Annual Technical Summary Meeting
2016 RI/FS Summary
Leviathan Mine Site, Alpine County, California

January 26, 2017

Presentation Outline

- Overview of Study Areas
- 2016 RI/FS On-Going Monitoring Activities
- 2016 Remedial Investigation Activities
- 2016 Feasibility Study Investigation Activities
- RI/FS Data Collection Progress
- 2017 RI/FS Activities

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Study Areas

On-Property:

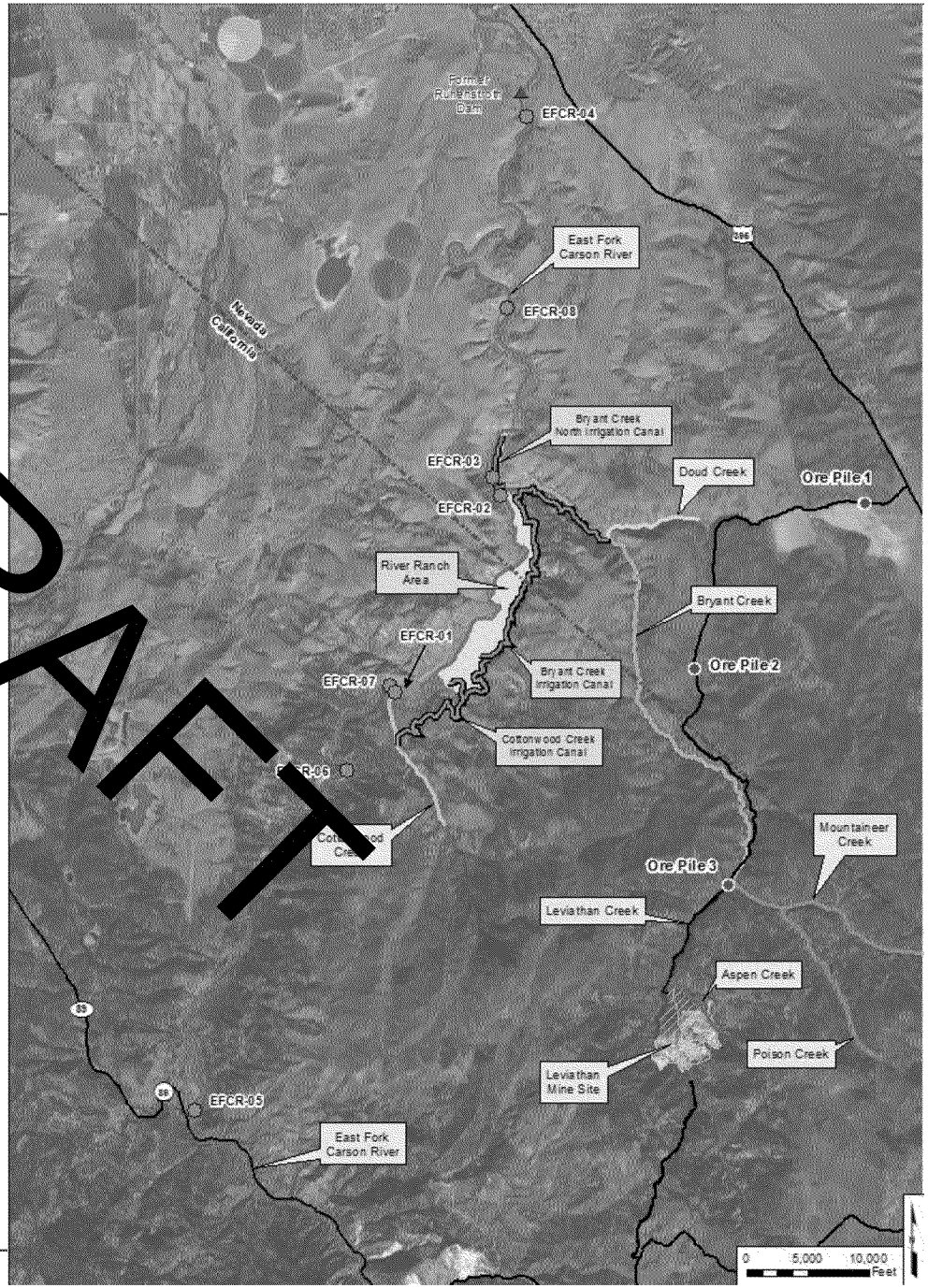
- Leviathan Creek Study Area (LCSA)
- Pit Study Area
- Aspen Creek Study Area (ACSA)

Off-Property:

- Downstream Study Area (DSA)
- Supplemental Study Areas (SSAs)
  - River Ranch
  - Suspected Ore Piles
  - East Fork Carson River
  - Leviathan Mine Road

Reference:

- Reference Study Area
  - On-Property and Off-Property
  - Cottonwood, Mountaineer, Poison Creeks
  - Supplemental Study Areas



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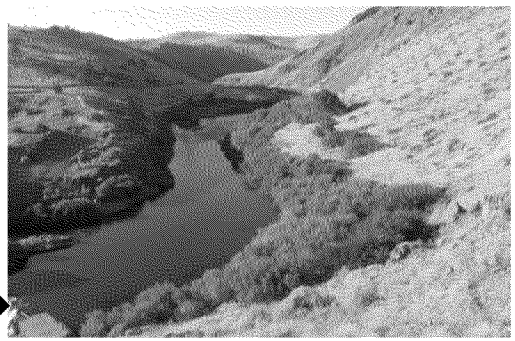
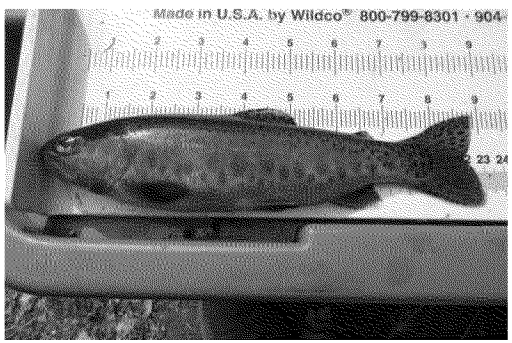
2016 Remedial Investigation Activities (On-Property, DSA, and SSAs

- Monitoring Well Installation
- LCSA Surface Water/Groundwater Interaction Investigation (Amendment No. 1)
- Supplemental Bryant Creek Surface Water Investigation
- Floodplain Soil Investigation
- Mine Waste Investigation
- Plant and Habitat-Related Soil Investigation
- Fish Survey and Sampling
- Sediment Quality Triad Sampling
- River Ranch Soil Investigation
- Leviathan Mine Road and Suspected Ore Pile Investigations
- East Fork Carson River Fluvial Soil and Surface Water Investigation
- Hydrocarbon Investigation





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2016 Remedial Investigation On-Going Monitoring Activities

- Groundwater Monitoring
- Surface Water Monitoring
- AD Discharge Monitoring
- Meteorological Station and Evaporation Pan Monitoring & Maintenance
- Storm Water, Base Flow, and Snowmelt Runoff Monitoring & Maintenance
- Upper Tributary Weirs, Piezometers and Drive-Point Piezometers

CUD and Aspen Seep Flow Station Data Collection & Maintenance

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2016 Monitoring Well Installation

On-Property:

- LOC-34 (MW-47)

ACSA and LCSA Perimeter:

- LOC-37 (MW-51)
- LOC-38D (MW-50)
- LOC-38S (MW-52)
- LOC-39S (MW-49)
- LOC-40S (MW-48)
- LOC-41 (MW-53)

Reference:

- LOC-35 (MW-46)
- LOC-36S (MW-45)

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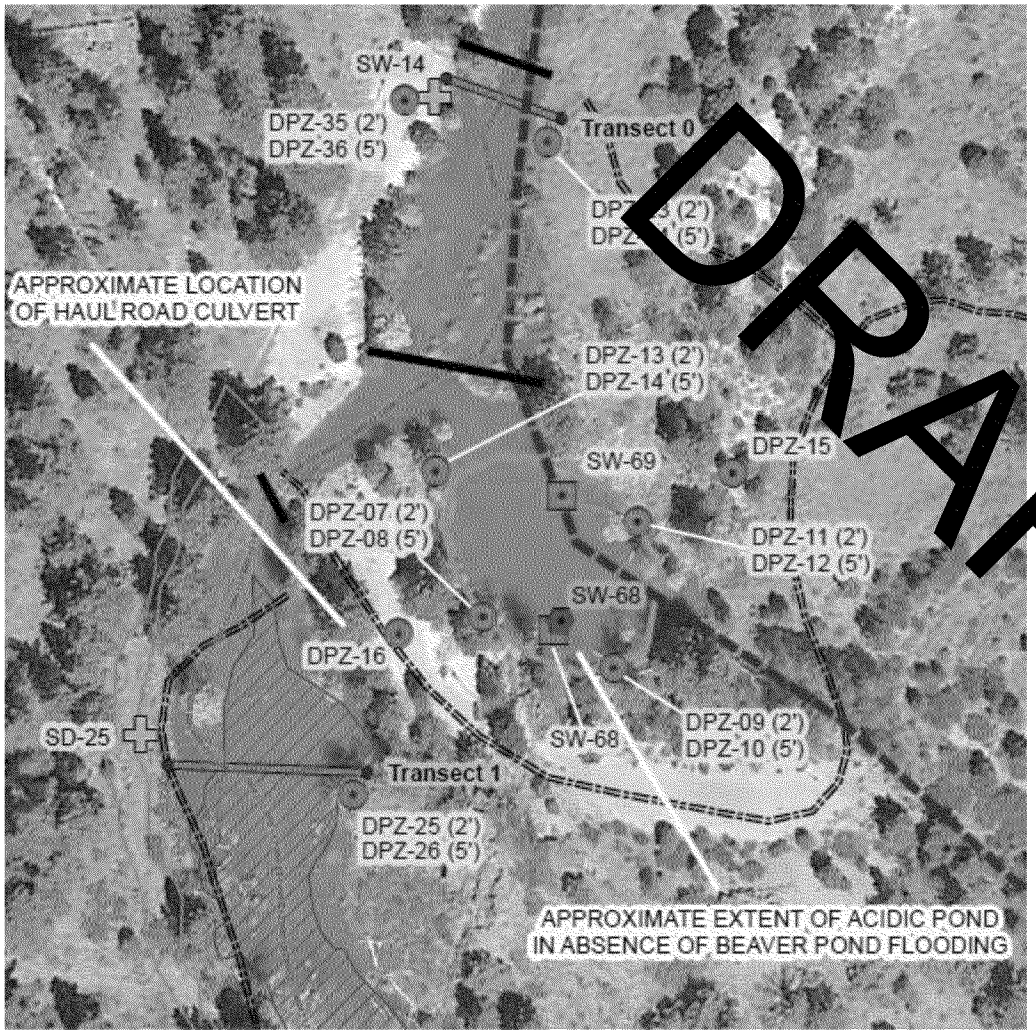
Leviathan Creek/Acidic Pond Surface Water/Groundwater Interaction Investigation



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Installed:

- 36 Drive Point Piezometers (16 pairs + 4 singles)
- 9 water level transducers in select drive point piezometers
- 3 Surface Water Staff Gages and stilling wells
- 13 surface water monitoring locations
- 3 water level transducers in select surface water monitoring locations
- 3 Seepage Meeters

Surface Water/Groundwater Interaction Investigation (continued)

Scope of Work:

- Measured water levels in drive-point piezometers monthly
- Collected surface water samples and flow measurements at the surface water monitoring locations in spring and late summer when the beaver ponds were at their lowest water level
- Collected groundwater samples from the drive-point piezometers in spring and early fall when the beaver ponds were at their lowest water level

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2016 Plant and Habitat-Related Soil Investigation

Locations:

- On-Property
  - 23 locations
- Downstream Study Area
  - 36 locations
- Reference Study Area
  - 15 locations

Plant Sampling and Analysis:

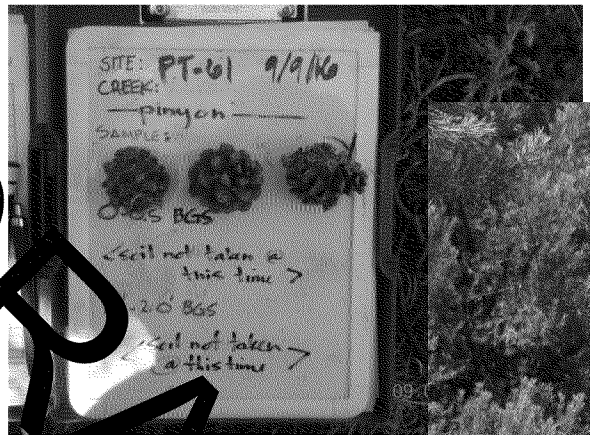
- Targeted plant tissue (stems, seed, leaves, fruit, etc.)
- 64 plant tissue samples collected

Habitat-Related Soil Sampling and Analysis:

- Collocated soil samples collected at two depths where possible
- 75 habitat-related soil samples

Sampling Status:

- Completed to extent possible



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2016 Fish Survey and Sampling

Locations:

- On-Property
  - 3 reaches
- Downstream Study Area
  - 12 reaches
- Reference Study Area
  - 9 reaches (3 in Cottonwood and 6 in Mountaineer Creek)

Sampling and Analysis:

- On-Property: no fish present
- DSA: 36 individual and 13 composite fish samples
- RSA: 9 individual and 14 composite fish samples

Sampling Status:

- Complete

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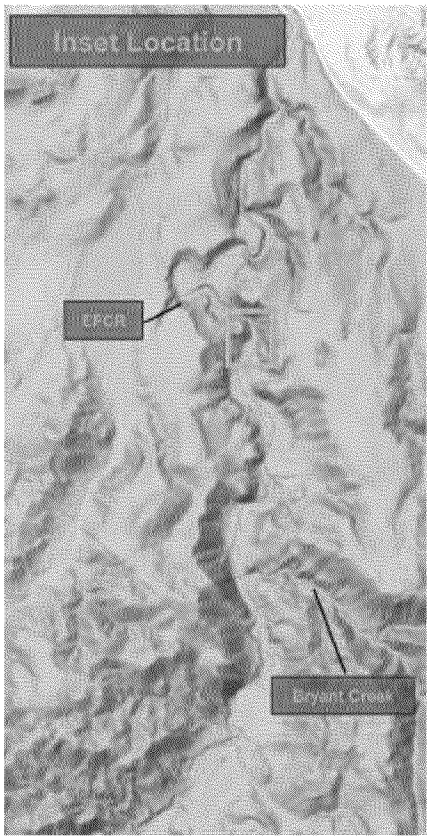
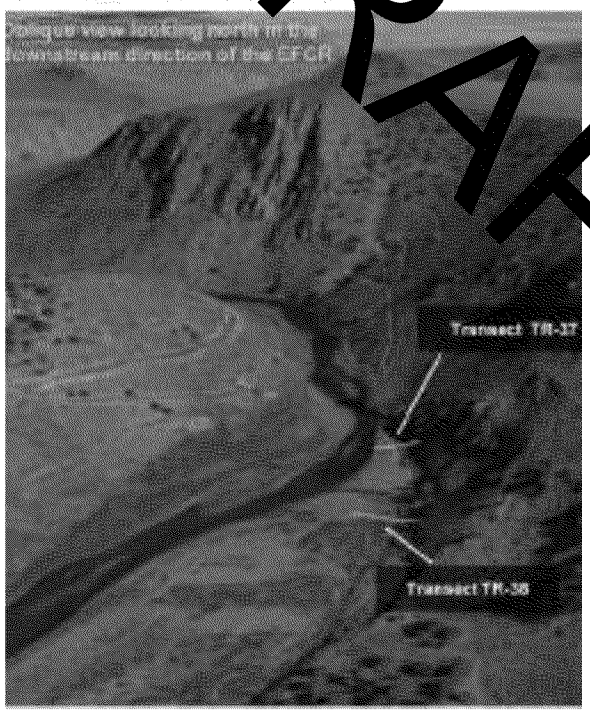
2016 East Fork Carson River Fluvial Soil and Surface Water Investigations





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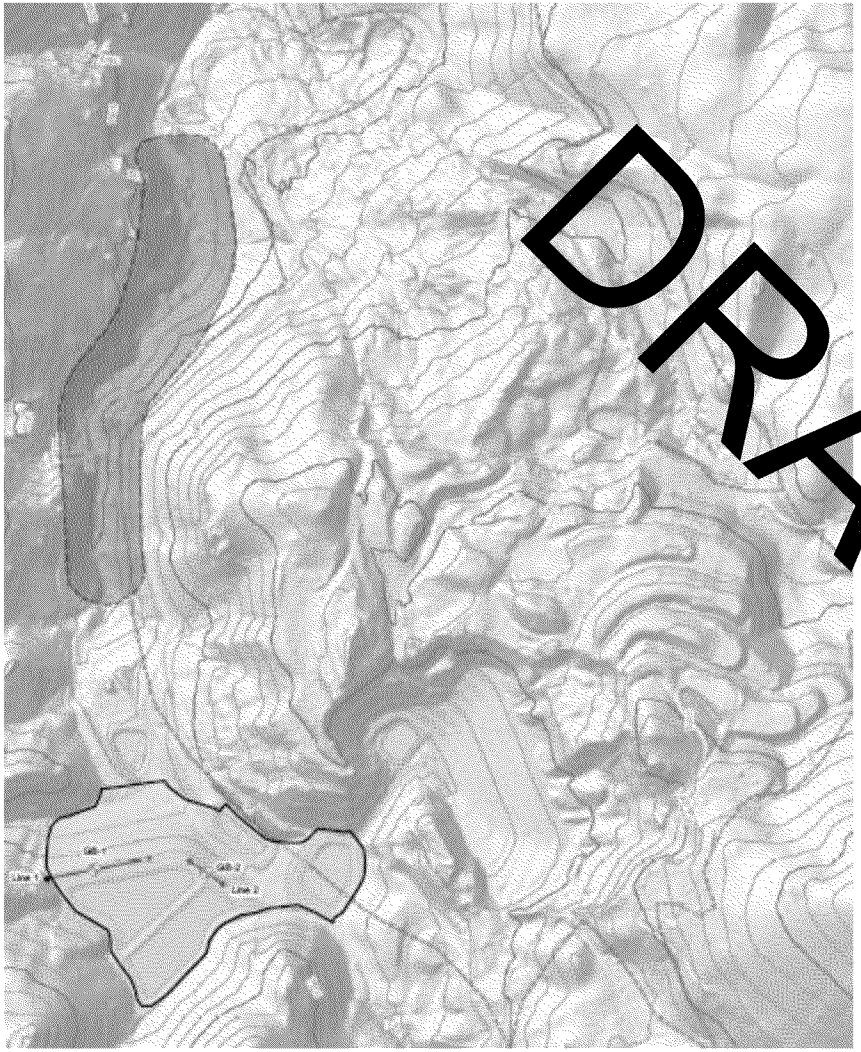
Locations:

- 10 Transects
  - 5 Upstream of Bryant
  - 5 Downstream of Bryant
- 3 Locations in each Transect
- 8 Surface Water Locations
  - 4 Upstream of Bryant
  - 4 Downstream of Bryant

Sampling Status:

- Completed except 8 surface water locations to be sampled in spring (high flow)

2016 Geotechnical Investigation



- Completed review of existing soil and rock core
- Conducted four geophysical surveys at two locations on mine waste near Pond 2N/2S
- Completed two geotechnical borings in mine waste near Pond 2N/2S
  - GB-1 to a depth of 61.5 feet
  - GB-2 to a depth of 133 feet
- Completed geotechnical/geologic mapping along Leviathan Creek between the Delta Area and the toe of the Leviathan Creek Basin Landslide

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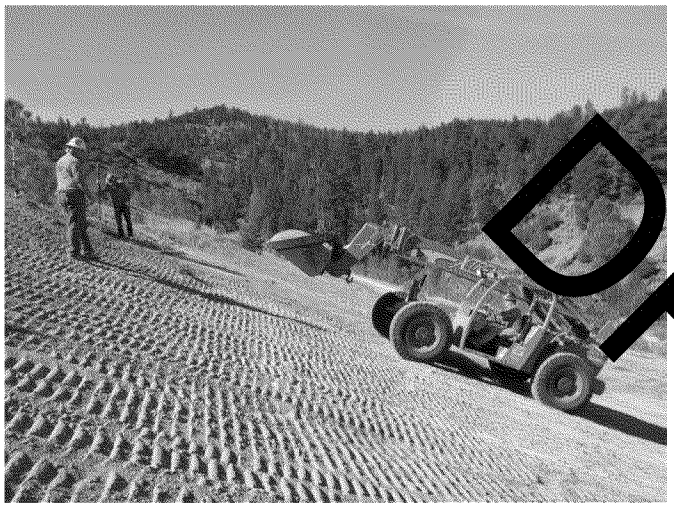
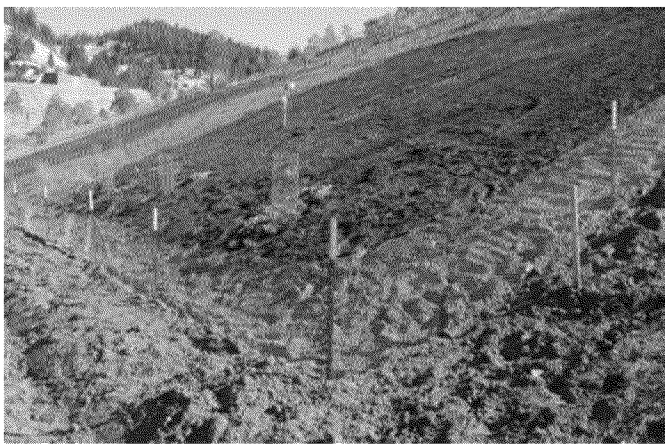
2016 Revegetation Treatability Study Investigation

2016 Revegetation Treatability Study Investigation





Prepared three revegetation plots:

- Conducted initial soil sampling
- Performed deep lime/nutrient amendment incorporation
- Conducted post-amendment soil sampling
- Seeded and installed containerized plants
- Installed monitoring equipment with data loggers

Prepared three hydrology plots:

- De-vegetated half of the hydrology plot as a control
- Performed vegetation surveys
- Conducted initial soil sampling
- Installed monitoring equipment with data loggers

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2016 Upper Pond Conveyance System Construction

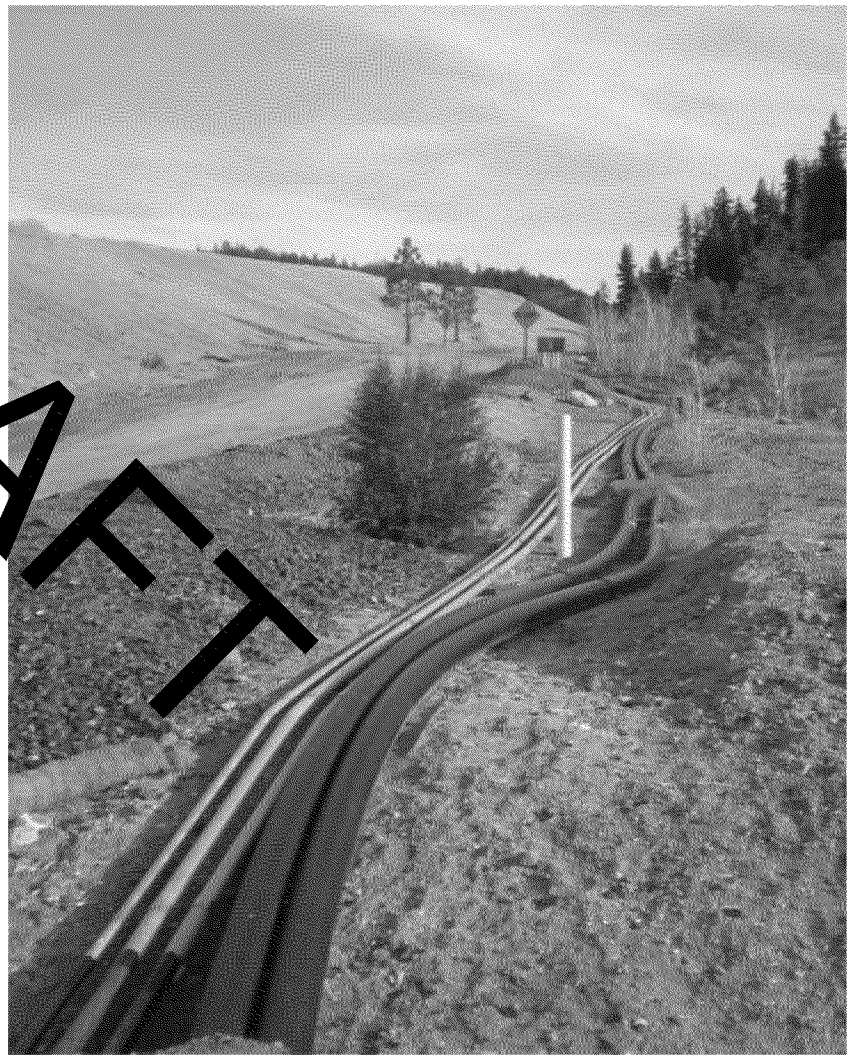
Dual-Contained HDPE pipeline connecting Pond 1 and Pond 2 with Pond 4

- Above and underground sections complete
- Cross-over valves constructed

Pump Stations Constructed at Pond 1 and Pond 2

- Concrete pads constructed
- Electrical and communication panels installed
- Pumps installed

Access Road constructed at base of Pond 2 Slope



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2017 Upper Pond Conveyance System Activities

Electrical and Controls

- Leak Detection
- Pull power cable and fiber optic through installed conduit
- Tie into HDS generators

Pump Station Piping and Instrumentation Installation

Programing

- Functional checkout of PLC program
- Commissioning of instrumentation

Asphalt Restoration

Final Commissioning

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2015 FRI Data Collection Status

Study Area		Data Collection Activity															
		Mapping/Field Verification	Drilling/Well Installation	Groundwater Monitoring	Mine Waste Soil Sampling	Floodplain Soil Sampling	Soil Sampling	Stream Sediment Sampling	Meteorological Monitoring	Surface Water Monitoring	Source Monitoring	Acidic Pond Characterization	Upper Tributary Characterization	Storm Water and Snowmelt Monitoring	Plant/Soil Sampling	Sediment Quality Triad	Fish Surveys and Sampling
On-Property Study Area		X	Q3 2016	Q2 2018*	X	Q2 2016	Q2 2017**	Q3 2016	X	X	X	Q2 2016	Q2 2016	Q3 2017*	Q4 2017**	X	Q3 2016
Off-Property Study Area	Downstream Study Area	X				Q3 2016				Q4 2016					Q4 2017**	X	Q3 2016
	River Ranch	X					Q2 2017**			Q2 2016							
	East Fork Carson River	Q2 2016					Q3 2017**			X						X	
	Ore Piles	X					Q2 2017**										
	Leviathan Mine Road	X					Q3 2016										
Reference Study Area		X	Q3 2016	Q2 2018*		Q2 2016	Q2 2017**	X		Q4 2016				Q3 2017*	Q4 2017**	Q3 2016	Q3 2016

1. Estimated completion dates subject to change based actual field imlementation time, weather conditions, and contractor availability.

X = Task complete (for select activities assumes 2 years monitoring sufficient)

= Task in progress (for select activities assumes 2 years monitoring needed per work plan)

= Task not started

Q1 = Quarter in which field work estimated to be completed

* = Based on 2 years monitoring per work plan

** = For select locations subject to NHPA process

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2016 FRI Data Collection Status

Study Area		RI Data Collection Activity															
		Mapping/Field Verification	Drilling/Well Installation	Groundwater Monitoring	Mine Waste Soil Sampling	Woodchuck Soil Sampling	Soil Sampling	Stream Sediment Sampling	Meteorological Monitoring	Surface Water Monitoring	Source Monitoring	SW / GW Interaction	Upper Tributary Characterization	Storm Water and Snowmelt Monitoring	Plant/Soil Sampling	Sediment Quality Triad	Fish Surveys and Sampling
On-Property Study Area		X	X	Q2 2018*	X	Q[illegible] 2018	X	X	X	X	X	Q4 2017	Q4 2017	Q4 2017*	X	X	X
Off-Property Study Area	Downstream Study Area	X				X		X		Q4 2017					X	X	X
	River Ranch	X					Q[illegible] 2017*			X							
	East Fork Carson River	X					X			Q2 2017						X	
	Ore Piles	X					X										
	Leviathan Mine Road	X					X										
Reference Study Area		X	Q3 2017	Q2 2018*		X	X	X		X				Q4 2017*	X	X	X

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X = Task complete (for select activities assumes 2 years monitoring sufficient)
= Task in progress (for select activities assumes 2 years monitoring needed per work plan)
= Task not started
Q1 = Quarter field work estimated to be complete (may change based on time required, weather conditions, and contractor availability).
* = Based on 2 years monitoring per work plan
** = Complete except deep samples at 6 locations

2015 Feasibility Study Activities Status

Investigation Study	Field Data Collection	Treatability Study	On-Going Monitoring
Geotechnical Investigation	Q3 2017*		Q3 2018
Revegetation Treatability Study	Q4 2016	Q1 2016	Q3 2018

Estimated completion dates subject to change based on actual field implementation time, weather conditions, and contractor availability.

= Task complete
= Task in progress
= Task not started
Q1 = Quarter field work estimated to be complete
* = For select locations subject to NHPA process

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2016 Feasibility Study Activities Status

FS Investigation/Study	Field Data Collection	Treatability Study	Monitoring
Geotechnical Investigation	Q2 2017		Q3 2018
Revegetation Treatability Study	X	X	Q3 2018
Interim Combined Treatment	Q2/Q3 2017	Q2/Q3 2017	

X = Task complete

= Task in progress

= Task not started

Q1 = Quarter field work estimated to be complete (may change based on time required, weather conditions and contractor availability).

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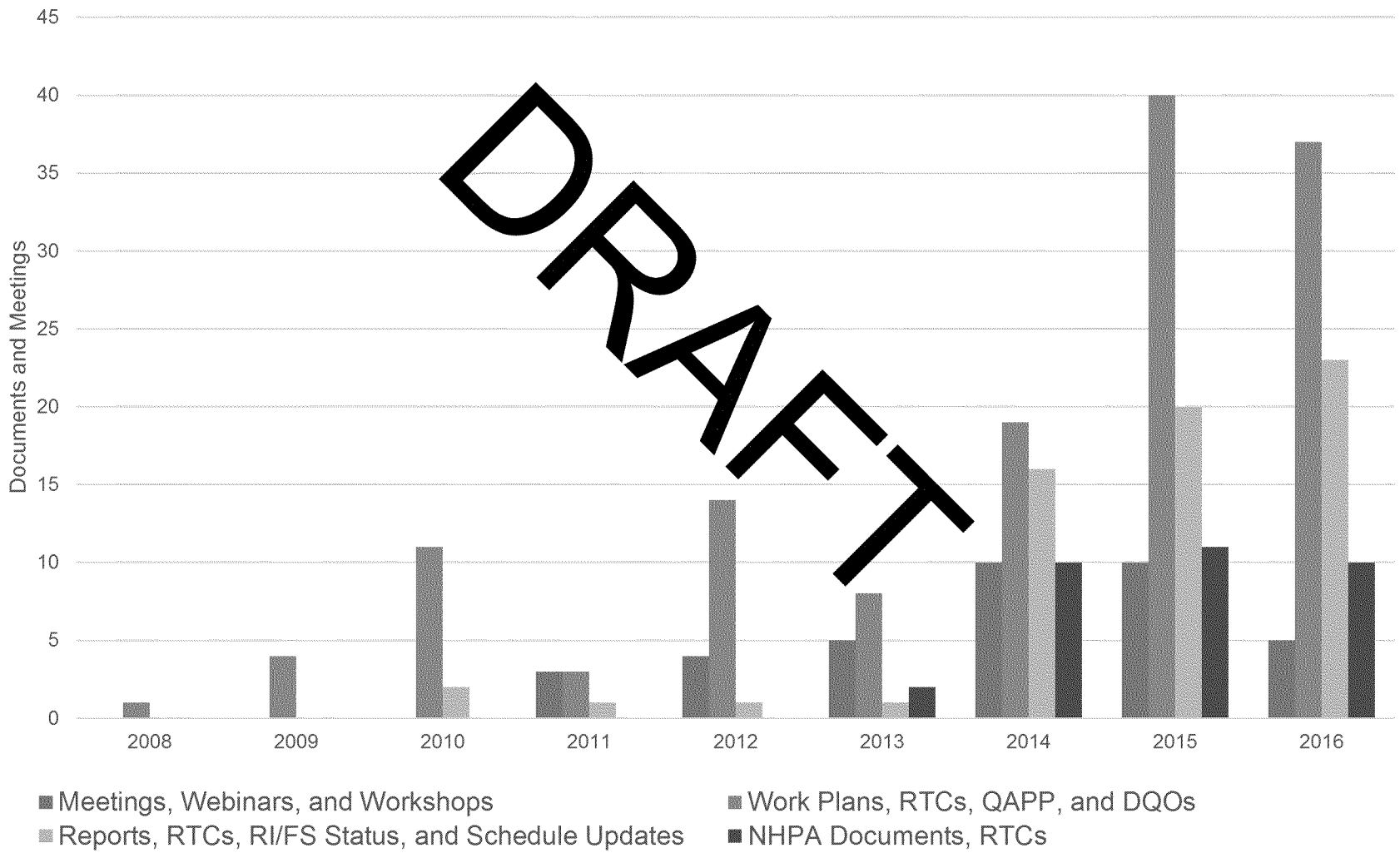
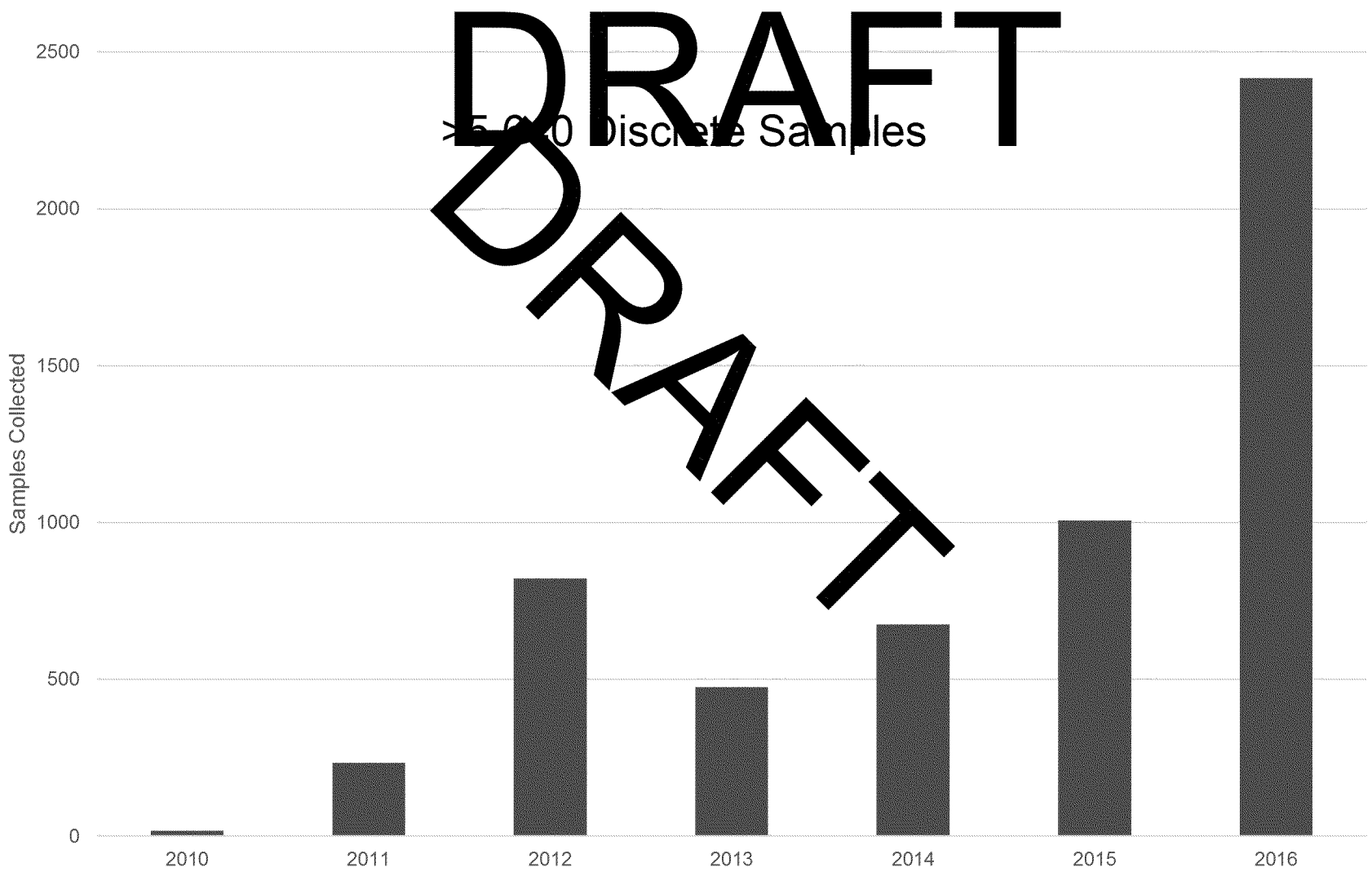
Project Documents and Meetings from 2008 – 2016 (approximate)



Samples Collected from 2010 – 2016 (approximate)



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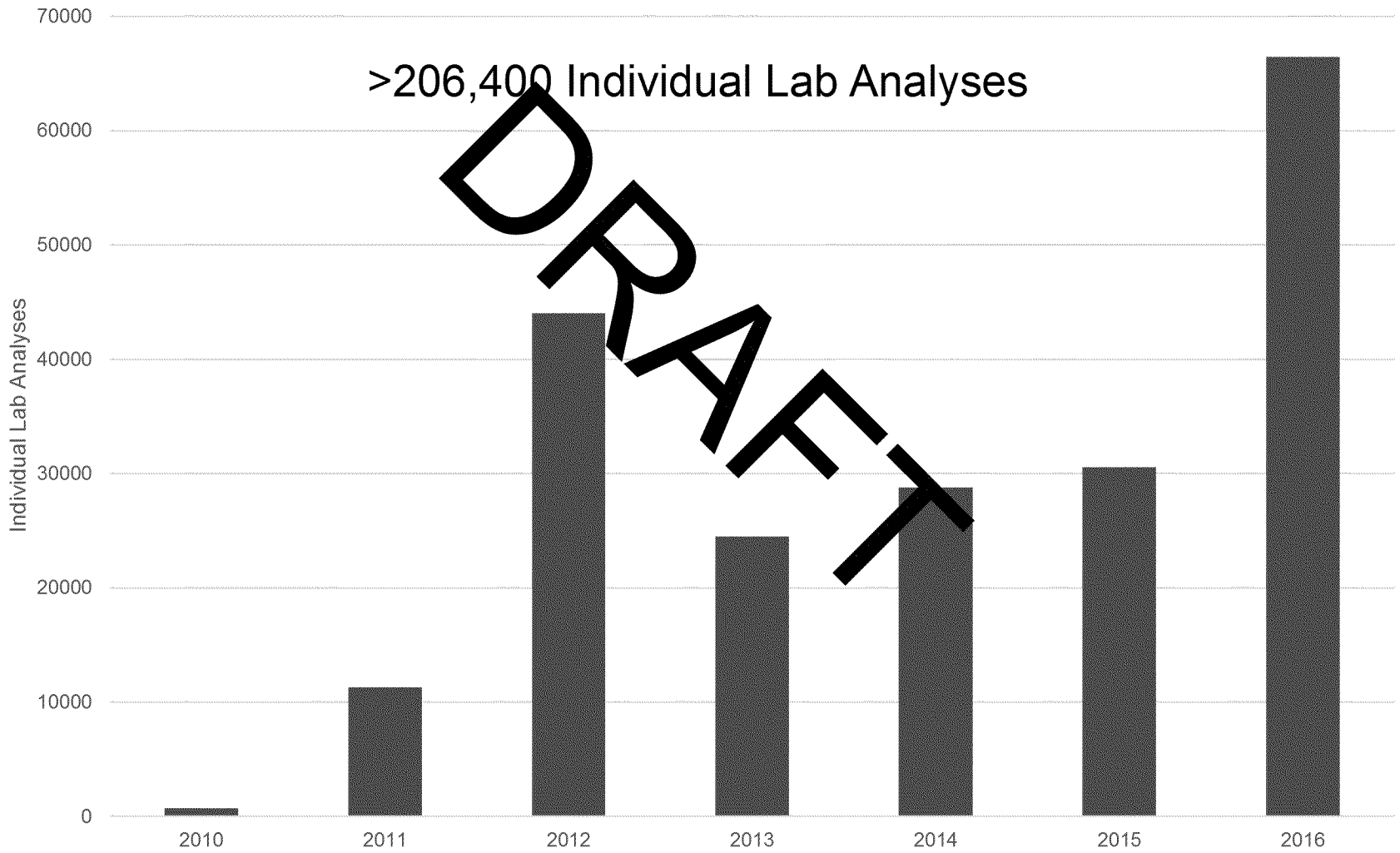
Individual Lab Analyses for Samples Collected 2010 – 2016 (approximate)



2017 Planned RI Field Activities

On-Property & DSA On-going Monitoring Programs

- Groundwater
- Upper Tributary Groundwater and Surface Water
- Meteorological Conditions
- Surface Water and Surface Water ADI Discharge
- Storm Water and Snowmelt Runoff
- CUD and Aspen Flow Station

On-Property Area

- Stream Sediment and Floodplain Soil in Leviathan Creek Beaver Dam/Pond Complex
- LCSA Surface Water/Groundwater Interaction (Amendment 11)
- Hydrocarbon Investigation – No work planned*

Off-Property Area

- No work planned*

Drilling

- Hydraulic testing of 5 wells installed in years prior to 2016 and 9 wells installed in 2016

Reference Area

- Mapping in Upper Leviathan and Aspen Creeks

Multiple Areas

- Plant/Soil Sampling – Plant biomass estimation and bioaccessibility testing
- Fish Surveys and Sampling – No work planned*

Supplemental Study Areas

- River Ranch – Collect soil samples from 2 to 6 foot depths at 6 locations
- East Fork Carson River – Collect surface water samples from 8 locations in spring
- Ore Piles – No work planned*
- Leviathan Mine Road – no work planned*

*Subject to change after data collected through 2016 has been evaluated

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2017 Planned FS Field Activities

- Geotechnical Investigation
  - Rock coring, televiewer survey, and inclinometer/pressure transducer installation in GB-01
  - Monitoring of slope inclinometer/pressure traansducers
- Revegetation Treatability Study
  - Continue monitoring of hydrology and revegetation plots
  - Double-ring infiltrometer testing
- Interim Combined Treatment
  - Completion of the pipeline
  - Shakedown and testing of combined treatment
  - Continued monitoring of the combined treatment

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2017 Data Interpretation and Reporting Activities

- Continue data evaluation and interpretation
- Continue analysis of media-specific data sets for inclusion in the RI Report
- Prepare draft RI Report

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2017 Risk Assessment Activities

Human Health Risk Assessment

- Response to comments and revision of work plan
- Evaluate data sets for use in risk assessment (as appropriate)
- Process will be a combination of screening-level comparisons in technical reports followed by baseline-risk assessment

Ecological Risk Assessment

- Evaluate data sets for use in risk assessment (as appropriate)
- Process will be a combination of screening-level comparisons in technical reports followed by baseline-risk assessment

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