cereal residues, refer to CIS 825, "Wheat Straw Management and Nitrogen Fertilizer Requirements."

Row crop residues (potatoes, sugar beets, onions) generally do not require additional N for decomposition. Consequently, these residues have little effect on the N needs of field corn.

Legume residues from beans, peas, and alfalfa can release appreciable N during the following crop season that may not be reflected by the pre-plant soil test. This N is derived from the decomposition of both plant tops and nodulated root systems.

NITROGEN FROM MANURES - Soils in which field corn is grown occasionally receive animal manures or lagoon wastes. Nutrient contributions from these sources should also be taken into consideration when estimating available N for the next season. Manures can preclude the need for any fertilizer, depending on the rate applied and their nutrient composition.

Manures can vary appreciably depending on the animal, how the manure is processed, and the kind and extent of bedding material. For the most accurate estimate of fertilizer equivalent values, the manure should be analyzed for its nutrient content.

IRRIGATION WATER - Irrigation waters derived from deep wells are generally low in N. More shallow wells can have significant levels of nitrogen because of leaching of nitrogen from impacts from commercial fertilizer use, animal waste, and improperly functioning septic systems. Irrigation waters from most districts are also low in N when diverted from its source. Background levels of N from original sources are generally about 2 parts per million (ppm). The more return flow included in diverted water sources, the higher the N content. Return flows may include N dissolved when irrigation waters pass through fields high in residual or recently added fertilizer N as well as from soluble fertilizer N applied with the irrigation water.

Most irrigation districts should know the N content of the water they divert. Contact them for this information to determine the levels of N added with your irrigation water. However, since irrigation water N levels are influenced by upstream management, if you use irrigation water that receives runoff after it is diverted, only a water test can accurately evaluate the N added with irrigation waters.

For each ppm or milligrams per liter (mg/L) of N reported in the water sample, multiply by 2.7 to get the N added per acre foot of water applied. For example, if the water sample contained 10 ppm of N, 3 acre feet of water applied would be the equivalent of 81 pounds of N per acre. Typically, of the water applied with furrow irrigation only 50 percent is retained on the field and the rest runs off the end. The net retention of N applied with furrow irrigation would, therefore, be about half of the water applied or about 40 pounds per acre in this example. If more or less of the irrigation water is retained with each wetting, then growers should adjust the water N contribution accordingly.

Excessive irrigation by any method reduces N availability to field corn. Additional N may be needed under these conditions. Growers should not use aqua or anhydrous N through a sprinkler irrigation system.

Water running soluble N sources with a furrow irrigation system can be an effective means of adding N. Two limitations of this practice are that (1) the application of the N with this method may not be as uniform as desired and (2) runoff containing the N may contaminate downstream surface waters. Growers can minimize the loss of N by shutting off the injection unit before the irrigation water reaches the end of the furrow. This practice should not substitute for careful consideration of N needs while N can be side dressed.

CALCULATION OF N APPLICATION RATES

To calculate the fertilizer N application rate, the following equation is used:

Fertilizer application rate (deficit) or Over application of Nitrogen =
(Total N required to produce a given yield) - (Mineralizable N) - (Inorganic N measured by the soil test) - (previous crop/residue management) - (Manure Nitrogen) - (Irrigation Water)

TIMING OF NITROGEN APPLICATION

Coarse-textured soils, including sandy loams, loamy soils and sands, may lose N from leaching. For these soils, side dress a portion of the N at the time of the last cultivation. Sprinkler irrigation of corn under center pivots provides increased flexibility for providing N during the season. With sprinklers N can be injected into the system and applied with the water. On silt loam soils, split applications of N have not proven more effective as long as pre-plant N is adequately incorporated.

High N rates (approaching 300 pounds per acre) broadcast and incorporated before planting may reduce early season corn growth. If high N rates are needed, split applications should be considered.

High plant populations (above 28,000 to 30,000) and early plantings of longer season hybrids in the Treasure Valley will respond to high N rates provided there are no other limiting factors. High N rates will not compensate for reductions in stand or delayed plantings. High plant populations of field corn are more susceptible to N shortages because of greater competition among plants for limited N.

Side dressing may cause root pruning depending on plant size, distance of shank from the row and placement depth. High N rates (above 300 pounds per acre) broadcast and incorporated before planting may reduce early season corn growth. If high N rates are needed, split applications should be considered. On sandy textured soils subject to leaching, side dress a portion of the N at the time of the last cultivation. Under sprinkler irrigations, N can be injected through the lines throughout the season. On silt loam soils, split applications of N have not proven more effective as long as pre-plant N is adequately incorporated.

PHOSPHORUS

Adequate phosphorus (P) is necessary for maximum production of field corn. The soil test for P is based on samples collected from the first foot of soil. The soil is extracted with sodium bicarbonate.

Economic response to fertilizer P is more likely with cooler soil temperatures and soils with high lime content, particularly when planting long season hybrids. Phosphorus is an immobile nutrient that does not move appreciably from where it is placed. It should be mixed into the seedbed or banded within easy reach of the seedling roots before or during the planting operation.

POTASSIUM

Field corn requires adequate potassium (K) for optimum growth. Soil test K can be useful in determining the need for K fertilizers. The soil sample is taken from the first foot of soil and extracted with sodium bicarbonate. Fertilizer K rates are based on soil test.

MICRONUTRIENTS

Zinc (Zn) deficiencies occur primarily on soils that are eroded, leveled or where the exposed subsoil is higher in lime. The DTPA test on soil samples collected from the first foot can be used for identifying Zn fertilizer needs. Apply 10 pounds of Zn per acre when the soil test measures less than 0.6 ppm.

Other micronutrients have not been shown to limit corn production. "Shotgun" applications of micronutrient mixtures containing boron (B), copper (Cu), iron (Fe) and manganese (Mn) "for insurance" have not been shown to be economical and are not recommended.

SULFUR (S)

The major corn-growing regions in Idaho should not experience shortages of S. Areas with S deficiencies include some irrigated areas where both the soil and irrigation water are low in S. Snake River water is known to have high S concentrations. Coarse-textured soils including sandy loams, loamy sands and sands would be more susceptible to S deficiencies than silt loam soils. Where the need for S is evident, use 30 pounds per acre

of sulfate-sulfur (S04).

SALINITY (SALTS)

Field corn has a low to moderate tolerance to accumulated salts. Soils with total salt readings above 3 or 4 mmhos/cm can be cropped effectively. Readings up to 6 are also satisfactory although more careful water management may be required.

Potatoes

NITROGEN

Nitrogen rates depend upon some of the following factors: previous crop, past fertilizer use, soil type and leaching hazard and realistic yield goal for the grower and the area.

Most Idaho potato fields will respond to fertilizer nitrogen (N). The N rate used, along with other management factors, particularly irrigation, can have a marked effect on the yield and quality of the potato crop.

TOTAL N REQUIREMENTS BASED ON POTENTIAL YIELD

Fertilizer N rates should be used which correspond to the yield growers can reasonably expect under their soil and management conditions. The historical potato yield obtained by a grower in a specific field or area generally provides a fair approximation of yield potential given a grower's traditional crop management. Projected changes in crop management (i.e. improved variety, better disease and weed control) designed to appreciably increase production may require adjustment of yield potential upward.

Research has shown that the available N required to produce a good potato yield depends on a variety of crop management practices. Factors such as weed, insect and disease control as well as irrigation, planting date and soil type can influence the N required by potatoes for maximum yield.

AVAILABLE NITROGEN

Available N in the soil includes mineralizable N (released from organic matter during the growing season) inorganic N as nitrate (N03-N) and ammonium (NH4-N), and N credits from previous cropping or manures. Each component of available N must be estimated for accurate determination of optimum fertilizer N rates.

MINERALIZABLE NITROGEN - Soils vary in their capacity to release N from organic matter during the growing season. The amount of N released depends on such factors as soil type, soil moisture, soil temperature, previous crop, and the history of fertilizer N applied. While soil organic matter content is frequently used to estimate annual mineralizable N contributions, in southern Idaho irrigated soils organic matter does not accurately predict the amount of N that is mineralized.

INORGANIC NITROGEN - Residual soil inorganic N (N03, NH4) can be evaluated most effectively with a soil test. Soil samples should be collected in foot increments to a depth of two feet, unless roots are restricted by dense soil layers or high water tables. Ammonium is generally low in pre-plant soil samples and thus contributes little to available N. However, it can be as high or higher than N03-N. NH4-N should be determined along with N03-N, especially when there is reason to expect the presence of appreciable NH4-N, such as recent ammonium N fertilizer applications. Soil samples should be collected before seeding in the spring to represent the area to be fertilized.

NITROGEN FROM PREVIOUS CROP RESIDUES - Nitrogen associated with decomposition of previous crop residues should also be considered when estimating available N. Residues that require additional N for decomposition include cereal straw and mature corn stalks. Research has shown that 15 pounds of additional N are needed per ton of straw returned to the soil, up to a maximum of 50 pounds. For more information on compensating for cereal residues, refer to CIS 825, "Wheat Straw Management and Nitrogen Fertilizer Requirements."

Row crop residues (potatoes, sugar beets, onions) generally do not require additional N for decomposition. Consequently, these residues have little effect on the N needs of potatoes.

Legume residues from beans, peas, and alfalfa can release appreciable N during the following crop season that may not be reflected by the pre-plant soil test. This N is derived from the decomposition of both plant tops and nodulated root systems.

NITROGEN FROM MANURES - Soils in which potatoes are grown rarely receive animal manures or lagoon wastes. Nutrient contributions from these sources should also be taken into consideration when estimating available N for the next season. Manures can preclude the need for any fertilizer, depending on the rate applied and their nutrient composition.

Manures can vary appreciably depending on the animal, how the manure is processed, and the kind and extent of bedding material. For the most accurate estimate of fertilizer equivalent values, the manure should be analyzed for its nutrient content.

IRRIGATION WATER - Irrigation waters derived from deep wells are generally low in N. More shallow wells can have significant levels of nitrogen because of leaching of nitrogen from impacts from commercial fertilizer use, animal waste, and improperly functioning septic systems. Irrigation waters from most districts are also low in N when diverted from its source. Background levels of N from original sources are generally about 2 parts per million (ppm). The more return flow included in diverted water sources, the higher the N content. Return flows may include N dissolved when irrigation waters pass through fields high in residual or recently added fertilizer N as well as from soluble fertilizer N applied with the irrigation water.

Most irrigation districts should know the N content of the water they divert. Contact them for this information to determine the levels of N added with your irrigation water. However, since irrigation water N levels are influenced by upstream management, if you use irrigation water that receives runoff after it is diverted, only a water test can accurately evaluate the N added with irrigation waters.

For each ppm or milligrams per liter (mg/L) of N reported in the water sample, multiply by 2.7 to get the N added per acre foot of water applied. For example, if the water sample contained 10 ppm of N, 3 acre feet of water applied would be the equivalent of 81 pounds of N per acre. Typically, of the water applied with furrow irrigation only 50 percent is retained on the field and the rest runs off the end. The net retention of N applied with furrow irrigation would, therefore, be about half of the water applied or about 40 pounds per acre in this example. If more or less of the irrigation water is retained with each wetting, then growers should adjust the water N contribution accordingly.

Excessive irrigation by any method reduces N availability to potatoes. Additional N may be needed under these conditions. Growers should not use aqua or anhydrous N through a sprinkler irrigation system.

Water running soluble N sources with a furrow irrigation system can be an effective means of adding N. Two limitations of this practice are that (1) the application of the N with this method may not be as uniform as desired and (2) runoff containing the N may contaminate downstream surface waters. Growers can minimize the loss of N by shutting off the injection unit before the irrigation water reaches the end of the furrow. This practice should not substitute for careful consideration of N needs while N can be side dressed.

CALCULATION OF N APPLICATION RATES

To calculate the fertilizer N application rate, the following equation is used:

Fertilizer application rate (deficit) or Over application of Nitrogen =
(Total N required to produce a given yield) - (Mineralizable N) - (Inorganic N measured by the soil test) - (previous crop/residue management) - (Manure Nitrogen) -(Irrigation Water)

TIMING OF NITROGEN APPLICATION

Nitrogen fertilizer recommendations are for Russet Burbank potatoes grown on sandy loam soils. Adjustments are made for very sandy soils (add 30 lb N/acre) and silt loam soils (subtract 40 lb N/acre) to account for differences in nitrogen mineralization rates and nitrogen use efficiency. To maximize yield and quality, growers should aim to have about 40 to 45% of their total N supply applied by row closure. Nitrogen applications made during tuber bulking should be guided by petiole sampling to maintain at least 15,000 ppm N03-N in the fourth petiole from the growing tip.

Excess levels of soil N at or before tuberization can delay tuber growth, reduce yields and lower tuber specific gravity. Excess N in late summer and fall can delay maturity of the tubers. This delayed tuber maturity can adversely affect tuber storability and quality.

The N needs of the potato crop are best met by split-application of N fertilizer. This involves applying lower

rates of N fertilizer pre-plant and at planting, with the remainder of the crop's N needs applied with the irrigation water. Some cropping systems - for example, furrow irrigation - make it difficult to apply N fertilizer and get efficient plant uptake. Under these conditions most of the crop N needs are applied to the soil before planting.

Nitrogen applied with irrigation water is an effective way to supplement the crop during the growing season. Do not use aqua or anhydrous ammonia in sprinkler system applications. Applications through a sprinkler system are not folar fertilization.

PHOSPHORUS

Potato plants need phosphorus (P) for plant growth and will respond to P fertilizer if the soil test concentration is low. Phosphorus soil test for potatoes is based on an extraction with sodium bicarbonate. Soil samples for a phosphorus soil test should be taken from 0- to 12-inch depths. This depth of sampling is critical to achieve an accurate soil test P level. Deviation in sampling depth from the 12-inch depth may drastically alter soil test results.

Phosphorus is immobile in soil and therefore does not move from where it is placed. Applied P fertilizer must be mixed into the seedbed before planting for best results. Banding P fertilizer along side plants has not been as effective as P fertilizer that has been broadcast and incorporated. Eroded or scraped areas, commonly referred to as "white soil" areas, may be low in available P because of its high content of "free lime." These areas should be tested and fertilized separately. To compensate for low P availability when free lime is present in the soil, rates of P are increased with increasing levels of free lime. Total phosphorus concentrations should be kept above 0.22% in the fourth petiole during tuber bulking.

POTASSIUM

Potatoes require high levels of available potassium (K). Potassium is relatively immobile in the soil. For best results, K fertilizers should be applied pre-plant and mixed into the seedbed. Banding beside the plants has been used successfully but is not as effective as K fertilizer which has been broadcast and incorporated.

Potassium fertilizer applications reduce specific gravity of harvested tubers. Potassium chloride fertilizer (KCl or muriate of potash) lowers specific gravity of tubers more than potassium sulfate fertilizer (K2SO4 or sulfate of potash). Growers should avoid over-fertilization of potatoes with K fertilizers. When specific gravity of tubers is important, potassium sulfate is the preferred K fertilizer source. Total potassium concentrations should be kept above 7.0% in the fourth petiole during tuber bulking.

SULFUR

Potatoes generally do not respond to sulfur (S) fertilization. Sulfur response is most likely to occur in sandy soils and in areas where irrigation water sources are low in S. Water low in S includes mountain streams and some well waters. The more irrigation return-flow in the water source the greater the amount of dissolved, plant-available sulfate (S04) form. Elemental sulfur is not recommended because it is not immediately available to plants. Elemental sulfur will require several months from time of application until it is converted to plant-available form.

MICRONUTRIENTS

"Shotgun" application of micronutrients - I.e. complete mixes containing boron (B), copper (Cu), iron (Fe), manganese (Mn) and zinc (Zn) - "for insurance" are not recommended since these elements have not been shown to give an economical response. Soil tests for individual micronutrients are available and concentrations in the 0- to 1-inch soil sample are: B = 0.5 ppm, Cu = 0.2 ppm, Fe = 4.0 ppm, Mn = 2.0 ppm, Zn = 0.5 ppm. Critical concentrations represent values below which a response from the application of that micronutrient may be obtained.

Zinc deficiencies have not been widespread on potatoes although some crops in certain areas of southern Idaho do show a Zn deficiency. When the soil test for Zn is below the critical concentration or where land leveling or erosion has exposed white subsoil containing free lime, apply Zn fertilizer at a rate which will supply 10 pounds of Zn per acre or equivalent. This amount of Zn should be sufficient for 4 to 6 years of crop production.

GENERAL COMMENTS

The P, K, and Zn nutritional status of the plant should also be monitored during the growing season. The same petiole sample used for N03-N concentrations can also be used for this purpose. Guidelines for adequate concentrations of these and other nutrients in the petiole can be obtained from your county agricultural Extension agent, consultant, or fieldman.

Fertilizer materials containing P, K and Zn should be thoroughly incorporated into the root zone. These materials can be effectively applied in the fall.

Sugarbeets

NITROGEN

Nitrogen rates depend upon some of the following factors: previous crop, past fertilizer use, soil type and leaching hazard and realistic yield goal for the grower and the area.

Controlling the amount of N available to the sugar beet is critical in producing high beet tonnage with high sugar percentage. Nitrogen in excess can reduce sugar percentage and gross income per acre.

TOTAL N REQUIREMENTS BASED ON POTENTIAL YIELD

Fertilizer N rates should be used which correspond to the yield growers can reasonably expect under their soil and management conditions. The historical sugar beet yield obtained by a grower in a specific field or area generally provides a fair approximation of yield potential given a grower's traditional crop management. Projected changes in crop management (i.e. improved variety, better disease and weed control) designed to appreciably increase production may require adjustment of yield potential upward.

AVAILABLE NITROGEN

Available N in the soil includes mineralizable N (released from organic matter during the growing season) inorganic N as nitrate (N03-N) and ammonium (NH4-N), and N credits from previous cropping or manures. Each component of available N must be estimated for accurate determination of optimum fertilizer N rates.

MINERALIZABLE NITROGEN - Soils vary in their capacity to release N from organic matter during the growing season. The amount of N released depends on such factors as soil type, soil moisture, soil temperature, previous crop, and the history of fertilizer N applied. Soils that retain moisture tend to mineralize more N than soils such as sandy loams, which dry out more rapidly. Mineralization of N is limited by cooler soil temperatures that limit soil biological activity.

While soil organic matter content is frequently used to estimate annual mineralizable N contributions, in southern Idaho irrigated soils organic matter does not accurately predict the amount of N that is mineralized.

INORGANIC NITROGEN - Residual soil inorganic N (N03, NH4) can be evaluated most effectively with a soil test. Accurate soil sampling and analysis in a high value crop like sugar beets is one of the best investments that can be made and is highly recommended. A soil test measures the residual N carryover from the previous crop and provides the necessary information for accurate fertilizer application. Nitrate nitrogen (NO3-N) is mobile in the soil. Soil samples, therefore, should be taken from the 0- to 12-inch and 12- to 24-inch soil depths or the effective root zone. These depths should be sampled and kept separate for analysis.

If the first foot is low in N (less than 5 ppm) but the sum of the first 2 feet is adequate, 20 to 40 pounds of N per acre may be applied to provide N until root growth is sufficient to reach the N in the second foot (about 4 to 5 weeks after emergence).

NITROGEN FROM PREVIOUS CROP RESIDUES - Nitrogen associated with decomposition of previous crop residues should also be considered when estimating available N. Residues that require additional N for decomposition include cereal straw and mature corn stalks. Research has shown that 15 pounds of additional N are needed per ton of straw returned to the soil, up to a maximum of 50 pounds. For more information on compensating for cereal residues, refer to CIS 825, "Wheat Straw Management and Nitrogen Fertilizer Requirements."

Non-cereal residues (potatoes, sugar beets, onions, beans, mint, and sweet corn) generally do not require additional N for decomposition. Consequently, these residues have little effect on the N needs of sugar beets.

Legume residues from beans, peas, and alfalfa can release appreciable N during the following crop season that may not be reflected by the pre-plant soil test. This N is derived from the decomposition of both plant tops and nodulated root systems.

NITROGEN FROM MANURES - Very few soils used for sugar beets receive animal manures or lagoon wastes. Nutrient contributions from these sources should also be taken into consideration when estimating available N for the next season. Manures can preclude the need for any fertilizer, depending on the rate applied and their nutrient composition.

Manures can vary appreciably depending on the animal, how the manure is processed, and the kind and extent of bedding material. For the most accurate estimate of fertilizer equivalent values, the manure should be analyzed for its nutrient content.

IRRIGATION WATER - Irrigation waters derived from deep wells are generally low in N. More shallow wells can have significant levels of nitrogen because of leaching of nitrogen from impacts from commercial fertilizer use, animal waste, and improperly functioning septic systems. Irrigation waters from most districts are also low in N when diverted from its source. Background levels of N from original sources are generally about 2 parts per million (ppm). The more return flow included in diverted water sources, the higher the N content. Return flows may include N dissolved when irrigation waters pass through fields high in residual or recently added fertilizer N as well as from soluble fertilizer N applied with the irrigation water.

Most irrigation districts should know the N content of the water they divert. Contact them for this information to determine the levels of N added with your irrigation water. However, since irrigation water N levels are influenced by upstream management, if you use irrigation water that receives runoff after it is diverted, only a water test can accurately evaluate the N added with irrigation waters.

For each ppm or milligrams per liter (mg/L) of N reported in the water sample, multiply by 2.7 to get the N added per acre foot of water applied. For example, if the water sample contained 10 ppm of N, 3 acre feet of water applied would be the equivalent of 81 pounds of N per acre. Typically, of the water applied with furrow irrigation only 50 percent is retained on the field and the rest runs off the end. The net retention of N applied with furrow irrigation would, therefore, be about half of the water applied or about 40 pounds per acre in this example. If more or less of the irrigation water is retained with each wetting, then growers should adjust the water N contribution accordingly.

Excessive irrigation by any method reduces N availability to sugar beets. Additional N may be needed under these conditions. Growers should not use aqua or anhydrous N through a sprinkler irrigation system.

Water running soluble N sources with a furrow irrigation system can be an effective means of adding N. Two limitations of this practice are that (1) the application of the N with this method may not be as uniform as desired and (2) runoff containing the N may contaminate downstream surface waters. Growers can minimize the loss of N by shutting off the injection unit before the irrigation water reaches the end of the furrow. This practice should not substitute for careful consideration of N needs while N can be side dressed.

CALCULATION OF N APPLICATION RATES

To calculate the fertilizer N application rate, the following equation is used:

Fertilizer application rate (deficit) or Over application of Nitrogen =
(Total N required to produce a given yield) - (Mineralizable N) - (Inorganic N measured by the soil test) - (previous crop/residue management) - (Manure Nitrogen) - (Irrigation Water)

TIMING OF NITROGEN APPLICATION

Nitrogen fertilizers can be fall applied on loam, silt loam, and clay soils. Winter leaching of N from the soil profile can be reduced to a minimum by applying N in the ammonium or urea forms when soil temperature is below 45 F. Greater efficiency may be obtained from pre-plant application in spring or by side dressing before July 1. Nitrogen applied after July 1 stimulates vegetative growth, lowers sugar percentage and extractability and contributes little to total sugar yield.

On sandy soils where over-irrigation and leaching of nitrogen are likely, side dressing or applications of nitrogen through irrigation water before July 1 are suggested for at least half of the rate used.

Split N applications often increase nitrogen use efficiency, sugar beet tonnage, and sugar production. Research conducted at the Kimberly R & E Center during 1992-1994 showed that split N fertilization generally increased estimated recoverable sugar and net economic return/acre compared to applying all N pre-plant. However, growers need to avoid applying significant amounts of N late in the growing season, which can stimulate top growth at the expense of sugar production.

The practice of placing starter fertilizer with the seed is not recommended because it will reduce germination and result in poor stands.

PHOSPHORUS

Sugarbeets will respond to P fertilizer if soil test levels are low. The soil test is based on extractable P present in the upper 12 inches of the soil.

Phosphorus should be plowed down or applied to rough-plowed ground and worked into the seedbed. High rates should not be placed with or immediately below the seed. Side dressing is recommended when late applications are necessary.

POTASSIUM

Sugarbeets require less K than potatoes or alfalfa but will respond to K fertilization if soil test levels are low. The soil test is based on the extractable K present in the upper 12 inches of the soil. Potassium should be incorporated into the seedbed.

MICRONUTRIENTS

Deficiencies of Zn are not widespread in sugar beets. When the soil test for Zn is below 0.6 ppm in the upper 12 inches of the soil, or where land leveling has exposed white, limey subsoil, apply Zn fertilizer at a rate that supplies 10 pounds of zinc per acre or equivalent.

"Shotgun" applications of micronutrient mixtures "for insurance" have not been necessary or economical; therefore, they are not recommended.

SULFUR

Sulfur is generally not deficient in the major sugar beet-growing region of Idaho where the Snake River is the source of irrigation water. In areas known to be S deficient or where the soil test is less than 8 ppm in the 0- to 12-inch soil sample, apply 30 pounds S per acre.

GENERAL COMMENTS

Uniform plant populations (110 to 130 plants per 100 feet of row) after thinning have produced the highest root yields and sugar percentages.

Wheat-Winter, Irrigated South ID

NITROGEN

Adequate nitrogen is necessary for maximum production of irrigated wheat. Nitrogen represents, by far, the largest share of fertilizer costs for wheat in Idaho. The amount of nitrogen required depends on many factors which influence total wheat production and quality. Both yield potential and available nitrogen (N03 = NH4) should be considered when determining N fertilizer rates.

TOTAL N REQUIREMENTS BASED ON POTENTIAL YIELD

Fertilizer N rates should be used which correspond to the yield growers can reasonably expect under their soil and management conditions. The historical wheat yield obtained by a grower in a specific field or area generally provides a fair approximation of yield potential given a grower's traditional crop management. Projected changes in crop management (i.e. improved variety, better disease and weed control) designed to appreciably increase production may require adjustment of yield potential upward.

Research has shown that the available N required to produce a bushel of irrigated wheat depends on a variety of crop management practices. Factors such as weed, insect and disease control as well as irrigation, planting date

and soil type can influence the N required by wheat for maximum yield. The results of irrigated field trials in the Boise and Magic valleys suggest as a rule that 2 pounds available N per bushel of wheat is required for maximum production up to 120 bushels per acre. Above 120 bushels per acre, the factor is somewhat less than two.

AVAILABLE NITROGEN

Available N in the soil includes mineralizable N (released from organic matter during the growing season) inorganic N as nitrate (N03-N) and ammonium (NH4-N), and N credits from previous cropping or manures. Each component of available N must be estimated for accurate determination of optimum fertilizer N rates.

MINERALIZABLE NITROGEN - Soils vary in their capacity to release N from organic matter during the growing season. The amount of N released depends on such factors as soil type, soil moisture, soil temperature, previous crop, and the history of fertilizer N applied. While soil organic matter content is frequently used to estimate annual mineralizable N contributions, in southern Idaho irrigated soils organic matter does not accurately predict the amount of N that is mineralized.

INORGANIC NITROGEN - Residual soil inorganic N (N03, NH4) can be evaluated most effectively with a soil test. Soil samples should be collected in foot increments to a depth of two feet, unless roots are restricted by dense soil layers or high water tables. Ammonium is generally low in pre-plant soil samples and thus contributes little to available N. However, it can be as high or higher than N03-N. NH4-N should be determined along with N03-N, especially when there is reason to expect the presence of appreciable NH4-N, such as recent ammonium N fertilizer applications.

A pre-plant soil sample is often only collected from the first foot of soil. Although this information is not as complete and reliable as would be provided by deeper sampling, residual N measurements from the first foot of soil can be combined with estimates of residual N in the second foot to predict N requirements for irrigated winter wheat. For fall planted winter cereals in western Idaho, pre-plant soil test N03-N in the second foot of the soil is commonly only one-half to two-thirds as high as in the first foot of soil. However, this estimate may not be accurate after potatoes or other sprinkler irrigated crops, especially in coarser textured soils. Basing N rate recommendations on estimates of residual N in the second foot increases the risk of recommending either too little or too much N.

NITROGEN FROM PREVIOUS CROP RESIDUES - Nitrogen associated with decomposition of previous crop residues should also be considered when estimating available N. Residues that require additional N for decomposition include cereal straw and mature corn stalks. Research has shown that 15 pounds of additional N are needed per ton of straw returned to the soil, up to a maximum of 50 pounds. For more information on compensating for cereal residues, refer to CIS 825, "Wheat Straw Management and Nitrogen Fertilizer Requirements."

Row crop residues (potatoes, sugar beets, onions) generally do not require additional N for decomposition. Consequently, these residues have little effect on the N needs of winter wheat.

Legume residues from beans, peas, and alfalfa can release appreciable N during the following crop season that may not be reflected by the pre-plant soil test. This N is derived from the decomposition of both plant tops and nodulated root systems.

NITROGEN FROM MANURES - Soils in which winter wheat is grown occasionally receive animal manures or lagoon wastes. Nutrient contributions from these sources should also be taken into consideration when estimating available N for the next season. Manures can preclude the need for any fertilizer, depending on the rate applied and their nutrient composition.

Manures can vary appreciable depending on the animal, how the manure is processed, and the kind and extent of bedding material. For the most accurate estimate of fertilizer equivalent values, the manure should be analyzed for its nutrient content.

IRRIGATION WATER - Irrigation waters derived from deep wells are generally low in N. More shallow wells can have significant levels of nitrogen because of leaching of nitrogen from impacts from commercial fertilizer use, animal waste, and improperly functioning septic systems. Irrigation waters from most districts are also low in N when diverted from its source. Background levels of N from original sources are generally about 2 parts per million (ppm). The more return flow included in diverted water sources, the higher the N content. Return

flows may include N dissolved when irrigation waters pass through fields high in residual or recently added fertilizer N as well as from soluble fertilizer N applied with the irrigation water.

Most irrigation districts should know the N content of the water they divert. Contact them for this information to determine the levels of N added with your irrigation water. However, since irrigation water N levels are influenced by upstream management, if you use irrigation water that receives runoff after it is diverted, only a water test can accurately evaluate the N added with irrigation waters.

For each ppm or milligrams per liter (mg/L) of N reported in the water sample, multiply by 2.7 to get the N added per acre foot of water applied. For example, if the water sample contained 10 ppm of N, 3 acre feet of water applied would be the equivalent of 81 pounds of N per acre. Typically, of the water applied with furrow irrigation only 50 percent is retained on the field and the rest runs off the end. The net retention of N applied with furrow irrigation would, therefore, be about half of the water applied or about 40 pounds per acre in this example. If more or less of the irrigation water is retained with each wetting, then growers should adjust the water N contribution accordingly.

Excessive irrigation by any method reduces N availability to winter wheat. Additional N may be needed under these conditions. Growers should not use aqua or anhydrous N through a sprinkler irrigation system.

Water running soluble N sources with a furrow irrigation system can be an effective means of adding N. Two limitations of this practice are that (1) the application of the N with this method may not be as uniform as desired and (2) runoff containing the N may contaminate downstream surface waters. Growers can minimize the loss of N by shutting off the injection unit before the irrigation water reaches the end of the furrow. This practice should not substitute for careful consideration of N needs while N can be side dressed.

CALCULATION OF N APPLICATION RATES

To calculate the fertilizer N application rate, the following equation is used:

Fertilizer application rate (deficit) or Over application of Nitrogen =
(Total N required to produce a given yield) - (Mineralizable N) - (Inorganic N measured by the soil test) - (previous crop/residue management) - (Manure Nitrogen) - Irrigation Water

TIMING OF NITROGEN APPLICATION

Excessive irrigation or heavy winter precipitation can result in leaching of nitrate N beyond the root systems. This hazard exists on all soils, but particularly on coarse textured soils such as sands, and sandy loams. Fall pre-plant N was once thought to be as good or preferable to spring top dressed N in calcareous silt loam or clay soils in areas of low rainfall. However, even under these conditions, southern Idaho research has shown than N applied in late winter or early spring is frequently used more effectively than early fall pre-plant applied N. Nitrogen fertilizers containing ammonium (ammonium sulfate, anhydrous or aqua ammonia, or urea) are less subject to leaching losses when lower soil temperatures (less than 40 F) inhibit the microbial conversion of ammonium to nitrate. Lower temperatures also reduce the microbial activity that is responsible for the immobilization of applied N. Late fall, split, or spring applied N is also recommended when residues from previous grain or mature corn crops are returned to the soil in early fall.

Early spring N applications are more effective for increasing grain protein for irrigated hard red winter wheat. Nitrogen applied after the boot stage will contribute more to grain protein than to yield. Most wheat varieties respond in a similar way to N. However, varieties differ in their tolerance of high N rates. High N contributes to lodging of varieties with poor straw strength.

PHOSPHORUS (P)

Wheat requires little phosphorus compared to the P requirements of other crops although minimum soil levels are necessary for maximum production. Adequate P is especially necessary for winter hardiness. Soil tests can indicate whether soils require phosphorus fertilization for maximum wheat production. Soil samples are taken from the 0- to 12-inch depth.

Broadcast plow down, broadcasts seedbed incorporation or drill banding low rates of P with seed are effective

methods of application. Drill banding may reduce the fertilizer P required. Drill banding high rates of P, especially ammonium phosphate fertilizers, can cause seedling damage. For more detailed discussion of banding, refer to PNW 283, "Fertilizer Band Location for Cereal Root Access."

POTASSIUM (K)

Wheat has a lower requirement for K compared to sugar beets, corn or potatoes. Soil tests can be useful indicators of the need for K. Potassium should be incorporated during seedbed preparation.

SULFUR (S)

Sulfur requirements for wheat will vary depending on soil texture, previously incorporated crop residues, leaching losses, S content of irrigation water and S soil test. Wheat irrigated with Snake River water should not experience S shortages. Soils low in S (less than 10 ppm S04-S in the plow layer or 8 ppm in the 0- to 12-inch depth) should receive 20 to 40 pounds of S per acre.

Sulfur deficiency appears as a general yellowing of the plant early in the season and looks much like N deficiency. Plant analysis can be a useful means of differentiating between the two deficiencies. An N to S ratio of 17 in whole plant tissues is generally used for diagnosing sulfur deficient wheat. Sulfur deficient wheat has also been known to contain high nitrate nitrogen (N03-N) concentrations.

MICRONUTRIENTS

Micronutrients have not been shown to be limiting wheat production and "shotgun" application of micronutrient mixtures containing boron, manganese, iron and copper "for insurance" have not been shown to be responsive and are not suggested.

GENERAL COMMENTS

Avoid a heavy first irrigation on spring cereals to prevent water logging, reduced tailoring and N leaching.

The above fertilizer guidelines are based on relationships established between University of Idaho soil test and crop yield response research. In this research, crop response to fertilizers was evaluated at several sites where the response to fertilizer differed. The recommendations reflect the general or overall response to fertilizers at specific soil test values and the response in individual fields can differ appreciably from the general table recommendation. Some sites will require less than the general recommendation, other sites more. Unfortunately, the science has not developed to the point where the table recommendations can account for all the unknown variables influencing the effectiveness of applied fertilizers at individual sites. The table fertilizer recommendations can only be used as general guides rather than specific recommendations for each and every field.

Furthermore, soil variability can sharply reduce the accuracy composite soil test values for individual fields. That is why large contiguous areas within fields should be sampled separately when they are known to differ in crop growth or soil characteristics known to influence the response to fertilizer. But soil variability frequently does not occur conveniently in large areas that can be sampled separately or fertilized differently. The fertilizer recommendations in most cases do not account for this variability. Soil test based recommendations may be excessive in some field areas and inadequate in other areas of the same field. The recommendations then will be appropriate only to the degree that the composite soil test values for fields actually represent the field. Thus, for fields that are highly variable, the fertilizer recommendations should be considered conservative estimates of fertilizers needed. All the more reason to consider the table fertilizer recommendations as general guides rather than specific recommendations for each and every field.

The fertilizer rates suggested in the tables will support above average yields if other factors are not limiting production. Therefore the recommendations assume that good crop management practices will be used, i.e. insect, disease, and weed control. Nutrient requirements can be met using either commercial fertilizers or

equivalent organic matter sources, such as manure or compost, provided their nutrient content and relative availability are known or can be estimated from published literature. Soil test based recommended rates will not be appropriate if the soil samples are improperly taken or do not represent the area to be fertilized. For nitrogen n particular, recommendations will be most accurate when crop history is taken into account and projected yields are reasonable estimates based on long term records.

General Comments:

- Over irrigation and nutrient loss is a hazard. Optimum irrigation management is necessary to meet crop water use needs and avoid loss of nutrients through leaching beyond the root zone and runoff with irrigation tail water.
- Nitrogen leaching is particularly a concern on sandy soils. Optimum management may require split Nitrogen applications to meet crop needs.
- Weed, insect, and disease control significantly influence the efficiency and effectiveness of your fertilizer applications and ultimately crop yield and farm profitability.
- Phosphorus, potassium, and zinc nutrients can be effectively fall-applied as they are not readily leached over winter.
- Phosphorus can be budgeted for a crop rotation.
- If you have questions regarding the interpretation of this information, please contact your Extension Agricultural agent, Crop consultant, or your commodity company fieldman.
- Both farm profitability and water quality can be improved with efficient nutrient use. The following are recommendations in nutrient management, which will optimize nutrient use for crop production while protecting water quality:

1) Avoid the application of nutrient sources in close proximity to streams, wetlands, drainage ditches, areas of very shallow soils, and sinkholes.

2) Accurately calibrate nutrient application equipment to insure that recommended rates are applied.

3) Nitrogen recommendations for many crops are based on yield goals for the crops. It is important to establish realistic yield goals for each field based upon historical yield data, county averages, and your management practices to avoid unnecessary fertilizer costs and minimize potential water quality impairments.

Appendix D: SOIL TEST DATA

Field: No Data **Date of Test:** No Data

Parameter	Units	0-12"	12-24"	18-24"
Soil Texture		No Data	No Data	
EC	mmhos	No Data	No Data	
PH		No Data	No Data	
%Lime	%	No Data	No Data	
OM	%	No Data	No Data	
CEC	meq	No Data	No Data	
Nitrate-N	ppm	No Data	No Data	
Ammonia-N	ppm	No Data	No Data	
P	ppm	No Data	No Data	No Data

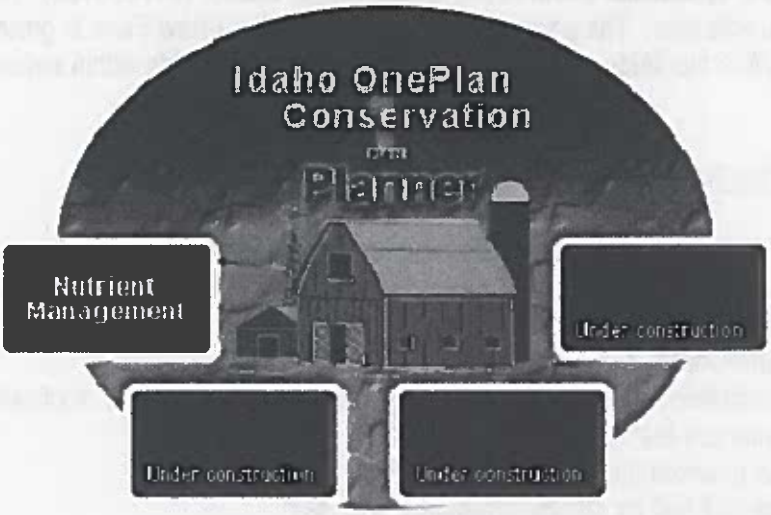
K	ppm	No Data	No Data	
Z	ppm	No Data	No Data	
Mn	ppm	No Data	No Data	
Fe	ppm	No Data	No Data	
Cu	ppm	No Data	No Data	
Ca	ppm	No Data	No Data	
Mg	ppm	No Data	No Data	
Na	ppm	No Data	No Data	

Grandview Shaw Farm

Nutrient Management Plan

Agriculture . . .

Launching into the Future



Nutrient Management Plan Prepared For:
Grandview Farms
(208) 834-2231
Shaw Farm

Certified Planner:
Michael Mitchell
Professional Engineer, EAC Engineering, Inc
(208) 381-0607

Producer Signature: _____ Certificated Planner Signature: _____

Date Completed: 10-02-07

The information provided by those using the "Idaho OnePlan" shall be deemed to be trade secrets, production records, or other proprietary information and shall be kept confidential and shall be exempt from enclosure pursuant to section 9-340D, Idaho Code. (Title 22 Chapter 27 17D6)

SHAW FARM
Producer Summary

Farm Summary

Shaw Farm is an existing farm located 1.3 miles northeast of Grandview, Idaho. The farm is owned by Grandview Farms and managed by Mike Usabel. The farm consists of four furrow irrigated field for a total of 60.5 acres available for accepting imported manure/compost from Simplot/Grandview Feedlot.

Farm Resource Concerns

Shaw Farm is located in the Watershed Basin of the Middle Snake Succor (#17050103). The facility is found at 116W 04'38" 43N 00'38" using GPS Coordinates. The primary resource concern for Shaw Farm is ground water quality.
Solid waste is applied to all of the fields and pasture and incorporated on fields within seven days of application.

Nutrient Management Plan Requirements

Producer will maintain field application records for a minimum of five years and make them available for review at routine inspections by ISDA personnel. These records must include (where applicable):

1. Fertilizer application rates
2. Manure/Compost application rates
3. On each field, keep a record of manure and chemical fertilizer applications, crop information, and soil and manure test results.
4. Fields to which the nutrients are applied
5. Spring soil test for nitrogen (required annually)
   0-12" and 12-24" nitrogen test

Crop Nutrient Requirement	
Crop	Pounds of P205 per acres
Alfalfa	86

Manure/Compost field application requirement (tons)							
Acres x crop nutrient requirement ÷ manure p205 value* = Tons required							
Example	Corn - 250(acres)	X	75 (crop requirement)		÷ 16.85		
Corn	250	X	75**	= 18750	÷ 16.85*	=	1112.76 tons

*based on manure test values for P205
**pounds of p205 required per acre

Irrigation Management Plan Recommendations

Irrigation water management is very important in nutrient management. If irrigation water is applied at a rate over the crop needs, there is potential for runoff and/or leaching of nutrients. If irrigation water is under-applied, the crop will not have optimal growth conditions. Crop irrigation water requirements changes through the growing season depending on climate conditions and crop Evapotranspiration rate. Proper irrigation water management responds to these crop demands. It is recommended that:

- Irrigation schedules continue to be managed by your irrigation specialist.
- Continual inspection and maintenance of irrigation equipment will prevent unwarranted waste discharges into surface or ground water.

Nutrient Management Plan Recommendations

Land application of manure at agronomic rates, along with irrigation scheduling, is the most effective way to obtain maximum nutrient benefits from manure, condition the soil, and avoid potential water quality problems downstream. Cattle manure is a valuable resource, which will
also improve soil properties such as water holding capacity, infiltration, tilth, structure, porosity, and nutrient retention and release. If animal manure and/or commercial fertilizers are not properly managed, contaminants may impact surface and/or groundwater.

Application of manure applied at an agronomic rate is a sustainable practice and is always allowed under ISDA regulations. Regardless of the rate prescribed by this nutrient management plan, soil testing at the 0-12 inch and 12-24 inch soil depths is required for nitrogen management.

- Set realistic crop yield goals in order to provide an accurate account of the plant nitrogen needs.
- Apply N so that it is available during peak plant demand.
- Apply fertilizer to cool season crop in the spring rather than the previous fall. This will prevent fertilizer leaching through the soil profile and provide the crop with the necessary levels of nutrients.
- Use split or multiple fertilizer applications in order to provide the crop with a pre-plant treatment and the needed nutrient levels throughout the growing season until the point of major nutrient uptake.
- Avoid the application of nutrient sources in close proximity to streams, wetlands, drainage ditches, areas of very shallow soils, and sinkholes.

Shaw Farm
ANALYSIS OF RESOURCE CONCERNS

INTRODUCTION

The purpose of this nutrient management plan is to meet agricultural production goals and to certify that manure and nutrients are properly managed to minimize adverse impact to surface or groundwater. Plans are written in cooperation with the producer to:

1) assure proper containment of animal manure and process waste water

2) assess resource concerns which exist on the property

3) budget nutrient sources to optimize crop water and nutrient needs. Nutrient sources include commercial fertilizers, animal manure, mineralization of previous crop soil organic matter, accounting of residues, and irrigation water.

4) When applicable, assess irrigation water management to minimize movement of nutrients beyond the root zone or with runoff.

If animal manure and/or commercial fertilizers are not properly managed, contaminants may negatively impact surface and/or groundwater. Some water resource contaminants associated with poorly managed animal manure and fertilizers are:

Phosphorus in the soil readily adsorbs to soil particles; thus, erosion of soil by surface runoff is the general mode of phosphorus transport. Even at very low concentrations, phosphorus can result in plant and algae blooms in surface water bodies. Alga blooms are a nuisance to boaters, irrigators, and others. Toxins released by certain algae can be lethal to livestock or other animals that drink the water. Dissolved oxygen in the water is depleted as algae die and decompose, sometimes causing fish kills.

Nitrogen in the form of nitrate (NO_3^-) is highly water-soluble and will move with water, particularly down the soil profile past the root zone if not utilized by plants (thus becoming a groundwater contamination issue).Nitrates are toxic to infants under 6 months, and to livestock at high concentrations. In surface water, excess nitrogen, like phosphorus, can result in nuisance plant and algae growth.

Organic matter in high load decreases dissolved oxygen in a surface water body when it decomposes. Low levels of dissolved oxygen is harmful or even fatal to fish and other aquatic life.

Bacteria and microorganism illnesses (pathogens) potentially transmitted through water by animal manure include Giardia, Typhoid Fever, Cryptosporidium, and Cholera. Pathogens from animal waste can negatively impact surface and groundwater quality.

FACILITY DESCRIPTION

Owner Information

Owner (1): Grandview Farms
Address: 1301 Hwy 67 , Grandview, ID 83642
Phone: (208) 834-2231 N/A
N/A

Location

Site Map: Facility site plan illustrated in Figure 1

Soil Conservation District: Elmore
County: Elmore
Watershed Basin: Middle Snake-succor (USGS Hydrologic Unit Code # 17050103)

ANALYSIS OF RESOURCE CONCERNS

Farm Resource Concerns

Shaw Farm is located in a watershed containing water quality limited stream segments listed according to the Clean Water Act. Stream segments are listed because a water quality parameter prevents the attainment of the "Fishable/Swimmable" goal of the Clean Water Act.

WATERBODY	BOUNDARIES	BACT	CHAN STAB	DO	FLOW ALT	HAB ALT	MET HG	MET	NH3	NUTR	O_G	ORG	PEST	PH	SAL	SED	TDG	TEMP	UNKN	*
Snake River	CJ Strike Res to Castle Creek	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	X

Shaw Farm is not located in a critical Nitrate-Nitrogen management area. Nitrate Management Areas are designated based upon ground water quality sampling results. Two priority groups exist as follows:

Priority 1 is designated because at least 25% of the ground water sampling locations within the area exceed 5-milligrams/liter nitrate. This is one-half of the maximum contaminant level of 10-milligrams/liter nitrate. This nitrate concentration is considered evidence of significant degradation. Public drinking water systems are required to increase monitoring frequency when this level is reached.

Priority 2 is designated because at least 50% of the ground water sampling locations within the area exceed 2-milligrams/liter nitrate. This concentration threshold provides an indication of human-caused (anthropogenic) impacts. The upper limit for naturally occurring (background) concentrations of nitrate is considered to be about 2 mg/l.

Shaw Farm is located in a sole source aquifer area - Western Snake River Plain Aquifer.

Field Resource Concerns

- **Open Irrigation Water Conveyances** - Irrigation tail water can deliver nutrients to surface water via open canals. Nutrient loading of open canals can have a detrimental affect on the health of receiving waters.

Depth Limiting Subsurface Features

Field Name	Subsurface Feature	Depth from Surface (in)
Field 22	Water Table	48
Field 23	Water Table	48
Field 24	Water Table	48
Field 25	Water Table	48

Well Testing Results (See back of page):

Well	Date	Hardness	EC	PH	K	Nitrates	Nitrites	NH3	Na	Carbonate	Bicarbonate
No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data

ISDA REGULATIONS AND THE IDAHO NUTRIENT MANAGEMENT STANDARD

Nutrient management plans for animal agricultural operations regulated by the Idaho State Department of Agriculture (ISDA) must be approved by the Idaho State Department of Agriculture and must follow the Natural Resource Conservation Service (NRCS) Agriculture Waste Management Field Handbook and the Idaho Nutrient Management Standard. ISDA regulation and the Standard use soil test phosphorus as the indicator for environmental impact from agricultural production practices. The Idaho Nutrient Management Standard is based on a threshold soil test phosphorus level (TH), above which there is no agronomic advantage to application of phosphorus.

The Idaho Nutrient Management Standard categorizes fields as a surface water concern or a groundwater concern. A surface water concern indicates that runoff leaves the contiguous operating unit from normal storm events, rain on snow, frozen ground, or irrigation. The soil phosphorus threshold for a field with a surface water concern is 40 ppm phosphorus for soils alkaline (ph > 6) tested with the Olsen method and 60 ppm phosphorus for acidic (ph < 6.5) soils tested with the Bray method (0-12"Soil Sample Depth).

A groundwater resource concern indicates that runoff does not leave the contiguous operating unit from normal storm events, rain on snow, frozen ground, or irrigation. There are two sub-categories for fields identified as having a groundwater concern. The first category applies to fields with a resource concern within the first five feet of the soil profile. A resource concern could be shallow soils, gravel, cobble, bedrock, high groundwater table, or a drained field. These fields are indicated as a groundwater concern <5'. The soil phosphorus threshold for a field with a groundwater concern <5' is 20 ppm phosphorus for soils tested with the Olsen method and 25 ppm phosphorus for soils tested with the Bray method(18-24" Soil Sample Depth).

If a field is not classified as having a surface water concern or a groundwater <5' concern, by default it is classified as having a groundwater concern >5'. The soil phosphorus threshold for a field with a groundwater concern >5' is 30 ppm phosphorus for soils tested with the Olsen method and 45 ppm phosphorus for soils tested with the Bray method(18-24" Soil Sample Depth).

Field Phosphorus Threshold

Field	Resource Concern	P Threshold (ppm)	P Threshold Soil Test Depth
Field 22	Groundwater < 5'	20	18 - 24"
Field 23	Groundwater < 5'	20	18 - 24"
Field 24	Groundwater < 5'	20	18 - 24"
Field 25	Groundwater < 5'	20	18 - 24"

Farm Location

Idaho Transverse Mercator

Coordinates of the farm center (meters): X = 2331195.02328012, Y = 1314321.75548356

Map Scale: 1 : 87

Figure 1. Base Map

Farm Location

Idaho Transverse Mercator

Coordinates of the farm center (meters): X = 2331195.02328012, Y = 1314321.75548356

Map Scale: 1 : 88

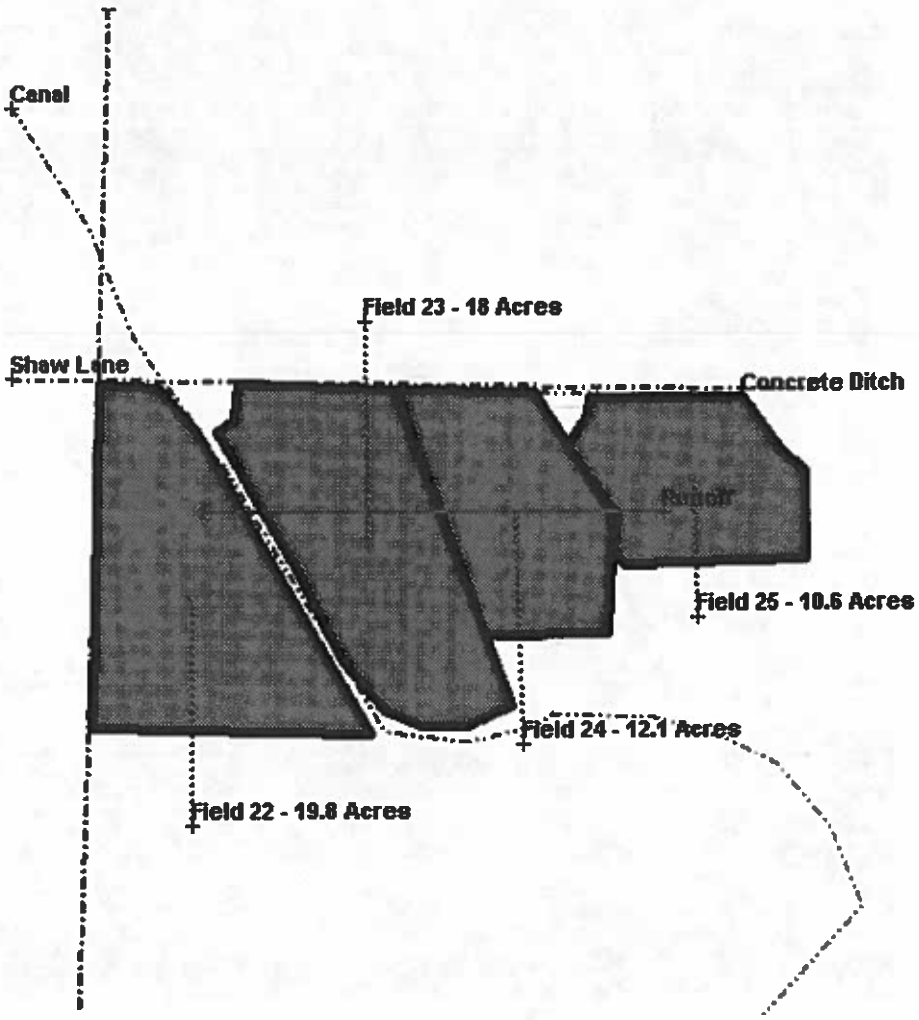


Figure 2. Farmstead Map

NUTRIENT MANAGEMENT REQUIREMENTS/RECOMMENDATIONS

Manure Application Rate Requirement By Year

FIELD: Field 22

Name	Man App		Imported Nutrients	Mineralization		Total	
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	Y		5 T/ac				
		N	59	N	0	N	59
		P	86			P	86
		K	330			K	330
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2005)	Y		5 T/ac				
		N	59	N	33	N	92
		P	86			P	86
		K	330			K	330
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2006)	Y		5 T/ac				
		N	59	N	33	N	92
		P	86			P	86
		K	330			K	330
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2007)	Y		5 T/ac				
		N	59	N	33	N	92
		P	86			P	86
		K	330			K	330

FIELD: Field 23

Name	Man App		Imported Nutrients	Mineralization		Total	
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	Y		5 T/ac				
		N	59	N	0	N	59
		P	86			P	86
		K	330			K	330
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2005)	Y		5 T/ac				
		N	59	N	33	N	92
		P	86			P	86
		K	330			K	330
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2006)	Y		5 T/ac				
		N	59	N	33	N	92
		P	86			P	86
		K	330			K	330
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2007)	Y		5 T/ac				
		N	59	N	33	N	92
		P	86			P	86
		K	330			K	330

FIELD: Field 24

Name	Man App		Imported Nutrients	Mineralization		Total	
			5 T/ac				
lfalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	Y	N	59	N	0	N	59
		P	86			P	86
		K	330			K	330
			5 T/ac				
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2005)	Y	N	59	N	33	N	92
		P	86			P	86
		K	330			K	330
			5 T/ac				
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2006)	Y	N	59	N	33	N	92
		P	86			P	86
		K	330			K	330
			5 T/ac				
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2007)	Y	N	59	N	33	N	92
		P	86			P	86
		K	330			K	330

FIELD: Field 25

Name	Man App		Imported Nutrients	Mineralization		Total	
			5 T/ac				
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	Y	N	59	N	0	N	59
		P	86			P	86
		K	330			K	330
			5 T/ac				
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2005)	Y	N	59	N	33	N	92
		P	86			P	86
		K	330			K	330
			5 T/ac				
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2006)	Y	N	59	N	33	N	92
		P	86			P	86
		K	330			K	330
			5 T/ac				
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2007)	Y	N	59	N	33	N	92
		P	86			P	86
		K	330			K	330

Minimum Acres Required for Manure Application

Manure Group	Acres
Imported Nutrients	58

The acreage in the table is based on an average crop uptake of 100 lbs P_2O_5 per acre. These acreage numbers are for estimating export acreage needed. Wastewater application should begin with the first irrigation of the season and end with the last irrigation of the season. Rates should be designed to supply uniform application. When applying wastewater outside of the irrigation window you must contact the Department of Agriculture, Division of Animal Industries.

Hydraulic Balance

Field	Date
Field 22	April 15
Field 23	April 15
Field 24	April 15
Field 25	April 15

0.5" of wastewater may be applied to fields after the hydraulic balance date to remain in compliance with this nutrient management plan.

Spring Soil Test
Spring soils tests must be taken every year from every field to determine a commercial fertilization rate. If commercial fertilizer isn't applied (for a perennial crop), spring soil samples are not required. If you do not apply commercial fertilizer, a complete soil analysis will need to be conducted initially to determine the nutrient baseline.

Record Keeping For each field keep a record of annual manure and chemical fertilizer applications. Include nutrient source, date, time, rate and application method.

ANNUAL NUTRIENT BUDGET

The following crop nutrient budget is based on soil test data and cropping information. It is for one year for the following field and specified crop information:

Nutrient Budget Summary

Field: Field 22 **Crop:** Alfalfa Hay, Irrigated South ID-Cut Mid Bloom **Yield:** 7.5

	N	P205	K20
Crop Nutrient Requirement	364	86	351
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	0		
from Prior Bio-Nutrients	33		
from Irrigation Water	0		0
Nutrient Balance from above	332.5	85.9	351
Imported Nutrients	59	86	330
Estimated Remaining Nutrients Required	273	0	22
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	273	0	22

Acceptable: Sustainable agronomic rate.

Field: Field 23 **Crop:** Alfalfa Hay, Irrigated South ID-Cut Mid Bloom **Yield:** 7.5

	N	P205	K20
Crop Nutrient Requirement	364	86	351
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	0		
from Prior Bio-Nutrients	33		
from Irrigation Water	0		0
Nutrient Balance from above	332.5	85.9	351
Imported Nutrients	59	86	330
Estimated Remaining Nutrients Required	273	0	22
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	273	0	22

Acceptable: Sustainable agronomic rate.

Field: Field 24 **Crop:** Alfalfa Hay, Irrigated South ID-Cut Mid Bloom **Yield:** 7.5

	N	P205	K20
Crop Nutrient Requirement	364	86	351
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	0		
from Prior Bio-Nutrients	33		
from Irrigation Water	0		0

Nutrient Balance from above	332.5	85.9	351
Imported Nutrients	59	86	330
Estimated Remaining Nutrients Required	273	0	22
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	273	0	22

Acceptable: Sustainable agronomic rate.

Field: Field 25 **Crop:** Alfalfa Hay, Irrigated South ID-Cut Mid Bloom **Yield:** 7.5

	N	P205	K20
Crop Nutrient Requirement	364	86	351
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	0		
from Prior Bio-Nutrients	33		
from Irrigation Water	0		0
Nutrient Balance from above	332.5	85.9	351
Imported Nutrients	59	86	330
Estimated Remaining Nutrients Required	273	0	22
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	273	0	22

Acceptable: Sustainable agronomic rate.

BIO-NUTRIENT EXPORT INFO

Exported Bio-Nutrient Summary					
Bio-Nutrient Group Name	**Amount**	**Consumer**	**Consumer's Address**	**Telephone**	**Acres**
No nutrients exported from this facility					

Appendix B: NUTRIENT RISK ANALYSIS

Phosphorus Runoff Risk Assessment

FIELD: Field 22
Overall Risk Rating: Very High
Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 85.9

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: Surface applied no incorporation

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: Field 23

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 85.9

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: Surface applied no incorporation

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very High

Comments: Reduce surface irrigation flows and/or field slope; or capture tail-water and use a pump back to reapply tail-water; or if possible and appropriate convert to sprinkler irrigation.

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: Field 24

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 85.9

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: Surface applied no incorporation

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very High

Comments: Reduce surface irrigation flows and/or field slope; or capture tail-water and use a pump back to reapply tail-water; or if possible and appropriate convert to sprinkler irrigation.

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: Field 25

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 85.9

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: Surface applied no incorporation

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very High

Comments: Reduce surface irrigation flows and/or field slope; or capture tail-water and use a pump back to reapply tail-water; or if possible and appropriate convert to sprinkler irrigation.

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

Nutrient Leaching Risk Assessment

FIELD: Field 22
Overall Risk Rating: Medium
Leaching losses may be contributing to soluble nutrient leaching below the root zone during some years.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very High

Comments: Due to the low irrigation efficiency on this field, conversion to a more efficient irrigation system like Sprinkler or Drip Irrigation should be considered. If this is not possible consider shorter set times to minimize runoff and/or the length of run to minimize leaching. A Tail water Recovery & Pump back System will help to reduce or eliminate runoff. An additional consideration is to incorporate a Surge Irrigation that will help to reduce runoff and deep percolation losses. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth Rating: High

Comments: Because the water table is near the surface (and/or the soil is shallow), this field is vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a significant concern.

FIELD: Field 23
Overall Risk Rating: Very High
Leaching losses are likely contributing to soluble nutrient leaching below the root zone during most years. Nutrient management practices must be intense.

Percolation Rating: Very High

Deep Percolation (as % of Evapotranspiration): >40% Over ET

Comments: High potential for soluble nutrient leaching to occur. Nitrogen losses from denitrification will probably occur. Apply water according to crop requirements. Do not apply nitrogen prior to leaching events. Water logging and poor soil aeration may negatively affect crop yields (in some areas of field).

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very High

Comments: Due to the low irrigation efficiency on this field, conversion to a more efficient irrigation system like Sprinkler or Drip Irrigation should be considered. If this is not possible consider shorter set times to minimize runoff and/or the length of run to minimize leaching. A Tail water Recovery & Pump back System will help to reduce or eliminate runoff. An additional consideration is to incorporate a Surge Irrigation that will help to reduce runoff and deep percolation losses. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth Rating: High

Comments: Because the water table is near the surface (and/or the soil is shallow), this field is vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a significant concern.

FIELD: Field 24

Overall Risk Rating: Very High

Leaching losses are likely contributing to soluble nutrient leaching below the root zone during most years. Nutrient management practices must be intense.

Percolation Rating: Very High

Deep Percolation (as % of Evapotranspiration): >40% Over ET

Comments: High potential for soluble nutrient leaching to occur. Nitrogen losses from denitrification will probably occur. Apply water according to crop requirements. Do not apply nitrogen prior to leaching events. Water logging and poor soil aeration may negatively affect crop yields (in some areas of field).

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very High

Comments: Due to the low irrigation efficiency on this field, conversion to a more efficient irrigation system like Sprinkler or Drip Irrigation should be considered. If this is not possible consider shorter set times to minimize runoff and/or the length of run to minimize leaching. A Tail water Recovery & Pump back System will help to reduce or eliminate runoff. An additional consideration is to incorporate a Surge Irrigation that will help to reduce runoff and deep percolation losses. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth Rating: High

Comments: Because the water table is near the surface (and/or the soil is shallow), this field is vulnerable to

ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a significant concern.

FIELD: Field 25

Overall Risk Rating: Very High

Leaching losses are likely contributing to soluble nutrient leaching below the root zone during most years. Nutrient management practices must be intense.

Percolation Rating: Very High

Deep Percolation (as % of Evapotranspiration): >40% Over ET

Comments: High potential for soluble nutrient leaching to occur. Nitrogen losses from denitrification will probably occur. Apply water according to crop requirements. Do not apply nitrogen prior to leaching events. Water logging and poor soil aeration may negatively affect crop yields (in some areas of field).

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very High

Comments: Due to the low irrigation efficiency on this field, conversion to a more efficient irrigation system like Sprinkler or Drip Irrigation should be considered. If this is not possible consider shorter set times to minimize runoff and/or the length of run to minimize leaching. A Tail water Recovery & Pump back System will help to reduce or eliminate runoff. An additional consideration is to incorporate a Surge Irrigation that will help to reduce runoff and deep percolation losses. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth Rating: High

Comments: Because the water table is near the surface (and/or the soil is shallow), this field is vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a significant concern.

NUTRIENT RISK ANALYSIS Legend

BMP	Definition	Purpose
Buffer Strip	Contour buffer strips are strips of perennial grass alternated with wider cultivated strips that are farmed on the contour.	Contour buffer strips slow runoff water and trap sediment. Consequently, soil erosion is generally reduced significantly by this practice. Sediments, nutrients, pesticides, and other potential pollutants are filtered out as water flows through the grass strips. The grass strips also provide food and cover for wildlife.
Channel Vegetation	Establishing and maintaining adequate plants on channel banks, berms, spoil, and associated areas.	To stabilize channel banks and adjacent areas and reduce erosion and sedimentation. To maintain or enhance the quality of the environment, including visual aspects and fish and wildlife habitat.
Chiseling and Sub soiling	Loosening the soil, without inverting and with a minimum of mixing of the surface soil, to shatter restrictive layers below normal plow depth that inhibit water movement or root development.	To improve water and root penetration and aeration.
Composting Facility	A composting facility is installed for biological stabilization of waste organic material.	The purpose of this practice is to biologically treat waste organic material and produce humus-like material that can be recycled as a soil amendment or organic fertilizer. The material may also be used by other acceptable methods of recycling that comply with laws, rules and regulations.
Conservation Cover	This practice involves establishing and maintaining a protective cover of perennial vegetation on land	This practice reduces soil erosion, associated sedimentation, improves water quality, and creates or

	retired from agriculture production.	enhances wildlife habitat.
Conservation Cropping Sequence	Growing crops in a recurring sequence on the same field.	This practice may be applied as part of a best management practice to support one or more of the following: Reduce sheet and rill erosion, Reduce irrigation induced erosion, Reduce soil erosion from wind, Maintain or improve soil organic matter content, Manage deficient or excess plant nutrients, Improve water use efficiency, Manage saline seeps, Manage plant pests (weeds, insects, diseases), Provide food for domestic livestock, and Provide food and cover for wildlife.
Contour Farming	Farming sloping land in such a way that preparing land, planting, and cultivating are done on the contours. (This includes following established grades of terraces or diversion.)	To reduce erosion and control water.
Cover and Green Manure Crop	A crop of close-growing, legumes, or small grain grown primarily for seasonal protection and soil improvement. It usually is grown for 1 year or less, except where there is permanent cover as in orchards.	To control erosion during periods when the major crops do not furnish adequate cover; add organic material to the soil; and improve infiltration, aeration, and tilth.
Critical Area Planting	Planting vegetation on critically eroding areas that require extraordinary treatment.	This practice is used on highly erodible areas that cannot be stabilized by ordinary planting techniques and if left untreated may cause severe erosion or sediment damage. Examples of critical areas include the following: 1) Dams, dikes, levees, and other construction sites with very steep slopes, 2) Mine spoil and surface mined land with poor quality soil and possibly chemical problems, and 3) Agriculture land with severe gullies requiring specialized

		planting techniques and management.
Dike or Berm	An embankment constructed of earth or other suitable materials to protect land against overflow or to regulate water.	Dikes are used to: Permit improvement of agricultural land by preventing overflow and better use of drainage facilities, Prevent damage to land and property, Facilitate water storage and control in connection with wildlife and other developments, and Protect natural areas, scenic features and archeological sites from damage.
Diversion	A channel constructed across the slope with a supporting ridge on the lower side.	To divert excess water from one area for use or safe disposal in other areas.
Drip Irrigation	A planned irrigation system in which all necessary facilities are installed for efficiently applying water directly to the root zone of plants by means of applicators (orifices, emitters, porous tubing, perforated pipe) operated under low pressure. The applicators can be placed on or below the surface of the ground.	To efficiently apply water directly to the plant root zone to maintain soil moisture within the range for good plant growth and without excessive water loss, erosion, reduction in water quality, or salt accumulation.
Filter Strip	A strip or area of vegetation for removing pollutants water.	A filter strip reduces pollution by filtration, deposition, infiltration, absorption, adsorption, decomposition, and volatilization of sediment, organic matter, and other pollutants from runoff and waste water.
Fish Stream Improvement	Fish Stream Improvement is improving a stream channel to make or enhance fish habitat.	The purpose of the practice is to increase production of desired species of fish. The practice involves improving food supplies, shelter, spawning areas, water quality, and other elements of fish habitat.
Grade Stabilization Construction	A structure used to control the grade and head cutting in natural	These structures are to: Stabilize the grade and control erosion in

	or artificial channels.	natural or artificial channels, prevent the formation or advance of gullies, enhance environmental quality, and reduce pollution hazards.
Grassed Waterway	A natural or constructed channel that is shaped or graded to required dimensions and established in suitable vegetation for the stable conveyance of runoff.	Grassed waterways convey runoff from terraces, diversions, or other water concentrations without causing erosion or flooding and to improve water quality.
Grazing Land Mechanical Treatment	Modifying physical soil and/or plant conditions with mechanical tools by treatments such as; pitting, contour furrowing, and ripping or sub-soiling.	This practice should be applied as part of a best management practice to support one or more of the following purposes: Fracture compacted soil layers and improve soil permeability, Reduce water runoff and increase infiltration, Break up sod bound conditions and thatch to increase plant vigor, and Renovate and stimulate plant community for greater productivity and yield.
Heavy Use Area Protection	Protecting heavily used areas by establishing vegetative cover, by surfacing with suitable materials, or by installing needed structures.	To stabilize urban, recreation, or facility areas frequently and intensely used by people, animals, or vehicles.
Irrigation Land Leveling	Reshaping the surface of land to be irrigated to planned grades.	To permit uniform and efficient application of irrigation water without causing erosion, loss of water quality, or damage to land by water logging and at the same time to provide for adequate surface drainage.
Irrigation Water Management	Irrigation water management is the process of determining and controlling the volume, frequency, and application rate of irrigation water in a planned, efficient manner.	Irrigation water management is applied as part of a conservation management system to support one or more of the following: Manage soil Moisture to promote desired crop response; Optimize use of available water supplies; Minimize irrigation induced soil erosion;

		Decrease non-point source pollution of surface and groundwater resources; Manage salts in the crop root zone; Manage air, soil, or plant micro-climate.
Mulching	Applying plant residues or other suitable materials not produced on the site to the soil surface.	To conserve moisture; prevent surface compaction or crusting; reduce runoff and erosion; control weeds; and help establish plant cover.
Polyacrylamide (PAM)	Polyacrylamide is an organic polymer formulated to stabilize soil when applied in irrigation water.	Water applied with PAM stabilizes soil aggregates which can then resist the erosive forces of water. If correctly applied, PAM will produce clear runoff water and residue erosion within the field by over 90 percent.
Prescribed Grazing	Prescribed grazing is the controlled harvest of vegetation with grazing animals, managed with the intent to achieve a specific objective.	Application of this practice will manipulate the intensity, frequency, duration, and season of grazing to: 1) Improve water infiltration, 2) maintain or improve riparian and upland area vegetation, 3) protect stream banks from erosion, 4) manage for deposition of fecal material away from water bodies, and 5) promote ecological and economically stable plant communities which meet landowner objectives.
Residue Management (Conservation Tillage)	Managing the amount, orientation, and distribution of crop and other plant residue on the soil surface.	This practice may be applied as part of a conservation system to support one or more of the following: Reduce sheet and rill erosion. Reduce wind erosion. Maintain or improve soil organic matter content and tilth. Conserve soil moisture. Manage snow to increase plant available moisture. Provide food and escape cover for wildlife.
Riparian Forest Buffer	A riparian forest buffer is an area	The riparian forest buffer is a

	of trees and/or shrubs located adjacent to a body of water. The vegetation extends outward from the water body for a specified distance necessary to provide a minimum level of protection and/or enhancement.	multi-purpose practice design to accomplish one or more of the following: Create shade to lower water temperatures and improve habitat for aquatic animals, Provide a source of debris necessary for healthy robust populations of aquatic organisms and wildlife, and Act as a buffer to filter out sediment, organic material, fertilizer, pesticides and other pollutants that may adversely impact the water body, including shallow ground water.
Sediment Basin	A basin constructed to collect and store debris or sediment.	A sediment basin may have the following uses: Preserve the capacity of reservoirs, ditches, canals, diversion, waterways, and streams, Prevent undesirable deposition on bottom lands and developed areas, Trap sediment originating from construction sites, and Reduce or abate pollution by providing basins for deposition and storage of silt, sand, gravel, stone, agricultural wastes, and other detritus.
Sprinkler System	A planned irrigation system in which all necessary facilities are installed for efficiently applying water by means of perforated pipes or nozzles operated under pressure.	To efficiently and uniformly apply irrigation water to maintain adequate soil moisture for optimum plant growth without causing excessive water loss, erosion, or reduced water quality.
Stream Channel Stabilization	Stabilizing the channel of a stream with suitable structures.	To control aggradations or degradation in a stream channel.
Stream bank Protection	Using vegetation or structures to stabilize and protect banks of streams, lakes, estuaries, or excavated channels against scour and erosion.	To stabilize or protect banks of streams, lakes, estuaries, or excavated channels for one or more of the following purposes: Prevent the loss of land or damage to utilities, roads, buildings, or other facilities adjacent to the banks, Maintain the capacity of the channel, Control channel meander

		that would adversely affect downstream facilities, Reduce sediment loads causing downstream damages and pollution, and Improve the stream for recreation or as a habitat for fish and wildlife.
Strip-cropping, Contour	Growing crops in a systematic arrangement of strips or bands on the contour to reduce water erosion. The crops are arranged so that a strip of grass or close-growing crop is alternated with a strip of clean-tilled crop or fallow or a strip of grass is alternated with a close-growing crop.	To reduce sheet and rill erosion and/or to reduce transport of sediment and other water-borne contaminants.
Strip-cropping, Field	Growing crops in a systematic arrangement of strips or bands across the general slope (not on the contour) to reduce water erosion. The crops are arranged so that a strip of grass or a close-growing crop is alternated with a clean-tilled crop or fallow.	To help control erosion and runoff on sloping cropland where contour strip-cropping is not practical.
Subsurface Drains	A Subsurface Drain is a conduit, such as corrugated plastic tubing, tile, or pipe, installed beneath the ground surface to collect and/or convey drainage water.	The purpose of a subsurface drain is to: Improve the environment for vegetation, Reduce erosion, Improve water quality, Collect ground water for beneficial use, Remove water from heavy use areas such as recreation areas, or around buildings, and Regulate water to control health hazards caused by pests.
Surge Irrigation	Surge irrigation is the intermittent application of water to furrows, corrugates, or borders creating a series of on and off periods of constant or variable time spans.	Surge allows a lighter application of water with a higher efficiency. The result is less deep percolation of water at the upper end of the field and a more uniform application.
Tail water Recovery & Pump back System	A facility to collect, store, and transport irrigation tail water for	To conserve farm irrigation water supplies and water quality by

	reuse in a farm irrigation distribution system.	collecting the water that runs off the field surface for reuse on the farm.
Terraces	An earth embankment, a channel, or a combination ridge and channel constructed across the slope.	Reduce slope length, reduce sediment content in runoff water, reduce erosion, Improve water quality, intercept and conduct surface runoff at a non-erosive velocity to a stable outlet, retain runoff for moisture conservation, prevent gully development, reform the land surface, improve farmability, and reduce flooding.
Use Exclusion	Excluding animals, people or vehicles from an area.	To protect, maintain, or improve the quantity and quality of the plant, animal, soil, air, water, and aesthetics resources and human health and safety.
Water and Sediment Control Basin	An earth embankment or a combination ridge and channel generally constructed across the slope and minor watercourses to form a sediment trap and water detention basin.	To improve farmability of sloping land, reduce watercourse and gully erosion, trap sediment, reduce and manage onsite and downstream runoff, and improve downstream water quality.
Watering Facility	A device (tank, trough, or other watertight container) for providing animal access to water.	To provide watering facilities for livestock and/or wildlife at selected locations in order to: 1) protect and enhance vegetative cover through proper distribution of grazing; 2) provide erosion control through better grassland management; or 3) protect streams, ponds and water supplies from contamination by providing alternative access to water.
Wetland Development/Restoration	The construction or restoration of a wetland facility to provide the hydrological and biological benefits of a wetland.	To develop or restore hydric soil conditions, hydrologic conditions, hydrophytic plant communities, and wetland functions.

Appendix C: CROP SPECIFIC GUIDELINES

Alfalfa Hay, Irrigated South ID-Cut Mid Bloom

NITROGEN

Nitrogen (N) fertilizer is generally not needed for alfalfa since a healthy alfalfa stand is capable of fixing adequate levels of N. Responses to applied N usually indicate the alfalfa stand is not effectively nodulated due to lack of proper seed inoculation at planting, or that the stand is aging.

Soils containing 20 to 30 pounds (4 to 7.5 ppm) of nitrate-nitrogen (NO3-N) in the top 12 inches have sufficient N to establish a stand of alfalfa seeded alone. Adding fertilizer N at establishment reduces nodule number and nodule activity.

Establishing alfalfa with a companion crop is not recommended because the alfalfa stand typically is reduced by the excessive competition from the companion plantings. When growers plant alfalfa with a companion crop, both crops compete for the N. Under these conditions, N rates of 30 to 40 pounds per acre are suggested to establish alfalfa stands.

PHOSPHORUS

Alfalfa responds well to applied phosphorus (P). The need for P fertilization can be determined by a soil test. Phosphorus materials should be broadcast and incorporated into the seedbed before planting. For best results, P fertilizers should be applied on established stands in the fall. The University of Idaho recommended application should be sufficient for 2 years of production.

POTASSIUM

Alfalfa has a high potassium (K) requirement. Recommended K fertilization levels are determined by soil test. Broadcast and incorporate K at establishment or apply in the fall or early spring on established stands.

SULFUR

Mountain valleys and foothill areas that receive higher amounts of precipitation and/or that are irrigated with low sulfur-containing water are likely areas for sulfur (S) deficiency. Areas irrigated with water from the Snake River or any water containing the sulfate (SO4) form of sulfur should have an adequate amount of S.

Alfalfa and other legumes require more S than grasses. Plant tissue testing is an excellent tool for detecting S-deficient alfalfa. Samples should be analyzed for total N and total S. These values are used to calculate the nitrogen/sulfur ratio, which should be less than 15. When the ratio is greater than 15, an S deficiency is suspected.

Soils testing less than 8 ppm SO4-S for 0- to 12-inch soil depth should receive 40 pounds S per acre. This rate of application should provide adequate sulfur for 2 years of production. Many southern Idaho soils contain accumulated S below the 12-inch depth. Although the 0- to 12-inch soil zone may be low in S (8 ppm), the soil below 12 inches may supply enough S for alfalfa production. Thus, testing the soil at both 0- to 12- and 12- to 24-inch depths is advised for good S recommendation.

Fertilizer S sources include gypsum (CaS04) and elemental sulfur. S is also included in some N, P and K fertilizer materials. Elemental S must be biologically converted to the S04 form to be used by the plant. The rate of conversion depends on soil temperature, soil water content and particle size of the elemental S applied. To correct a S deficiency, the year of application use a fertilizer containing S04 as the readily available S source. Elemental S can be used to provide long term S release.

MICRONUTRIENTS

Zinc (Zn) deficiencies on alfalfa have not been observed in Idaho. Crops such as beans, corn, potatoes, and onions would normally exhibit Zn deficiency before alfalfa. Zinc applied to any of those crops would have sufficient residual for alfalfa.

BORON

Alfalfa is sensitive to low soil boron (B). Boron deficiencies have been observed in southern Idaho, but they are not widespread. Deficiencies normally occur on acidic soils (pH less than 7.0) and droughty (gravelly and sandy) soils. If the soil tests less than 0.25 ppm B, apply 1 to 3 pounds per acre of B. Do not use higher rates because B in excessive amounts is toxic to plants.

GENERAL COMMENTS

Complete information on cultural practices necessary for alfalfa production is contained in University of Idaho Current Information Series 144, "Producing maximum Yields of Irrigated Alfalfa hay."

Irrigation, weeds, and insects can influence the effectiveness of a fertilizer application.

Alfalfa fields in southern Idaho frequently become yellow during the re-growth of the second and third crop. These fields have not responded to applications of fertilizer to correct this temporary yellowing condition.

Alfalfa can become a cash crop in the rotation by the application of needed management inputs such as water, fertilizer and pesticides and by timely harvesting. Alfalfa quality is enhanced by cutting at the early bud stage and more frequently during the growing season. This practice will reduce stand life, however.

Alfalfa hay should be analyzed to determine P content. Phosphorus is important for animal nutrition and can greatly influence animal performance and animal health. Fertilization can increase P content of forage.

Applications of S have been shown to reduce alfalfa selenium (Se) concentrations on soils low in available Se. Levels of Se above 0.1 ppm in the dry forage are considered adequate to prevent white muscle disease and other disorders related to limited Se forage.

The above fertilizer guidelines are based on relationships established between University of Idaho soil test and crop yield response research. In this research, crop response to fertilizers was evaluated at several sites where the response to fertilizer differed. The recommendations reflect the general or overall response to fertilizers at specific soil test values and the response in individual fields can differ appreciably from the general table recommendation. Some sites will require less than the general recommendation, other sites more. Unfortunately, the science has not developed to the point where the table recommendations can account for all the unknown variables influencing the effectiveness of applied fertilizers at individual sites. The table fertilizer recommendations can only be used as general guides rather than specific recommendations for each and every field.

Furthermore, soil variability can sharply reduce the accuracy composite soil test values for individual fields. That is why large contiguous areas within fields should be sampled separately when they are known to differ in crop growth or soil characteristics known to influence the response to fertilizer. But soil variability frequently does not occur conveniently in large areas that can be sampled separately or fertilized differently. The fertilizer recommendations in most cases do not account for this variability. Soil test based recommendations may be excessive in some field areas and inadequate in other areas of the same field. The recommendations then will be appropriate only to the degree that the composite soil test values for fields actually represent the field. Thus, for fields that are highly variable, the fertilizer recommendations should be considered conservative estimates of fertilizers needed. All the more reason to consider the table fertilizer recommendations as general guides rather than specific recommendations for each and every field.

The fertilizer rates suggested in the tables will support above average yields if other factors are not limiting production. Therefore the recommendations assume that good crop management practices will be used, i.e. insect, disease, and weed control. Nutrient requirements can be met using either commercial fertilizers or equivalent organic matter sources, such as manure or compost, provided their nutrient content and relative availability are known or can be estimated from published literature. Soil test based recommended rates will not be appropriate if the soil samples are improperly taken or do not represent the area to be fertilized. For nitrogen in particular, recommendations will be most accurate when crop history is taken into account and projected yields are reasonable estimates based on long term records.

General Comments:

- Over irrigation and nutrient loss is a hazard. Optimum irrigation management is necessary to meet crop water use needs and avoid loss of nutrients through leaching beyond the root zone and runoff with irrigation tail water.
- Nitrogen leaching is particularly a concern on sandy soils. Optimum management may require split Nitrogen applications to meet crop needs.
- Weed, insect, and disease control significantly influence the efficiency and effectiveness of your fertilizer applications and ultimately crop yield and farm profitability.
- Phosphorus, potassium, and zinc nutrients can be effectively fall-applied as they are not readily leached over winter.
- Phosphorus can be budgeted for a crop rotation.
- If you have questions regarding the interpretation of this information, please contact your Extension Agricultural agent, Crop consultant, or your commodity company fieldman.
- Both farm profitability and water quality can be improved with efficient nutrient use. The following are recommendations in nutrient management, which will optimize nutrient use for crop production while protecting water quality:

1) Avoid the application of nutrient sources in close proximity to streams, wetlands, drainage ditches, areas of very shallow soils, and sinkholes.

2) Accurately calibrate nutrient application equipment to insure that recommended rates are applied.

3) Nitrogen recommendations for many crops are based on yield goals for the crops. It is important to establish realistic yield goals for each field based upon historical yield data, county averages, and your management practices to avoid unnecessary fertilizer costs and minimize potential water quality impairments.

Appendix D: SOIL TEST DATA

Field: No Data **Date of Test:** No Data

Parameter	Units	0-12"	12-24"	18-24"
Soil Texture		No Data	No Data	
EC	mmhos	No Data	No Data	
PH		No Data	No Data	
%Lime	%	No Data	No Data	
OM	%	No Data	No Data	
CEC	meq	No Data	No Data	
Nitrate-N	ppm	No Data	No Data	
Ammonia-N	ppm	No Data	No Data	
P	ppm	No Data	No Data	No Data
K	ppm	No Data	No Data	
Z	ppm	No Data	No Data	
Mn	ppm	No Data	No Data	
Fe	ppm	No Data	No Data	
Cu	ppm	No Data	No Data	

Ca	ppm	No Data	No Data	
Mg	ppm	No Data	No Data	
Na	ppm	No Data	No Data	

Grandview Smith Pasture

Nutrient Management Plan

Agriculture . . .

Launching into the Future

Nutrient Management Plan Prepared For:
Grandview Farms
(208) 834-2234
Smith Pasture

Certified Planner:
Michael Mitchell
Professional Engineer, EAC Engineering, Inc
(559) 381-0607

Producer Signature: _____ Certificated Planner Signature: _____
Date Completed: 10-02-07

The information provided by those using the "Idaho OnePlan" shall be deemed to be trade secrets, production records, or other proprietary information and shall be kept confidential and shall be exempt from enclosure pursuant to section 9-340D, Idaho Code. (Title 22 Chapter 27 17D6)

Smith Pasture
Producer Summary

Farm Summary

Smith Pasture is an existing farm located mile east of Grandview, Idaho. The farm is owned by Grandview Farms and managed by Mike Usabel. The farm consists of one pasture equaling 1208 acres available for accepting imported manure/compost from Simplot/Grandview Feedlot. This facility also pastures 300 pasture cattle for approximately 30 days each year.

Farm Resource Concerns

Smith Pasture is located in the Watershed Basin of the Middle Snake Succor (#17050103). The facility is found at 116W 08'44" 43N 01'06" using GPS Coordinates. The primary resource concern for Smith Pasture is ground water quality.
The facility is located along the Snake River however the field is bermed to protect against runoff into the Snake. Solid waste is applied to all of the fields and pasture and incorporated on fields within seven days of application.

Nutrient Management Plan Requirements

Producer will maintain field application records for a minimum of five years and make them available for review at routine inspections by ISDA personnel. These records must include (where applicable):

1. Fertilizer application rates
2. Manure/Compost application rates
3. On each field, keep a record of manure and chemical fertilizer applications, crop information, and soil and manure test results.
4. Fields to which the nutrients are applied
5. Spring soil test for nitrogen (required annually)
   0-12" and 12-24" nitrogen test

Crop Nutrient Requirement	
Crop	Pounds of P205 per acres
Pasture`	73

Irrigation Management Plan Recommendations

Irrigation water management is very important in nutrient management. If irrigation water is applied at a rate over the crop needs, there is potential for runoff and/or leaching of nutrients. If irrigation water is under-applied, the crop will not have optimal growth conditions. Crop irrigation water requirements changes through the growing season depending on climate conditions and crop Evapotranspiration rate. Proper irrigation water management responds to these crop demands. It is recommended that:

- Irrigation schedules continue to be managed by your irrigation specialist.
- Continual inspection and maintenance of irrigation equipment will prevent unwarranted waste discharges into surface or ground water.

Nutrient Management Plan Recommendations

Land application of manure at agronomic rates, along with irrigation scheduling, is the most effective way to obtain maximum nutrient benefits from manure, condition the soil, and avoid potential water quality problems downstream. Cattle manure is a valuable resource, which will also improve soil properties such as water holding capacity, infiltration, tilth, structure, porosity, and nutrient retention and release. If animal manure and/or commercial fertilizers are not properly managed, contaminants may impact surface and/or groundwater.

Application of manure applied at an agronomic rate is a sustainable practice and is always allowed under ISDA regulations. Regardless of the rate prescribed by this nutrient management plan, soil testing at the 0-12 inch and 12-24 inch soil depths is required for nitrogen management.

- Set realistic crop yield goals in order to provide an accurate account of the plant nitrogen needs.
- Apply N so that it is available during peak plant demand.
- Apply fertilizer to cool season crop in the spring rather than the previous fall. This will prevent fertilizer leaching through the soil profile and provide the crop with the necessary levels of nutrients.
- Use split or multiple fertilizer applications in order to provide the crop with a pre-plant treatment and the needed nutrient levels throughout the growing season until the point of major nutrient uptake.
- Avoid the application of nutrient sources in close proximity to streams, wetlands, drainage ditches, areas of very shallow soils, and sinkholes.

Smith Pasture
ANALYSIS OF RESOURCE CONCERNS

INTRODUCTION

The purpose of this nutrient management plan is to meet agricultural production goals and to certify that manure and nutrients are properly managed to minimize adverse impact to surface or groundwater. Plans are written in cooperation with the producer to:

1) assure proper containment of animal manure and process waste water

2) assess resource concerns which exist on the property

3) budget nutrient sources to optimize crop water and nutrient needs. Nutrient sources include commercial fertilizers, animal manure, mineralization of previous crop soil organic matter, accounting of residues, and irrigation water.

4) When applicable, assess irrigation water management to minimize movement of nutrients beyond the root zone or with runoff.

If animal manure and/or commercial fertilizers are not properly managed, contaminants may negatively impact surface and/or groundwater. Some water resource contaminants associated with poorly managed animal manure and fertilizers are:

Phosphorus in the soil readily adsorbs to soil particles; thus, erosion of soil by surface runoff is the general mode of phosphorus transport. Even at very low concentrations, phosphorus can result in plant and algae blooms in surface water bodies. Alga blooms are a nuisance to boaters, irrigators, and others. Toxins released by certain algae can be lethal to livestock or other animals that drink the water. Dissolved oxygen in the water is depleted as algae die and decompose, sometimes causing fish kills.

Nitrogen in the form of nitrate (NO_3^-) is highly water-soluble and will move with water, particularly down the soil profile past the root zone if not utilized by plants (thus becoming a groundwater contamination issue).Nitrates are toxic to infants under 6 months, and to livestock at high concentrations. In surface water, excess nitrogen, like phosphorus, can result in nuisance plant and algae growth.

Organic matter in high load decreases dissolved oxygen in a surface water body when it decomposes. Low levels of dissolved oxygen is harmful or even fatal to fish and other aquatic life.

Bacteria and microorganism illnesses (pathogens) potentially transmitted through water by animal manure include Giardia, Typhoid Fever, Cryptosporidium, and Cholera. Pathogens from animal waste can negatively impact surface and groundwater quality.

FACILITY DESCRIPTION

Owner Information

Owner (1):	Grandview Farms
Address:	1304 Hwy 67 , Grandview, ID 83624
Phone:	(208) 834-2231 N/A
	N/A

Location

Site Map: Facility site plan illustrated in Figure 1

Soil Conservation District:	Bruneau River
County:	Elmore
Watershed Basin:	Middle Snake-succor (USGS Hydrologic Unit Code # 17050103)

ANALYSIS OF RESOURCE CONCERNS

Farm Resource Concerns

Grandview Smith Pasture is located in a watershed containing water quality limited stream segments listed according to the Clean Water Act. Stream segments are listed because a water quality parameter prevents the attainment of the "Fishable/Swimmable" goal of the Clean Water Act.

WATERBODY	BOUNDARIES	BACT	CHAN STAB	DO	FLOW ALT	HAB ALT	MET HG	MET	NH3	NUTR	O_G	ORG	PEST	PH	SAL	SED	TDG	TEMP	UNKN	*
Snake River	CJ Strike Res to Castle Creek	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	X

Grandview Smith Pasture is <u>not</u> located in a critical Nitrate-Nitrogen management area. Nitrate Management Areas are designated based upon ground water quality sampling results. Two priority groups exist as follows:

<u>Priority 1</u> is designated because at least 25% of the ground water sampling locations within the area exceed 5-milligrams/liter nitrate. This is one-half of the maximum contaminant level of 10-milligrams/liter nitrate. This nitrate concentration is considered evidence of significant degradation. Public drinking water systems are required to increase monitoring frequency when this level is reached.

<u>Priority 2</u> is designated because at least 50% of the ground water sampling locations within the area exceed 2-milligrams/liter nitrate. This concentration threshold provides an indication of human-caused (anthropogenic) impacts. The upper limit for naturally occurring (background) concentrations of nitrate is considered to be about 2 mg/l.

Grandview Smith Pasture is located in a sole source aquifer area - Western Snake River Plain Aquifer.

Field Resource Concerns

- **Open Irrigation Water Conveyances** - Irrigation tail water can deliver nutrients to surface water via open canals. Nutrient loading of open canals can have a detrimental affect on the health of receiving waters.

Depth Limiting Subsurface Features

Field Name	Subsurface Feature	Depth from Surface (in)
Pasture 1	Cobbles	12
	Water Table	18

Well Testing Results (See back of page):

Well	Date	Hardness	EC	PH	K	Nitrates	Nitrites	NH3	Na	Carbonate	Bicarbonate

No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data

ISDA REGULATIONS AND THE IDAHO NUTRIENT MANAGEMENT STANDARD

Nutrient management plans for animal agricultural operations regulated by the Idaho State Department of Agriculture (ISDA) must be approved by the Idaho State Department of Agriculture and must follow the Natural Resource Conservation Service (NRCS) Agriculture Waste Management Field Handbook and the Idaho Nutrient Management Standard. ISDA regulation and the Standard use soil test phosphorus as the indicator for environmental impact from agricultural production practices. The Idaho Nutrient Management Standard is based on a threshold soil test phosphorus level (TH), above which there is no agronomic advantage to application of phosphorus.

The Idaho Nutrient Management Standard categorizes fields as a surface water concern or a groundwater concern. A surface water concern indicates that runoff leaves the contiguous operating unit from normal storm events, rain on snow, frozen ground, or irrigation. The soil phosphorus threshold for a field with a surface water concern is 40 ppm phosphorus for soils alkaline (ph > 6) tested with the Olsen method and 60 ppm phosphorus for acidic (ph < 6.5) soils tested with the Bray method (0-12"Soil Sample Depth).

A groundwater resource concern indicates that runoff does not leave the contiguous operating unit from normal storm events, rain on snow, frozen ground, or irrigation. There are two sub-categories for fields identified as having a groundwater concern. The first category applies to fields with a resource concern within the first five feet of the soil profile. A resource concern could be shallow soils, gravel, cobble, bedrock, high groundwater table, or a drained field. These fields are indicated as a groundwater concern <5'. The soil phosphorus threshold for a field with a groundwater concern <5' is 20 ppm phosphorus for soils tested with the Olsen method and 25 ppm phosphorus for soils tested with the Bray method(18-24" Soil Sample Depth).

If a field is not classified as having a surface water concern or a groundwater <5' concern, by default it is classified as having a groundwater concern >5'. The soil phosphorus threshold for a field with a groundwater concern >5' is 30 ppm phosphorus for soils tested with the Olsen method and 45 ppm phosphorus for soils tested with the Bray method(18-24" Soil Sample Depth).

Field Phosphorus Threshold

Field	Resource Concern	P Threshold (ppm)	P Threshehold Soil Test Depth
Pasture 1	Groundwater < 5'	20	18 - 24"

Farm Location

Idaho Transverse Mercator

Coordinates of the farm center (meters): X = 2326993.38926559, Y = 1315307.13456568

Map Scale: 1 : 317

Figure 1. Base Map

Farm Location

Idaho Transverse Mercator

Coordinates of the farm center (meters): X = 2326993.38926559, Y = 1315307.13456568

Map Scale: 1 : 317

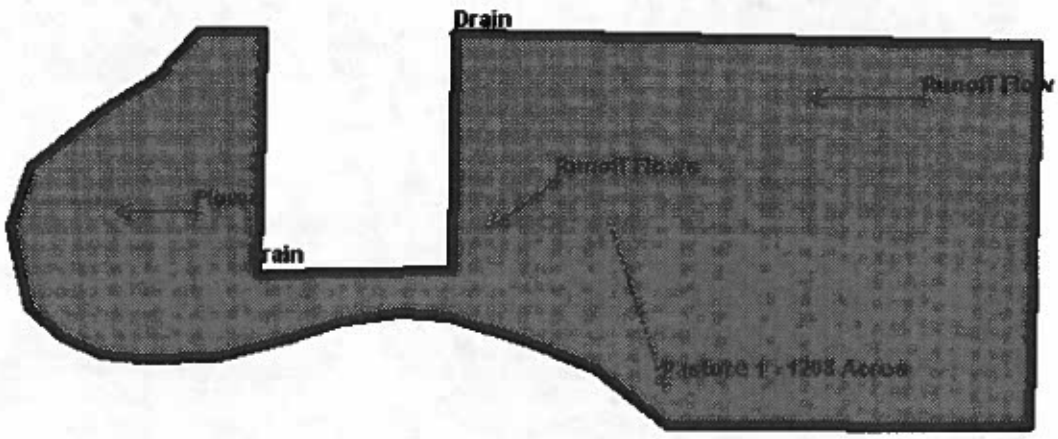


Figure 2. Farmstead Map

NUTRIENT MANAGEMENT REQUIREMENTS/RECOMMENDATIONS

Manure Application Rate Requirement By Year

Assisted Mode has been turned off.

FIELD: Pasture 1

Name	Man App		Imported Nutrients	Pasture(s)	Mineralization		Total	
Pasture, Irrigated South ID - Good Condition Root Depth 4 feet(2004)	Y		4 T/ac	0 T/ac				
		N	44	0	N	0	N	44
		P	72	1			P	73
		K	276	2			K	278
Pasture, Irrigated South ID - Good Condition Root Depth 4 feet(2005)	Y		4 T/ac	0 T/ac				
		N	44	0	N	24	N	68
		P	72	1			P	73
		K	276	2			K	278
Pasture, Irrigated South ID - Good Condition Root Depth 4 feet(2006)	Y		4 T/ac	0 T/ac				
		N	44	0	N	24	N	68
		P	72	1			P	73
		K	276	2			K	278
Pasture, Irrigated South ID - Poor Condition Root Depth 2 feet(2007)	Y		4 T/ac	0 T/ac				
		N	44	0	N	24	N	68
		P	72	1			P	73
		K	276	2			K	278
Pasture, Irrigated South ID - Good Condition Root Depth 4 feet(2008)	Y		4 T/ac	0 T/ac				
		N	44	0	N	24	N	68
		P	72	1			P	73
		K	276	2			K	278

Minimum Acres Required for Manure Application

Manure Group	Acres
Imported Nutrients	972
Pasture(s)	18

The acreage in the table is based on an average crop uptake of 100 lbs P_2O_5 per acre. These acreage numbers are for estimating export acreage needed. Wastewater application should begin with the first irrigation of the season and end with the last irrigation of the season. Rates should be designed to supply uniform application. When applying wastewater outside of the irrigation window you must contact the Department of Agriculture.

Hydraulic Balance

Field	Date
Pasture 1	April 1

0.5" of wastewater may be applied to fields after the hydraulic balance date to remain in compliance with this nutrient management plan.

Spring Soil Test

Spring soils tests must be taken every year from every field to determine a commercial fertilization rate. If commercial fertilizer isn't applied (for a perennial crop), spring soil samples are not required. If you do not apply commercial fertilizer, a complete soil analysis will need to be conducted initially to determine the nutrient baseline.

Record Keeping For each field keep a record of annual manure and chemical fertilizer applications. Include nutrient source, date, time, rate and application method.

ANNUAL NUTRIENT BUDGET

The following crop nutrient budget is based on soil test data and cropping information. It is for one year for the following field and specified crop information:

Nutrient Budget Summary

Field: Pasture 1 **Crop:** Pasture, Irrigated South ID - Good Condition Root Depth 4 feet **Yield:** 4

	N	P205	K20
Crop Nutrient Requirement	150	73	207
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	0		
from Prior Bio-Nutrients	24		
from Irrigation Water	0		0
Nutrient Balance from above	[illegible]	73.3	207.4
Imported Nutrients	44	72	276
Pasture(s)	0	1	2
Estimated Remaining Nutrients Required	83	0	-70
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	83	0	-70

ution: Rate is either deficit or is approaching an amount that may potentially contribute to an environmental risk.
Acceptable: Sustainable agronomic rate.

ANALYSIS OF ANIMAL SYSTEM

WASTE STORAGE AND HANDLING

Livestock Unit Characteristic

Description	Animal	Number	Weight	Days Collected	Housing	Bedding Type	Bedding (tons)
Pasture Cattle	Beef - High forage diet	300	700	30	Open Lot	N/A	0

Manure/Biosolid Groups

Manure Group	Storage Type	Application Method	Days to Incorporation	Nitrogen Retention(%)	Annual Volume (ft3)	Annual Weight (tons)
Imported Nutrients	Manure Stored in Open Lot, Arid Region	Broadcast, no incorporation, with containment	>7 days	70	1,248,558	5,194
Pasture(s)	Pasture	Broadcast, no incorporation, no containment	>7 days	14	6,300	198

* in Nitrogen Retention % Column means "Overridden Nitrogen Values"
Assisted Mode has been turned off.

Manure Group		Pasture Cattle
Pasture(s)	% To Group	100

Annual Production of Nutrients

The nutrient values were calculated based on animal weight and nitrogen loss estimates as described in the NRCS Agricultural Waste Management Field Handbook guidelines (1996). The calculations are estimates, and manure testing is recommended for more accuracy, as manure nutrient content varies widely among operations.

	Nutrient Distribution on Facility			
	Pounds N	Pounds P_2O_5	Pounds K_2O	% of Total
Total Nutrients Produced	118073	89105	337666	
Imported Nutrients	117800	87519	335844	99
Pasture(s)	273	1586	1822	1

Comments on Bionutrients
No Comments

MANURE STORAGE SUMMARY

Total Solid Capacity		
Bio-Nutrient Group	Cubic Feet	% Contained
Pasture(s)	6,300	0%
Imported Nutrients	1,248,558	0%

Containment of Waste and Corral Runoff
It is important that all contaminated runoff from corrals be contained and/or diverted to the lagoon storage system. As stated in the Idaho State Department of Agriculture (ISDA) regulation, a discharge is allowed only under large precipitation events (>25yr, 24hr storm event). Lagoon structures must be properly designed, operated, and maintained to contain all contaminated runoff from a 25-year, 24-hour rainfall event for the site location and maintained to contain all runoff from accumulation of winter precipitation from a one in five-year winter. Animals confined in the CAFO may not have direct contact with canals, streams, lakes, or other surface waters.

Comments
No Comments

BIO-NUTRIENT EXPORT INFO

Exported Bio-Nutrient Summary					
Bio-Nutrient Group Name	**Amount**	**Consumer**	**Consumer's Address**	**Telephone**	**Acres**
No manure exported from this facility					

ANALYSIS OF CROPPING SYSTEM

Farming Operation
Total Acres: 1208

Crop Production History

THIS IS NOT A FERTILIZER RECOMMENDATION

Crop Rotation Name: Rotation A

Crop	Yield	Yield Units	N Requirement	P_2O_5 uptake	K_2O Requirement
Pasture, Irrigated South ID - Good Condition Root Depth 4 feet	4	tons/acre	150	73.3	200
Pasture, Irrigated South ID - Good Condition Root Depth 4 feet	4	tons/acre	150	73.3	200
Pasture, Irrigated South ID - Poor Condition Root Depth 2 feet	4	tons/acre	150	73.3	200
Pasture, Irrigated South ID - Good Condition Root Depth 4 feet	4	tons/acre	150	73.3	200
Average				73	

* Nitrogen and Potassium Requirements assume zero credits.

Mapped Resource Concern(s)

Field Name	Acres	Resource Concern(s)
Pasture 1	1208	Open Irrigation Water Conveyances

ANALYSIS OF IRRIGATION PRACTICES

Irrigation Management

Proper irrigation management depends on factors such as the following.

Irrigation Efficiency: The efficiency with which the irrigation wets the entire crop root zone. This takes losses that occur from evaporation, runoff and deep percolation.

Crop Evapotranspiration Rate (ET): The combined rate at which water from the soil profile is evaporated into the atmosphere and transpired from the crop. The rate is expressed in units of inches/day.

Management Allowable Depletion (MAD): The percentage of water, which can be depleted from the soil before the crop, experiences water deficiency stress.

Available Water Holding Capacity in the Soil (AWH): The amount of water the pores in the soil profile can hold against gravity. The AWH is expressed as inches of water per inch of soil.

Crop Rooting Depth: The depth in the soil profile to which the crop roots can penetrate.

Surface Irrigation Summary

Field Name: Pasture 1

Date of Initial Irrigation:	
Current Crop	Pasture, Irrigated South ID - Good Condition Root Depth 4 feet
Furrow Flow Rate	.0 gpm
Delivery Method	N/A
Furrow Length	.0 ft
Furrow Spacing	.0 ft
Time to Reach End of Furrow	.0 hours

Month	Days Between Irrigation	Set Time (hours)	Irrigation Application Efficiency	Water Applied (in)	Net Irrigation Requirement (in)	Deep Perc.	Runoff Index
Mar	.0	.0	.0	.0	.4	.0	.0
Apr	.0	.0	.0	.0	1.7	.0	.0
May	.0	.0	.0	.0	3.0	.0	.0
Jun	.0	.0	.0	.0	4.5	.0	.0
Jul	.0	.0	.0	.0	6.5	.0	.0
Aug	.0	.0	.0	.0	5.5	.0	.0
Sep	.0	.0	.0	.0	3.0	.0	.0

Oct	.0	.0	.0	.0	1.3	.0	.0

Appendix A: ANALYSIS OF SOIL CHARACTERISTICS

Soil Survey (USDA NRCS) information was used to describe the soil variations across each field. **This is not absolute** and may vary for each specific situation. The soil map has broad areas that have distinctive pattern of soils, relief, and drainage. Each map unit on the soil map is a unique natural landscape. Typically, it consists of one or more major soils or miscellaneous areas and some minor soils or miscellaneous areas. It is named for the major soils or miscellaneous areas. Because the minor soils are not described in the following summary, the combined acreage for all major soils will be less than the acreage for each field.

Table 1. Soil type across each field

Field Name	Soil Type	Percentage	Approximate Acreage	Surface Texture[1]
Pasture 1	WATER	100	21.83	
	ORNEA	80	29.84	GR-L
	LETHA	80	33.08	L
	LETHA	80	569.8	FSL
	GRANDVIEW	80	55.79	L
	LORAY	30	38.71	GR-FSL
	DORS	50	64.52	FSL
	DORS	75	18.76	FSL
	BRAMWELL	80	53.04	SICL
	BRAM	85	7.09	SIL
	BALDOCK	80	77.47	L

Note: 1- See Appendix A.

Table 2 contains important soil characteristics for each of the fields identified in this plan. Each soil characteristic listed is representative for the entire field based on a weighted average. *(**Caution:** USDA NRCS Soil Survey information was used to estimate the values reported in Table 2. **These are not absolute values** and may vary for each specific situation. They are estimated values representative for each field.)* The following includes a brief description of each of those factors:

Dominant Surface Texture -- The predominant texture of the surface layer. Soil texture is the relative proportion, by weight, of the particle separate classes (sand, silt, and clay) finer than 2 mm in equivalent diameter. Soil texture influences engineering works and plant growth and is used as an indicator of how soils formed. (See Appendix A)

Available Water Capacity (AWC) -- The volume of water that should be available to plants if the soil, inclusive of fragments, were at field capacity. It is commonly defined as the difference between the

amount of soil moisture at field capacity and the amount at permanent wilting point. Typical Available Water Capacities are 0.6 inches/foot for a Sand and 2.0 inches/foot for a Silt Loam. Available Water Capacity is an important soil property in developing water budgets, predicting droughtiness, designing and operating irrigation systems, designing drainage systems, protecting water resources, and predicting yields.

Surface Soil Erodibility Factor (K) -- A factor which quantifies the susceptibility of soil detachment by water. Factors vary from a low of 0.02 to a high of 0.64.

Soil Loss Tolerance (T) -- The maximum amount of erosion at which the quality of a soil as a medium for plant growth can be maintained.

Slope -- The difference in elevation between two points expressed as a percentage of the distance between those points.

Permeability -- The quality of the soil that enables water or air to move through it.

Permeability Class -- Permeability expressed by classes ranging from very rapid to impermeable. (See Appendix A)

Runoff Class - An index of the likelihood for runoff to occur based on inherent soil and slope characteristic. Runoff classes range from Negligible to Very High. (See Appendix A)

Surface pH -- A numerical expression of the relative acidity or alkalinity of the surface soil layer.

Surface pH Classification -- A general descriptive term for soil pH, acid or alkaline.

Table 3 contains additional important soil characteristics for each of the fields identified in this plan. Each soil characteristic listed represents a potential limiting condition within the soil profile (< 5 feet) across the field. *(**Caution:** USDA NRCS Soil Survey information was used to estimate the values reported in Table 2. **These are not absolute values** and may vary for each specific situation. They are estimated values representative for each field.)* The following includes a brief description of each of those factors:

Soil Layer with > 50 % Gravel, Cobble or Stone -- A layer comprised of more than 50 % gravel, cobbles or stones.

Pan - A compact, dense layer in the soil that impedes the movement of water and the growth of roots. Examples include *hardpan, claypan, plowpan*, and *Fragipan*. (See Appendix A)

Rock -- A layer of rock in the soil that impedes the movement of water and the growth of roots.

Seasonal High Water Table -- A seasonal water table that exist near the surface.

Drainage Class - Drainage class identifies the natural drainage condition of the soil. It refers to the frequency and duration of wet periods. Alteration of the water regime by humans, either through

drainage or irrigation, is not a consideration unless the alterations have significantly changed the morphology of the soil. (See Appendix A)

Hydrologic Group -- A group of soils having similar runoff potential under similar storm and cover conditions.

Table 2. Soil characteristics representative for each field

Field Name	Representative For Entire Field (Weighted Average)											
	Dominant Surface Texture & (Acreage)[1]	Total Available Water Capacity to 5 feet (in)	Surface Soil Erodibility Factor - K	Soil Loss Tolerance - T (tons/acre)	Calculated Sheet and Rill Erosion Rate[1] (tons/acre)	Calculated Irrigation Induced Erosion Rate[1] (tons/acre)	Slope (%)	Permeability (in/hour)	Permeability Class[1,2]	Runoff Class[1,3]	Surface pH	Surface pH Classification
Pasture 1	FSL(823 92)	6.55	0.27	4	-1	-1	1.84	1.44	Moderate	L	8.2	Alkaline

NOTES:

1 - See Appendix A;

2 - PERMEABILITY CLASSES: VR = Very Rapid, R = Rapid, MR = Moderately Rapid, M = Moderate, MS = Moderately Slow, S = Slow, VS = Very Slow, I = Impermeable;

3 - RUNOFF CLASS: N = Negligible, LV = Very Low, L = Low, M = Medium, H = High, HV = Very High;

Table 3. Soil characteristics that represent a potential limiting condition within the soil profile (< 5 feet) across the entire field.

Field Name	Depth to Limiting Layer < 5 feet - Soil Layer with > 50 % Gravel, Cobble or Stone					Depth to Limiting Layer < 5 feet - Pan[1]				
	Dominant Condition		Most Limiting Condition			Dominant Condition		Most Limiting Condition		
	Layer Description[1,2]	Acres	Layer Description[1,2]	Acres	Minimum Depth (in)	Layer Description	Acres	Layer Description	Acres	Minimum Depth (in)
Pasture 1	None Present	1004.83	GRV GRX CBV	41.58	12	No Pan Present	1209.97	No Pan Present	1209.97	0

Field Name	Depth to Limiting Layer < 5 feet - Rock					Depth to Limiting Layer < 5 feet - Seasonal High Water Table				
	Dominant Condition		Most Limiting Condition			Dominant Condition		Most Limiting Condition		
	Layer Description	Acres	Layer Description	Acres	Minimum Depth (in)	Layer Description	Acres	Layer Description	Acres	Minimum Depth (in)
Pasture 1	No Rock Layer Present	1209.97	No Rock Layer Present	1209.97	N/A	No Water Table Present	1004.83	No Water Table Present	105.12	1.5

Field Name	Drainage Class[1,3]		Hydrologic Group[1]	
	Dominant Drainage Class	Acres	Dominant Hydrologic Group	Acres
Pasture 1	Moderately well drained	782.05	C	1004.83

NOTES:

1 - See Appendix A;

2 - GRAVEL, COBBLE, or STONE: GRV = Very Gravelly, GRX = Extremely Gravelly, CBV = Very Cobbly, CBX = Extremely Cobbly, STV = Very Stony, STX = Extremely Stony, WB = Weathered Bedrock, and UWB = Unweathered Bedrock;

3 - DRAINAGE CLASS: E = Excessively drained, SE = Somewhat Excessively drained, W = Well drained, MW = Moderately Well drained, SP = Somewhat Poorly drained, P = Poorly drained, VP = Very Poorly drained;

ANALYSIS OF SOIL CHARACTERISTICS Legend

Soil Pan

Hardpan – A hardened or cemented layer soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

Claypan – A slowly permeable soil horizon that contains much more clay than the horizon above it. A claypan is commonly hard when dry and plastic or stiff when wet.

Plowpan – A compacted layer formed in the soil directly below the plow layer.

Fragipan – A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restrict roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than deform slowly.

Soil Drainage Class

Excessively drained (E). Water is removed very rapidly. The occurrence of internal free water commonly is very rare or very deep. The soils are commonly coarse-textured and have very high hydraulic conductivity or are very shallow. They are not suited to crop production unless irrigated.

Somewhat excessively drained (SE). Water is removed from the soil rapidly. Internal free water occurrence commonly is very rare or very deep. The soils are commonly coarse-textured and have high saturated hydraulic conductivity or are very shallow. Without irrigation, only a narrow range of crops can be grown and yields are low.

Well drained (W). Water is removed from the soil readily but not rapidly. Internal free water occurrence commonly is deep or very deep; annual duration is not specified. Water is available to plants throughout most of the growing season in humid regions. Wetness does not inhibit growth of roots for significant periods during most growing seasons.

Moderately well drained (MW). Water is removed from the soil somewhat slowly during some periods of the year. Internal free water occurrence commonly is moderately deep and transitory through permanent. The soils are wet for only a short time within the rooting depth during the growing season, but long enough that most mesophytic crops are affected. They commonly have a moderately low or lower saturated hydraulic conductivity in a layer within the upper 1 m, periodically receive high rainfall, or both.

Somewhat poorly drained (SP). Water is removed slowly so that the soil is wet at a shallow depth for significant periods during the growing season. The occurrence of internal free water commonly is shallow to moderately deep and transitory to permanent. Wetness markedly restricts the growth of

mesophytic crops, unless artificial drainage is provided. The soils commonly have one or more of the following characteristics: low or very low saturated hydraulic conductivity, a high water table, additional water from seepage, or nearly continuous rainfall.

Poorly drained (P). Water is removed so slowly that the soil is wet at shallow depths periodically during the growing season or remains wet for long periods. The occurrence of internal free water is shallow or very shallow and common or persistent. Free water is commonly at or near the surface long enough during the growing season so that most mesophytic crops cannot be grown, unless the soil is artificially drained. The soil, however, is not continuously wet directly below plow-depth. Free water at shallow depth is usually present. This water table is commonly the result of low or very low saturated hydraulic conductivity of nearly continuous rainfall, or of a combination of these.

Very poorly drained (VP). Water is removed from the soil so slowly that free water remains at or very near the ground surface during much of the growing season. The occurrence of internal free water is very shallow and persistent or permanent. Unless the soil is artificially drained, most mesophytic crops cannot be grown. The soils are commonly level or depressed and frequently ponded. If rainfall is high or nearly continuous, slope gradients may be greater.

Soil Hydrologic Group

Group A – Soils that have low runoff potential and high infiltration rates even when thoroughly wetted. They consist chiefly of deep, well to excessively drained sands and gravels. These soils have a high rate of water transmission (greater than 0.30 in/hr).

Group B – Soils that have moderate infiltration rates when thoroughly wetted. They consist chiefly of moderately deep to deep, moderately well to well drained soils with moderately fine to moderately coarse textures. These soils have a moderate rate of water transmission (greater than 0.15 – 0.30 in/hr).

Group C – Soils that have low infiltration rates when thoroughly wetted. They consist chiefly of soils with a layer that impedes downward movement of water and soils with moderately fine to fine texture. These soils have a low rate of water transmission (greater than 0.05 - 0.15 in/hr).

Group D – Soils that have high runoff potential. They have very low infiltration rates when thoroughly wetted. They consist chiefly of clay soils with high swelling potential, soils with a permanent high water table, soils with a claypan or clay layer at or near the surface, and shallow soils over impervious material. These soils have a very low rate of water transmission (greater than 0.0 - 0.05 in/hr).

Soil Permeability Class

Very Rapid:	20.0 to 100.0 inches/hour
Rapid:	6.0 to 20.0 inches/hour
Moderately Rapid:	2.0 to 6.0 inches/hour
Moderate:	0.6 to 2.0 inches/hour
Moderately Slow:	0.2 to 0.6 inches/hour

Slow:	0.06 to 0.20 inches
Very Slow:	0.0015 to 0.06 inches/hour
Impermeable:	0.0000 to 0.0015 inches/hour

Soil Texture Modifiers, Texture Class and Terms Used in Lieu of Texture.

Texture Modifiers	
ASHY	Ashy
BY	Bouldery
BYV	Very bouldery
BYX	Extremely bouldery
CB	Cobbly
CBV	Very cobbly
CBX	Extremely cobbly
CN	Channery
CNV	Very channery
CNX	Extremely channery
COP	Coprogenous
DIA	Diatomaceous
FL	Flaggy
FLV	Very flaggy
FLX	Extremely flaggy
GR	Gravelly
GRC	Coarse gravelly
GRF	Fine gravelly
GRM	Medium gravelly
GRV	Very gravelly
GRX	Extremely gravelly
GS	Grassy
GYP	Gypsiferous
HB	Herbaceous
HYDR	Hydrous
MEDL	Medial
MK	Mucky
MR	Marly
MS	Mossy
PBY	Paraboulder y
PBYV	Very Paraboulder y
PBYX	Extremely Paraboulder y
PCB	Paracobbly
PCBV	Very Paracobbly
PCBX	Extremely Paracobbly
PCN	Parachannery
PCNV	Very Parachannery
PCNX	Extremely Parachannery
PF	Permanently frozen
PFL	Paraflaggy
PFLV	Very Paraflaggy
PFLX	Extremely Paraflaggy
PGR	Paragravelly

Texture Class	
C	Clay
CL	Clay loam
COS	Coarse sand
COSL	Coarse sandy loam
FS	Fine sand
FSL	Fine sandy loam
L	Loam
LCOS	Loamy coarse sand
LFS	Loamy fine sand
LS	Loamy sand
LVFS	Loamy very fine sand
S	Sand
SC	Sandy clay
SCL	Sandy clay loam
SI	Silt
SIC	Silty clay
SICL	Silty clay loam
SIL	Silt loam
SL	Sandy loam
VFS	Very fine sand
VFSL	Very fine sandy loam

Terms used in lieu of texture	
BR	Bedrock
BY	Boulders
CB	Cobbles
CN	Channers
DUR	Duripan
FL	Flagstones
G	Gravel
HPM	Highly Decomposed plant material
MAT	Material
MPM	Moderately Decomposed plant materi
MPT	Mucky peat
MUCK	Muck
OR	Ortstein
PBY	Paraboulders
PC	Petrocalcic
PCB	Paracobbles
PCN	Parachanners
PEAT	Peat
PF	Petroferric
PFL	Paraflagstones
PG	Paragravel
PGP	Petrogypsic
PL	Placic
PST	Parastones
SPM	Slightly Decomposed plant material
ST	Stones
W	Water

PGRV Very Paragravelly
PGRX Extremely Paragravelly
PST Parastony
PSTV Very Parastony
PSTX Extremely Parastony
PT Peaty
ST Stony
STV Very stony
STX Extremely stony
WD Woody

Appendix B: NUTRIENT RISK ANALYSIS

Phosphorus Runoff Risk Assessment

FIELD: Pasture 1
Overall Risk Rating: Very High
Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 73.3

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: Very High

Manure Application Method: Surface applied no incorporation w/o containment

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

Nutrient Leaching Risk Assessment

FIELD: Pasture 1

Overall Risk Rating: Medium

Leaching losses may be contributing to soluble nutrient leaching below the root zone during some years.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether

adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very High

Comments: Due to the low irrigation efficiency on this field, conversion to a more efficient irrigation system like Sprinkler or Drip Irrigation should be considered. If this is not possible consider shorter set times to minimize runoff and/or the length of run to minimize leaching. A Tail water Recovery & Pumpback System will help to reduce or eliminate runoff. An additional consideration is to incorporate a Surge Irrigation that will help to reduce runoff and deep percolation losses. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth Rating: High

Comments: Because the water table is near the surface (and/or the soil is shallow), this field is vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a significant concern.

NUTRIENT RISK ANALYSIS Legend

BMP	Definition	Purpose
Buffer Strip	Contour buffer strips are strips of perennial grass alternated with wider cultivated strips that are farmed on the contour.	Contour buffer strips slow runoff water and trap sediment. Consequently, soil erosion is generally reduced significantly by this practice. Sediments, nutrients, pesticides, and other potential pollutants are filtered out as water flows through the grass strips. The grass strips also provide food and cover for wildlife.
Channel Vegetation	Establishing and maintaining adequate plants on channel banks, berms, spoil, and associated areas.	To stabilize channel banks and adjacent areas and reduce erosion and sedimentation. To maintain or enhance the quality of the environment, including visual aspects and fish and wildlife habitat.
Chiseling and Sub soiling	Loosening the soil, without inverting and with a minimum of mixing of the surface soil, to shatter restrictive layers below normal plow depth that inhibit water movement or root development.	To improve water and root penetration and aeration.
Composting Facility	A composting facility is installed for biological stabilization of waste organic material.	The purpose of this practice is to biologically treat waste organic material and produce humus-like material that can be recycled as a soil amendment or organic fertilizer. The material may also be used by other acceptable methods of recycling that comply with laws, rules and regulations.

Conservation Cover	This practice involves establishing and maintaining a protective cover of perennial vegetation on land retired from agriculture production.	This practice reduces soil erosion, associated sedimentation, improves water quality, and creates or enhances wildlife habitat.
Conservation Cropping Sequence	Growing crops in a recurring sequence on the same field.	This practice may be applied as part of a best management practice to support one or more of the following: Reduce sheet and rill erosion, Reduce irrigation induced erosion, Reduce soil erosion from wind, Maintain or improve soil organic matter content, Manage deficient or excess plant nutrients, Improve water use efficiency, Manage saline seeps, Manage plant pests (weeds, insects, diseases), Provide food for domestic livestock, and Provide food and cover for wildlife.
Contour Farming	Farming sloping lands in such a way that preparing land, planting, and cultivating are done on the contours. (This includes following established grades of terraces or diversion.)	To reduce erosion and control water.
Cover and Green Manure Crop	A crop of close-growing, legumes, or small grain grown primarily for seasonal protection and soil improvement. It usually is grown for 1 year or less, except where there is permanent cover as in orchards.	To control erosion during periods when the major crops do not furnish adequate cover; add organic material to the soil; and improve infiltration, aeration, and tilth.
Critical Area Planting	Planting vegetation on critically eroding areas that require extraordinary treatment.	This practice is used on highly erodible areas that cannot be stabilized by ordinary planting techniques and if left untreated

		may cause severe erosion or sediment damage. Examples of critical areas include the following: 1) Dams, dikes, levees, and other construction sites with very steep slopes, 2) Mine spoil and surface mined land with poor quality soil and possibly chemical problems, and 3) Agriculture land with severe gullies requiring specialized planting techniques and management.
Dike or Berm	An embankment constructed of earth or other suitable materials to protect land against overflow or to regulate water.	Dikes are used to: Permit improvement of agricultural land by preventing overflow and better use of drainage facilities, Prevent damage to land and property, Facilitate water storage and control in connection with wildlife and other developments, and Protect natural areas, scenic features and archeological sites from damage.
Diversion	A channel constructed across the slope with a supporting ridge on the lower side.	To divert excess water from one area for use or safe disposal in other areas.
Drip Irrigation	A planned irrigation system in which all necessary facilities are installed for efficiently applying water directly to the root zone of plants by means of applicators (orifices, emitters, porous tubing, and perforated pipe) operated under low pressure. The applicators can be placed on or below the surface of the ground.	To efficiently apply water directly to the plant root zone to maintain soil moisture within the range for good plant growth and without excessive water loss, erosion, reduction in water quality, or salt accumulation.
Filter Strip	A strip or area of vegetation for removing pollutants water.	A filter strip reduces pollution by filtration, deposition, infiltration, absorption, adsorption, decomposition, and volatilization of sediment, organic matter, and

		other pollutants from runoff and waste water.
Fish Stream Improvement	Fish Stream Improvement is improving a stream channel to make or enhance fish habitat.	The purpose of the practice is to increase production of desired species of fish. The practice involves improving food supplies, shelter, spawning areas, water quality, and other elements of fish habitat.
Grade Stabilization Construction	A structure used to control the grade and head cutting in natural or artificial channels.	These structures are to: Stabilize the grade and control erosion in natural or artificial channels, prevent the formation or advance of gullies, enhance environmental quality, and reduce pollution hazards.
Grassed Waterway	A natural or constructed channel that is shaped or graded to required dimensions and established in suitable vegetation for the stable conveyance of runoff.	Grassed waterways convey runoff from terraces, diversions, or other water concentrations without causing erosion or flooding and to improve water quality.
Grazing Land Mechanical Treatment	Modifying physical soil and/or plant conditions with mechanical tools by treatments such as; pitting, contour furrowing, and ripping or sub-soiling.	This practice should be applied as part of a best management practice to support one or more of the following purposes: Fracture compacted soil layers and improve soil permeability, Reduce water runoff and increase infiltration, Break up sod bound conditions and thatch to increase plant vigor, and Renovate and stimulate plant community for greater productivity and yield.
Heavy Use Area Protection	Protecting heavily used areas by establishing vegetative cover, by surfacing with suitable materials,	To stabilize urban, recreation, or facility areas frequently and intensely used by people, animals,

	or by installing needed structures.	or vehicles.
Irrigation Land Leveling	Reshaping the surface of land to be irrigated to planned grades.	To permit uniform and efficient application of irrigation water without causing erosion, loss of water quality, or damage to land by water logging and at the same time to provide for adequate surface drainage.
Irrigation Water Management	Irrigation water management is the process of determining and controlling the volume, frequency, and application rate of irrigation water in a planned, efficient manner.	Irrigation water management is applied as part of a conservation management system to support one or more of the following: Manage soil Moisture to promote desired crop response; Optimize use of available water supplies; Minimize irrigation induced soil erosion; Decrease non-point source pollution of surface and groundwater resources; Manage salts in the crop root zone; Manage air, soil, or plant micro-climate.
Mulching	Applying plant residues or other suitable materials not produced on the site to the soil surface.	To conserve moisture; prevent surface compaction or crusting; reduce runoff and erosion; control weeds; and help establish plant cover.
Polyacrylamide (PAM)	Polyacrylamide is an organic polymer formulated to stabilize soil when applied in irrigation water.	Water applied with PAM stabilizes soil aggregates which can then resist the erosive forces of water. If correctly applied, PAM will produce clear runoff water and reduce erosion within the field by over 90 percent.
Prescribed Grazing	Prescribed grazing is the controlled harvest of vegetation with grazing animals, managed with the intent to achieve a	Application of this practice will manipulate the intensity, frequency, duration, and season of grazing to: 1) Improve water

	specific objective.	infiltration, 2) maintain or improve riparian and upland area vegetation, 3) protect stream banks from erosion, 4) manage for deposition of fecal material away from water bodies, and 5) promote ecological and economically stable plant communities which meet landowner objectives.
Residue Management (Conservation Tillage)	Managing the amount, orientation, and distribution of crop and other plant residue on the soil surface.	This practice may be applied as part of a conservation system to support one or more of the following: Reduce sheet and rill erosion. Reduce wind erosion. Maintain or improve soil organic matter content and tilth. Conserve soil moisture. Manage snow to increase plant available moisture. Provide food and escape cover for wildlife.
Riparian Forest Buffer	A riparian forest buffer is an area of trees and/or shrubs located adjacent to a body of water. The vegetation extends outward from the water body for a specified distance necessary to provide a minimum level of protection and/or enhancement.	The riparian forest buffer is a multi-purpose practice design to accomplish one or more of the following: Create shade to lower water temperatures and improve habitat for aquatic animals, Provide a source of debris necessary for healthy robust populations of aquatic organisms and wildlife, and Act as a buffer to filter out sediment, organic material, fertilizer, pesticides and other pollutants that may adversely impact the water body, including shallow ground water.
Sediment Basin	A basin constructed to collect and store debris or sediment.	A sediment basin may have the following uses: Preserve the capacity of reservoirs, ditches, canals, diversion, waterways, and streams, Prevent undesirable

		deposition on bottom lands and developed areas, Trap sediment originating from construction sites, and Reduce or abate pollution by providing basins for deposition and storage of silt, sand, gravel, stone, agricultural wastes, and other detritus.
Sprinkler System	A planned irrigation system in which all necessary facilities are installed for efficiently applying water by means of perforated pipes or nozzles operated under pressure.	To efficiently and uniformly apply irrigation water to maintain adequate soil moisture for optimum plant growth without causing excessive water loss, erosion, or reduced water quality.
Stream Channel Stabilization	Stabilizing the channel of a stream with suitable structures.	To control aggradation or degradation in a stream channel.
Stream bank Protection	Using vegetation or structures to stabilize and protect banks of streams, lakes, estuaries, or excavated channels against scour and erosion.	To stabilize or protect banks of streams, lakes, estuaries, or excavated channels for one or more of the following purposes: Prevent the loss of land or damage to utilities, roads, buildings, or other facilities adjacent to the banks, Maintain the capacity of the channel, Control channel meander that would adversely affect downstream facilities, Reduce sediment loads causing downstream damages and pollution, and Improve the stream for recreation or as a habitat for fish and wildlife.
Strip-cropping, Contour	Growing crops in a systematic arrangement of strips or bands on the contour to reduce water erosion. The crops are arranged so that a strip of grass or close-growing crop is alternated with a strip of clean-tilled crop or fallow	To reduce sheet and rill erosion and/or to reduce transport of sediment and other water-borne contaminants.

	or a strip of grass is alternated with a close-growing crop.	
Strip-cropping, Field	Growing crops in a systematic arrangement of strips or bands across the general slope (not on the contour) to reduce water erosion. The crops are arranged so that a strip of grass or a close-growing crop is alternated with a clean-tilled crop or fallow.	To help control erosion and runoff on sloping cropland where contour strip-cropping is not practical.
Subsurface Drains	A Subsurface Drain is a conduit, such as corrugated plastic tubing, tile, or pipe, installed beneath the ground surface to collect and/or convey drainage water.	The purpose of a subsurface drain is to: Improve the environment for vegetation, Reduce erosion, Improve water quality, Collect ground water for beneficial use, Remove water from heavy use areas such as recreation areas, or around buildings, and Regulate water to control health hazards caused by pests.
Surge Irrigation	Surge irrigation is the intermittent application of water to furrows, corrugates, or borders creating a series of on and off periods of constant or variable time spans.	Surge allows a lighter application of water with a higher efficiency .The result is less deep percolation of water at the upper end of the field and a more uniform application.
Tail water Recovery & Pumpback System	A facility to collect, store, and transport irrigation tail water for reuse in a farm irrigation distribution system.	To conserve farm irrigation water supplies and water quality by collecting the water that runs off the field surface for reuse on the farm.
Terraces	An earth embankment, a channel, or a combination ridge and channel constructed across the slope.	Reduce slope length, reduce sediment content in runoff water, reduce erosion, Improve water quality, intercept and conduct surface runoff at a non-erosive velocity to a stable outlet, retain

		runoff for moisture conservation, prevent gully development, reform the land surface, improve farmability, and reduce flooding.
Use Exclusion	Excluding animals, people or vehicles from an area.	To protect, maintain, or improve the quantity and quality of the plant, animal, soil, air, water, and aesthetics resources and human health and safety.
Water and Sediment Control Basin	An earth embankment or a combination ridge and channel generally constructed across the slope and minor watercourses to form a sediment trap and water detention basin.	To improve farmability of sloping land, reduce watercourse and gully erosion, trap sediment, reduce and manage onsite and downstream runoff, and improve downstream water quality.
Watering Facility	A device (tank, trough, or other watertight container) for providing animal access to water.	To provide watering facilities for livestock and/or wildlife at selected locations in order to: 1) protect and enhance vegetative cover through proper distribution of grazing; 2) provide erosion control through better grassland management; or 3) protect streams, ponds and water supplies from contamination by providing alternative access to water.
Wetland Development/Restoration	The construction or restoration of a wetland facility to provide the hydrological and biological benefits of a wetland.	To develop or restore hydric soil conditions, hydrologic conditions, hydrophytic plant communities, and wetland functions.

Appendix C: CROP SPECIFIC GUIDELINES

Pasture, Irrigated South ID - Good Condition Root Depth 4 feet

Lack of adequate fertilizer, improper irrigation management, poor stands, non-adapted plant species and poor grazing management are the major causes of low forage production in irrigated pastures. When properly managed, pastures will respond to fertilization and produce large quantities of high-quality forage and livestock products. Irrigated pastures are typically composed either of grass-legume mixtures or grasses alone. The composition of the pasture can be changed by fertilizer management and grazing method. Adapted and high-quality grasses for irrigated pastures include brome grass and orchard grass for well-drained soil, fescue and wheatgrass for saline soils and creeping meadow foxtail and reed canary grass for wet soil. These grasses make excellent summer re-growth. Highest producing grass-legume mixtures usually include one or more of the above grasses with a well-adapted legume variety. An adapted legume variety should have good winter hardiness and resistance to insects and diseases.

NITROGEN

Nitrogen rates depend upon some of the following factors: previous crop, past fertilizer use, soil type and leaching hazard and realistic yield goal for the grower and the area. Grass pastures have responded well to nitrogen (N) fertilizer applications up to 150 pounds N per acre. The N rate depends upon the length of frost-free growing season and the number of cuttings or grazing periods. Production potential increases as the frost-free growing period is extended. Split applications of N fertilizer maintain a more uniform level of forage production through summer and fall. Broadcast 30 to 50 pounds N per acre per application after each cutting or grazing cycle, and irrigate to move N into the plant root zone. As the amount of legume increases in a grass/legume mixture, the need for N fertilizer decreases. When the legume composes over 60 percent of the mixture, responses from N are limited. Nitrogen applications will reduce the quantity of legume in a mixed species stand. Inoculation of legumes when the stand is established will reduce the need for N fertilization when legumes dominate the stand composition.

PHOSPHORUS

Intensively managed, high-producing pasture may respond to phosphorus (P) fertilization. Grasses generally have a low P requirement, and legumes generally have a high P requirement. Thus, P fertilizer applications tend to encourage legumes. Phosphorus movement in soils is limited, so P fertilizer needs to be placed in the rooting zone. Apply phosphorus during seedbed preparation whenever possible. Top-dress established pastures with P fertilizer, preferably in the fall.

POTASSIUM

Grasses have moderate potassium (K) requirements, and legumes have high K requirements. Idaho soils are usually high in natural K. Irrigation water contains K except in mountain streams. Potassium movement in soils is limited, though not to the same extent as that of phosphorus. Incorporate K during seedbed preparation or broadcast in the fall on established stands.

SULFUR

Sulfur (S) demand is greater for legumes than grasses. Sulfur requirements for grass and legumes will vary with soil texture, leaching losses, S soil test and S content of irrigation water. Apply 30 pounds of S to soil testing less than 10 ppm sulfate-sulfur (S04-S) in the plow layer. Areas irrigated with water

from the Snake River and other streams fed by return flow should have adequate S. High rainfall areas, mountain valleys and foothill areas are likely areas for S deficiencies. Sulfur sources should be carefully selected due to variation in its availability to plants. Elemental sulfur must be converted so sulfate (S04) form by soil micro-organisms before it can be taken up by plants. Conversion of elemental S to S04 may take several months in warm moist soils. Elemental S fertilizers cannot supply adequate levels of S the year of application. However, these elemental S sources can supply considerable S the year after the initial application. Sulfate-sulfur sources are recommended to alleviate deficiencies the year of application.

MICRONUTRIENTS

Deficiencies of micronutrients such as zinc (Zn), copper (Cu), manganese (Mn) and iron (Fe) have not been observed on irrigated pastures in southern Idaho. Grasses and legumes are not sensitive to low levels of micronutrients as are row crops such as beans and corn. Boron (B) deficiencies may be observed on legumes in gravelly textured soils. If the soil tests less than 0.25 ppm B, apply 1 to 3 pounds of B per acre. Do not use higher rates because B is toxic to plants in excessive amounts.

GENERAL COMMENTS

Nitrogen and phosphorus are the elements needed most on Idaho irrigated pastures. Potassium, sulfur, zinc and boron may be needed. Their need is best determined by soil and plant tissue tests.

Legume population in a grass-legume mixture is reduced by nitrogen fertilization and increased by phosphorus and potassium addition when these nutrients are low in the soil.

Forage from properly fertilized grass or mixed grass-legume pastures have higher protein, providing higher quality livestock feed than unfertilized pastures.

Irrigated pastures make good use of sloping land, stony soils and shallow soils which are less desirable for row crops. Pastures reduce soil erosion during irrigation on sloping land.

Fertilizers are only one part of pasture management. Pastures are most profitable when plant selection, irrigation and harvest techniques are not limiting production.

Rotational grazing will provide more forage and greater returns than continuous grazing.

Contact your County Extension Agent if you have any questions regarding the interpretation of this information or for further information on your local needs.

Pasture, Irrigated South ID - Poor Condition Root Depth 2 feet

Lack of adequate fertilizer, improper irrigation management, poor stands, non-adapted plant species and poor grazing management are the major causes of low forage production in irrigated pastures. When properly managed, pastures will respond to fertilization and produce large quantities of high-quality forage and livestock products. Irrigated pastures are typically composed either of grass-legume mixtures or grasses alone. The composition of the pasture can be changed by fertilizer management and grazing method. Adapted and high-quality grasses for irrigated pastures include brome grass and orchard grass for well-drained soil, fescue and wheatgrass for saline soils and creeping meadow foxtail

and reed canary grass for wet soil. These grasses make excellent summer re-growth. Highest producing grass-legume mixtures usually include one or more of the above grasses with a well-adapted legume variety. An adapted legume variety should have good winter hardiness and resistance to insects and diseases.

NITROGEN

Nitrogen rates depend upon some of the following factors: previous crop, past fertilizer use, soil type and leaching hazard and realistic yield goal for the grower and the area. Grass pastures have responded well to nitrogen (N) fertilizer applications up to 150 pounds N per acre. The N rate depends upon the length of frost-free growing season and the number of cuttings or grazing periods. Production potential increases as the frost-free growing period is extended. Split applications of N fertilizer maintain a more uniform level of forage production through summer and fall. Broadcast 30 to 50 pounds N per acre per application after each cutting or grazing cycle, and irrigate to move N into the plant root zone. As the amount of legume increases in a grass/legume mixture, the need for N fertilizer decreases. When the legume composes over 60 percent of the mixture, responses from N are limited. Nitrogen applications will reduce the quantity of legume in a mixed species stand. Inoculation of legumes when the stand is established will reduce the need for N fertilization when legumes dominate the stand composition.

PHOSPHORUS

Intensively managed, high-producing pasture may respond to phosphorus (P) fertilization. Grasses generally have a low P requirement, and legumes generally have a high P requirement. Thus, P fertilizer applications tend to encourage legumes. Phosphorus movement in soils is limited, so P fertilizer needs to be placed in the rooting zone. Apply phosphorus during seedbed preparation whenever possible. Top-dress established pastures with P fertilizer, preferably in the fall.

POTASSIUM

Grasses have moderate potassium (K) requirements, and legumes have high K requirements. Idaho soils are usually high in natural K. Irrigation water contains K except in mountain streams. Potassium movement in soils is limited, though not to the same extent as that of phosphorus. Incorporate K during seedbed preparation or broadcast in the fall on established stands.

SULFUR

Sulfur (S) demand is greater for legumes than grasses. Sulfur requirements for grass and legumes will vary with soil texture, leaching losses, S soil test and S content of irrigation water. Apply 30 pounds of S to soil testing less than 10 ppm sulfate-sulfur (S04-S) in the plow layer. Areas irrigated with water from the Snake River and other streams fed by return flow should have adequate S. High rainfall areas, mountain valleys and foothill areas are likely areas for S deficiencies. Sulfur sources should be carefully selected due to variation in its availability to plants. Elemental sulfur must be converted so sulfate (S04) form by soil micro-organisms before it can be taken up by plants. Conversion of elemental S to S04 may take several months in warm moist soils. Elemental S fertilizers cannot supply adequate levels of S the year of application. However, these elemental S sources can supply considerable S the year after the initial application. Sulfate-sulfur sources are recommended to alleviate deficiencies the year of application.

MICRONUTRIENTS

Deficiencies of micronutrients such as zinc (Zn), copper (Cu), manganese (Mn) and iron (Fe) have not

been observed on irrigated pastures in southern Idaho. Grasses and legumes are not sensitive to low levels of micronutrients as are row crops such as beans and corn. Boron (B) deficiencies may be observed on legumes in gravelly textured soils. If the soil tests less than 0.25 ppm B, apply 1 to 3 pounds of B per acre. Do not use higher rates because B is toxic to plants in excessive amounts.

GENERAL COMMENTS

Nitrogen and phosphorus are the elements needed most on Idaho irrigated pastures. Potassium, sulfur, zinc and boron may be needed. Their need is best determined by soil and plant tissue tests.

Legume population in a grass-legume mixture is reduced by nitrogen fertilization and increased by phosphorus and potassium addition when these nutrients are low in the soil.

Forage from properly fertilized grass or mixed grass-legume pastures have higher protein, providing higher quality livestock feed than unfertilized pastures.

Irrigated pastures make good use of sloping land, stony soils and shallow soils which are less desirable for row crops. Pastures reduce soil erosion during irrigation on sloping land.

Fertilizers are only one part of pasture management. Pastures are most profitable when plant selection, irrigation and harvest techniques are not limiting production.

Rotational grazing will provide more forage and greater returns than continuous grazing.

Contact your County Extension Agent if you have any questions regarding the interpretation of this information or for further information on your local needs.

The above fertilizer guidelines are based on relationships established between University of Idaho soil test and crop yield response research. In this research, crop response to fertilizers was evaluated at several sites where the response to fertilizer differed. The recommendations reflect the general or overall response to fertilizers at specific soil test values and the response in individual fields can differ appreciably from the general table recommendation. Some sites will require less than the general recommendation, other sites more. Unfortunately, the science has not developed to the point where the table recommendations can account for all the unknown variables influencing the effectiveness of applied fertilizers at individual sites. The table fertilizer recommendations can only be used as general guides rather than specific recommendations for each and every field.

Furthermore, soil variability can sharply reduce the accuracy composite soil test values for individual fields. That is why large contiguous areas within fields should be sampled separately when they are known to differ in crop growth or soil characteristics known to influence the response to fertilizer. But soil variability frequently does not occur conveniently in large areas that can be sampled separately or fertilized differently. The fertilizer recommendations in most cases do not account for this variability. Soil test based recommendations may be excessive in some field areas and inadequate in other areas of the same field. The recommendations then will be appropriate only to the degree that the composite soil test values for fields actually represent the field. Thus, for fields that are highly variable, the

fertilizer recommendations should be considered conservative estimates of fertilizers needed. All the more reason to consider the table fertilizer recommendations as general guides rather than specific recommendations for each and every field.

The fertilizer rates suggested in the tables will support above average yields if other factors are not limiting production. Therefore the recommendations assume that good crop management practices will be used, i.e. insect, disease, and weed control. Nutrient requirements can be met using either commercial fertilizers or equivalent organic matter sources, such as manure or compost, provided their nutrient content and relative availability are known or can be estimated from published literature. Soil test based recommended rates will not be appropriate if the soil samples are improperly taken or do not represent the area to be fertilized. For nitrogen in particular, recommendations will be most accurate when crop history is taken into account and projected yields are reasonable estimates based on long term records.

General Comments:

- Over irrigation and nutrient loss is a hazard. Optimum irrigation management is necessary to meet crop water use needs and avoid loss of nutrients through leaching beyond the root zone and runoff with irrigation tail water.

- Nitrogen leaching is particularly a concern on sandy soils. Optimum management may require split Nitrogen applications to meet crop needs.

- Weed, insect, and disease control significantly influence the efficiency and effectiveness of your fertilizer applications and ultimately crop yield and farm profitability.

- Phosphorus, potassium, and zinc nutrients can be effectively fall-applied as they are not readily leached over winter.

- Phosphorus can be budgeted for a crop rotation.

- If you have questions regarding the interpretation of this information, please contact your Extension Agricultural agent, Crop consultant, or your commodity company fieldsman.

- Both farm profitability and water quality can be improved with efficient nutrient use. The following are recommendations in nutrient management, which will optimize nutrient use for crop production while protecting water quality:

1) Avoid the application of nutrient sources in close proximity to streams, wetlands, drainage ditches, areas of very shallow soils, and sinkholes.

2) Accurately calibrate nutrient application equipment to insure that recommended rates are applied.

3) Nitrogen recommendations for many crops are based on yield goals for the crops. It is important to establish realistic yield goals for each field based upon historical yield data, county averages, and your management practices to avoid unnecessary fertilizer costs and minimize potential water quality impairments.

Appendix D: SOIL TEST DATA

Field: No Data **Date of Test:** No Data

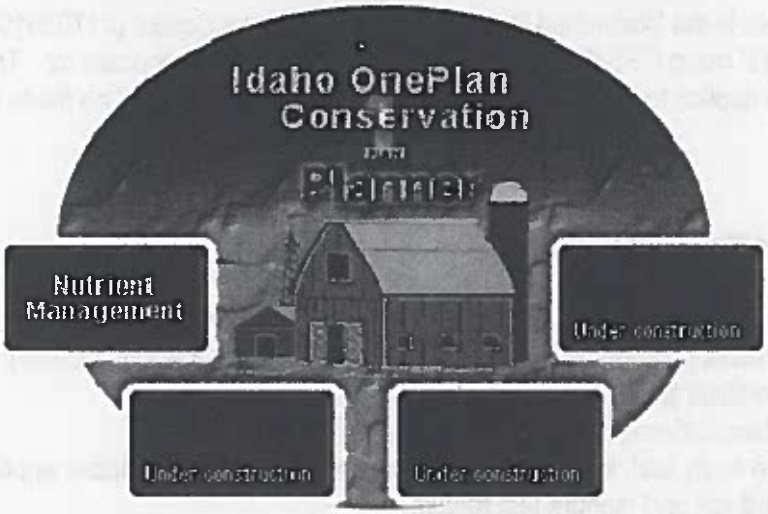
Parameter	Units	0-12"	12-24"	18-24"
Soil Texture		No Data	No Data	
EC	mmhos	No Data	No Data	
PH		No Data	No Data	
%Lime	%	No Data	No Data	
OM	%	No Data	No Data	
CEC	meq	No Data	No Data	
Nitrate-N	ppm	No Data	No Data	
Ammonia-N	ppm	No Data	No Data	
P	ppm	No Data	No Data	No Data
K	ppm	No Data	No Data	
Z	ppm	No Data	No Data	
Mn	ppm	No Data	No Data	
Fe	ppm	No Data	No Data	
Cu	ppm	No Data	No Data	
Ca	ppm	No Data	No Data	
Mg	ppm	No Data	No Data	
Na	ppm	No Data	No Data	

Grandview Triangle Dairy

Nutrient Management Plan

Agriculture . . .

Launching into the Future



Nutrient Management Plan Prepared For:
Grandview Farms
(208) 834-2231
Triangle Dairy

Certified Planner:
Michael Mitchell
Professional Engineer, EAC Angering, Inc.
(559) 381-0607

Producer Signature: _____ Certificated Planner Signature: _____
Date Completed: 10-02-07

The information provided by those using the "Idaho OnePlan" shall be deemed to be trade secrets, production records, or other proprietary information and shall be kept confidential and shall be exempt from enclosure pursuant to section 9-340D, Idaho Code. (Title 22 Chapter 27 17D6)

TRIANGLE DAIRY
Producer Summary

Farm Summary

Triangle Dairy is an existing farm located 12.5 miles southwest of Mountain Home Air Force Base. The farm is owned by Grandview Farms and managed by Mike Usabel. The farm consists of sixteen pivot irrigated fields and five fields that irrigate with hand lines for a total of 1985.3 acres available for accepting imported manure/compost from Simplot/Grandview Feedlot.

Farm Resource Concerns

Triangle Dairy is located in the Watershed Basin of the Middle Snake Succor (#17050103). The facility is found at 116W 02'56" 42N 55'01" using GPS Coordinates. The primary resource concern for Triangle Dairy is ground water quality. Solid waste is applied to all of the fields and pasture and incorporated on fields within seven days of application.

Nutrient Management Plan Requirements

Producer will maintain field application records for a minimum of five years and make them available for review at routine inspections by ISDA personnel. These records must include (where applicable):

1. Fertilizer application rates
2. Manure/Compost application rates
3. On each field, keep a record of manure and chemical fertilizer applications, crop information, and soil and manure test results.
4. Fields to which the nutrients are applied
5. Spring soil test for nitrogen (required annually)
   0-12" and 12-24" nitrogen test

Crop Nutrient Requirement	
Crop	**Pounds of P205 per acres**
Alfalfa	86
Sugarbeets	48
Potatoes	76
Corn	58

Manure/Compost field application requirement (tons)						
Acres x crop nutrient requirement ÷ manure p205 value* = Tons required						
Example	Corn - 250(acres)	X	75 (crop requirement)		÷ 16.85	
Corn	250	X	58**	= 14500	÷ 16.85*	= 86 tons

*based on manure test values for P205
**pounds of p205 required per acre

Irrigation Management Plan Recommendations

Irrigation water management is very important in nutrient management. If irrigation water is applied at a rate over the crop needs, there is potential for runoff and/or leaching of nutrients. If irrigation water is under-applied, the crop will not have optimal growth conditions. Crop irrigation water requirements changes through the growing season depending on climate conditions and crop Evapotranspiration rate. Proper irrigation

water management responds to these crop demands. It is recommended that:

- Irrigation schedules continue to be managed by your irrigation specialist.
- Continual inspection and maintenance of irrigation equipment will prevent unwarranted waste discharges into surface or ground water.

Nutrient Management Plan Recommendations

Land application of manure at agronomic rates, along with irrigation scheduling, is the most effective way to obtain maximum nutrient benefits from manure, condition the soil, and avoid potential water quality problems downstream. Cattle manure is a valuable resource, which will also improve soil properties such as water holding capacity, infiltration, tilth, structure, porosity, and nutrient retention and release. If animal manure and/or commercial fertilizers are not properly managed, contaminants may impact surface and/or groundwater.

Application of manure applied at an agronomic rate is a sustainable practice and is always allowed under ISDA regulations. Regardless of the rate prescribed by this nutrient management plan, soil testing at the 0-12 inch and 12-24 inch soil depths is required for nitrogen management.

- Set realistic crop yield goals in order to provide an accurate account of the plant nitrogen needs.
- Apply N so that it is available during peak plant demand.
- Apply fertilizer to cool season crop in the spring rather than the previous fall. This will prevent fertilizer leaching through the soil profile and provide the crop with the necessary levels of nutrients.
- Use split or multiple fertilizer applications in order to provide the crop with a pre-plant treatment and the needed nutrient levels throughout the growing season until the point of major nutrient uptake.
- Avoid the application of nutrient sources in close proximity to streams, wetlands, drainage ditches, areas of very shallow soils, and sinkholes.

Triangle Dairy
ANALYSIS OF RESOURCE CONCERNS

INTRODUCTION

The purpose of this nutrient management plan is to meet agricultural production goals and to certify that manure and nutrients are properly managed to minimize adverse impact to surface or groundwater. Plans are written in cooperation with the producer to:

1) assure proper containment of animal manure and process waste water

2) assess resource concerns which exist on the property

3) budget nutrient sources to optimize crop water and nutrient needs. Nutrient sources include commercial fertilizers, animal manure, mineralization of previous crop soil organic matter, accounting of residues, and irrigation water.

4) When applicable, assess irrigation water management to minimize movement of nutrients beyond the root zone or with runoff.

If animal manure and/or commercial fertilizers are not properly managed, contaminants may negatively impact surface and/or groundwater. Some water resource contaminants associated with poorly managed animal manure and fertilizers are:

Phosphorus in the soil readily adsorbs to soil particles; thus, erosion of soil by surface runoff is the general mode of phosphorus transport. Even at very low concentrations, phosphorus can result in plant and algae blooms in surface water bodies. Alga blooms are a nuisance to boaters, irrigators, and others. Toxins released by certain algae can be lethal to livestock or other animals that drink the water. Dissolved oxygen in the water is depleted as algae die and decompose, sometimes causing fish kills.

Nitrogen in the form of nitrate (NO_3^-) is highly water-soluble and will move with water, particularly down the soil profile past the root zone if not utilized by plants (thus becoming a groundwater contamination issue).Nitrates are toxic to infants under 6 months, and to livestock at high concentrations. In surface water, excess nitrogen, like phosphorus, can result in nuisance plant and algae growth.

Organic matter in high load decreases dissolved oxygen in a surface water body when it decomposes. Low levels of dissolved oxygen is harmful or even fatal to fish and other aquatic life.

Bacteria and microorganism illnesses (pathogens) potentially transmitted through water by animal manure include Giardia, Typhoid Fever, Cryptosporidium, and Cholera. Pathogens from animal waste can negatively impact surface and groundwater quality.

FACILITY DESCRIPTION

Owner Information

Owner (1):	Grandview Farms
Address:	1304 Hwy 67 , Grandview, ID 83624
Phone:	(208) 834-2231 N/A
	N/A

Location

Site Map: Facility site plan illustrated in Figure 1

Soil Conservation District:	Bruneau River
County:	Owyhee
Watershed Basin:	Middle Snake-succor (USGS Hydrologic Unit Code # 17050103)

ANALYSIS OF RESOURCE CONCERNS

Farm Resource Concerns

Triangle Dairy is located in a watershed containing water quality limited stream segments listed according to the Clean Water Act. Stream segments are listed because a water quality parameter prevents the attainment of the "Fishable/Swimmable" goal of the Clean Water Act.

WATERBODY	BOUNDARIES	BACT	CHAN STAB	DO	FLOW ALT	HAB ALT	MET HG	MET	NH3	NUTR	O_G	ORG	PEST	PH	SAL	SED	TDG	TEMP	UNKN	*
Snake River	CJ Strike Res to Castle Creek	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	X

Triangle Dairy is <u>not</u> located in a critical Nitrate-Nitrogen management area. Nitrate Management Areas are designated based upon ground water quality sampling results. Two priority groups exist as follows:

<u>Priority 1</u> is designated because at least 25% of the ground water sampling locations within the area exceed 5-milligrams/liter nitrate. This is one-half of the maximum contaminant level of 10-milligrams/liter nitrate. This nitrate concentration is considered evidence of significant degradation. Public drinking water systems are required to increase monitoring frequency when this level is reached.

<u>Priority 2</u> is designated because at least 50% of the ground water sampling locations within the area exceed 2-milligrams/liter nitrate. This concentration threshold provides an indication of human-caused (anthropogenic) impacts. The upper limit for naturally occurring (background) concentrations of nitrate is considered to be about 2 mg/l.

Triangle Dairy is located in a sole source aquifer area - Western Snake River Plain Aquifer.

Field Resource Concerns

- **Open Irrigation Water Conveyances** - Irrigation tail water can deliver nutrients to surface water via open canals. Nutrient loading of open canals can have a detrimental affect on the health of receiving waters.
- **Surface Water** - Surface water has water quality standards based on the designated use of the water body. These water quality standards must be met or the water body is listed as water quality impaired and falls under the TMDL process. Good irrigation and nutrient management practices will help keep nutrients available for crop use and decrease the nutrient loading into surface water.

Depth Limiting Subsurface Features

Field Name	Subsurface Feature	Depth from Surface (in)
F- 5 South	Water Table	36
F- 8 South 2/3	Cobbles	13
	Fractured Bedrock	20
	Water Table	>72
F-1	Water Table	>72
F-10	Water Table	36
F-11	Water Table	36
F-12	Water Table	36
F-13	Water Table	36

F-14	Cobbles	12
	Water Table	>72
F-15	Water Table	36
F-16	Water Table	36
F-17	Water Table	36
F-18	Water Table	36
F-2	Water Table	36
F-3	Water Table	36
F-4	Cobbles	13
	Fractured Bedrock	20
	Water Table	>72
F-5 North	Water Table	36
F-6 East	Water Table	36
F-6 West	Water Table	36
F-7	Water Table	36
F-8 North 1/3	Cobbles	13
	Water Table	>72
F-9	Water Table	36

Well Testing Results (See back of page):

Well	Date	Hardness	EC	PH	K	Nitrates	Nitrites	NH3	Na	Carbonate	Bicarbonate
No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data	No Data

ISDA REGULATIONS AND THE IDAHO NUTRIENT MANAGEMENT STANDARD

Nutrient management plans for animal agricultural operations regulated by the Idaho State Department of Agriculture (ISDA) must be approved by the Idaho State Department of Agriculture and must follow the Natural Resource Conservation Service (NRCS) Agriculture Waste Management Field Handbook and the Idaho Nutrient Management Standard. ISDA regulation and the Standard use soil test phosphorus as the indicator for environmental impact from agricultural production practices. The Idaho Nutrient Management Standard is based on a threshold soil test phosphorus level (TH), above which there is no agronomic advantage to application of phosphorus.

The Idaho Nutrient Management Standard categorizes fields as a surface water concern or a groundwater concern. A surface water concern indicates that runoff leaves the contiguous operating unit from normal storm events, rain on snow, frozen ground, or irrigation. The soil phosphorus threshold for a field with a surface water concern is 40 ppm phosphorus for soils alkaline (ph > 6) tested with the Olsen method and 60 ppm phosphorus for acidic (ph < 6.5) soils tested with the Bray method (0-12"Soil Sample Depth).

A groundwater resource concern indicates that runoff does not leave the contiguous operating unit from normal storm events, rain on snow, frozen ground, or irrigation. There are two sub-categories for fields identified as having a groundwater concern. The first category applies to fields with a resource concern within the first five feet of the soil profile. A resource concern could be shallow soils, gravel, cobble, bedrock, high groundwater table, or a drained field. These fields are indicated as a groundwater concern <5'. The soil phosphorus threshold for a field with a groundwater concern <5' is 20 ppm phosphorus for soils tested with the Olsen method and 25 ppm phosphorus for soils tested with the Bray method(18-24" Soil Sample Depth).

If a field is not classified as having a surface water concern or a groundwater <5' concern, by default it is classified as having a groundwater concern >5'. The soil phosphorus threshold for a field with a groundwater concern >5' is 30 ppm phosphorus for soils tested with the Olsen method and 45 ppm phosphorus for soils tested with the Bray method(18-24" Soil Sample Depth).

Field Phosphorus Threshold

Field	Resource Concern	P Threshold (ppm)	P Threshold Soil Test Depth
F- 5 South	Groundwater < 5'	20	18 - 24"
F- 8 South 2/3	Groundwater < 5'	20	18 - 24"
F-1	Groundwater >=5'	30	18 - 24"
F-10	Groundwater < 5'	20	18 - 24"
F-11	Groundwater < 5'	20	18 - 24"
F-12	Groundwater < 5'	20	18 - 24"
F-13	Groundwater < 5'	20	18 - 24"
F-14	Groundwater < 5'	20	18 - 24"
F-15	Groundwater < 5'	20	18 - 24"
F-16	Groundwater < 5'	20	18 - 24"
F-17	Groundwater < 5'	20	18 - 24"
F-18	Groundwater < 5'	20	18 - 24"
F-2	Groundwater < 5'	20	18 - 24"
F-3	Groundwater < 5'	20	18 - 24"
F-4	Groundwater < 5'	20	18 - 24"
F-5 North	Groundwater < 5'	20	18 - 24"
F-6 East	Groundwater < 5'	20	18 - 24"
F-6 West	Groundwater < 5'	20	18 - 24"
F-7	Groundwater < 5'	20	18 - 24"
F-8 North 1/3	Groundwater < 5'	20	18 - 24"
F-9	Groundwater < 5'	20	18 - 24"

Farm Location

Idaho Transverse Mercator

Coordinates of the farm center (meters): X = 2332346.86623427, Y = 1304326.58568366

Map Scale: 1 : 38

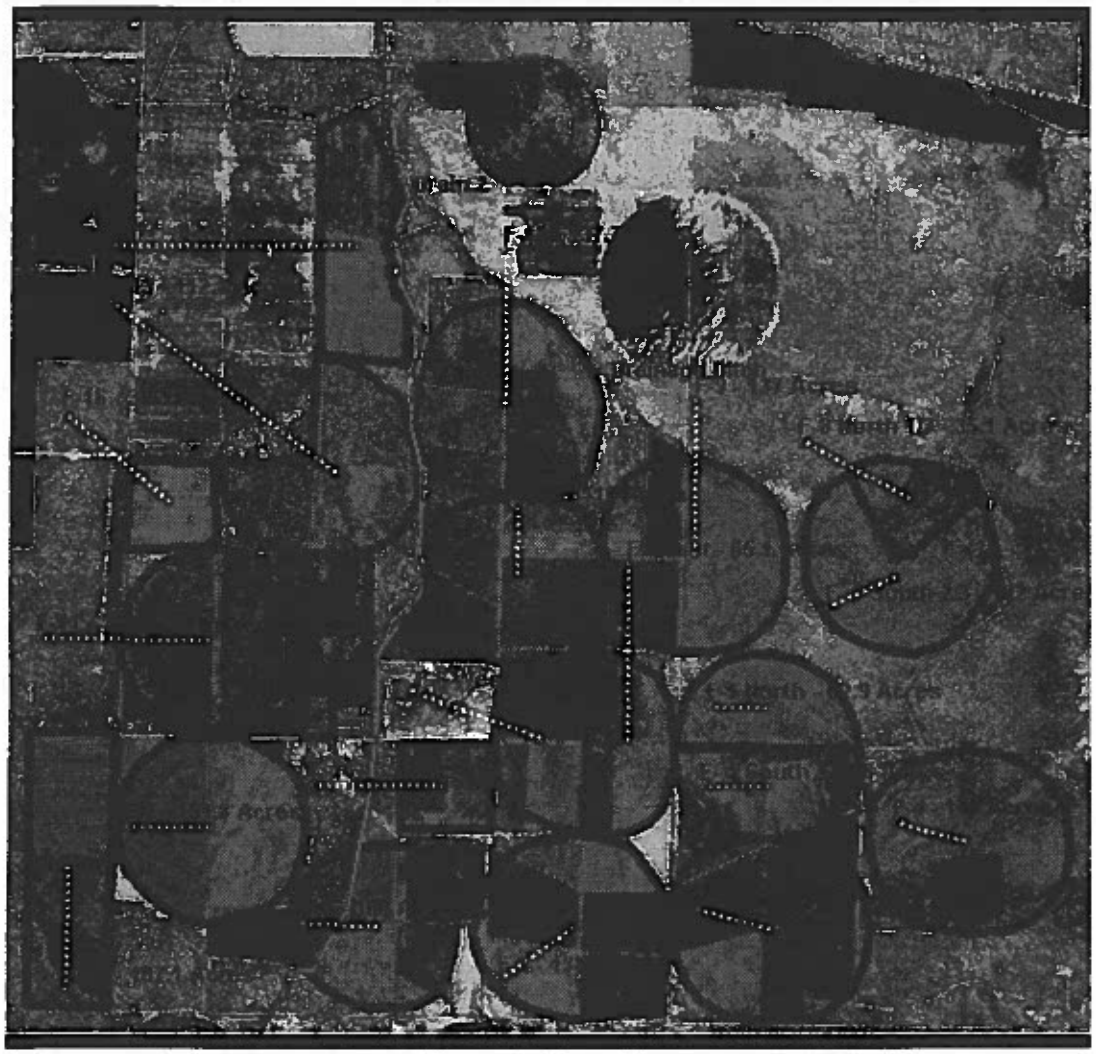


Figure 1. Base Map

Farm Location

Idaho Transverse Mercator

Coordinates of the farm center (meters): X = 2332346.86623427, Y = 1304326.58568366

Map Scale: 1 : 38

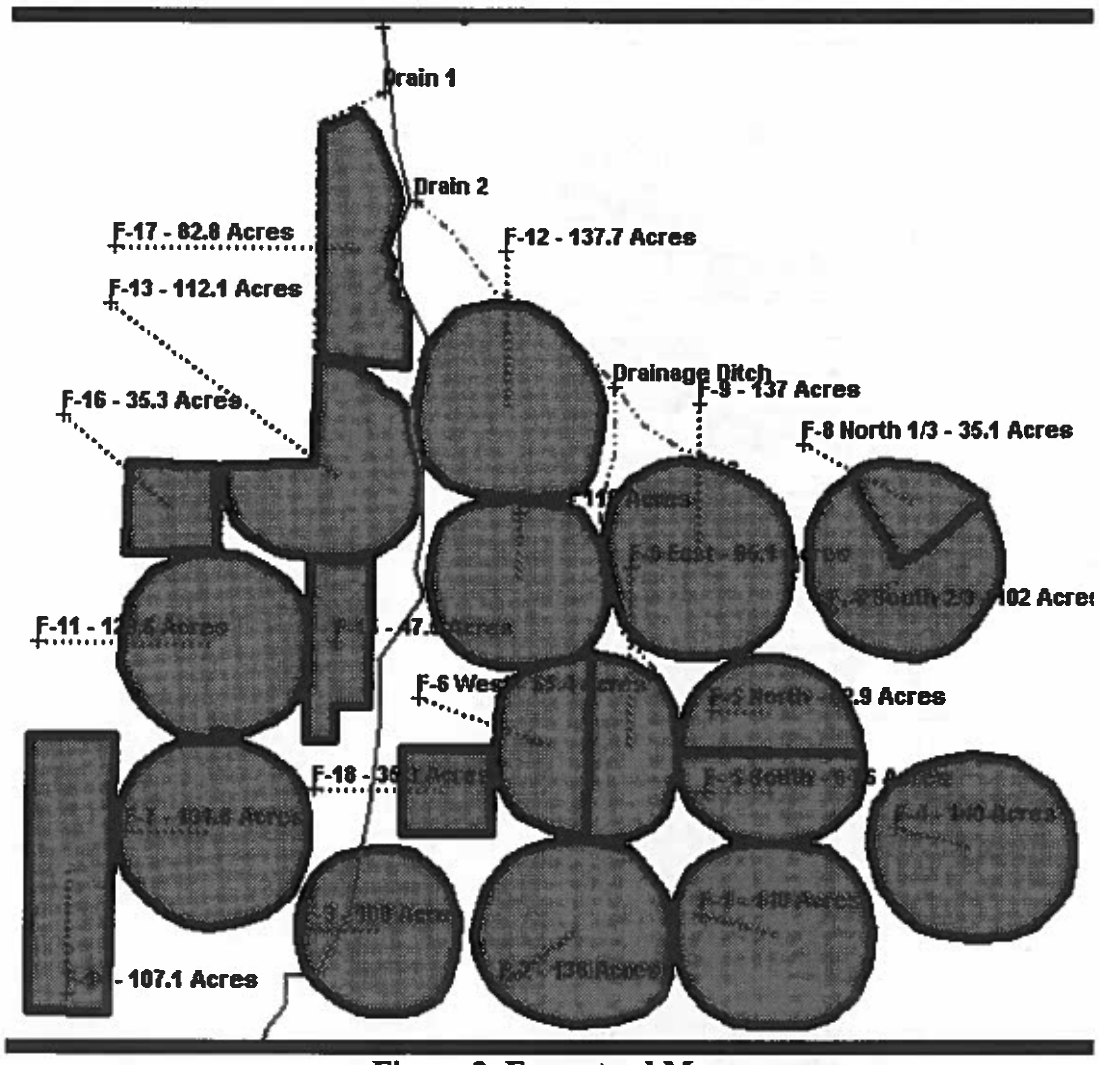


Figure 2. Farmstead Map

NUTRIENT MANAGEMENT REQUIREMENTS/RECOMMENDATIONS

Manure Application Rate Requirement By Year

FIELD: F- 5 South

Name	Man App		Imported Nutrients	Mineralization		Total	
Corn-Field Grain, Irrigated South ID(2004)	Y		3 T/ac				
		N	38	N	0	N	38
		P	54			P	54
		K	208			K	208
Corn-Field Grain, Irrigated South ID(2005)	Y		3 T/ac				
		N	38	N	-14	N	24
		P	54			P	54
		K	208			K	208
Corn-Field Grain, Irrigated South ID(2006)	Y		3 T/ac				
		N	38	N	-14	N	24
		P	54			P	54
		K	208			K	208
Corn-Field Grain, Irrigated South ID(2007)	Y		3 T/ac				
		N	38	N	21	N	59
		P	54			P	54
		K	208			K	208
Sugarbeets(2008)	Y		3 T/ac				
		N	38	N	21	N	59
		P	54			P	54
		K	208			K	208
Sugarbeets(2009)	Y		3 T/ac				
		N	38	N	21	N	59
		P	54			P	54
		K	208			K	208
Corn-Field Grain, Irrigated South ID(2010)	Y		3 T/ac				
		N	38	N	21	N	59
		P	54			P	54
		K	208			K	208

FIELD: F- 8 South 2/3

Name	Man App		Imported Nutrients	Mineralization		Total	
Corn-Field Grain, Irrigated South ID(2004)	Y		3 T/ac				
		N	41	N	0	N	41
		P	59			P	59
		K	226			K	226
Corn-Field Grain, Irrigated South ID(2005)	Y		3 T/ac				
		N	41	N	-12	N	29
		P	59			P	59
		K	226			K	226

Corn-Field Grain, Irrigated South ID(2006)	Y		3 T/ac				
		N	41	N	-12	N	29
		P	59			P	59
		K	226			K	226
Potatoes(2007)	Y		3 T/ac				
		N	41	N	23	N	64
		P	59			P	59
		K	226			K	226
Sugarbeets(2008)	Y		3 T/ac				
		N	41	N	23	N	64
		P	59			P	59
		K	226			K	226
Corn-Field Grain, Irrigated South ID(2009)	Y		3 T/ac				
		N	41	N	23	N	64
		P	59			P	59
		K	226			K	226
Corn-Field Grain, Irrigated South ID(2010)	Y		3 T/ac				
		N	41	N	23	N	64
		P	59			P	59
		K	226			K	226

FIELD: F-1

Name	Man App		Imported Nutrients	Mineralization		Total	
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	Y		5 T/ac				
		N	56	N	0	N	56
		P	80			P	80
		K	308			K	308
Corn-Field Grain, Irrigated South ID(2005)	Y		5 T/ac				
		N	56	N	85	N	141
		P	80			P	80
		K	308			K	308
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2006)	Y		5 T/ac				
		N	56	N	-7	N	49
		P	80			P	80
		K	308			K	308
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2007)	Y		5 T/ac				
		N	56	N	31	N	87
		P	80			P	80
		K	308			K	308
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2008)	Y		5 T/ac				
		N	56	N	31	N	87
		P	80			P	80
		K	308			K	308
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2009)	Y		5 T/ac				
		N	56	N	31	N	87
		P	80			P	80
		K	308			K	308
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2010)	Y		5 T/ac				

		N	56	N	31	N	87
		P	80			P	80
		K	308			K	308

FIELD: F-10

Name	Man App		Imported Nutrients	Mineralization		Total	
Corn-Field Grain, Irrigated South ID(2004)	Y		3 T/ac				
		N	38	N	0	N	38
		P	54			P	54
		K	208			K	208
Corn-Field Grain, Irrigated South ID(2005)	Y		3 T/ac				
		N	38	N	-14	N	24
		P	54			P	54
		K	208			K	208
Corn-Field Grain, Irrigated South ID(2006)	Y		3 T/ac				
		N	38	N	-14	N	24
		P	54			P	54
		K	208			K	208
Corn-Field Grain, Irrigated South ID(2007)	Y		3 T/ac				
		N	38	N	21	N	59
		P	54			P	54
		K	208			K	208
Sugarbeets(2008)	Y		3 T/ac				
		N	38	N	21	N	59
		P	54			P	54
		K	208			K	208
Sugarbeets(2009)	Y		3 T/ac				
		N	38	N	21	N	59
		P	54			P	54
		K	208			K	208
Corn-Field Grain, Irrigated South ID(2010)	Y		3 T/ac				
		N	38	N	21	N	59
		P	54			P	54
		K	208			K	208

FIELD: F-11

Name	Man App		Imported Nutrients	Mineralization		Total	
Potatoes(2004)	Y		5 T/ac				
		N	54	N	0	N	54
		P	78			P	78
		K	299			K	299
Sugarbeets(2005)	Y		5 T/ac				
		N	54	N	30	N	84
		P	78			P	78
		K	299			K	299
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2006)	Y		5 T/ac				
		N	54	N	30	N	84

		P	78			P	78
		K	299			K	299
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2007)	Y		5 T/ac				
		N	54	N	30	N	84
		P	78			P	78
		K	299			K	299
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2008)	Y		5 T/ac				
		N	54	N	30	N	84
		P	78			P	78
		K	299			K	299
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2009)	Y		5 T/ac				
		N	54	N	30	N	84
		P	78			P	78
		K	299			K	299
Potatoes(2010)	Y		5 T/ac				
		N	54	N	30	N	84
		P	78			P	78
		K	299			K	299

FIELD: F-12

Name	Man App		Imported Nutrients	Mineralization		Total	
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	Y		5 T/ac				
		N	54	N	0	N	54
		P	78			P	78
		K	299			K	299
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2005)	Y		5 T/ac				
		N	54	N	30	N	84
		P	78			P	78
		K	299			K	299
Potatoes(2006)	Y		5 T/ac				
		N	54	N	30	N	84
		P	78			P	78
		K	299			K	299
Sugarbeets(2007)	Y		5 T/ac				
		N	54	N	30	N	84
		P	78			P	78
		K	299			K	299
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2008)	Y		5 T/ac				
		N	54	N	30	N	84
		P	78			P	78
		K	299			K	299
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2009)	Y		5 T/ac				
		N	54	N	30	N	84
		P	78			P	78
		K	299			K	299
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2010)	Y		5 T/ac				
		N	54	N	30	N	84
		P	78			P	78
		K	299			K	299

FIELD: F-13

Name	Man App		Imported Nutrients	Mineralization		Total	
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	Y		5 T/ac				
		N	59	N	0	N	59
		P	86			P	86
		K	330			K	330
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2005)	Y		5 T/ac				
		N	59	N	33	N	92
		P	86			P	86
		K	330			K	330
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2006)	Y		5 T/ac				
		N	59	N	33	N	92
		P	86			P	86
		K	330			K	330
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2007)	Y		5 T/ac				
		N	59	N	33	N	92
		P	86			P	86
		K	330			K	330
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2008)	Y		5 T/ac				
		N	59	N	33	N	92
		P	86			P	86
		K	330			K	330
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2009)	Y		5 T/ac				
		N	59	N	33	N	92
		P	86			P	86
		K	330			K	330
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2010)	Y		5 T/ac				
		N	59	N	33	N	92
		P	86			P	86
		K	330			K	330

FIELD: F-14

Name	Man App		Imported Nutrients	Mineralization		Total	
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	Y		5 T/ac				
		N	56	N	0	N	56
		P	80			P	80
		K	309			K	309
Potatoes(2005)	Y		5 T/ac				
		N	56	N	96	N	152
		P	80			P	80
		K	309			K	309
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2006)	Y		5 T/ac				
		N	56	N	31	N	87
		P	80			P	80
		K	309			K	309
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2007)	Y		5 T/ac				
		N	56	N	31	N	87

		P	80			P	80
		K	309			K	309
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2008)	Y		5 T/ac				
		N	56	N	31	N	87
		P	80			P	80
		K	309			K	309
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2009)	Y		5 T/ac				
		N	56	N	31	N	87
		P	80			P	80
		K	309			K	309
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2010)	Y		5 T/ac				
		N	56	N	31	N	87
		P	80			P	80
		K	309			K	309

FIELD: F-15

Name	Man App		Imported Nutrients	Mineralization		Total	
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	Y		5 T/ac				
		N	54	N	0	N	54
		P	78			P	78
		K	299			K	299
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2005)	Y		5 T/ac				
		N	54	N	30	N	84
		P	78			P	78
		K	299			K	299
Potatoes(2006)	Y		5 T/ac				
		N	54	N	30	N	84
		P	78			P	78
		K	299			K	299
Sugarbeets(2007)	Y		5 T/ac				
		N	54	N	30	N	84
		P	78			P	78
		K	299			K	299
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2008)	Y		5 T/ac				
		N	54	N	30	N	84
		P	78			P	78
		K	299			K	299
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2009)	Y		5 T/ac				
		N	54	N	30	N	84
		P	78			P	78
		K	299			K	299
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2010)	Y		5 T/ac				
		N	54	N	30	N	84
		P	78			P	78
		K	299			K	299

FIELD: F-16

Name	Man App		Imported Nutrients	Mineralization		Total	
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	Y		5 T/ac				
		N	59	N	0	N	59
		P	86			P	86
		K	330			K	330
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2005)	Y		5 T/ac				
		N	59	N	33	N	92
		P	86			P	86
		K	330			K	330
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2006)	Y		5 T/ac				
		N	59	N	33	N	92
		P	86			P	86
		K	330			K	330
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2007)	Y		5 T/ac				
		N	59	N	33	N	92
		P	86			P	86
		K	330			K	330
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2008)	Y		5 T/ac				
		N	59	N	33	N	92
		P	86			P	86
		K	330			K	330
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2009)	Y		5 T/ac				
		N	59	N	33	N	92
		P	86			P	86
		K	330			K	330
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2010)	Y		5 T/ac				
		N	59	N	33	N	92
		P	86			P	86
		K	330			K	330

FIELD: F-17

Name	Man App		Imported Nutrients	Mineralization		Total	
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	Y		5 T/ac				
		N	54	N	0	N	54
		P	78			P	78
		K	299			K	299
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2005)	Y		5 T/ac				
		N	54	N	30	N	84
		P	78			P	78
		K	299			K	299
Potatoes(2006)	Y		5 T/ac				
		N	54	N	30	N	84
		P	78			P	78
		K	299			K	299
Sugarbeets(2007)	Y		5 T/ac				
		N	54	N	30	N	84
		P	78			P	78
		K	299			K	299

Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2008)	Y		5 T/ac					
		N	54	N	30	N	84	
		P	78			P	78	
		K	299			K	299	
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2009)	Y		5 T/ac					
		N	54	N	30	N	84	
		P	78			P	78	
		K	299			K	299	
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2010)	Y		5 T/ac					
		N	54	N	30	N	84	
		P	78			P	78	
		K	299			K	299	

FIELD: F-18

Name	Man App		Imported Nutrients	Mineralization		Total		
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	Y		5 T/ac					
		N	54	N	0	N	54	
		P	78			P	78	
		K	299			K	299	
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2005)	Y		5 T/ac					
		N	54	N	30	N	84	
		P	78			P	78	
		K	299			K	299	
Potatoes(2006)	Y		5 T/ac					
		N	54	N	30	N	84	
		P	78			P	78	
		K	299			K	299	
Sugarbeets(2007)	Y		5 T/ac					
		N	54	N	30	N	84	
		P	78			P	78	
		K	299			K	299	
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2008)	Y		5 T/ac					
		N	54	N	30	N	84	
		P	78			P	78	
		K	299			K	299	
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2009)	Y		5 T/ac					
		N	54	N	30	N	84	
		P	78			P	78	
		K	299			K	299	
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2010)	Y		5 T/ac					
		N	54	N	30	N	84	
		P	78			P	78	
		K	299			K	299	

FIELD: F-2

Name	Man App		Imported Nutrients	Mineralization		Total	
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	Y		5 T/ac				

		N	59	N	0	N	59
		P	86			P	86
		K	330			K	330
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2005)	Y		5 T/ac				
		N	59	N	33	N	92
		P	86			P	86
		K	330			K	330
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2006)	Y		5 T/ac				
		N	59	N	33	N	92
		P	86			P	86
		K	330			K	330
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2007)	Y		5 T/ac				
		N	59	N	33	N	92
		P	86			P	86
		K	330			K	330
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2008)	Y		5 T/ac				
		N	59	N	33	N	92
		P	86			P	86
		K	330			K	330
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2009)	Y		5 T/ac				
		N	59	N	33	N	92
		P	86			P	86
		K	330			K	330
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2010)	Y		5 T/ac				
		N	59	N	33	N	92
		P	86			P	86
		K	330			K	330

FIELD: F-3

Name	Man App		Imported Nutrients	Mineralization		Total	
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2004)	Y		5 T/ac				
		N	56	N	0	N	56
		P	80			P	80
		K	308			K	308
Corn-Field Grain, Irrigated South ID(2005)	Y		5 T/ac				
		N	56	N	85	N	141
		P	80			P	80
		K	308			K	308
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2006)	Y		5 T/ac				
		N	56	N	-7	N	49
		P	80			P	80
		K	308			K	308
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2007)	Y		5 T/ac				
		N	56	N	31	N	87
		P	80			P	80
		K	308			K	308
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2008)	Y		5 T/ac				
		N	56	N	31	N	87
		P	80			P	80

		K	308				K	308
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2009)	Y		5 T/ac					
		N	56	N	31		N	87
		P	80				P	80
		K	308				K	308
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2010)	Y		5 T/ac					
		N	56	N	31		N	87
		P	80				P	80
		K	308				K	308

FIELD: F-4

Name	Man App		Imported Nutrients	Mineralization			Total	
Corn-Field Grain, Irrigated South ID(2004)	Y		5 T/ac					
		N	56	N	0		N	56
		P	80				P	80
		K	308				K	308
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2005)	Y		5 T/ac					
		N	56	N	-7		N	49
		P	80				P	80
		K	308				K	308
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2006)	Y		5 T/ac					
		N	56	N	31		N	87
		P	80				P	80
		K	308				K	308
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2007)	Y		5 T/ac					
		N	56	N	31		N	87
		P	80				P	80
		K	308				K	308
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2008)	Y		5 T/ac					
		N	56	N	31		N	87
		P	80				P	80
		K	308				K	308
Alfalfa Hay, Irrigated South ID-Cut Mid Bloom(2009)	Y		5 T/ac					
		N	56	N	31		N	87
		P	80				P	80
		K	308				K	308
Corn-Field Grain, Irrigated South ID(2010)	Y		5 T/ac					
		N	56	N	31		N	87
		P	80				P	80
		K	308				K	308

FIELD: F-5 North

Name	Man App		Imported Nutrients	Mineralization			Total	
Corn-Field Grain, Irrigated South ID(2004)	Y		4 T/ac					
		N	41	N	0		N	41
		P	59				P	59
		K	228				K	228

Sugarbeets(2005)	Y		4 T/ac				
		N	41	N	-15	N	26
		P	59			P	59
		K	228			K	228
Wheat-Winter, Irrigated South ID(2006)	Y		4 T/ac				
		N	41	N	68	N	109
		P	59			P	59
		K	228			K	228
Potatoes(2007)	Y		4 T/ac				
		N	41	N	23	N	64
		P	59			P	59
		K	228			K	228
Corn-Field Grain, Irrigated South ID(2008)	Y		4 T/ac				
		N	41	N	23	N	64
		P	59			P	59
		K	228			K	228
Corn-Field Grain, Irrigated South ID(2009)	Y		4 T/ac				
		N	41	N	23	N	64
		P	59			P	59
		K	228			K	228
Corn-Field Grain, Irrigated South ID(2010)	Y		4 T/ac				
		N	41	N	23	N	64
		P	59			P	59
		K	228			K	228

FIELD: F-6 East

Name	Man App		Imported Nutrients	Mineralization		Total	
Corn-Field Grain, Irrigated South ID(2004)	Y		3 T/ac				
		N	38	N	0	N	38
		P	54			P	54
		K	208			K	208
Corn-Field Grain, Irrigated South ID(2005)	Y		3 T/ac				
		N	38	N	-14	N	24
		P	54			P	54
		K	208			K	208
Corn-Field Grain, Irrigated South ID(2006)	Y		3 T/ac				
		N	38	N	-14	N	24
		P	54			P	54
		K	208			K	208
Corn-Field Grain, Irrigated South ID(2007)	Y		3 T/ac				
		N	38	N	21	N	59
		P	54			P	54
		K	208			K	208
Sugarbeets(2008)	Y		3 T/ac				
		N	38	N	21	N	59
		P	54			P	54
		K	208			K	208
Sugarbeets(2009)	Y		3 T/ac				

		N	38	N	21	N	59
		P	54			P	54
		K	208			K	208
Corn-Field Grain, Irrigated South ID(2010)	Y		3 T/ac				
		N	38	N	21	N	59
		P	54			P	54
		K	208			K	208

FIELD: F-6 West

Name	Man App		Imported Nutrients	Mineralization		Total	
Corn-Field Grain, Irrigated South ID(2004)	Y		4 T/ac				
		N	41	N	0	N	41
		P	59			P	59
		K	228			K	228
Corn-Field Grain, Irrigated South ID(2005)	Y		4 T/ac				
		N	41	N	-12	N	29
		P	59			P	59
		K	228			K	228
Sugarbeets(2006)	Y		4 T/ac				
		N	41	N	-15	N	26
		P	59			P	59
		K	228			K	228
Wheat-Winter, Irrigated South ID(2007)	Y		4 T/ac				
		N	41	N	68	N	109
		P	59			P	59
		K	228			K	228
Potatoes(2008)	Y		4 T/ac				
		N	41	N	23	N	64
		P	59			P	59
		K	228			K	228
Corn-Field Grain, Irrigated South ID(2009)	Y		4 T/ac				
		N	41	N	23	N	64
		P	59			P	59
		K	228			K	228
Corn-Field Grain, Irrigated South ID(2010)	Y		4 T/ac				
		N	41	N	23	N	64
		P	59			P	59
		K	228			K	228

FIELD: F-7

Name	Man App		Imported Nutrients	Mineralization		Total	
Corn-Field Grain, Irrigated South ID(2004)	Y		3 T/ac				
		N	41	N	0	N	41
		P	59			P	59
		K	226			K	226
Corn-Field Grain, Irrigated South ID(2005)	Y		3 T/ac				
		N	41	N	-12	N	29

		P	59			P	59
		K	226			K	226
Corn-Field Grain, Irrigated South ID(2006)	Y		3 T/ac				
		N	41	N	-12	N	29
		P	59			P	59
		K	226			K	226
Corn-Field Grain, Irrigated South ID(2007)	Y		3 T/ac				
		N	41	N	23	N	64
		P	59			P	59
		K	226			K	226
Potatoes(2008)	Y		3 T/ac				
		N	41	N	23	N	64
		P	59			P	59
		K	226			K	226
Sugarbeets(2009)	Y		3 T/ac				
		N	41	N	23	N	64
		P	59			P	59
		K	226			K	226
Corn-Field Grain, Irrigated South ID(2010)	Y		3 T/ac				
		N	41	N	23	N	64
		P	59			P	59
		K	226			K	226

FIELD: F-8 North 1/3

Name	Man App		Imported Nutrients	Mineralization		Total	
Corn-Field Grain, Irrigated South ID(2004)	Y		3 T/ac				
		N	41	N	0	N	41
		P	59			P	59
		K	226			K	226
Corn-Field Grain, Irrigated South ID(2005)	Y		3 T/ac				
		N	41	N	-12	N	29
		P	59			P	59
		K	226			K	226
Potatoes(2006)	Y		3 T/ac				
		N	41	N	-15	N	26
		P	59			P	59
		K	226			K	226
Sugarbeets(2007)	Y		3 T/ac				
		N	41	N	23	N	64
		P	59			P	59
		K	226			K	226
Corn-Field Grain, Irrigated South ID(2008)	Y		3 T/ac				
		N	41	N	23	N	64
		P	59			P	59
		K	226			K	226
Corn-Field Grain, Irrigated South ID(2009)	Y		3 T/ac				
		N	41	N	23	N	64
		P	59			P	59
		K	226			K	226

Corn-Field Grain, Irrigated South ID(2010)	Y		3 T/ac				
		N	41	N	23	N	64
		P	59			P	59
		K	226			K	226

FIELD: F-9

Name	Man App		Imported Nutrients	Mineralization		Total	
Corn-Field Grain, Irrigated South ID(2004)	Y		3 T/ac				
		N	38	N	0	N	38
		P	54			P	54
		K	208			K	208
Corn-Field Grain, Irrigated South ID(2005)	Y		3 T/ac				
		N	38	N	-14	N	24
		P	54			P	54
		K	208			K	208
Corn-Field Grain, Irrigated South ID(2006)	Y		3 T/ac				
		N	38	N	-14	N	24
		P	54			P	54
		K	208			K	208
Corn-Field Grain, Irrigated South ID(2007)	Y		3 T/ac				
		N	38	N	21	N	59
		P	54			P	54
		K	208			K	208
Sugarbeets(2008)	Y		3 T/ac				
		N	38	N	21	N	59
		P	54			P	54
		K	208			K	208
Sugarbeets(2009)	Y		3 T/ac				
		N	38	N	21	N	59
		P	54			P	54
		K	208			K	208
Corn-Field Grain, Irrigated South ID(2010)	Y		3 T/ac				
		N	38	N	21	N	59
		P	54			P	54
		K	208			K	208

Minimum Acres Required for Manure Application

Manure Group	Acres
Imported Nutrients	1573

The acreage in the table is based on an average crop uptake of 100 lbs P_2O_5 per acre. These acreage numbers are for estimating export acreage needed. Wastewater application should begin with the first irrigation of the season and end with the last irrigation of the season. Rates should be designed to supply uniform application. When applying wastewater outside of the irrigation window you must contact the Department of Agriculture, Division of Animal Industries.

Hydraulic Balance

Field	Date

F- 5 South	January 1
F- 8 South 2/3	May 1
F-1	April 1
F-10	March 15
F-11	April 15
F-12	April 15
F-13	April 15
F-14	May 1
F-15	March 15
F-16	April 1
F-17	May 1
F-18	March 15
F-2	April 1
F-3	March 15
F-4	April 1
F-5 North	May 1
F-6 East	April 1
F-6 West	March 15
F-7	April 1
F-8 North 1/3	May 1
F-9	January 1

0.5" of wastewater may be applied to fields after the hydraulic balance date to remain in compliance with this nutrient management plan.

Spring Soil Test
Spring soils tests must be taken every year from every field to determine a commercial fertilization rate. If commercial fertilizer isn't applied (for a perennial crop), spring soil samples are not required. If you do not apply commercial fertilizer, a complete soil analysis will need to be conducted initially to determine the nutrient baseline.

Record Keeping For each field keep a record of annual manure and chemical fertilizer applications. Include nutrient source, date, time, rate and application method.

ANNUAL NUTRIENT BUDGET

The following crop nutrient budget is based on soil test data and cropping information. It is for one year for the following field and specified crop information:

Nutrient Budget Summary

Field: F- 5 South **Crop:** Corn-Field Grain, Irrigated South ID **Yield:** 160

	N	P205	K20
Crop Nutrient Requirement	255	58	43
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	-35		
from Prior Bio-Nutrients	21		
from Irrigation Water	0		0
Nutrient Balance from above	270.1	57.5	43
Imported Nutrients	38	54	208
Estimated Remaining Nutrients Required	232	4	-166
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	232	4	-166

Acceptable: Sustainable agronomic rate.

Field: F- 8 South 2/3 **Crop:** Corn-Field Grain, Irrigated South ID **Yield:** 160

	N	P205	K20
Crop Nutrient Requirement	255	58	43
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	-35		
from Prior Bio-Nutrients	23		
from Irrigation Water	0		0
Nutrient Balance from above	268.3	57.5	43
Imported Nutrients	41	59	226
Estimated Remaining Nutrients Required	227	-1	-183
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	227	-1	-183

Acceptable: Sustainable agronomic rate.

Field: F-1 **Crop:** Corn-Field Grain, Irrigated South ID **Yield:** 143.2

	N	P205	K20
Crop Nutrient Requirement	255	51	38
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	54		
from Prior Bio-Nutrients	31		
from Irrigation Water	0		0
Nutrient Balance from above	171.2	51.4	38.5

Imported Nutrients	56	80	308
Estimated Remaining Nutrients Required	116	-29	-270
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	116	-29	-270

Unacceptable Rate: May be a resource risk.
Acceptable: Sustainable agronomic rate.

Field: F-10 **Crop:** Corn-Field Grain, Irrigated South ID **Yield:** 160

	N	P205	K20
Crop Nutrient Requirement	255	58	43
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	-35		
from Prior Bio-Nutrients	21		
from Irrigation Water	0		0
Nutrient Balance from above	270.1	57.5	43
Imported Nutrients	38	54	208
Estimated Remaining Nutrients Required	232	4	-166
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	232	4	-166

Acceptable: Sustainable agronomic rate.

Field: F-11 **Crop:** Sugarbeets **Yield:** 35

	N	P205	K20
Crop Nutrient Requirement	290	48	118
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	0		
from Prior Bio-Nutrients	30		
from Irrigation Water	0		0
Nutrient Balance from above	261.1	48.1	117.6
Imported Nutrients	54	78	299
Estimated Remaining Nutrients Required	207	-30	-181
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	207	-30	-181

Acceptable: Sustainable agronomic rate.

Field: F-12 **Crop:** Alfalfa Hay, Irrigated South ID-Cut Mid Bloom **Yield:** 7.5

	N	P205	K20
Crop Nutrient Requirement	364	86	351
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	0		
from Prior Bio-Nutrients	30		
from Irrigation Water	0		0
Nutrient Balance from above	335.6	85.9	351

Imported Nutrients	54	78	299
Estimated Remaining Nutrients Required	282	8	52
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	282	8	52

Acceptable: Sustainable agronomic rate.

Field: F-13 **Crop:** Alfalfa Hay, Irrigated South ID-Cut Mid Bloom **Yield:** 7.5

	N	P205	K20
Crop Nutrient Requirement	364	86	351
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	0		
from Prior Bio-Nutrients	33		
from Irrigation Water	0		0
Nutrient Balance from above	332.5	85.9	351
Imported Nutrients	59	86	330
Estimated Remaining Nutrients Required	273	0	22
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	273	0	22

Acceptable: Sustainable agronomic rate.

Field: F-14 **Crop:** Potatoes **Yield:** 550

	N	P205	K20
Crop Nutrient Requirement	330	76	343
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	65		
from Prior Bio-Nutrients	31		
from Irrigation Water	0		0
Nutrient Balance from above	235.1	75.6	343.2
Imported Nutrients	56	80	309
Estimated Remaining Nutrients Required	179	-4	34
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	179	-4	34

Unacceptable Rate: May be a resource risk.
Acceptable: Sustainable agronomic rate.

Field: F-15 **Crop:** Alfalfa Hay, Irrigated South ID-Cut Mid Bloom **Yield:** 7.5

	N	P205	K20
Crop Nutrient Requirement	364	86	351
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	0		
from Prior Bio-Nutrients	30		
from Irrigation Water	0		0
Nutrient Balance from above	335.6	85.9	351

Imported Nutrients	54	78	299
Estimated Remaining Nutrients Required	282	8	52
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	282	8	52

Acceptable: Sustainable agronomic rate.

Field: F-16 **Crop:** Alfalfa Hay, Irrigated South ID-Cut Mid Bloom **Yield:** 7.5

	N	P205	K20
Crop Nutrient Requirement	364	86	351
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	0		
from Prior Bio-Nutrients	33		
from Irrigation Water	0		0
Nutrient Balance from above	332.5	85.9	351
Imported Nutrients	59	86	330
Estimated Remaining Nutrients Required	273	0	22
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	273	0	22

Acceptable: Sustainable agronomic rate.

Field: F-17 **Crop:** Alfalfa Hay, Irrigated South ID-Cut Mid Bloom **Yield:** 7.5

	N	P205	K20
Crop Nutrient Requirement	364	86	351
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	0		
from Prior Bio-Nutrients	30		
from Irrigation Water	0		0
Nutrient Balance from above	335.6	85.9	351
Imported Nutrients	54	78	299
Estimated Remaining Nutrients Required	282	8	52
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	282	8	52

Acceptable: Sustainable agronomic rate.

Field: F-18 **Crop:** Alfalfa Hay, Irrigated South ID-Cut Mid Bloom **Yield:** 7.5

	N	P205	K20
Crop Nutrient Requirement	364	86	351
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	0		
from Prior Bio-Nutrients	30		
from Irrigation Water	0		0
Nutrient Balance from above	335.6	85.9	351
Imported Nutrients	54	78	299

Estimated Remaining Nutrients Required	282	8	52
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	282	8	52

Acceptable: Sustainable agronomic rate.

Field: F-2 **Crop:** Alfalfa Hay, Irrigated South ID-Cut Mid Bloom **Yield:** 7.5

	N	P205	K20
Crop Nutrient Requirement	364	86	351
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	0		
from Prior Bio-Nutrients	33		
from Irrigation Water	0		0
Nutrient Balance from above	332.5	85.9	351
Imported Nutrients	59	86	330
Estimated Remaining Nutrients Required	273	0	22
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	273	0	22

Acceptable: Sustainable agronomic rate.

Field: F-3 **Crop:** Corn-Field Grain, Irrigated South ID **Yield:** 143.2

	N	P205	K20
Crop Nutrient Requirement	255	51	38
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	54		
from Prior Bio-Nutrients	31		
from Irrigation Water	0		0
Nutrient Balance from above	171.2	51.4	38.5
Imported Nutrients	56	80	308
Estimated Remaining Nutrients Required	116	-29	-270
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	116	-29	-270

Unacceptable Rate: May be a resource risk.
Acceptable: Sustainable agronomic rate.

Field: F-4 **Crop:** Alfalfa Hay, Irrigated South ID-Cut Mid Bloom **Yield:** 7.5

	N	P205	K20
Crop Nutrient Requirement	364	86	351
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	-38		
from Prior Bio-Nutrients	31		
from Irrigation Water	0		0
Nutrient Balance from above	372.7	85.9	351
Imported Nutrients	56	80	308

Estimated Remaining Nutrients Required	318	6	44
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	318	6	44

Acceptable: Sustainable agronomic rate.

Field: F-5 North **Crop:** Sugarbeets **Yield:** 35

	N	P205	K20
Crop Nutrient Requirement	290	48	118
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	-38		
from Prior Bio-Nutrients	23		
from Irrigation Water	0		0
Nutrient Balance from above	306.2	48.1	117.6
Imported Nutrients	41	59	228
Estimated Remaining Nutrients Required	265	-11	-110
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	265	-11	-110

Acceptable: Sustainable agronomic rate.

Field: F-6 East **Crop:** Corn-Field Grain, Irrigated South ID **Yield:** 160

	N	P205	K20
Crop Nutrient Requirement	255	58	43
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	-35		
from Prior Bio-Nutrients	21		
from Irrigation Water	0		0
Nutrient Balance from above	270.1	57.5	43
Imported Nutrients	38	54	208
Estimated Remaining Nutrients Required	232	4	-166
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	232	4	-166

Acceptable: Sustainable agronomic rate.

Field: F-6 West **Crop:** Corn-Field Grain, Irrigated South ID **Yield:** 160

	N	P205	K20
Crop Nutrient Requirement	255	58	43
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	-35		
from Prior Bio-Nutrients	23		
from Irrigation Water	0		0
Nutrient Balance from above	268.2	57.5	43
Imported Nutrients	41	59	228
Estimated Remaining Nutrients Required	227	-1	-185

Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	227	-1	-185

Acceptable: Sustainable agronomic rate.

Field: F-7 **Crop:** Corn-Field Grain, Irrigated South ID **Yield:** 160

	N	P205	K20
Crop Nutrient Requirement	255	58	43
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	-35		
from Prior Bio-Nutrients	23		
from Irrigation Water	0		0
Nutrient Balance from above	268.3	57.5	43
Imported Nutrients	41	59	226
Estimated Remaining Nutrients Required	227	-1	-183
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	227	-1	-183

Acceptable: Sustainable agronomic rate.

Field: F-8 North 1/3 **Crop:** Corn-Field Grain, Irrigated South ID **Yield:** 160

	N	P205	K20
Crop Nutrient Requirement	255	58	43
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	-35		
from Prior Bio-Nutrients	23		
from Irrigation Water	0		0
Nutrient Balance from above	268.3	57.5	43
Imported Nutrients	41	59	226
Estimated Remaining Nutrients Required	227	-1	-183
Commercial Fertilizer Application	0	0	0
Final Nutrient Balance	227	-1	-183

Acceptable: Sustainable agronomic rate.

Field: F-9 **Crop:** Corn-Field Grain, Irrigated South ID **Yield:** 160

	N	P205	K20
Crop Nutrient Requirement	255	58	43
Nutrients From Soil	?		
from Mineralized Nitrogen	0		
from Prior Crops	-35		
from Prior Bio-Nutrients	21		
from Irrigation Water	0		0
Nutrient Balance from above	270.1	57.5	43
Imported Nutrients	38	54	208
Estimated Remaining Nutrients Required	232	4	-166
Commercial Fertilizer Application	0	0	0

Final Nutrient Balance	232	4	-166

Acceptable: Sustainable agronomic rate.

BIO-NUTRIENT EXPORT INFO

Exported Bio-Nutrient Summary					
Bio-Nutrient Group Name	**Amount**	**Consumer**	**Consumer's Address**	**Telephone**	**Acres**
No nutrients exported from this facility					

Appendix B: NUTRIENT RISK ANALYSIS

Phosphorus Runoff Risk Assessment

FIELD: F- 5 South
Overall Risk Rating: Very High
Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 54.3

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: N/A

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: F- 8 South 2/3

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 58.9

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: N/A

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: F-1

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 30

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 80.1

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: N/A

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: F-10

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 54.3

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: N/A

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: F-11

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 77.9

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: N/A

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B) .

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler

irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: F-12
Overall Risk Rating: Very High
Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 77.9

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: N/A

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: F-13

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 85.9

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: Surface applied no incorporation

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based

on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.
Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.
Comments: No Data

Runoff Best Management Practices Rating: Low
List best management practices that mitigate runoff(See Appendix B)
Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High
Distance to Surface Water Body: 0
Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: F-14
Overall Risk Rating: Very High
Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.
Soil Test P Rating: Critical
Soil Test Depth: 18-24"
Idaho Nutrient Management Standard Threshold: 20
Soil Test Phosphorus Concentration: N/A
Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.
Phosphorus Application Rate: 0
Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High
Phosphorus Application Method: N/A
Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium
Manure Application Rate: 80.5
Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except

for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: N/A

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: F-15

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 77.9

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: N/A

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: F-16

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 85.9

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: Surface applied no incorporation

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: F-17

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 77.9

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: N/A

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of

this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: F-18

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 77.9

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: N/A

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: F-2

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 85.9

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: Surface applied no incorporation

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: F-3

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 80.1

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: N/A

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: F-4

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan

is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 80.1

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: N/A

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: F-5 North

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented

to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 59.4

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: N/A

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: F-6 East

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 54.3

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: N/A

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff N/A Rating: Very High

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: F-6 West

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 59.4

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: N/A

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: F-7

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 58.9

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: N/A

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: F-8 North 1/3

Overall Risk Rating: Very High

Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.

Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0
Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High
Phosphorus Application Method: N/A
Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium
Manure Application Rate: 58.9
Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High
Manure Application Method: N/A
Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.
Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.
Comments: No Data

Runoff Best Management Practices Rating: Low
List best management practices that mitigate runoff(See Appendix B)
Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High
Distance to Surface Water Body: 0
Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

FIELD: F-9
Overall Risk Rating: Very High
Very high potential for phosphorus loss and adverse effects on surface and/or ground waters. All necessary soil and water conservation measures and a phosphorus management plan must be implemented to minimize phosphorus loss. Reference risk assessment below and consult a local resource conservation planning specialist and/or the Idaho OnePlan Conservation Planning module to determine appropriate Best Management Practices for this field.
Soil Test P Rating: Critical

Soil Test Depth: 18-24"

Idaho Nutrient Management Standard Threshold: 20

Soil Test Phosphorus Concentration: N/A

Comments: Soil test P is above the Idaho Nutrient Management Standard Phosphorus Threshold. Test soils annually to monitor buildup or decline in soil P and to determine if your Nutrient Management Plan is successful in reducing soil P levels.

Phosphorus Fertilizer Application Rate Rating: Very Low or N.A.

Phosphorus Application Rate: 0

Comments: No Data

Phosphorus Fertilizer Application Method Rating: Very High

Phosphorus Application Method: N/A

Comments: For greatest phosphorus efficiency place commercial fertilizer P with planter or inject > 2"; otherwise incorporate > 3" by disking, chiseling, etc.

Manure Phosphorus Application Rate Rating: Medium

Manure Application Rate: 54.3

Comments: Sufficient soil P may be available for normal agronomic production after fertilization, except for possible response to a starter fertilizer for specific crops like potatoes (see Crop Specific Recommendations). A long range nutrient management plan will assist you in maintaining optimum soil P levels.

Manure Phosphorus Application Method Rating: High

Manure Application Method: N/A

Comments: For greatest phosphorus efficiency inject Organic P > 2" or plow; otherwise incorporate > 3" by disking, chiseling, etc. Where phosphorus is applied with irrigation, time applications to coincide as closely as possible with plant uptake. Emergency applications outside the growing season must be based on a water balance.

Irrigation Runoff Index (Irrigated) Rating: Very Low or N.A.

Comments: No Data

Surface Irrigation or Overhead Irrigation Rating: Very Low or N.A.

Comments: No Data

Runoff Best Management Practices Rating: Low

List best management practices that mitigate runoff(See Appendix B)

Comments: Consider implementing Conservation Practices that improve the long-term sustainability of this field

Distance to Surface Water Body Rating: Very High

Distance to Surface Water Body: 0

Comments: Because of the high soil test P, runoff should be eliminated by converting to sprinkler irrigation or installing a tail water recovery system; or sediment retention measures like filter strips or sediment basins should be installed to minimize offsite transport and loss of Phosphorus.

Nutrient Leaching Risk Assessment

FIELD: F- 5 South
Overall Risk Rating: Low
Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very Low or N.A.

Comments: No Data

Soil/Water Table Depth Rating: Low

Comments: Because the dominant soils have slow infiltration rates and water transmission, this field will probably not contribute to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water should be minimal.

FIELD: F- 8 South 2/3
Overall Risk Rating: Low
Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very Low or N.A.

Comments: No Data

Soil/Water Table Depth Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: F-1

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very Low or N.A.

Comments: No Data

Soil/Water Table Depth Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: F-10

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity

(EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very Low or N.A.

Comments: No Data

Soil/Water Table Depth Rating: High

Comments: Because the water table is near the surface (and/or the soil is shallow), this field is vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a significant concern.

FIELD: F-11

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very Low or N.A.

Comments: No Data

Soil/Water Table Depth Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: F-12

Overall Risk Rating: Low
Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very Low or N.A.

Comments: No Data

Soil/Water Table Depth Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: F-13
Overall Risk Rating: Low
Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very Low or N.A.

Comments: No Data

Soil/Water Table Depth Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: F-14

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very Low or N.A.

Comments: Good apparent irrigation water management, but if crop requirements are not being met crop yields may suffer from a water shortage. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: F-15

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very Low or N.A.

Comments: Good apparent irrigation water management, but if crop requirements are not being met crop yields may suffer from a water shortage. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: F-16

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very Low or N.A.

Comments: Good apparent irrigation water management, but if crop requirements are not being met crop yields may suffer from a water shortage. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth Rating: High

Comments: Because the water table is near the surface (and/or the soil is shallow), this field is vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water

and interconnected surface water may be a significant concern.

FIELD: F-17
Overall Risk Rating: Low
Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very Low or N.A.

Comments: Good apparent irrigation water management, but if crop requirements are not being met crop yields may suffer from a water shortage. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: F-18
Overall Risk Rating: Low
Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very Low or N.A.

Comments: Good apparent irrigation water management, but if crop requirements are not being met crop yields may suffer from a water shortage. Be sure that the right amount of irrigation water is applied as uniformly as possible to meet crop needs and minimize leaching from the root zone. Check with irrigation professional to assure that crop growth requirements are being adequately met.

Soil/Water Table Depth Rating: High

Comments: Because the water table is near the surface (and/or the soil is shallow), this field is vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a significant concern.

FIELD: F-2

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very Low or N.A.

Comments: No Data

Soil/Water Table Depth Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: F-3

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very Low or N.A.

Comments: No Data

Soil/Water Table Depth Rating: High

Comments: Because the water table is near the surface (and/or the soil is shallow), this field is vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a significant concern.

FIELD: F-4

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very Low or N.A.

Comments: No Data

Soil/Water Table Depth Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface

transport to ground water and interconnected surface water may be a concern.

FIELD: F-5 North
Overall Risk Rating: Low
Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.
Percolation Rating: Very Low or N.A.
Deep Percolation (as % of Evapotranspiration): <5% Over ET
Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.
Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.
Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very Low or N.A.
Comments: No Data

Soil/Water Table Depth Rating: Medium
Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: F-6 East
Overall Risk Rating: Medium
Leaching losses may be contributing to soluble nutrient leaching below the root zone during some years.
Percolation Rating:
Deep Percolation (as % of Evapotranspiration): <5% Over ET
Comments: No Data

Nitrogen Application Rate Rating: Very Low or N.A.
Comments: No Data

Nitrogen Application Timing Rating: Very Low or N.A.
Comments: No Data

Soil/Water Table Depth Rating: High
Comments: No Data

FIELD: F-6 West

Overall Risk Rating: Low
Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very Low or N.A.

Comments: No Data

Soil/Water Table Depth Rating: High

Comments: Because the water table is near the surface (and/or the soil is shallow), this field is vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a significant concern.

FIELD: F-7
Overall Risk Rating: Low
Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very Low or N.A.

Comments: No Data

Soil/Water Table Depth Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: F-8 North 1/3

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very Low or N.A.

Comments: No Data

Soil/Water Table Depth Rating: Medium

Comments: Because the dominant soils have moderate to high infiltration rates and water transmission, this field may be vulnerable to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water and interconnected surface water may be a concern.

FIELD: F-9

Overall Risk Rating: Low

Leaching losses are probably not contributing to soluble nutrient leaching below the root zone.

Percolation Rating: Very Low or N.A.

Deep Percolation (as % of Evapotranspiration): <5% Over ET

Comments: Nutrient leaching should not be a problem, however, there is a potential salt balance problem (and the crop's water requirement may not be completely satisfied). Evaluate whether adequate water is being applied to meet salt (leaching) requirements. If irrigation water has a high Electrical Conductivity (EC)/Sodium Adsorption Ration (SAR) salt balance may be critical.

Nitrogen Application Rate Rating: Very Low or N.A.

Comments: Some potential for nitrogen leaching if excess water is applied from irrigation and/or precipitation events. Potential for yield reduction from a nitrogen deficiency. Use soil and/or plant test and appropriate fertilizer recommendation for determining nutrient application rates.

Nitrogen Application Timing Rating: Very Low or N.A.

Comments: Good job! Follow Nitrogen application recommendations and apply according to crop growth needs.

Irrigation Efficiency Rating: Very Low or N.A.

Comments: No Data

Soil/Water Table Depth Rating: Low

Comments: Because the dominant soils have slow infiltration rates and water transmission, this field will probably not contribute to ground water contamination. Nutrient leaching and subsequent subsurface transport to ground water should be minimal.

NUTRIENT RISK ANALYSIS Legend

BMP	Definition	Purpose
Buffer Strip	Contour buffer strips are strips of perennial grass alternated with wider cultivated strips that are farmed on the contour.	Contour buffer strips slow runoff water and trap sediment. Consequently, soil erosion is generally reduced significantly by this practice. Sediments, nutrients, pesticides, and other potential pollutants are filtered out as water flows through the grass strips. The grass strips also provide food and cover for wildlife.
Channel Vegetation	Establishing and maintaining adequate plants on channel banks, berms, spoil, and associated areas.	To stabilize channel banks and adjacent areas and reduce erosion and sedimentation. To maintain or enhance the quality of the environment, including visual aspects and fish and wildlife habitat.
Chiseling and Sub soiling	Loosening the soil, without inverting and with a minimum of mixing of the surface soil, to shatter restrictive layers below normal plow depth that inhibit water movement or root development.	To improve water and root penetration and aeration.
Composting Facility	A composting facility is installed for biological stabilization of waste organic material.	The purpose of this practice is to biologically treat waste organic material and produce humus-like material that can be recycled as a soil amendment or organic fertilizer. The material may also be used by other acceptable methods of recycling that comply with laws, rules and regulations.
Conservation Cover	This practice involves establishing and maintaining a protective cover of perennial vegetation on land retired from agriculture	This practice reduces soil erosion, associated sedimentation, improves water quality, and creates or enhances wildlife habitat.

	production.	
Conservation Cropping Sequence	Growing crops in a recurring sequence on the same field.	This practice may be applied as part of a best management practice to support one or more of the following: Reduce sheet and rill erosion, Reduce irrigation induced erosion, Reduce soil erosion from wind, Maintain or improve soil organic matter content, Manage deficient or excess plant nutrients, Improve water use efficiency, Manage saline seeps, Manage plant pests (weeds, insects, diseases), Provide food for domestic livestock, and Provide food and cover for wildlife.
Contour Farming	Farming sloping land in such a way that preparing land, planting, and cultivating are done on the contours. (This includes following established grades of terraces or diversion.)	To reduce erosion and control water.
Cover and Green Manure Crop	A crop of close-growing, legumes, or small grain grown primarily for seasonal protection and soil improvement. It usually is grown for 1 year or less, except where there is permanent cover as in orchards.	To control erosion during periods when the major crops do not furnish adequate cover; add organic material to the soil; and improve infiltration, aeration, and tilth.
Critical Area Planting	Planting vegetation on critically eroding areas that require extraordinary treatment.	This practice is used on highly erodible areas that cannot be stabilized by ordinary planting techniques and if left untreated may cause severe erosion or sediment damage. Examples of critical areas include the following: 1) Dams, dikes, levees, and other construction sites with very steep slopes, 2) Mine spoil and surface mined land with poor quality soil and possibly chemical problems, and 3) Agriculture land with severe gullies requiring specialized planting techniques and

		management.
Dike or Berm	An embankment constructed of earth or other suitable materials to protect land against overflow or to regulate water.	Dikes are used to: Permit improvement of agricultural land by preventing overflow and better use of drainage facilities, Prevent damage to land and property, Facilitate water storage and control in connection with wildlife and other developments, and Protect natural areas, scenic features and archeological sites from damage.
Diversion	A channel constructed across the slope with a supporting ridge on the lower side.	To divert excess water from one area for use or safe disposal in other areas.
Drip Irrigation	A planned irrigation system in which all necessary facilities are installed for efficiently applying water directly to the root zone of plants by means of applicators (orifices, emitters, porous tubing, perforated pipe) operated under low pressure. The applicators can be placed on or below the surface of the ground.	To efficiently apply water directly to the plant root zone to maintain soil moisture within the range for good plant growth and without excessive water loss, erosion, reduction in water quality, or salt accumulation.
Filter Strip	A strip or area of vegetation for removing pollutants water.	A filter strip reduces pollution by filtration, deposition, infiltration, absorption, adsorption, decomposition, and volatilization of sediment, organic matter, and other pollutants from runoff and waste water.
Fish Stream Improvement	Fish Stream Improvement is improving a stream channel to make or enhance fish habitat.	The purpose of the practice is to increase production of desired species of fish. The practice involves improving food supplies, shelter, spawning areas, water quality, and other elements of fish habitat.
Grade Stabilization Construction	A structure used to control the grade and head cutting in natural or artificial channels.	These structures are to: Stabilize the grade and control erosion in natural or artificial channels, prevent the formation or advance of

		gullies, enhance environmental quality, and reduce pollution hazards.
Grassed Waterway	A natural or constructed channel that is shaped or graded to required dimensions and established in suitable vegetation for the stable conveyance of runoff.	Grassed waterways convey runoff from terraces, diversions, or other water concentrations without causing erosion or flooding and to improve water quality.
Grazing Land Mechanical Treatment	Modifying physical soil and/or plant conditions with mechanical tools by treatments such as; pitting, contour furrowing, and ripping or sub-soiling.	This practice should be applied as part of a best management practice to support one or more of the following purposes: Fracture compacted soil layers and improve soil permeability, Reduce water runoff and increase infiltration, Break up sod bound conditions and thatch to increase plant vigor, and Renovate and stimulate plant community for greater productivity and yield.
Heavy Use Area Protection	Protecting heavily used areas by establishing vegetative cover, by surfacing with suitable materials, or by installing needed structures.	To stabilize urban, recreation, or facility areas frequently and intensely used by people, animals, or vehicles.
Irrigation Land Leveling	Reshaping the surface of land to be irrigated to planned grades.	To permit uniform and efficient application of irrigation water without causing erosion, loss of water quality, or damage to land by water logging and at the same time to provide for adequate surface drainage.
Irrigation Water Management	Irrigation water management is the process of determining and controlling the volume, frequency, and application rate of irrigation water in a planned, efficient manner.	Irrigation water management is applied as part of a conservation management system to support one or more of the following: Manage soil Moisture to promote desired crop response; Optimize use of available water supplies; Minimize irrigation induced soil erosion; Decrease non-point source pollution of surface and groundwater resources; Manage

		salts in the crop root zone; Manage air, soil, or plant micro-climate.
Mulching	Applying plant residues or other suitable materials not produced on the site to the soil surface.	To conserve moisture; prevent surface compaction or crusting; reduce runoff and erosion; control weeds; and help establish plant cover.
Polyacrylamide (PAM)	Polyacrylamide is an organic polymer formulated to stabilize soil when applied in irrigation water.	Water applied with PAM stabilizes soil aggregates which can then resist the erosive forces of water. If correctly applied, PAM will produce clear runoff water and residue erosion within the field by over 90 percent.
Prescribed Grazing	Prescribed grazing is the controlled harvest of vegetation with grazing animals, managed with the intent to achieve a specific objective.	Application of this practice will manipulate the intensity, frequency, duration, and season of grazing to: 1) Improve water infiltration, 2) maintain or improve riparian and upland area vegetation, 3) protect stream banks from erosion, 4) manage for deposition of fecal material away from water bodies, and 5) promote ecological and economically stable plant communities which meet landowner objectives.
Residue Management (Conservation Tillage)	Managing the amount, orientation, and distribution of crop and other plant residue on the soil surface.	This practice may be applied as part of a conservation system to support one or more of the following: Reduce sheet and rill erosion. Reduce wind erosion. Maintain or improve soil organic matter content and tilth. Conserve soil moisture. Manage snow to increase plant available moisture. Provide food and escape cover for wildlife.
Riparian Forest Buffer	A riparian forest buffer is an area of trees and/or shrubs located adjacent to a body of water. The vegetation extends outward from the water body for a specified	The riparian forest buffer is a multi-purpose practice design to accomplish one or more of the following: Create shade to lower water temperatures and improve

	distance necessary to provide a minimum level of protection and/or enhancement.	habitat for aquatic animals, Provide a source of debris necessary for healthy robust populations of aquatic organisms and wildlife, and Act as a buffer to filter out sediment, organic material, fertilizer, pesticides and other pollutants that may adversely impact the water body, including shallow ground water.
Sediment Basin	A basin constructed to collect and store debris or sediment.	A sediment basin may have the following uses: Preserve the capacity of reservoirs, ditches, canals, diversion, waterways, and streams, Prevent undesirable deposition on bottom lands and developed areas, Trap sediment originating from construction sites, and Reduce or abate pollution by providing basins for deposition and storage of silt, sand, gravel, stone, agricultural wastes, and other detritus.
Sprinkler System	A planned irrigation system in which all necessary facilities are installed for efficiently applying water by means of perforated pipes or nozzles operated under pressure.	To efficiently and uniformly apply irrigation water to maintain adequate soil moisture for optimum plant growth without causing excessive water loss, erosion, or reduced water quality.
Stream Channel Stabilization	Stabilizing the channel of a stream with suitable structures.	To control aggradations or degradation in a stream channel.
Stream bank Protection	Using vegetation or structures to stabilize and protect banks of streams, lakes, estuaries, or excavated channels against scour and erosion.	To stabilize or protect banks of streams, lakes, estuaries, or excavated channels for one or more of the following purposes: Prevent the loss of land or damage to utilities, roads, buildings, or other facilities adjacent to the banks, Maintain the capacity of the channel, Control channel meander that would adversely affect downstream facilities, Reduce sediment loads causing downstream damages and

		pollution, and Improve the stream for recreation or as a habitat for fish and wildlife.
Strip-cropping, Contour	Growing crops in a systematic arrangement of strips or bands on the contour to reduce water erosion. The crops are arranged so that a strip of grass or close-growing crop is alternated with a strip of clean-tilled crop or fallow or a strip of grass is alternated with a close-growing crop.	To reduce sheet and rill erosion and/or to reduce transport of sediment and other water-borne contaminants.
Strip-cropping, Field	Growing crops in a systematic arrangement of strips or bands across the general slope (not on the contour) to reduce water erosion. The crops are arranged so that a strip of grass or a close-growing crop is alternated with a clean-tilled crop or fallow.	To help control erosion and runoff on sloping cropland where contour strip-cropping is not practical.
Subsurface Drains	A Subsurface Drain is a conduit, such as corrugated plastic tubing, tile, or pipe, installed beneath the ground surface to collect and/or convey drainage water.	The purpose of a subsurface drain is to: Improve the environment for vegetation, Reduce erosion, Improve water quality, Collect ground water for beneficial use, Remove water from heavy use areas such as recreation areas, or around buildings, and Regulate water to control health hazards caused by pests.
Surge Irrigation	Surge irrigation is the intermittent application of water to furrows, corrugates, or borders creating a series of on and off periods of constant or variable time spans.	Surge allows a lighter application of water with a higher efficiency. The result is less deep percolation of water at the upper end of the field and a more uniform application.
Tail water Recovery & Pumpback System	A facility to collect, store, and transport irrigation tail water for reuse in a farm irrigation distribution system.	To conserve farm irrigation water supplies and water quality by collecting the water that runs off the field surface for reuse on the farm.

Terraces	An earth embankment, a channel, or a combination ridge and channel constructed across the slope.	Reduce slope length, reduce sediment content in runoff water, reduce erosion, Improve water quality, intercept and conduct surface runoff at a non-erosive velocity to a stable outlet, retain runoff for moisture conservation, prevent gully development, reform the land surface, improve farmability, and reduce flooding.
Use Exclusion	Excluding animals, people or vehicles from an area.	To protect, maintain, or improve the quantity and quality of the plant, animal, soil, air, water, and aesthetics resources and human health and safety.
Water and Sediment Control Basin	An earth embankment or a combination ridge and channel generally constructed across the slope and minor watercourses to form a sediment trap and water detention basin.	To improve farmability of sloping land, reduce watercourse and gully erosion, trap sediment, reduce and manage onsite and downstream runoff, and improve downstream water quality.
Watering Facility	A device (tank, trough, or other watertight container) for providing animal access to water.	To provide watering facilities for livestock and/or wildlife at selected locations in order to: 1) protect and enhance vegetative cover through proper distribution of grazing; 2) provide erosion control through better grassland management; or 3) protect streams, ponds and water supplies from contamination by providing alternative access to water.
Wetland Development/Restoration	The construction or restoration of a wetland facility to provide the hydrological and biological benefits of a wetland.	To develop or restore hydric soil conditions, hydrologic conditions, hydrophytic plant communities, and wetland functions.

Appendix C: CROP SPECIFIC GUIDELINES

Alfalfa Hay, Irrigated South ID-Cut Mid Bloom

NITROGEN

Nitrogen (N) fertilizer is generally not needed for alfalfa since a healthy alfalfa stand is capable of fixing adequate levels of N. Responses to applied N usually indicate the alfalfa stand is not effectively nodulated due to lack of proper seed inoculation at planting, or that the stand is aging.

Soils containing 20 to 30 pounds (4 to 7.5 ppm) of nitrate-nitrogen (NO3-N) in the top 12 inches have sufficient N to establish a stand of alfalfa seeded alone. Adding fertilizer N at establishment reduces nodule number and nodule activity.

Establishing alfalfa with a companion crop is not recommended because the alfalfa stand typically is reduced by the excessive competition from the companion plantings. When growers plant alfalfa with a companion crop, both crops compete for the N. Under these conditions, N rates of 30 to 40 pounds per acre are suggested to establish alfalfa stands.

PHOSPHORUS

Alfalfa responds well to applied phosphorus (P). The need for P fertilization can be determined by a soil test. Phosphorus materials should be broadcast and incorporated into the seedbed before planting. For best results, P fertilizers should be applied on established stands in the fall. The University of Idaho recommended application should be sufficient for 2 years of production.

POTASSIUM

Alfalfa has a high potassium (K) requirement. Recommended K fertilization levels are determined by soil test. Broadcast and incorporate K at establishment or apply in the fall or early spring on established stands.

SULFUR

Mountain valleys and foothill areas that receive higher amounts of precipitation and/or that are irrigated with low sulfur-containing water are likely areas for sulfur (S) deficiency. Areas irrigated with water from the Snake River or any water containing the sulfate (SO4) form of sulfur should have an adequate amount of S.

Alfalfa and other legumes require more S than grasses. Plant tissue testing is an excellent tool for detecting S-deficient alfalfa. Samples should be analyzed for total N and total S. These values are used to calculate the nitrogen/sulfur ratio, which should be less than 15. When the ratio is greater than 15, an S deficiency is suspected.

Soils testing less than 8 ppm SO4-S for 0- to 12-inch soil depth should receive 40 pounds S per acre. This rate of application should provide adequate sulfur for 2 years of production. Many southern Idaho soils contain accumulated S below the 12-inch depth. Although the 0- to 12-inch soil zone may be low in S (8 ppm), the soil below 12 inches may supply enough S for alfalfa production. Thus, testing the soil at both 0- to 12- and 12- to 24-inch depths is advised for good S recommendation.

Fertilizer S sources include gypsum (CaS04) and elemental sulfur. S is also included in some N, P and K fertilizer materials. Elemental S must be biologically converted to the S04 form to be used by the plant. The rate of conversion depends on soil temperature, soil water content and particle size of the elemental S applied. To correct a S deficiency, the year of application use a fertilizer containing S04 as the readily available S source. Elemental S can be used to provide long term S release.

MICRONUTRIENTS

Zinc (Zn) deficiencies on alfalfa have not been observed in Idaho. Crops such as beans, corn, potatoes, and onions would normally exhibit Zn deficiency before alfalfa. Zinc applied to any of those crops would have sufficient residual for alfalfa.

BORON

Alfalfa is sensitive to low soil boron (B). Boron deficiencies have been observed in southern Idaho, but they are not widespread. Deficiencies normally occur on acidic soils (pH less than 7.0) and droughty (gravelly and sandy) soils. If the soil tests less than 0.25 ppm B, apply 1 to 3 pounds per acre of B. Do not use higher rates because B in excessive amounts is toxic to plants.

GENERAL COMMENTS

Complete information on cultural practices necessary for alfalfa production is contained in University of Idaho Current Information Series 144, "Producing maximum Yields of Irrigated Alfalfa hay."

Irrigation, weeds, and insects can influence the effectiveness of a fertilizer application.

Alfalfa fields in southern Idaho frequently become yellow during the re-growth of the second and third crop. These fields have not responded to applications of fertilizer to correct this temporary yellowing condition.

Alfalfa can become a cash crop in the rotation by the application of needed management inputs such as water, fertilizer and pesticides and by timely harvesting. Alfalfa quality is enhanced by cutting at the early bud stage and more frequently during the growing season. This practice will reduce stand life, however.

Alfalfa hay should be analyzed to determine P content. Phosphorus is important for animal nutrition and can greatly influence animal performance and animal health. Fertilization can increase P content of forage.

Applications of S have been shown to reduce alfalfa selenium (Se) concentrations on soils low in available Se. Levels of Se above 0.1 ppm in the dry forage are considered adequate to prevent white muscle disease and other disorders related to limited Se forage.

Corn-Field Grain, Irrigated South ID

NITROGEN

Nitrogen rates depend upon some of the following factors: previous crop, past fertilizer use, soil type and leaching hazard and realistic yield goal for the grower and the area.

Adequate N is necessary for maximum economic production of irrigated field corn used for silage or grain. Fertilizer N represents by far the largest share of the fertilizer costs for field corn in Idaho. The amount of N required depends on many factors that influence total corn production and quality. These factors include length of growing season, corn hybrid, previous crop, past fertilizer use, soil type, leaching hazard and previous manuring. Estimates of both the N available to corn during the season and the yield potential of the crop should be considered when determining N fertilizer rates.

TOTAL N REQUIREMENTS BASED ON POTENTIAL YIELD

Fertilizer N rates should be used which correspond to the yield growers can reasonably expect under their soil and management conditions. The historical field corn yield obtained by a grower in a specific field or area generally provides a fair approximation of yield potential given a grower's traditional crop management. Projected changes in crop management (i.e. improved variety, better disease and weed control) designed to appreciably increase production may require adjustment of yield potential upward. Research has shown that the available N required to produce a good field corn yield depends on a variety of crop management practices. Factors such as weed, insect and disease control as well as irrigation, planting date and soil type can influence the N required by triticale for maximum yield.

AVAILABLE NITROGEN

Available N in the soil includes mineralizable N (released from organic matter during the growing season) inorganic N as nitrate (N03-N) and ammonium (NH4-N), and N credits from previous cropping or manures. Each component of available N must be estimated for accurate determination of optimum fertilizer N rates.

MINERALIZABLE NITROGEN - Soils vary in their capacity to release N from organic matter during the growing season. The amount of N released depends on such factors as soil type, soil moisture, soil temperature, previous crop, and the history of fertilizer N applied. While soil organic matter content is

frequently used to estimate annual mineralizable N contributions, in southern Idaho irrigated soils organic matter does not accurately predict the amount of N that is mineralized.

INORGANIC NITROGEN - Residual soil inorganic N (N03, NH4) can be evaluated most effectively with a soil test. Soil samples should be collected in foot increments to a depth of two feet, unless roots are restricted by dense soil layers or high water tables. Ammonium is generally low in pre-plant soil samples and thus contributes little to available N. However, it can be as high or higher than N03-N. NH4-N should be determined along with N03-N, especially when there is reason to expect the presence of appreciable NH4-N, such as recent ammonium N fertilizer applications. Soil samples should be collected before seeding in the spring to represent the area to be fertilized.

NITROGEN FROM PREVIOUS CROP RESIDUES - Nitrogen associated with decomposition of previous crop residues should also be considered when estimating available N. Residues that require additional N for decomposition include cereal straw and mature corn stalks. Research has shown that 15 pounds of additional N are needed per ton of straw returned to the soil, up to a maximum of 50 pounds. For more information on compensating for cereal residues, refer to CIS 825, "Wheat Straw Management and Nitrogen Fertilizer Requirements."

Row crop residues (potatoes, sugar beets, onions) generally do not require additional N for decomposition. Consequently, these residues have little effect on the N needs of field corn.

Legume residues from beans, peas, and alfalfa can release appreciable N during the following crop season that may not be reflected by the pre-plant soil test. This N is derived from the decomposition of both plant tops and nodulated root systems.

NITROGEN FROM MANURES - Soils in which field corn is grown occasionally receive animal manures or lagoon wastes. Nutrient contributions from these sources should also be taken into consideration when estimating available N for the next season. Manures can preclude the need for any fertilizer, depending on the rate applied and their nutrient composition.

Manures can vary appreciably depending on the animal, how the manure is processed, and the kind and extent of bedding material. For the most accurate estimate of fertilizer equivalent values, the manure should be analyzed for its nutrient content.

IRRIGATION WATER - Irrigation waters derived from deep wells are generally low in N. More shallow wells can have significant levels of nitrogen because of leaching of nitrogen from impacts from commercial fertilizer use, animal waste, and improperly functioning septic systems. Irrigation waters from most districts are also low in N when diverted from its source. Background levels of N from original sources are generally about 2 parts per million (ppm). The more return flow included in diverted water sources, the higher the N content. Return flows may include N dissolved when irrigation waters pass through fields high in residual or recently added fertilizer N as well as from soluble fertilizer N applied with the irrigation water.

Most irrigation districts should know the N content of the water they divert. Contact them for this information to determine the levels of N added with your irrigation water. However, since irrigation water N levels are influenced by upstream management, if you use irrigation water that receives runoff after it is diverted, only a water test can accurately evaluate the N added with irrigation waters.

For each ppm or milligrams per liter (mg/L) of N reported in the water sample, multiply by 2.7 to get the N added per acre foot of water applied. For example, if the water sample contained 10 ppm of N, 3 acre feet of water applied would be the equivalent of 81 pounds of N per acre. Typically, of the water applied with furrow irrigation only 50 percent is retained on the field and the rest runs off the end. The net retention of N applied with furrow irrigation would, therefore, be about half of the water applied or about 40 pounds per acre in this example. If more or less of the irrigation water is retained with each wetting, then growers should adjust the water N contribution accordingly.

Excessive irrigation by any method reduces N availability to field corn. Additional N may be needed under these conditions. Growers should not use aqua or anhydrous N through a sprinkler irrigation system.

Water running soluble N sources with a furrow irrigation system can be an effective means of adding N. Two limitations of this practice are that (1) the application of the N with this method may not be as uniform as desired and (2) runoff containing the N may contaminate downstream surface waters. Growers

can minimize the loss of N by shutting off the injection unit before the irrigation water reaches the end of the furrow. This practice should not substitute for careful consideration of N needs while N can be side dressed.

CALCULATION OF N APPLICATION RATES

To calculate the fertilizer N application rate, the following equation is used:

Fertilizer application rate (deficit) or Over application of Nitrogen =
(Total N required to produce a given yield) - (Mineralizable N) - (Inorganic N measured by the soil test) - (previous crop/residue management) - (Manure Nitrogen) - (Irrigation Water)

TIMING OF NITROGEN APPLICATION

Coarse-textured soils, including sandy loams, loamy soils and sands, may lose N from leaching. For these soils, side dress a portion of the N at the time of the last cultivation. Sprinkler irrigation of corn under center pivots provides increased flexibility for providing N during the season. With sprinklers N can be injected into the system and applied with the water. On silt loam soils, split applications of N have not proven more effective as long as pre-plant N is adequately incorporated.

High N rates (approaching 300 pounds per acre) broadcast and incorporated before planting may reduce early season corn growth. If high N rates are needed, split applications should be considered.

High plant populations (above 28,000 to 30,000) and early plantings of longer season hybrids in the Treasure Valley will respond to high N rates provided there are no other limiting factors. High N rates will not compensate for reductions in stand or delayed plantings. High plant populations of field corn are more susceptible to N shortages because of greater competition among plants for limited N.

Side dressing may cause root pruning depending on plant size, distance of shank from the row and placement depth. High N rates (above 300 pounds per acre) broadcast and incorporated before planting may reduce early season corn growth. If high N rates are needed, split applications should be considered. On sandy textured soils subject to leaching, side dress a portion of the N at the time of the last cultivation. Under sprinkler irrigations, N can be injected through the lines throughout the season. On silt loam soils, split applications of N have not proven more effective as long as pre-plant N is adequately incorporated.

PHOSPHORUS

Adequate phosphorus (P) is necessary for maximum production of field corn. The soil test for P is based on samples collected from the first foot of soil. The soil is extracted with sodium bicarbonate. Economic response to fertilizer P is more likely with cooler soil temperatures and soils with high lime content, particularly when planting long season hybrids. Phosphorus is an immobile nutrient that does not move appreciably from where it is placed. It should be mixed into the seedbed or banded within easy reach of the seedling roots before or during the planting operation.

POTASSIUM

Field corn requires adequate potassium (K) for optimum growth. Soil test K can be useful in determining the need for K fertilizers. The soil sample is taken from the first foot of soil and extracted with sodium bicarbonate. Fertilizer K rates are based on soil test.

MICRONUTRIENTS

Zinc (Zn) deficiencies occur primarily on soils that are eroded, leveled or where the exposed subsoil is higher in lime. The DTPA test on soil samples collected from the first foot can be used for identifying Zn fertilizer needs. Apply 10 pounds of Zn per acre when the soil test measures less than 0.6 ppm.

Other micronutrients have not been shown to limit corn production. "Shotgun" applications of micronutrient mixtures containing boron (B), copper (Cu), iron (Fe) and manganese (Mn) "for insurance" have not been shown to be economical and are not recommended.

SULFUR (S)

The major corn-growing regions in Idaho should not experience shortages of S. Areas with S deficiencies include some irrigated areas where both the soil and irrigation water are low in S. Snake River water is known to have high S concentrations. Coarse-textured soils including sandy loams, loamy sands and sands would be more susceptible to S deficiencies than silt loam soils. Where the need for S is evident, use 30 pounds per acre of sulfate-sulfur (S04).

SALINITY (SALTS)

Field corn has a low to moderate tolerance to accumulated salts. Soils with total salt readings above 3 or 4 mmhos/cm can be cropped effectively. Readings up to 6 are also satisfactory although more careful water management may be required.

Potatoes

NITROGEN

Nitrogen rates depend upon some of the following factors: previous crop, past fertilizer use, soil type and leaching hazard and realistic yield goal for the grower and the area.

Most Idaho potato fields will respond to fertilizer nitrogen (N). The N rate used, along with other management factors, particularly irrigation, can have a marked effect on the yield and quality of the potato crop.

TOTAL N REQUIREMENTS BASED ON POTENTIAL YIELD

Fertilizer N rates should be used which correspond to the yield growers can reasonably expect under their soil and management conditions. The historical potato yield obtained by a grower in a specific field or area generally provides a fair approximation of yield potential given a grower's traditional crop management. Projected changes in crop management (i.e. improved variety, better disease and weed control) designed to appreciably increase production may require adjustment of yield potential upward. Research has shown that the available N required to produce a good potato yield depends on a variety of crop management practices. Factors such as weed, insect and disease control as well as irrigation, planting date and soil type can influence the N required by potatoes for maximum yield.

AVAILABLE NITROGEN

Available N in the soil includes mineralizable N (released from organic matter during the growing season) inorganic N as nitrate (N03-N) and ammonium (NH4-N), and N credits from previous cropping or manures. Each component of available N must be estimated for accurate determination of optimum fertilizer N rates.

MINERALIZABLE NITROGEN - Soils vary in their capacity to release N from organic matter during the growing season. The amount of N released depends on such factors as soil type, soil moisture, soil temperature, previous crop, and the history of fertilizer N applied. While soil organic matter content is frequently used to estimate annual mineralizable N contributions, in southern Idaho irrigated soils organic matter does not accurately predict the amount of N that is mineralized.

INORGANIC NITROGEN - Residual soil inorganic N (N03, NH4) can be evaluated most effectively with a soil test. Soil samples should be collected in foot increments to a depth of two feet, unless roots are restricted by dense soil layers or high water tables. Ammonium is generally low in pre-plant soil samples and thus contributes little to available N. However, it can be as high or higher than N03-N. NH4-N should be determined along with N03-N, especially when there is reason to expect the presence of appreciable NH4-N, such as recent ammonium N fertilizer applications. Soil samples should be collected before seeding in the spring to represent the area to be fertilized.

NITROGEN FROM PREVIOUS CROP RESIDUES - Nitrogen associated with decomposition of previous crop residues should also be considered when estimating available N. Residues that require additional N for decomposition include cereal straw and mature corn stalks. Research has shown that 15 pounds of additional N are needed per ton of straw returned to the soil, up to a maximum of 50 pounds. For more information on compensating for cereal residues, refer to CIS 825, "Wheat Straw Management and Nitrogen Fertilizer Requirements."

Row crop residues (potatoes, sugar beets, onions) generally do not require additional N for decomposition. Consequently, these residues have little effect on the N needs of potatoes.

Legume residues from beans, peas, and alfalfa can release appreciable N during the following crop season that may not be reflected by the pre-plant soil test. This N is derived from the decomposition of both plant tops and nodulated root systems.

NITROGEN FROM MANURES - Soils in which potatoes are grown rarely receive animal manures or lagoon wastes. Nutrient contributions from these sources should also be taken into consideration when estimating available N for the next season. Manures can preclude the need for any fertilizer, depending on the rate applied and their nutrient composition.

Manures can vary appreciably depending on the animal, how the manure is processed, and the kind and extent of bedding material. For the most accurate estimate of fertilizer equivalent values, the manure should be analyzed for its nutrient content.

IRRIGATION WATER - Irrigation waters derived from deep wells are generally low in N. More shallow wells can have significant levels of nitrogen because of leaching of nitrogen from impacts from commercial fertilizer use, animal waste, and improperly functioning septic systems. Irrigation waters from most districts are also low in N when diverted from its source. Background levels of N from original sources are generally about 2 parts per million (ppm). The more return flow included in diverted water sources, the higher the N content. Return flows may include N dissolved when irrigation waters pass through fields high in residual or recently added fertilizer N as well as from soluble fertilizer N applied with the irrigation water.

Most irrigation districts should know the N content of the water they divert. Contact them for this information to determine the levels of N added with your irrigation water. However, since irrigation water N levels are influenced by upstream management, if you use irrigation water that receives runoff after it is diverted, only a water test can accurately evaluate the N added with irrigation waters.

For each ppm or milligrams per liter (mg/L) of N reported in the water sample, multiply by 2.7 to get the N added per acre foot of water applied. For example, if the water sample contained 10 ppm of N, 3 acre feet of water applied would be the equivalent of 81 pounds of N per acre. Typically, of the water applied with furrow irrigation only 50 percent is retained on the field and the rest runs off the end. The net retention of N applied with furrow irrigation would, therefore, be about half of the water applied or about 40 pounds per acre in this example. If more or less of the irrigation water is retained with each wetting, then growers should adjust the water N contribution accordingly.

Excessive irrigation by any method reduces N availability to potatoes. Additional N may be needed under these conditions. Growers should not use aqua or anhydrous N through a sprinkler irrigation system. Water running soluble N sources with a furrow irrigation system can be an effective means of adding N. Two limitations of this practice are that (1) the application of the N with this method may not be as uniform as desired and (2) runoff containing the N may contaminate downstream surface waters. Growers can minimize the loss of N by shutting off the injection unit before the irrigation water reaches the end of the furrow. This practice should not substitute for careful consideration of N needs while N can be side dressed.

CALCULATION OF N APPLICATION RATES

To calculate the fertilizer N application rate, the following equation is used:

Fertilizer application rate (deficit) or Over application of Nitrogen =
(Total N required to produce a given yield) - (Mineralizable N) - (Inorganic N measured by the soil test) - (previous crop/residue management) - (Manure Nitrogen) -(Irrigation Water)

TIMING OF NITROGEN APPLICATION

Nitrogen fertilizer recommendations are for Russet Burbank potatoes grown on sandy loam soils. Adjustments are made for very sandy soils (add 30 lb N/acre) and silt loam soils (subtract 40 lb N/acre) to account for differences in nitrogen mineralization rates and nitrogen use efficiency. To maximize yield and quality, growers should aim to have about 40 to 45% of their total N supply applied by row closure.

Nitrogen applications made during tuber bulking should be guided by petiole sampling to maintain at least 15,000 ppm N03-N in the fourth petiole from the growing tip.

Excess levels of soil N at or before tuberization can delay tuber growth, reduce yields and lower tuber specific gravity. Excess N in late summer and fall can delay maturity of the tubers. This delayed tuber maturity can adversely affect tuber storability and quality.

The N needs of the potato crop are best met by split-application of N fertilizer. This involves applying lower rates of N fertilizer pre-plant and at planting, with the remainder of the crop's N needs applied with the irrigation water. Some cropping systems - for example, furrow irrigation - make it difficult to apply N fertilizer and get efficient plant uptake. Under these conditions most of the crop N needs are applied to the soil before planting.

Nitrogen applied with irrigation water is an effective way to supplement the crop during the growing season. Do not use aqua or anhydrous ammonia in sprinkler system applications. Applications through a sprinkler system are not folar fertilization.

PHOSPHORUS

Potato plants need phosphorus (P) for plant growth and will respond to P fertilizer if the soil test concentration is low. Phosphorus soil test for potatoes is based on an extraction with sodium bicarbonate. Soil samples for a phosphorus soil test should be taken from 0- to 12-inch depths. This depth of sampling is critical to achieve an accurate soil test P level. Deviation in sampling depth from the 12-inch depth may drastically alter soil test results.

Phosphorus is immobile in soil and therefore does not move from where it is placed. Applied P fertilizer must be mixed into the seedbed before planting for best results. Banding P fertilizer along side plants has not been as effective as P fertilizer that has been broadcast and incorporated. Eroded or scraped areas, commonly referred to as "white soil" areas, may be low in available P because of its high content of "free lime." These areas should be tested and fertilized separately. To compensate for low P availability when free lime is present in the soil, rates of P are increased with increasing levels of free lime. Total phosphorus concentrations should be kept above 0.22% in the fourth petiole during tuber bulking.

POTASSIUM

Potatoes require high levels of available potassium (K). Potassium is relatively immobile in the soil. For best results, K fertilizers should be applied pre-plant and mixed into the seedbed. Banding beside the plants has been used successfully but is not as effective as K fertilizer which has been broadcast and incorporated.

Potassium fertilizer applications reduce specific gravity of harvested tubers. Potassium chloride fertilizer (KCl or muriate of potash) lowers specific gravity of tubers more than potassium sulfate fertilizer (K2SO4 or sulfate of potash). Growers should avoid over-fertilization of potatoes with K fertilizers. When specific gravity of tubers is important, potassium sulfate is the preferred K fertilizer source. Total potassium concentrations should be kept above 7.0% in the fourth petiole during tuber bulking.

SULFUR

Potatoes generally do not respond to sulfur (S) fertilization. Sulfur response is most likely to occur in sandy soils and in areas where irrigation water sources are low in S. Water low in S includes mountain streams and some well waters. The more irrigation return-flow in the water source the greater the amount of dissolved, plant-available sulfate (S04) form. Elemental sulfur is not recommended because it is not immediately available to plants. Elemental sulfur will require several months from time of application until it is converted to plant-available form.

MICRONUTRIENTS

"Shotgun" application of micronutrients - I.e. complete mixes containing boron (B), copper (Cu), iron (Fe), manganese (Mn) and zinc (Zn) - "for insurance" are not recommended since these elements have not been shown to give an economical response. Soil tests for individual micronutrients are available and concentrations in the 0- to 1-inch soil sample are: B = 0.5 ppm, Cu = 0.2 ppm, Fe = 4.0 ppm, Mn = 2.0

ppm, Zn = 0.5 ppm. Critical concentrations represent values below which a response from the application of that micronutrient may be obtained.

Zinc deficiencies have not been widespread on potatoes although some crops in certain areas of southern Idaho do show a Zn deficiency. When the soil test for Zn is below the critical concentration or where land leveling or erosion has exposed white subsoil containing free lime, apply Zn fertilizer at a rate which will supply 10 pounds of Zn per acre or equivalent. This amount of Zn should be sufficient for 4 to 6 years of crop production.

GENERAL COMMENTS

The P, K, and Zn nutritional status of the plant should also be monitored during the growing season. The same petiole sample used for N03-N concentrations can also be used for this purpose. Guidelines for adequate concentrations of these and other nutrients in the petiole can be obtained from your county agricultural Extension agent, consultant, or fieldman.

Fertilizer materials containing P, K and Zn should be thoroughly incorporated into the root zone. These materials can be effectively applied in the fall.

Sugarbeets

NITROGEN

Nitrogen rates depend upon some of the following factors: previous crop, past fertilizer use, soil type and leaching hazard and realistic yield goal for the grower and the area.

Controlling the amount of N available to the sugar beet is critical in producing high beet tonnage with high sugar percentage. Nitrogen in excess can reduce sugar percentage and gross income per acre.

TOTAL N REQUIREMENTS BASED ON POTENTIAL YIELD

Fertilizer N rates should be used which correspond to the yield growers can reasonably expect under their soil and management conditions. The historical sugar beet yield obtained by a grower in a specific field or area generally provides a fair approximation of yield potential given a grower's traditional crop management. Projected changes in crop management (i.e. improved variety, better disease and weed control) designed to appreciably increase production may require adjustment of yield potential upward.

AVAILABLE NITROGEN

Available N in the soil includes mineralizable N (released from organic matter during the growing season) inorganic N as nitrate (N03-N) and ammonium (NH4-N), and N credits from previous cropping or manures. Each component of available N must be estimated for accurate determination of optimum fertilizer N rates.

MINERALIZABLE NITROGEN - Soils vary in their capacity to release N from organic matter during the growing season. The amount of N released depends on such factors as soil type, soil moisture, soil temperature, previous crop, and the history of fertilizer N applied. Soils that retain moisture tend to mineralize more N than soils such as sandy loams, which dry out more rapidly. Mineralization of N is limited by cooler soil temperatures that limit soil biological activity.

While soil organic matter content is frequently used to estimate annual mineralizable N contributions, in southern Idaho irrigated soils organic matter does not accurately predict the amount of N that is mineralized.

INORGANIC NITROGEN - Residual soil inorganic N (N03, NH4) can be evaluated most effectively with a soil test. Accurate soil sampling and analysis in a high value crop like sugar beets is one of the best investments that can be made and is highly recommended. A soil test measures the residual N carryover from the previous crop and provides the necessary information for accurate fertilizer application. Nitrate nitrogen (NO3-N) is mobile in the soil. Soil samples, therefore, should be taken from the 0- to 12-inch and 12- to 24-inch soil depths or the effective root zone. These depths should be sampled and kept separate for analysis.

If the first foot is low in N (less than 5 ppm) but the sum of the first 2 feet is adequate, 20 to 40 pounds of N per acre may be applied to provide N until root growth is sufficient to reach the N in the second foot

(about 4 to 5 weeks after emergence).

NITROGEN FROM PREVIOUS CROP RESIDUES - Nitrogen associated with decomposition of previous crop residues should also be considered when estimating available N. Residues that require additional N for decomposition include cereal straw and mature corn stalks. Research has shown that 15 pounds of additional N are needed per ton of straw returned to the soil, up to a maximum of 50 pounds. For more information on compensating for cereal residues, refer to CIS 825, "Wheat Straw Management and Nitrogen Fertilizer Requirements."

Non-cereal residues (potatoes, sugar beets, onions, beans, mint, and sweet corn) generally do not require additional N for decomposition. Consequently, these residues have little effect on the N needs of sugar beets.

Legume residues from beans, peas, and alfalfa can release appreciable N during the following crop season that may not be reflected by the pre-plant soil test. This N is derived from the decomposition of both plant tops and nodulated root systems.

NITROGEN FROM MANURES - Very few soils used for sugar beets receive animal manures or lagoon wastes. Nutrient contributions from these sources should also be taken into consideration when estimating available N for the next season. Manures can preclude the need for any fertilizer, depending on the rate applied and their nutrient composition.

Manures can vary appreciably depending on the animal, how the manure is processed, and the kind and extent of bedding material. For the most accurate estimate of fertilizer equivalent values, the manure should be analyzed for its nutrient content.

IRRIGATION WATER - Irrigation waters derived from deep wells are generally low in N. More shallow wells can have significant levels of nitrogen because of leaching of nitrogen from impacts from commercial fertilizer use, animal waste, and improperly functioning septic systems. Irrigation waters from most districts are also low in N when diverted from its source. Background levels of N from original sources are generally about 2 parts per million (ppm). The more return flow included in diverted water sources, the higher the N content. Return flows may include N dissolved when irrigation waters pass through fields high in residual or recently added fertilizer N as well as from soluble fertilizer N applied with the irrigation water.

Most irrigation districts should know the N content of the water they divert. Contact them for this information to determine the levels of N added with your irrigation water. However, since irrigation water N levels are influenced by upstream management, if you use irrigation water that receives runoff after it is diverted, only a water test can accurately evaluate the N added with irrigation waters.

For each ppm or milligrams per liter (mg/L) of N reported in the water sample, multiply by 2.7 to get the N added per acre foot of water applied. For example, if the water sample contained 10 ppm of N, 3 acre feet of water applied would be the equivalent of 81 pounds of N per acre. Typically, of the water applied with furrow irrigation only 50 percent is retained on the field and the rest runs off the end. The net retention of N applied with furrow irrigation would, therefore, be about half of the water applied or about 40 pounds per acre in this example. If more or less of the irrigation water is retained with each wetting, then growers should adjust the water N contribution accordingly.

Excessive irrigation by any method reduces N availability to sugar beets. Additional N may be needed under these conditions. Growers should not use aqua or anhydrous N through a sprinkler irrigation system.

Water running soluble N sources with a furrow irrigation system can be an effective means of adding N. Two limitations of this practice are that (1) the application of the N with this method may not be as uniform as desired and (2) runoff containing the N may contaminate downstream surface waters. Growers can minimize the loss of N by shutting off the injection unit before the irrigation water reaches the end of the furrow. This practice should not substitute for careful consideration of N needs while N can be side dressed.

CALCULATION OF N APPLICATION RATES

To calculate the fertilizer N application rate, the following equation is used:

Fertilizer application rate (deficit) or Over application of Nitrogen =
(Total N required to produce a given yield) - (Mineralizable N) - (Inorganic N measured by the soil test) - (previous crop/residue management) - (Manure Nitrogen) - (Irrigation Water)

TIMING OF NITROGEN APPLICATION

Nitrogen fertilizers can be fall applied on loam, silt loam, and clay soils. Winter leaching of N from the soil profile can be reduced to a minimum by applying N in the ammonium or urea forms when soil temperature is below 45 F. Greater efficiency may be obtained from pre-plant application in spring or by side dressing before July 1. Nitrogen applied after July 1 stimulates vegetative growth, lowers sugar percentage and extractability and contributes little to total sugar yield.

On sandy soils where over-irrigation and leaching of nitrogen are likely, side dressing or applications of nitrogen through irrigation water before July 1 are suggested for at least half of the rate used.

Split N applications often increase nitrogen use efficiency, sugar beet tonnage, and sugar production. Research conducted at the Kimberly R & E Center during 1992-1994 showed that split N fertilization generally increased estimated recoverable sugar and net economic return/acre compared to applying all N pre-plant. However, growers need to avoid applying significant amounts of N late in the growing season, which can stimulate top growth at the expense of sugar production.

The practice of placing starter fertilizer with the seed is not recommended because it will reduce germination and result in poor stands.

PHOSPHORUS

Sugarbeets will respond to P fertilizer if soil test levels are low. The soil test is based on extractable P present in the upper 12 inches of the soil.

Phosphorus should be plowed down or applied to rough-plowed ground and worked into the seedbed. High rates should not be placed with or immediately below the seed. Side dressing is recommended when late applications are necessary.

POTASSIUM

Sugarbeets require less K than potatoes or alfalfa but will respond to K fertilization if soil test levels are low. The soil test is based on the extractable K present in the upper 12 inches of the soil. Potassium should be incorporated into the seedbed.

MICRONUTRIENTS

Deficiencies of Zn are not widespread in sugar beets. When the soil test for Zn is below 0.6 ppm in the upper 12 inches of the soil, or where land leveling has exposed white, limey subsoil, apply Zn fertilizer at a rate that supplies 10 pounds of zinc per acre or equivalent.

"Shotgun" applications of micronutrient mixtures "for insurance" have not been necessary or economical; therefore, they are not recommended.

SULFUR

Sulfur is generally not deficient in the major sugar beet-growing region of Idaho where the Snake River is the source of irrigation water. In areas known to be S deficient or where the soil test is less than 8 ppm in the 0- to 12-inch soil sample, apply 30 pounds S per acre.

GENERAL COMMENTS

Uniform plant populations (110 to 130 plants per 100 feet of row) after thinning have produced the highest root yields and sugar percentages.

Wheat-Winter, Irrigated South ID

NITROGEN

Adequate nitrogen is necessary for maximum production of irrigated wheat. Nitrogen represents, by far, the largest share of fertilizer costs for wheat in Idaho. The amount of nitrogen required depends on many

factors which influence total wheat production and quality. Both yield potential and available nitrogen (N03 = NH4) should be considered when determining N fertilizer rates.

TOTAL N REQUIREMENTS BASED ON POTENTIAL YIELD

Fertilizer N rates should be used which correspond to the yield growers can reasonably expect under their soil and management conditions. The historical wheat yield obtained by a grower in a specific field or area generally provides a fair approximation of yield potential given a grower's traditional crop management. Projected changes in crop management (i.e. improved variety, better disease and weed control) designed to appreciably increase production may require adjustment of yield potential upward. Research has shown that the available N required to produce a bushel of irrigated wheat depends on a variety of crop management practices. Factors such as weed, insect and disease control as well as irrigation, planting date and soil type can influence the N required by wheat for maximum yield. The results of irrigated field trials in the Boise and Magic valleys suggest as a rule that 2 pounds available N per bushel of wheat is required for maximum production up to 120 bushels per acre. Above 120 bushels per acre, the factor is somewhat less than two.

AVAILABLE NITROGEN

Available N in the soil includes mineralizable N (released from organic matter during the growing season) inorganic N as nitrate (N03-N) and ammonium (NH4-N), and N credits from previous cropping or manures. Each component of available N must be estimated for accurate determination of optimum fertilizer N rates.

MINERALIZABLE NITROGEN - Soils vary in their capacity to release N from organic matter during the growing season. The amount of N released depends on such factors as soil type, soil moisture, soil temperature, previous crop, and the history of fertilizer N applied. While soil organic matter content is frequently used to estimate annual mineralizable N contributions, in southern Idaho irrigated soils organic matter does not accurately predict the amount of N that is mineralized.

INORGANIC NITROGEN - Residual soil inorganic N (N03, NH4) can be evaluated most effectively with a soil test. Soil samples should be collected in foot increments to a depth of two feet, unless roots are restricted by dense soil layers or high water tables. Ammonium is generally low in pre-plant soil samples and thus contributes little to available N. However, it can be as high or higher than N03-N. NH4-N should be determined along with N03-N, especially when there is reason to expect the presence of appreciable NH4-N, such as recent ammonium N fertilizer applications.

A pre-plant soil sample is often only collected from the first foot of soil. Although this information is not as complete and reliable as would be provided by deeper sampling, residual N measurements from the first foot of soil can be combined with estimates of residual N in the second foot to predict N requirements for irrigated winter wheat. For fall planted winter cereals in western Idaho, pre-plant soil test N03-N in the second foot of the soil is commonly only one-half to two-thirds as high as in the first foot of soil. However, this estimate may not be accurate after potatoes or other sprinkler irrigated crops, especially in coarser textured soils. Basing N rate recommendations on estimates of residual N in the second foot increases the risk of recommending either too little or too much N.

NITROGEN FROM PREVIOUS CROP RESIDUES - Nitrogen associated with decomposition of previous crop residues should also be considered when estimating available N. Residues that require additional N for decomposition include cereal straw and mature corn stalks. Research has shown that 15 pounds of additional N are needed per ton of straw returned to the soil, up to a maximum of 50 pounds. For more information on compensating for cereal residues, refer to CIS 825, "Wheat Straw Management and Nitrogen Fertilizer Requirements."

Row crop residues (potatoes, sugar beets, onions) generally do not require additional N for decomposition. Consequently, these residues have little effect on the N needs of winter wheat. Legume residues from beans, peas, and alfalfa can release appreciable N during the following crop season that may not be reflected by the pre-plant soil test. This N is derived from the decomposition of both plant tops and nodulated root systems.

NITROGEN FROM MANURES - Soils in which winter wheat is grown occasionally receive animal

manures or lagoon wastes. Nutrient contributions from these sources should also be taken into consideration when estimating available N for the next season. Manures can preclude the need for any fertilizer, depending on the rate applied and their nutrient composition.

Manures can vary appreciable depending on the animal, how the manure is processed, and the kind and extent of bedding material. For the most accurate estimate of fertilizer equivalent values, the manure should be analyzed for its nutrient content.

IRRIGATION WATER - Irrigation waters derived from deep wells are generally low in N. More shallow wells can have significant levels of nitrogen because of leaching of nitrogen from impacts from commercial fertilizer use, animal waste, and improperly functioning septic systems. Irrigation waters from most districts are also low in N when diverted from its source. Background levels of N from original sources are generally about 2 parts per million (ppm). The more return flow included in diverted water sources, the higher the N content. Return flows may include N dissolved when irrigation waters pass through fields high in residual or recently added fertilizer N as well as from soluble fertilizer N applied with the irrigation water.

Most irrigation districts should know the N content of the water they divert. Contact them for this information to determine the levels of N added with your irrigation water. However, since irrigation water N levels are influenced by upstream management, if you use irrigation water that receives runoff after it is diverted, only a water test can accurately evaluate the N added with irrigation waters.

For each ppm or milligrams per liter (mg/L) of N reported in the water sample, multiply by 2.7 to get the N added per acre foot of water applied. For example, if the water sample contained 10 ppm of N, 3 acre feet of water applied would be the equivalent of 81 pounds of N per acre. Typically, of the water applied with furrow irrigation only 50 percent is retained on the field and the rest runs off the end. The net retention of N applied with furrow irrigation would, therefore, be about half of the water applied or about 40 pounds per acre in this example. If more or less of the irrigation water is retained with each wetting, then growers should adjust the water N contribution accordingly.

Excessive irrigation by any method reduces N availability to winter wheat. Additional N may be needed under these conditions. Growers should not use aqua or anhydrous N through a sprinkler irrigation system.

Water running soluble N sources with a furrow irrigation system can be an effective means of adding N. Two limitations of this practice are that (1) the application of the N with this method may not be as uniform as desired and (2) runoff containing the N may contaminate downstream surface waters. Growers can minimize the loss of N by shutting off the injection unit before the irrigation water reaches the end of the furrow. This practice should not substitute for careful consideration of N needs while N can be side dressed.

CALCULATION OF N APPLICATION RATES

To calculate the fertilizer N application rate, the following equation is used:

Fertilizer application rate (deficit) or Over application of Nitrogen =
(Total N required to produce a given yield) - (Mineralizable N) - (Inorganic N measured by the soil test) - (previous crop/residue management) - (Manure Nitrogen) - Irrigation Water

TIMING OF NITROGEN APPLICATION

Excessive irrigation or heavy winter precipitation can result in leaching of nitrate N beyond the root systems. This hazard exists on all soils, but particularly on coarse textured soils such as sands, and sandy loams. Fall pre-plant N was once thought to be as good or preferable to spring top dressed N in calcareous silt loam or clay soils in areas of low rainfall. However, even under these conditions, southern Idaho research has shown than N applied in late winter or early spring is frequently used more effectively than early fall pre-plant applied N.

Nitrogen fertilizers containing ammonium (ammonium sulfate, anhydrous or aqua ammonia, or urea) are less subject to leaching losses when lower soil temperatures (less than 40 F) inhibit the microbial

conversion of ammonium to nitrate. Lower temperatures also reduce the microbial activity that is responsible for the immobilization of applied N. Late fall, split, or spring applied N is also recommended when residues from previous grain or mature corn crops are returned to the soil in early fall.

Early spring N applications are more effective for increasing grain protein for irrigated hard red winter wheat. Nitrogen applied after the boot stage will contribute more to grain protein than to yield. Most wheat varieties respond in a similar way to N. However, varieties differ in their tolerance of high N rates. High N contributes to lodging of varieties with poor straw strength.

PHOSPHORUS (P)

Wheat requires little phosphorus compared to the P requirements of other crops although minimum soil levels are necessary for maximum production. Adequate P is especially necessary for winter hardiness. Soil tests can indicate whether soils require phosphorus fertilization for maximum wheat production. Soil samples are taken from the 0- to 12-inch depth.

Broadcast plow down, broadcasts seedbed incorporation or drill banding low rates of P with seed are effective methods of application. Drill banding may reduce the fertilizer P required. Drill banding high rates of P, especially ammonium phosphate fertilizers, can cause seedling damage. For more detailed discussion of banding, refer to PNW 283, "Fertilizer Band Location for Cereal Root Access."

POTASSIUM (K)

Wheat has a lower requirement for K compared to sugar beets, corn or potatoes. Soil tests can be useful indicators of the need for K. Potassium should be incorporated during seedbed preparation.

SULFUR (S)

Sulfur requirements for wheat will vary depending on soil texture, previously incorporated crop residues, leaching losses, S content of irrigation water and S soil test. Wheat irrigated with Snake River water should not experience S shortages. Soils low in S (less than 10 ppm S04-S in the plow layer or 8 ppm in the 0- to 12-inch depth) should receive 20 to 40 pounds of S per acre.

Sulfur deficiency appears as a general yellowing of the plant early in the season and looks much like N deficiency. Plant analysis can be a useful means of differentiating between the two deficiencies. An N to S ratio of 17 in whole plant tissues is generally used for diagnosing sulfur deficient wheat. Sulfur deficient wheat has also been known to contain high nitrate nitrogen (N03-N) concentrations.

MICRONUTRIENTS

Micronutrients have not been shown to be limiting wheat production and "shotgun" application of micronutrient mixtures containing boron, manganese, iron and copper "for insurance" have not been shown to be responsive and are not suggested.

GENERAL COMMENTS

Avoid a heavy first irrigation on spring cereals to prevent water logging, reduced tilling and N leaching.

The above fertilizer guidelines are based on relationships established between University of Idaho soil test and crop yield response research. In this research, crop response to fertilizers was evaluated at several sites where the response to fertilizer differed. The recommendations reflect the general or overall response to fertilizers at specific soil test values and the response in individual fields can differ appreciably from the general table recommendation. Some sites will require less than the general recommendation, other sites more. Unfortunately, the science has not developed to the point where the table recommendations can account for all the unknown variables influencing the effectiveness of applied fertilizers at individual sites. The table fertilizer recommendations can only be used as general guides rather than specific recommendations for each and every field.

Furthermore, soil variability can sharply reduce the accuracy composite soil test values for individual fields. That is why large contiguous areas within fields should be sampled separately when they are known to differ in crop growth or soil characteristics known to influence the response to fertilizer. But soil variability frequently does not occur conveniently in large areas that can be sampled separately or fertilized differently. The fertilizer recommendations in most cases do not account for this variability. Soil test based recommendations may be excessive in some field areas and inadequate in other areas of the same field. The recommendations then will be appropriate only to the degree that the composite soil test values for fields actually represent the field. Thus, for fields that are highly variable, the fertilizer recommendations should be considered conservative estimates of fertilizers needed. All the more reason to consider the table fertilizer recommendations as general guides rather than specific recommendations for each and every field.

The fertilizer rates suggested in the tables will support above average yields if other factors are not limiting production. Therefore the recommendations assume that good crop management practices will be used, i.e. insect, disease, and weed control. Nutrient requirements can be met using either commercial fertilizers or equivalent organic matter sources, such as manure or compost, provided their nutrient content and relative availability are known or can be estimated from published literature. Soil test based recommended rates will not be appropriate if the soil samples are improperly taken or do not represent the area to be fertilized. For nitrogen in particular, recommendations will be most accurate when crop history is taken into account and projected yields are reasonable estimates based on long term records.

General Comments:

- Over irrigation and nutrient loss is a hazard. Optimum irrigation management is necessary to meet crop water use needs and avoid loss of nutrients through leaching beyond the root zone and runoff with irrigation tail water.
- Nitrogen leaching is particularly a concern on sandy soils. Optimum management may require split Nitrogen applications to meet crop needs.
- Weed, insect, and disease control significantly influence the efficiency and effectiveness of your fertilizer applications and ultimately crop yield and farm profitability.
- Phosphorus, potassium, and zinc nutrients can be effectively fall-applied as they are not readily leached over winter.
- Phosphorus can be budgeted for a crop rotation.
- If you have questions regarding the interpretation of this information, please contact your Extension Agricultural agent, Crop consultant, or your commodity company fieldman.
- Both farm profitability and water quality can be improved with efficient nutrient use. The following are recommendations in nutrient management, which will optimize nutrient use for crop production while protecting water quality:

1) Avoid the application of nutrient sources in close proximity to streams, wetlands, drainage ditches, areas of very shallow soils, and sinkholes.

2) Accurately calibrate nutrient application equipment to insure that recommended rates are applied.

3) Nitrogen recommendations for many crops are based on yield goals for the crops. It is important to establish realistic yield goals for each field based upon historical yield data, county averages, and your management practices to avoid unnecessary fertilizer costs and minimize potential water quality impairments.

Appendix D: SOIL TEST DATA

Field: No Data **Date of Test:** No Data

Parameter	Units	0-12"	12-24"	18-24"
Soil Texture		No Data	No Data	
EC	mmhos	No Data	No Data	
PH		No Data	No Data	
%Lime	%	No Data	No Data	
OM	%	No Data	No Data	
CEC	meq	No Data	No Data	
Nitrate-N	ppm	No Data	No Data	
Ammonia-N	ppm	No Data	No Data	
P	ppm	No Data	No Data	No Data
K	ppm	No Data	No Data	
Z	ppm	No Data	No Data	
Mn	ppm	No Data	No Data	
Fe	ppm	No Data	No Data	
Cu	ppm	No Data	No Data	
Ca	ppm	No Data	No Data	
Mg	ppm	No Data	No Data	
Na	ppm	No Data	No Data	