Eco-Tech CONSULTANTS

Seven Hills Mine 2017 HGM Memorandum of Findings

To: Mr. Bryce West, Peabody Energy

From: Rick Larsen, Eco-Tech Consultants, Inc.

Subject: **2017 Hydrogeomorphic Assessment of the Seven Hills Mine**
Warrick County, Indiana
Eco-Tech Consultants Project LV2017009

Date: April 12, 2017

In a letter dated March 30, 2017, Mr. Peter Swenson with the United States Environmental Protection Agency recommended that the December 2006 Hydrogeomorphic (HGM) assessment for the Seven Hills mine be updated to reflect current wetland conditions and the verified wetland boundaries (799.74 acres). As a result, Eco-Tech Consultants, Inc. (Eco-Tech) conducted an HGM assessment at nine plots within the wetland boundary (July 17, 2015) at the proposed Seven Hills mine on April 5th, 6th, and 7th, 2017.

During our recent assessment, the locations of two of the original HGM plots were repositioned due to a later successional plant community change over the past eleven years. In 2006 Plot 1 was located within a palustrine emergent (PEM) wetland. This area is currently a palustrine scrub-shrub (PSS) wetland. Plot 1 was moved during the 2017 assessment to an adjacent PEM to assess a similar community type as the 2006 plot. The understory stems in the 2006 Plot 7 (PSS) location would currently be counted as trees and therefore the plot was relocated to a scrub-shrub location within the same wetland. Plot 5 was shifted slightly to the west to avoid open water conditions.

As in 2006, Eco-Tech applied the *Regional Guidebook for Assessing the Functions of Low Gradient, Riverine Wetlands in Western Kentucky* to the wetlands of Pigeon Creek. Collected field data was then input into a Western Kentucky HGM specific FCI calculator spreadsheet obtained from USACE ERDC. Data from 2006 was also run through this calculator for consistency, resulting in slightly modified sub-index and FCI scores from those reported previously.

While most of the desktop mapping variables remained constant, a few were revised based upon our current understanding and application of the HGM guidebook. For example the *Vsurfcon* variable, which measures the linear distance of the stream reach adjacent to the wetland assessment area that has been altered, is currently being reported as 100% for each plot. Pigeon Creek has been heavily channelized throughout the site and was determined to be the dominant water source for overbank flow in the adjacent wetlands. In 2006, smaller feeder tributaries with fewer channel modifications were used as the basis for surface water connection at several of the plot locations. This perspective helps to explain large reductions in FCI scores for indices such as "Export Organic Carbon."

Also changes observed in variables 18 through 27 are a result of the recent field measured plot data, either through moved plot center points, changes in vegetative structure, and or transect placements within each plot. A summary of the 2006 and 2017 variable sub-indices for each of the nine plots is attached (Table 1). The variable subindices are used to calculate the functional capacity index (FCI) for a particular wetland function.

Table 1. Functional Capacity Index scores for the Seven Hills Permit Area (April 5-7, 2017)

FCI Functions	1 - PEM		2 - PFO		3 - PFO		4 - PFO		5 - PSS	
	2006	2017	2006	2017	2006	2017	2006	2017	2006	2017
TemporarilyStore SurfaceWater	1.00	0.96	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00
Maintain Characteristic Subsurface Hydrology	0.93	0.89	0.93	0.89	0.93	0.89	0.93	0.89	0.93	0.89
Cycle Nutrients	0.51	0.23	0.89	0.66	0.83	0.68	0.31	0.66	0.63	0.69
Remove and Sequester Elements and Compounds	0.91	0.83	0.99	0.87	0.95	0.87	0.87	0.87	0.96	0.87
Retain Particulates	1.00	0.96	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00
Export Organic Carbon	0.00	0.00	0.56	0.00	0.69	0.00	0.62	0.00	0.71	0.00
Maintain Characteristic Plant Community	0.61	0.41	0.98	0.80	0.88	0.82	0.77	0.92	0.63	0.84
Provide Habitat for Wildlife	0.58	0.37	0.87	0.76	0.93	0.81	0.62	0.76	0.65	0.77
MEAN	**0.69**	**0.58**	**0.90**	**0.75**	**0.90**	**0.76**	**0.76**	**0.76**	**0.81**	**0.76**

FCI Functions	6 - PFO		7 - PSS		8 - PSS		9 - PFO	
	2006	2017	2006	2017	2006	2017	2006	2017
TemporarilyStore SurfaceWater	1.00	1.00	1.00	1.00	0.99	0.98	1.00	1.00
Maintain Characteristic Subsurface Hydrology	0.93	0.89	0.93	0.89	0.93	0.89	0.93	0.89
Cycle Nutrients	0.91	0.77	0.51	0.39	0.42	0.50	0.85	0.78
Remove and Sequester Elements and Compounds	1.00	0.87	0.92	0.87	0.87	0.87	0.99	0.87
Retain Particulates	1.00	1.00	1.00	1.00	0.99	0.98	1.00	1.00
Export Organic Carbon	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maintain Characteristic Plant Community	0.82	0.85	0.66	0.44	0.00	0.00	0.93	1.00
Provide Habitat for Wildlife	0.80	0.91	0.76	0.43	0.34	0.43	0.84	0.96
MEAN	**0.81**	**0.79**	**0.72**	**0.63**	**0.57**	**0.58**	**0.82**	**0.81**

Aggregate Mean Index 2006	0.776
Aggregate Mean Index 2017	0.712
Difference	-0.063
Percent Change	-8.2%

Six of the nine sample plots (1, 2, 3, 5, 6, & 7) in 2017 show a slightly lower average functional wetland value than those in 2006. The remaining plots (4, 8, & 9) show negligible change. The functions with the most change are cycle nutrients, export organic carbon, and provide habitat

for wildlife. A majority of the variables that contribute to the above functions are derived from the measured field plot data that are subject to change over time.

Overall the 2006 and 2017 five palustrine forested (PFO) plots have similar average FCI's with a mean difference of 0.06. The 2006 PFO plots had an average FCI of 0.83 while the 2017 plots have an average FCI of 0.77. PFO Plot 9 shows virtually no change in the mean FCI value of 0.81. This is most likely attributed to the late successional forested community in which the plot is found. Similar to the PFO plots, the PSS plots show very little change from 2006 to 2017 with a mean FCI deviation of 0.04. PSS plots in 2006 had an average FCI of 0.70 and the 2017 plots have an average FCI of 0.66. The one PEM plot had a mean change of 0.11 over the past eleven years. The 2006 PEM plot was sampled in a recently clear-cut field while the 2017 plot location is in a remnant agricultural field.

The overall wetland functions of the Pigeon Creek floodplain appear to have changed little over the past 11 years based on the comparative HGM assessment of the proposed mine site. No recent anthropogenic impacts or natural disturbances were noted within the wetland assessment area and the site remains in a similar condition as it was in 2006.

If you have any questions or require additional information, please contact me at (502) 259-0470 or rlarsen@ecotechinc.com.

Attachments:

1. 2006 and 2017 HGM Variables and Indices
2. Location Maps
3. Photographs
4. Field Data Sheets

ATTACHMENT 1

2006 and 2017 HGM Variables and Indices

Functional Capacity Indices Low Gradient Riverine Wetlands in Western Kentucky

Plot 1 (4-05-2017) **PEM**

Variables	Units	2006 Measure	2006 Subindex	2017 Measure	2017 Subindex
1. Vtract	ha	890	0.70	890	0.70
2. Vcore	%	47	1.00	47	1.00
3. Vconnect	%	72	1.00	72	1.00
4. Vslope	%	0.003	1.00	0.02	1.00
5. Vstore	%	55.6	1.00	85	1.00
6. Vmacro	no units	6	1.00	6	1.00
7. Vfreq	years	1	1.00	1	1.00
8. Vrough	no units	0.23	1.00	0.087	0.86
9. Vsoilint	%	0	1.00	0	1.00
10. Vwtf	p(1) / a(0)	1	1.00	1	1.00
11. Vwtd	inches	1	1.00	1	1.00
12. Vwtslope	%	26	0.74	38	0.62
13. Vsoilperm	in/hr	0.4	1.00	0.4	1.00
14. Vpore	%	43.5	1.00	43	1.00
15. Vsurfcon	%	100	0.00	100	0.00
16. Vclay	%	0	1.00	0	1.00
17. Vredox	p(1) / a(0)	1	1.00	1	1.00
18. Vtba	m2/ha	0	0.00	0	0.00
19. Vtden	stems/ha	0	0.00	0	0.00
20. Vsnag	stems/ha	0	0.00	0	0.00
21. Vwd	m3/ha	50.3	1.00	0	0.00
22. Vlog	m3/ha	17.5	1.00	0	0.00
23. Vssd	stems/ha	1475	0.50	850	0.50
24. Vgvc	%	85	0.27	97.5	0.13
25. Vohor	%	76	1.00	45	0.75
26. Vahor	%	25	0.31	0	0.00
27. Vcomp	%	75	0.75	33	0.33

FCI Function	2006	2017
Temporarily Store Surface Water	1.00	0.96
Maintain Characteristic Subsurface Hydrology	0.93	0.89
Cycle Nutrients	0.51	0.23
Remove and Sequester Elements and Compounds	0.91	0.83
Retain Particulates	1.00	0.96
Export Organic Carbon	0.00	0.00
Maintain Characteristic Plant Community	0.61	0.41
Provide Habitat for Wildlife	0.58	0.37
MEAN	**0.69**	**0.58**

Functional Capacity Indices Low Gradient Riverine Wetlands in Western Kentucky

Plot 2 (4-06-2017) **PFO**

Variables	Units	2006 Measure	2006 Subindex	2017 Measure	2017 Subindex
1. Vtract	ha	890	0.70	890	0.70
2. Vcore	%	47	1.00	47	1.00
3. Vconnect	%	72	1.00	72	1.00
4. Vslope	%	0.003	1.00	0.02	1.00
5. Vstore	%	56.5	1.00	68	1.00
6. Vmacro	no units	6	1.00	6	1.00
7. Vfreq	years	1	1.00	1	1.00
8. Vrough	no units	0.15	1.00	0.187	1.00
9. Vsoilint	%	0	1.00	0	1.00
10. Vwtf	p(1) / a(0)	1	1.00	1	1.00
11. Vwtd	inches	1	1.00	1	1.00
12. Vwtslope	%	26	0.74	38	0.62
13. Vsoilperm	in/hr	0.4	1.00	0.4	1.00
14. Vpore	%	43.5	1.00	43	1.00
15. Vsurfcon	%	90	0.10	100	0.00
16. Vclay	%	0	1.00	0	1.00
17. Vredox	p(1) / a(0)	1	1.00	1	1.00
18. Vtba	m2/ha	28.5	1.00	10.925	0.55
19. Vtden	stems/ha	900	0.85	600	1.00
20. Vsnag	stems/ha	225	0.10	0	0.00
21. Vwd	m3/ha	29.4	1.00	37.4	1.00
22. Vlog	m3/ha	35	1.00	29.856	1.00
23. Vssd	stems/ha	500	1.00	1325	0.50
24. Vgvc	%	70	0.44	28	0.91
25. Vohor	%	100	1.00	100	1.00
26. Vahor	%	71	0.89	0	0.00
27. Vcomp	%	100	1.00	50	0.50

FCI Function	2006	2017
Temporarily Store Surface Water	1.00	1.00
Maintain Characteristic Subsurface Hydrology	0.93	0.89
Cycle Nutrients	0.89	0.66
Remove and Sequester Elements and Compounds	0.99	0.87
Retain Particulates	1.00	1.00
Export Organic Carbon	0.56	0.00
Maintain Characteristic Plant Community	0.98	0.80
Provide Habitat for Wildlife	0.87	0.76
MEAN	**0.90**	**0.75**

Functional Capacity Indices Low Gradient Riverine Wetlands in Western Kentucky

Plot 3 (4-06-2017) **PFO**

Variables	Units	2006 Measure	2006 Subindex	2017 Measure	2017 Subindex
1. *Vtract*	ha	890	0.70	890	0.70
2. *Vcore*	%	47	1.00	47	1.00
3. *Vconnect*	%	72	1.00	72	1.00
4. *Vslope*	%	0.003	1.00	0.02	1.00
5. *Vstore*	%	51.6	0.94	64	1.00
6. *Vmacro*	no units	6	1.00	6	1.00
7. *Vfreq*	years	1	1.00	1	1.00
8. *Vrough*	no units	0.16	1.00	0.16	1.00
9. *Vsoilint*	%	0	1.00	0	1.00
10. *Vwtf*	p(1) / a(0)	1	1.00	1	1.00
11. *Vwtd*	inches	1	1.00	1	1.00
12. *Vwtslope*	%	26	0.74	38	0.62
13. *Vsoilperm*	in/hr	0.4	1.00	0.4	1.00
14. *Vpore*	%	43.5	1.00	43	1.00
15. *Vsurfcon*	%	75	0.25	100	0.00
16. *Vclay*	%	0	1.00	0	1.00
17. *Vredox*	p(1) / a(0)	1	1.00	1	1.00
18. *Vtba*	m2/ha	40.6	1.00	40.63	1.00
19. *Vtden*	stems/ha	525	1.00	700	1.00
20. *Vsnag*	stems/ha	50	1.00	100	0.10
21. *Vwd*	m3/ha	59.1	0.91	6.2	0.31
22. *Vlog*	m3/ha	26.2	1.00	10.4	1.00
23. *Vssd*	stems/ha	1500	0.50	250	1.00
24. *Vgvc*	%	25	0.94	38	0.80
25. *Vohor*	%	100	1.00	95	1.00
26. *Vahor*	%	51	0.64	0	0.00
27. *Vcomp*	%	56	0.56	33	0.33

FCI Function	2006	2017
Temporarily Store Surface Water	0.98	1.00
Maintain Characteristic Subsurface Hydrology	0.93	0.89
Cycle Nutrients	0.83	0.68
Remove and Sequester Elements and Compounds	0.95	0.87
Retain Particulates	0.98	1.00
Export Organic Carbon	0.69	0.00
Maintain Characteristic Plant Community	0.88	0.82
Provide Habitat for Wildlife	0.93	0.81
MEAN	**0.90**	**0.76**

Functional Capacity Indices Low Gradient Riverine Wetlands in Western Kentucky

Plot 4 (4-06-2017) **PFO**

Variables	Units	2006 Measure	2006 Subindex	2017 Measure	2017 Subindex
1. Vtract	ha	890	0.70	890	0.70
2. Vcore	%	47	1.00	47	1.00
3. Vconnect	%	72	1.00	72	1.00
4. Vslope	%	0.003	1.00	0.02	1.00
5. Vstore	%	260	1.00	112	1.00
6. Vmacro	no units	6	1.00	0	0.10
7. Vfreq	years	1	1.00	1	1.00
8. Vrough	no units	0.18	1.00	0.145	1.00
9. Vsoilint	%	0	1.00	0	1.00
10. Vwtf	p(1) / a(0)	1	1.00	1	1.00
11. Vwtd	inches	1	1.00	1	1.00
12. Vwtslope	%	26	0.74	38	0.62
13. Vsoilperm	in/hr	0.4	1.00	0.4	1.00
14. Vpore	%	43.5	1.00	43	1.00
15. Vsurfcon	%	50	0.50	100	0.00
16. Vclay	%	0	1.00	0	1.00
17. Vredox	p(1) / a(0)	1	1.00	1	1.00
18. Vtba	m2/ha	2.6	0.13	52.08	1.00
19. Vtden	stems/ha	225	0.56	1125	0.70
20. Vsnag	stems/ha	0	0.00	50	1.00
21. Vwd	m3/ha	1.5	0.08	11.1	0.56
22. Vlog	m3/ha	0	0.00	0	0.00
23. Vssd	stems/ha	12200	0.50	2500	0.50
24. Vgvc	%	95	0.16	30	0.89
25. Vohor	%	95	1.00	81	1.00
26. Vahor	%	0	0.00	0	0.00
27. Vcomp	%	83	0.83	83	0.83

FCI Function	2006	2017
Temporarily Store Surface Water	1.00	1.00
Maintain Characteristic Subsurface Hydrology	0.93	0.89
Cycle Nutrients	0.31	0.66
Remove and Sequester Elements and Compounds	0.87	0.87
Retain Particulates	1.00	1.00
Export Organic Carbon	0.62	0.00
Maintain Characteristic Plant Community	0.77	0.92
Provide Habitat for Wildlife	0.62	0.76
MEAN	**0.76**	**0.76**

Functional Capacity Indices Low Gradient Riverine Wetlands in Western Kentucky

Plot 5 (4-06-2017) **PSS**

Variables	Units	2006 Measure	2006 Subindex	2017 Measure	2017 Subindex
1. Vtract	ha	890	0.70	890	0.70
2. Vcore	%	47	1.00	47	1.00
3. Vconnect	%	72	1.00	72	1.00
4. Vslope	%	0.003	1.00	0.02	1.00
5. Vstore	%	312.5	1.00	95	1.00
6. Vmacro	no units	6	1.00	6	1.00
7. Vfreq	years	1	1.00	1	1.00
8. Vrough	no units	0.2	1.00	0.165	1.00
9. Vsoilint	%	0	1.00	0	1.00
10. Vwtf	p(1) / a(0)	1	1.00	1	1.00
11. Vwtd	inches	1	1.00	1	1.00
12. Vwtslope	%	26	0.74	38	0.62
13. Vsoilperm	in/hr	0.4	1.00	0.4	1.00
14. Vpore	%	43.5	1.00	43	1.00
15. Vsurfcon	%	75	0.25	100	0.00
16. Vclay	%	0	1.00	0	1.00
17. Vredox	p(1) / a(0)	1	1.00	1	1.00
18. Vtba	m2/ha	6.4	0.32	12.77	0.64
19. Vtden	stems/ha	150	0.38	925	0.81
20. Vsnag	stems/ha	225	0.10	0	0.00
21. Vwd	m3/ha	42.1	1.00	23.6	1.00
22. Vlog	m3/ha	35	1.00	17.354	1.00
23. Vssd	stems/ha	4725	0.50	7000	0.50
24. Vgvc	%	88	0.24	7.5	1.00
25. Vohor	%	100	1.00	100	1.00
26. Vahor	%	56	0.70	0	0.00
27. Vcomp	%	44	0.44	67	0.67

FCI Function	2006	2017
Temporarily Store Surface Water	1.00	1.00
Maintain Characteristic Subsurface Hydrology	0.93	0.89
Cycle Nutrients	0.63	0.69
Remove and Sequester Elements and Compounds	0.96	0.87
Retain Particulates	1.00	1.00
Export Organic Carbon	0.71	0.00
Maintain Characteristic Plant Community	0.63	0.84
Provide Habitat for Wildlife	0.65	0.77
MEAN	**0.81**	**0.76**

Functional Capacity Indices

Low Gradient Riverine Wetlands in Western Kentucky

Plot 6 (4-06-2017)

PFO

Variables	Units	2006 Measure	2006 Subindex	2017 Measure	2017 Subindex
1. *Vtract*	ha	890	0.70	890	0.70
2. *Vcore*	%	47	1.00	47	1.00
3. *Vconnect*	%	72	1.00	72	1.00
4. *Vslope*	%	0.003	1.00	0.02	1.00
5. *Vstore*	%	88.2	1.00	60	1.00
6. *Vmacro*	no units	6	1.00	6	1.00
7. *Vfreq*	years	1	1.00	1	1.00
8. *Vrough*	no units	0.17	1.00	0.165	1.00
9. *Vsoilint*	%	0	1.00	0	1.00
10. *Vwtf*	p(1) / a(0)	1	1.00	1	1.00
11. *Vwtd*	inches	1	1.00	1	1.00
12. *Vwtslope*	%	26	0.74	38	0.62
13. *Vsoilperm*	in/hr	0.4	1.00	0.4	1.00
14. *Vpore*	%	43.5	1.00	43	1.00
15. *Vsurfcon*	%	100	0.00	100	0.00
16. *Vclay*	%	0	1.00	0	1.00
17. *Vredox*	p(1) / a(0)	1	1.00	1	1.00
18. *Vtba*	m2/ha	49.5	1.00	39.07	1.00
19. *Vtden*	stems/ha	550	1.00	675	1.00
20. *Vsnag*	stems/ha	225	0.10	50	1.00
21. *Vwd*	m3/ha	58.7	0.91	85.7	0.64
22. *Vlog*	m3/ha	8.7	0.87	80.8	0.80
23. *Vssd*	stems/ha	575	0.85	450	1.00
24. *Vgvc*	%	47	0.70	11.3	1.00
25. *Vohor*	%	98	1.00	83.8	1.00
26. *Vahor*	%	81	1.00	0	0.00
27. *Vcomp*	%	33	0.33	44.3	0.44

FCI Function	2006	2017
Temporarily Store Surface Water	1.00	1.00
Maintain Characteristic Subsurface Hydrology	0.93	0.89
Cycle Nutrients	0.91	0.77
Remove and Sequester Elements and Compounds	1.00	0.87
Retain Particulates	1.00	1.00
Export Organic Carbon	0.00	0.00
Maintain Characteristic Plant Community	0.82	0.85
Provide Habitat for Wildlife	0.80	0.91
MEAN	**0.81**	**0.79**

Functional Capacity Indices Low Gradient Riverine Wetlands in Western Kentucky

Plot 7 (4-06-2017) **PSS**

Variables	Units	2006 Measure	2006 Subindex	2017 Measure	2017 Subindex
1. Vtract	ha	890	0.70	890	0.70
2. Vcore	%	47	1.00	47	1.00
3. Vconnect	%	72	1.00	72	1.00
4. Vslope	%	0.003	1.00	0.02	1.00
5. Vstore	%	377.8	1.00	67	1.00
6. Vmacro	no units	6	1.00	6	1.00
7. Vfreq	years	1	1.00	1	1.00
8. Vrough	no units	0.19	1.00	0.132	1.00
9. Vsoilint	%	0	1.00	0	1.00
10. Vwtf	p(1) / a(0)	1	1.00	1	1.00
11. Vwtd	inches	1	1.00	1	1.00
12. Vwtslope	%	26	0.74	38	0.62
13. Vsoilperm	in/hr	0.4	1.00	0.4	1.00
14. Vpore	%	43.5	1.00	43	1.00
15. Vsurfcon	%	100	0.00	100	0.00
16. Vclay	%	0	1.00	0	1.00
17. Vredox	p(1) / a(0)	1	1.00	1	1.00
18. Vtba	m2/ha	1.9	0.10	1.2	0.06
19. Vtden	stems/ha	125	0.31	25	0.06
20. Vsnag	stems/ha	50	1.00	0	0.00
21. Vwd	m3/ha	17.3	0.87	0	0.00
22. Vlog	m3/ha	8.7	0.87	0	0.00
23. Vssd	stems/ha	950	0.50	575	0.85
24. Vgvc	%	90	0.21	72	0.42
25. Vohor	%	84	1.00	100	1.00
26. Vahor	%	31	0.39	0	0.00
27. Vcomp	%	67	0.67	33	0.33

FCI Function	2006	2017
Temporarily Store Surface Water	1.00	1.00
Maintain Characteristic Subsurface Hydrology	0.93	0.89
Cycle Nutrients	0.51	0.39
Remove and Sequester Elements and Compounds	0.92	0.87
Retain Particulates	1.00	1.00
Export Organic Carbon	0.00	0.00
Maintain Characteristic Plant Community	0.66	0.44
Provide Habitat for Wildlife	0.76	0.43
MEAN	**0.72**	**0.63**

Functional Capacity Indices Low Gradient Riverine Wetlands in Western Kentucky

Plot 8 (4-07-2017) **PSS**

Variables	Units	2006 Measure	2006 Subindex	2017 Measure	2017 Subindex
1. Vtract	ha	890	0.70	890	0.70
2. Vcore	%	47	1.00	47	1.00
3. Vconnect	%	72	1.00	72	1.00
4. Vslope	%	0.003	1.00	0.02	1.00
5. Vstore	%	53.2	0.97	63	1.00
6. Vmacro	no units	6	1.00	6	1.00
7. Vfreq	years	1	1.00	1	1.00
8. Vrough	no units	0.18	1.00	0.095	0.91
9. Vsoilint	%	0	1.00	0	1.00
10. Vwtf	p(1) / a(0)	1	1.00	1	1.00
11. Vwtd	inches	1	1.00	1	1.00
12. Vwtslope	%	26	0.74	38	0.62
13. Vsoilperm	in/hr	0.4	1.00	0.4	1.00
14. Vpore	%	43.5	1.00	43	1.00
15. Vsurfcon	%	100	0.00	100	0.00
16. Vclay	%	0	1.00	0	1.00
17. Vredox	p(1) / a(0)	1	1.00	1	1.00
18. Vtba	m2/ha	0	0.00	0	0.00
19. Vtden	stems/ha	0	0.00	0	0.00
20. Vsnag	stems/ha	2500	0.10	0	0.00
21. Vwd	m3/ha	0	0.00	9.4	0.47
22. Vlog	m3/ha	0	0.00	9.5	0.95
23. Vssd	stems/ha	60000	0.50	20000	0.50
24. Vgvc	%	5	1.00	0	1.00
25. Vohor	%	100	1.00	100	1.00
26. Vahor	%	0	0.00	0	0.00
27. Vcomp	%	0	0.00	0	0.00

FCI Function	2006	2017
Temporarily Store Surface Water	0.99	0.98
Maintain Characteristic Subsurface Hydrology	0.93	0.89
Cycle Nutrients	0.42	0.50
Remove and Sequester Elements and Compounds	0.87	0.87
Retain Particulates	0.99	0.98
Export Organic Carbon	0.00	0.00
Maintain Characteristic Plant Community	0.00	0.00
Provide Habitat for Wildlife	0.34	0.43
MEAN	**0.57**	**0.58**

Functional Capacity Indices Low Gradient Riverine Wetlands in Western Kentucky

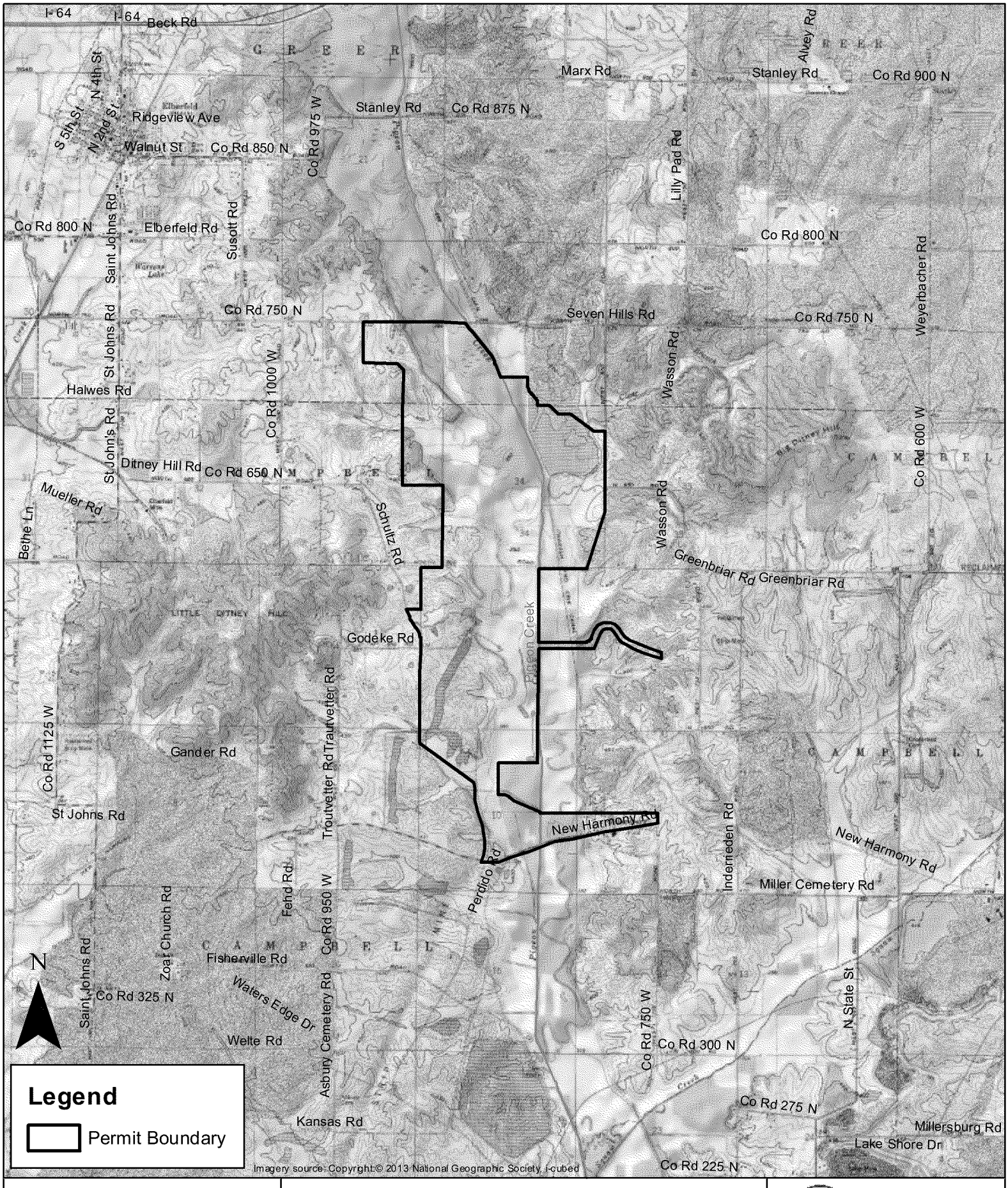
Plot 9 (4-07-2017) **PFO**

Variables	Units	2006 Measure	2006 Subindex	2017 Measure	2017 Subindex
1. Vtract	ha	890	0.70	890	0.70
2. Vcore	%	47	1.00	47	1.00
3. Vconnect	%	72	1.00	72	1.00
4. Vslope	%	0.003	1.00	0.02	1.00
5. Vstore	%	55	1.00	63	1.00
6. Vmacro	no units	6	1.00	6	1.00
7. Vfreq	years	1	1.00	1	1.00
8. Vrough	no units	0.19	1.00	0.145	1.00
9. Vsoilint	%	0	1.00	0	1.00
10. Vwtf	p(1) / a(0)	1	1.00	1	1.00
11. Vwtd	inches	1	1.00	1	1.00
12. Vwtslope	%	26	0.74	38	0.62
13. Vsoilperm	in/hr	0.4	1.00	0.4	1.00
14. Vpore	%	43.5	1.00	43	1.00
15. Vsurfcon	%	100	0.00	100	0.00
16. Vclay	%	0	1.00	0	1.00
17. Vredox	p(1) / a(0)	1	1.00	1	1.00
18. Vtba	m2/ha	15.3	0.77	32.1	1.00
19. Vtden	stems/ha	600	1.00	750	1.00
20. Vsnag	stems/ha	250	0.10	25	0.83
21. Vwd	m3/ha	45.9	1.00	32.5	1.00
22. Vlog	m3/ha	17.5	1.00	24.1	1.00
23. Vssd	stems/ha	700	0.60	375	1.00
24. Vgvc	%	40	0.78	46	0.71
25. Vohor	%	84	1.00	97.5	1.00
26. Vahor	%	75	0.94	0	0.00
27. Vcomp	%	83	0.83	100	1.00

FCI Function	2006	2017
Temporarily Store Surface Water	1.00	1.00
Maintain Characteristic Subsurface Hydrology	0.93	0.89
Cycle Nutrients	0.85	0.78
Remove and Sequester Elements and Compounds	0.99	0.87
Retain Particulates	1.00	1.00
Export Organic Carbon	0.00	0.00
Maintain Characteristic Plant Community	0.93	1.00
Provide Habitat for Wildlife	0.84	0.96
MEAN	**0.82**	**0.81**

ATTACHMENT 2

Location Maps



Seven Hills Mine
Peabody Energy
Warrick County, Indiana

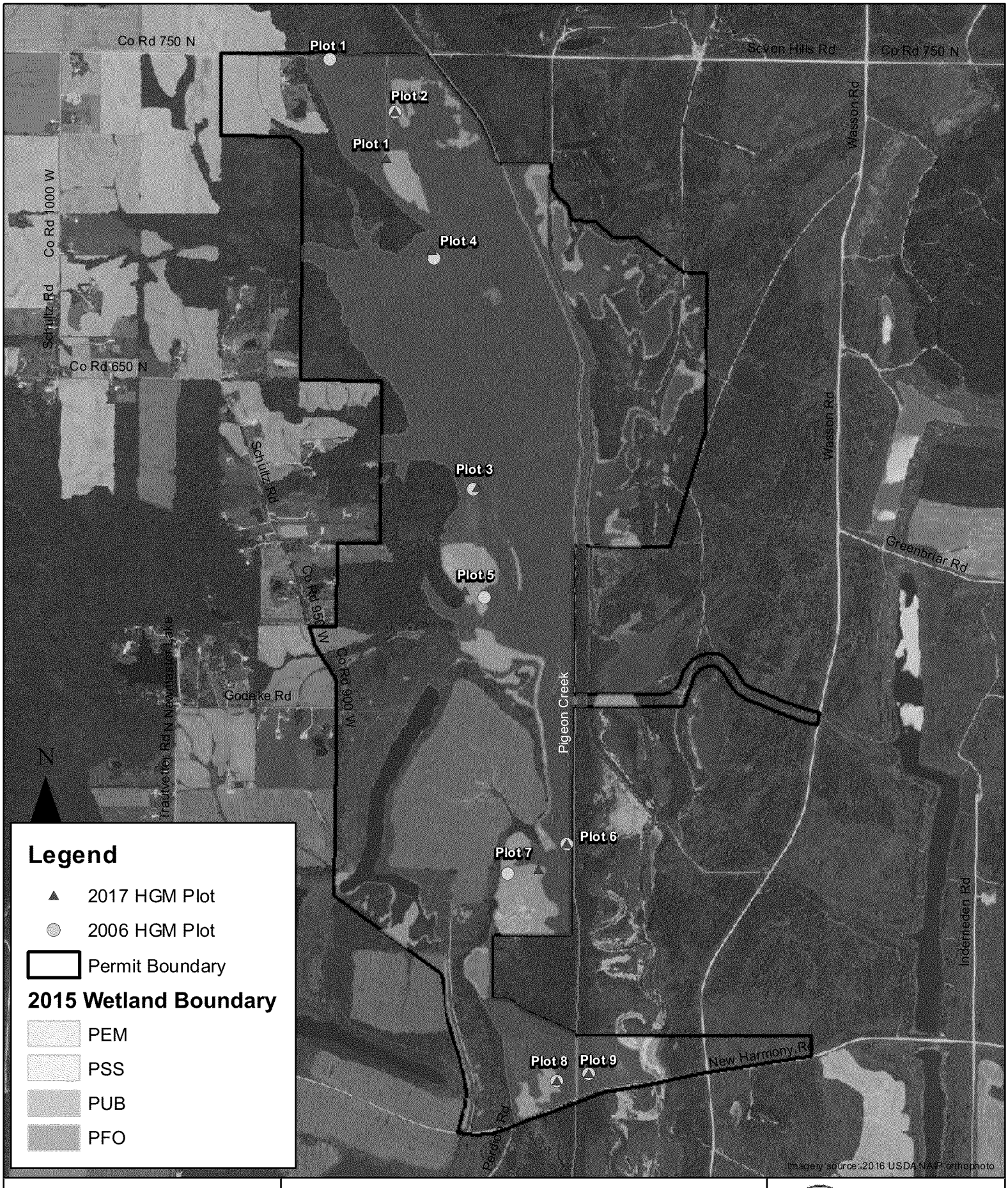
0 0.5 1 Miles

FIGURE 1. SEVEN HILLS MINE LOCATION MAP

Eco-Tech CONSULTANTS

Drawn by: RRN | Print date: 4/11/2017

ETC File: LV2017009



Seven Hills Mine
Peabody Energy
Warrick County, Indiana

0 1,000 2,000 Feet

FIGURE 2. LOCATION OF HGM ASSESSMENT SITES

Eco-Tech CONSULTANTS

Drawn by: RRN | Print date: 4/11/2017

ETC File: LV2017009

ATTACHMENT 3

Photographs

Photo 1. –HGM Plot 1.

Photo 2. – HGM Plot 2.

Photo 3. – HGM Plot 3.

Photo 4. – HGM Plot 4.

Photo 5. – HGM Plot 5.

Photo 6. – HGM Plot 6.

Photo 7. – HGM Plot 7.

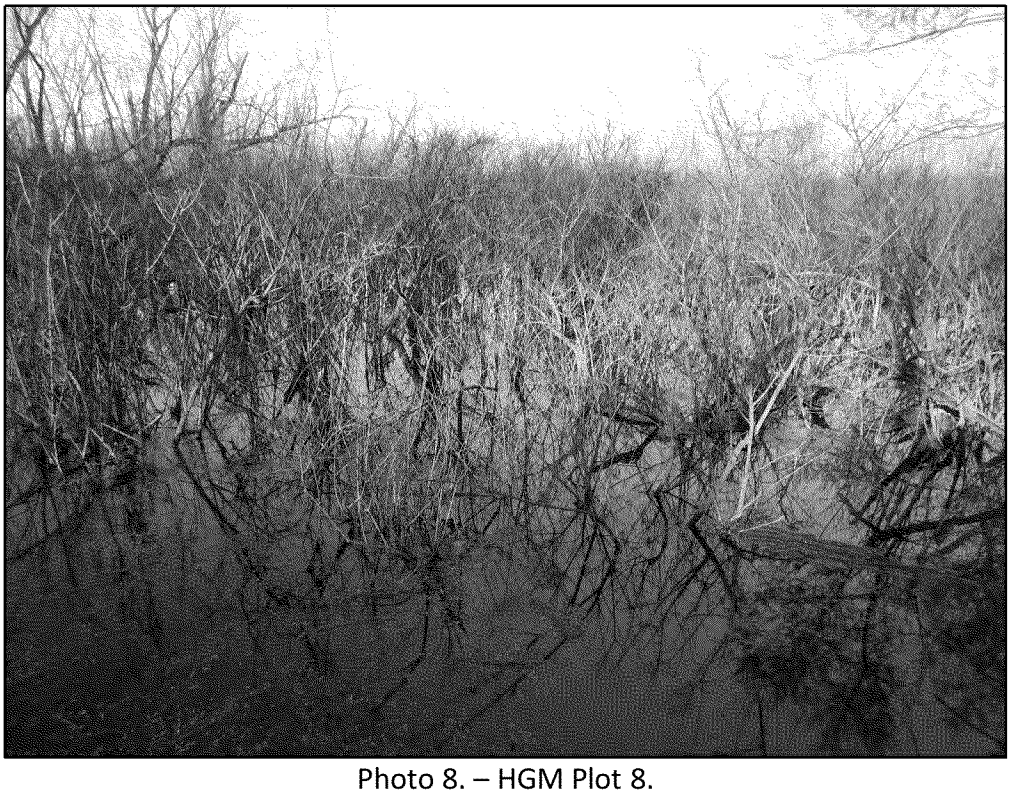


Photo 8. – HGM Plot 8.

Photo 9. – HGM Plot 9.

Photo 10. – Pigeon Creek Near Plot 6.

ATTACHMENT 4

Field Data Sheets

PEM

Field Data Sheet: Low Gradient Riverine Wetlands in Western Kentucky

Assessment Team : A+TEAM
Project Name/Location: 7 HILLS - PLOT 1 **Date :** 4-6-2017

Sample variables 1-6 using aerial photos, topographic maps, scenic overlooks, local informants, etc.

1. V_{TRACT} Area of wetland that is contiguous with the WAA *and* of the same subclass ..... 890 ha
2. V_{CORE} Percent of wetland tract that is >300 m from unsuitable habitat ..... 47 %
3. $V_{CONNECT}$ Percent of wetland tract perimeter that is "connected" to suitable habitat .. 72 %
4. V_{SLOPE} Percent floodplain slope ..... 0.02 %
5. V_{STORE} Floodplain width to channel width ratio 4286/50 85
6. V_{MACRO} Percent of WAA covered with macrotopographic features ..... 6 %

Sample variables 7-17 based on a walking reconnaissance of the WAA

7. V_{FREQ} Overbank flood recurrence interval ..... 1 years
   Check data source: gage data ✓, local knowledge ✓, flood frequency curves __, regional dimensionless curve __, hydrologic modeling __, other _____.
8. V_{ROUGH} Roughness Coefficient $.03(n_{BASE}) + .005(n_{TOPO}) + .002(n_{OBS}) + .05(n_{VEG}) =$ 0.087
9. $V_{SOILINT}$ Percent of WAA with altered soils ..... 0 %
10. V_{WTF} Water table fluctuation is (check one): ..... present ✓ absent ____
    Check data source: groundwater well, __ redoximorphic features, ✓ County Soil Survey __.
11. V_{WTD} Water table depth is ..... 1 inches
    Check data source: groundwater well, __ redoximorphic features, ✓ County Soil Survey ✓.
12. $V_{WTSLOPE}$ Percent of WAA with an altered water table slope ..... 17,472 X 769 = 308 Ac 38 %
    308 ÷ 799 = 38%
13. $V_{SOILPERM}$ Soil permeability ..... 0.4 (in./hr)
14. V_{PORE} Percent effective soil porosity ..... 43 %
15. $V_{SURFCON}$ Percent of adjacent stream reach with altered surface connections ..... 100 %
16. V_{CLAY} Percent of WAA with altered clay content in soil profile SILTY CLAY ..... 0 %
    50% CLAY
17. V_{REDOX} Redoximorphic features are (check one): ..... present ✓ absent ____

PLOT 1

Sample variables 18-20 from a representative number of locations in the WAA using a 0.04 ha circular plot (11.3 m (37 ft) radius)

18. V_{TBA} Tree basal area (average of 0.04 ha plot values on next line) . . . . . 0 m^2/ha
0.04 ha plots: 1 ____ m^2/ha 2 ____ m^2/ha 3 ____ m^2/ha 4 ____ m^2/ha

19. V_{TDEN} Number of tree stems (average of 0.04 ha plot values on next line) . . . . . 0 stems / ha
0.04 ha plots: 1 ____ stems/ha 2 ____ stems/ha 3 ____ stems/ha 4 ____ stems/ha

20. V_{SNAG} Number of snags (average of 0.04 ha plot values on next line) . . . . . 0 stems / ha
0.04 ha plots: 1 ____ stems/ha 2 ____ stems/ha 3 ____ stems/ha 4 ____ stems/ha

Sample variables 21-22 on two (2) 15 m transects partially within the 0.04 ha plot

21. V_{WD} Volume of woody debris (average of transect values on next line) . . . . . 0 m^3/ha
Transect: 1 ____ m^3/ha 2 ____ m^3/ha 3 ____ m^3/ha 4 ____ m^3/ha

22. V_{LOG} Volume of logs (average of transect values on next line) . . . . . 0 m^3/ha
Transect: 1 ____ m^3/ha 2 ____ m^3/ha 3 ____ m^3/ha 4 ____ m^3/ha

Sample variable 23 in two (2) 0.004 ha circular subplots (3.6 m (11.8 ft) radius) placed in representative locations of the 0.04 ha plot

23. V_{SSD} Number of woody understory stems (average of 0.04 ha plot values on next line)
. . . . . 850 stems / ha
0.04 ha plots: 1 ____ stems/ha 2 ____ stem/ha 3 ____ stems/ha 4 ____ stems/ha

Sample variables 24-26 in four (4) m^2 subplots placed in representative locations of each quadrant of the 0.04 ha plot

24. V_{GVC} Average cover of ground vegetation (average of 0.04 ha plot values on next line) . . 97.5 %
Average of 0.04 ha plots sampled: 1 ____ % 2 ____ % 3 ____ % 4 ____ %

25. V_{OHOR} Average cover of "O" Horizon (average of 0.04 ha plot values on next line) . . . . . 45 %
Average of 0.04 ha plots sampled: 1 ____ % 2 ____ % 3 ____ % 4 ____ %

26. V_{AHOR} Average cover of "A" Horizon (average of 0.04 ha plot values on next line) . . . . . 0 %
Average of 0.04 ha plots sampled: 1 ____ % 2 ____ % 3 ____ % 4 ____ %

27. V_{COMP} Concurrence with all strata dominants (average of 0.04 ha plot values on next line) 33 %
Average of 0.04 ha plots sampled: 1 ____ % 2 ____ % 3 ____ % 4 ____ %

PEM

Plot Worksheet: Low Gradient Riverine Wetlands in Western Kentucky

Assessment Team : A - TEAM

Project Name/Location : 7 HILLS **Plot Number :** 1 **Date :** 4-6-2017

Record dbh (cm) of trees by species below, square dbh values (cm^2), multiply result by 0.000079 (m^2), and sum resulting values in shaded columns (m^2/0.04 ha). Record in 18. V_{TBA}, multiply by 25 (m^2/ha).

Species	dbh (cm)	dbh^2 (cm^2)	× 0.00079 (m^2/0.04 ha)	Species	dbh (cm)	dbh^2 (cm^2)	× 0.00079 (m^2/0.04 ha)
None							

18. V_{TBA} Sum of values from shaded columns above = 0 (m^2/0.04 ha) × 25 = 0 m^2/ha

19. V_{TDEN} Total number of tree stems from above = 0 (stems/0.04 ha) × 25 = 0 stems/ha

20. V_{SNAG} Total number of snag stems from above= 0 (stems/0.04 ha) × 25 = 0 stems/ha

21/22. V_{WD} / V_{LOG}

Record number of stems in Size Class 1 (0.6-2.5 cm / 0.25-1 in) along a 6 ft section of Transect 1 and 2

Transect 1 0 Transect 2 0 *Total number of stems* = 0

Size Class 1 tons /acre = 0.187 × *total number of stems* = ... 0 tons/acre

Record number of stems in Size Class 2 (2.5 - 7.6 cm / 1-3 in) along 12 ft section of Transect 1 and 2

Transect 1 0 Transect 2 0 *Total number of stems* = 0

Size Class 2 tons / acre = 0.892 × *total number of stems* = ... 0 tons/acre

Record diameter of stems in Size Class 3 (> 7.6 cm / >3 in) along 50 ft section of Transect 1 and 2

Transect 1	diameter	diameter^2	Transect 2	diameter	diameter^2
Stem 1 =			Stem 1 =		
Stem 2 =			Stem 2 =		
Stem 3 =			Stem 3 =		
Stem 4 =			Stem 4 =		
Total diameter^2			Total diameter^2		

Total diameter^2 of stems from both transects = 0

PLOT 1

Size Class 3 tons / acre = 0.0687 × *Total diameter* ^{2} *of stems from both transects* = . 0 tons/acre
Total tons / acre (sum of Size Classes 1-3 from above) = ... 0 tons/acre
Cubic feet / acre = (32.05 × *total tons / acre*) / 0.58 = ... 0 cubic feet/acre
Cubic meters / ha = *cubic feet / acre* × 0.069 ..... 0 cubic meters/ha

23. V_{SSD} Tally woody understory stems two 0.004 ha subplots then average and multiply by 250:
~~Subplot 1~~ 卌 卌 ~~Subplot 2~~ 卌 卌 ~~Average~~ 34 × 25~~0~~ = . 850 stems/ha
卌 卌 ||||

24. V_{GVC} Estimate percent cover of ground vegetation in four m^2 subplots then average:
1 95 % 2 100 % 3 95 % 4 100 % ..... Average 97.5 %

25. V_{OHOR} Estimate percent cover of "O" Horizon in four m^2 subplots then average:
1 50 % 2 75 % 3 15 % 4 40 % ..... Average 45 %

26. V_{AHOR} Estimate percent cover of "A" Horizon in four m^2 subplots then average:
1 0 % 2 0 % 3 0 % 4 0 % ..... Average 0 %

27. V_{COMP} Determine percent concurrence with each strata using the table below
Tree = 0 % Shrub/Sapling = 100 % Ground Vegetation = 0 % .... Average 33 %

Dominant Species by Strata in Western Kentucky Low Gradient Riverine Wetlands		
Tree	Shrub/Sapling	Ground Vegetation
Acer rubrum	*Acer rubrum*	*Arundinaria gigantea*
Betula nigra	*Betula nigra*	*Aster* sp. 15/20/30/30
Carya laciniosa	*Carya laciniosa*	*Boehmaria cylindrica*
Celtis laevigata	*Carpinus caroliniana*	*Campsis radicans*
Fraxinus pennsylvanica	*Celtis laevigata*	*Carex squarosa*
Liquidambar styraciflua	*Celtis occidentalis*	*Eragrostis alba*
Quercus pagodifolia	*Fraxinus pennsylvanica* ☒	*Glyceria striata*
Quercus phellos	*Ilex decidua*	*Hypericum* sp.
Quercus lyrata	*Liquidambar styraciflua*	*Impatiens capensis*
Quercus imbricaria	*Nyssa sylvatica*	*Panicum* sp.
Quercus michauxii	*Quercus imbricaria*	*Parthenocissus quinquefolia*
Quercus stellata	*Quercus lyrata*	*Pilea pumila*
Quercus palustris	*Quercus phellos*	*Quercus phellos*
Salix nigra	*Quercus palustris*	*Salix nigra*
	Quercus pagodifolia	*Sauraurus cernuus*
	Quercus stellata	*Smilacina racemosa*
	Platanus occidentalis	*Smilax rotundifolia*
	Salix nigra ☒	*Sparganium* sp.
	Ulmus americana	*Toxicodendron radicans*

BLACK WILLOW
SILVER MAPLE

✓14 GRASH 41%
✓11 BLACK WILLOW 32%
27%

DOMINANT
REED CANARY GRASS 30% ✓
CAREX VULPINOIDEA 10%
CREEPING JENNY 40% ✓
ASTER SP. 15%
CAREX FRANKII 5%

PFO

Field Data Sheet: Low Gradient Riverine Wetlands in Western Kentucky

Assessment Team : A-TEAM
Project Name/Location: 7 HILLS / PLOT 2 **Date :** 4-5-2017

Sample variables 1-6 using aerial photos, topographic maps, scenic overlooks, local informants, etc.

1. V_{TRACT} Area of wetland that is contiguous with the WAA *and* of the same subclass ..... 890 ha
2. V_{CORE} Percent of wetland tract that is >300 m from unsuitable habitat ..... 47 %
3. $V_{CONNECT}$ Percent of wetland tract perimeter that is "connected" to suitable habitat .. 72 %
4. V_{SLOPE} Percent floodplain slope ..... 0.02 %
5. V_{STORE} Floodplain width to channel width ratio ....3412/50..... 68
6. V_{MACRO} Percent of WAA covered with macrotopographic features ..... 6 %

Sample variables 7-17 based on a walking reconnaissance of the WAA

7. V_{FREQ} Overbank flood recurrence interval ..... 1 years
   Check data source: gage data ✓, local knowledge ✓, flood frequency curves __, regional dimensionless curve __, hydrologic modeling __, other _____.
8. V_{ROUGH} Roughness Coefficient 0.03 (n_{BASE}) + .005 (n_{TOPO}) + .002 (n_{OBS}) + .15 (n_{VEG}) = ... 0.187
9. $V_{SOILINT}$ Percent of WAA with altered soils ..... 0 %.
10. V_{WTF} Water table fluctuation is (check one): ..... present ✓ absent ____
    Check data source: groundwater well, __ redoximorphic features, ✓ County Soil Survey __.
11. V_{WTD} Water table depth is ..... 1 inches
    Check data source: groundwater well, __ redoximorphic features, ✓ County Soil Survey ✓.
12. $V_{WTSLOPE}$ Percent of WAA with an altered water table slope ..... 38 %
13. $V_{SOILPERM}$ Soil permeability ..... 0.4 (in./hr)
14. V_{PORE} Percent effective soil porosity ..... 43 %
15. $V_{SURFCON}$ Percent of adjacent stream reach with altered surface connections ..... 100 %
16. V_{CLAY} Percent of WAA with altered clay content in soil profile SILTY CLAY ..... 0 %
17. V_{REDOX} Redoximorphic features are (check one): ..... present ✓ absent ____

PLOT 2

Sample variables 18-20 from a representative number of locations in the WAA using a 0.04 ha circular plot (11.3 m (37 ft) radius)

18. V_{TBA} Tree basal area (average of 0.04 ha plot values on next line) . . . . . 10,925 m^2/ha
0.04 ha plots: 1 ____ m^2/ha 2 ____ m^2/ha 3 ____ m^2/ha 4 ____ m^2/ha

19. V_{TDEN} Number of tree stems (average of 0.04 ha plot values on next line) . . . . . 600 stems / ha
0.04 ha plots: 1 ____ stems/ha 2 ____ stems/ha 3 ____ stems/ha 4 ____ stems/ha

20. V_{SNAG} Number of snags (average of 0.04 ha plot values on next line) . . . . . 0 stems / ha
0.04 ha plots: 1 ____ stems/ha 2 ____ stems/ha 3 ____ stems/ha 4 ____ stems/ha

Sample variables 21-22 on two (2) 15 m transects partially within the 0.04 ha plot

21. V_{WD} Volume of woody debris (average of transect values on next line) . . . . . 37.4 m^3/ha
Transect: 1 ____ m^3/ha 2 ____ m^3/ha 3 ____ m^3/ha 4 ____ m^3/ha

22. V_{LOG} Volume of logs (average of transect values on next line) . . . . . 29,856 m^3/ha
Transect: 1 ____ m^3/ha 2 ____ m^3/ha 3 ____ m^3/ha 4 ____ m^3/ha

Sample variable 23 in two (2) 0.004 ha circular subplots (3.6 m (11.8 ft) radius) placed in representative locations of the 0.04 ha plot

23. V_{SSD} Number of woody understory stems (average of 0.04 ha plot values on next line)
. . . . . 1325 stems / ha
0.04 ha plots: 1 ____ stems/ha 2 ____ stem/ha 3 ____ stems/ha 4 ____ stems/ha

Sample variables 24-26 in four (4) m^2 subplots placed in representative locations of each quadrant of the 0.04 ha plot

24. V_{GVC} Average cover of ground vegetation (average of 0.04 ha plot values on next line) . . 28 %
Average of 0.04 ha plots sampled: 1 ____ % 2 ____ % 3 ____ % 4 ____ %

25. V_{OHOR} Average cover of "O" Horizon (average of 0.04 ha plot values on next line) . . . . . 100 %
Average of 0.04 ha plots sampled: 1 ____ % 2 ____ % 3 ____ % 4 ____ %

26. V_{AHOR} Average cover of "A" Horizon (average of 0.04 ha plot values on next line) . . . . . 0 %
Average of 0.04 ha plots sampled: 1 ____ % 2 ____ % 3 ____ % 4 ____ %

27. V_{COMP} Concurrence with all strata dominants (average of 0.04 ha plot values on next line) 50 %
Average of 0.04 ha plots sampled: 1 ____ % 2 ____ % 3 ____ % 4 ____ %

Plot Worksheet: Low Gradient Riverine Wetlands in Western Kentucky

Assessment Team : A-TEAM

Project Name/Location : 7 HILLS **Plot Number :** 2 **Date :** 4-5-2017

Record dbh (cm) of trees by species below, square dbh values (cm^2), multiply result by 0.000079 (m^2), and sum resulting values in shaded columns (m^2/0.04 ha). Record in 18. V_{TBA}, multiply by 25 (m^2/ha).

Species	dbh ~~(cm)~~ IN.	dbh^2 (cm^2)	× 0.00079 (m^2/0.04 ha)	Species	dbh (cm)	dbh^2 (cm^2)	× 0.00079 (m^2/0.04 ha)
BL. WILLOW	4.9			BL. WILLOW	5.7		
BL. WILLOW	5.6			AM. ELM	5.8	✓	
BL. WILLOW	4.0			R. MAPLE	10.0	✓	
BL. WILLOW	5.3			BL. WILLOW	5.1		
GR. ASH	5.4	✓		BL. WILLOW	4.9		
BOXELDER	8.9			BL. WILLOW	4.4		
SILVERM.	8.8	✓		BL. WILLOW	3.9		
SILVERM.	9.1	✓		BL. WILLOW	4.0		
SILVERM	5.7	✓		BL. WILLOW	4.3		
GR. ASH	4.1	✓		BL. WILLOW	4.4		
GR. ASH	8.8	✓		BL. WILLOW	4.5		
BL. WILLOW	4.4			BL. WILLOW	4.2		

18. V_{TBA} Sum of values from shaded columns above = 0.437 (m^2/0.04 ha) × 25 = 10.925 m^2/ha

19. V_{TDEN} Total number of tree stems from above = 24 (stems/0.04 ha) × 25 = 600 stems/ha

20. V_{SNAG} Total number of snag stems from above= 0 (stems/0.04 ha) × 25 = 0 stems/ha

21/22. V_{WD} / V_{LOG}

Record number of stems in Size Class 1 (0.6-2.5 cm / 0.25-1 in) along a 6 ft section of Transect 1 and 2

Transect 1 _____ Transect 2 _____ *Total number of stems* = 1

Size Class 1 tons /acre = 0.187 × *total number of stems* = ... 0.2 tons/acre

Record number of stems in Size Class 2 (2.5 - 7.6 cm / 1-3 in) along 12 ft section of Transect 1 and 2

Transect 1 1 Transect 2 _____ *Total number of stems* = 2

Size Class 2 tons / acre = 0.892 × *total number of stems* = ... 1.8 tons/acre

Record diameter of stems in Size Class 3 (> 7.6 cm / >3 in) along 50 ft section of Transect 1 and 2

Transect 1	diameter	diameter^2	Transect 2	diameter	diameter^2
Stem 1 =	4.0	16	Stem 1 =	4.9	24.01
Stem 2 =			Stem 2 =	3.4	11.56
Stem 3 =			Stem 3 =	7.9	62.41
Stem 4 =			Stem 4 =		
Total diameter^2		16	Total diameter^2		98

Total diameter^2 of stems from both transects = 114

PLOT 2

Size Class 3 tons / acre = 0.0687 × *Total diameter² of stems from both transects* = 7.7 tons/acre
Total tons / acre (sum of Size Classes 1-3 from above) = ... 9.7 tons/acre
Cubic feet / acre = (32.05 × *total tons / acre*) / 0.58 = ... 536.0 cubic feet/acre
Cubic meters / ha = *cubic feet / acre* × 0.069 ..... 37.0 cubic meters/ha

23. V_{SSD} Tally woody understory stems two 0.004 ha subplots then average and multiply by 250:
~~Subplot~~ 1 ~~||||~~ ~~||||~~ ~~||||~~ ~~Subplot 2~~ ||| ~~Average~~ 53 × 250 = 1325 stems/ha
~~||||~~ ~~||||~~ ~~||||~~ ~~||||~~ ~~||||~~ ~~||||~~ ~~||||~~

24. V_{GVC} Estimate percent cover of ground vegetation in four m² subplots then average:
1 40 % 2 23 % 3 30 % 4 20 % ..... Average 28 %

25. V_{OHOR} Estimate percent cover of "O" Horizon in four m² subplots then average:
1 100 % 2 100 % 3 100 % 4 100 % ..... Average 100 %

26. V_{AHOR} Estimate percent cover of "A" Horizon in four m² subplots then average:
1 0 % 2 0 % 3 0 % 4 0 % ..... Average 0 %

27. V_{COMP} Determine percent concurrence with each strata using the table below
Tree = 50 % Shrub/Sapling = 100 % Ground Vegetation = 0 % .... Average 50 %

Dominant Species by Strata in Western Kentucky Low Gradient Riverine Wetlands		
Tree	Shrub/Sapling	Ground Vegetation
Acer rubrum	*Acer rubrum*	*Arundinaria gigantea*
Betula nigra	*Betula nigra*	*Aster* sp.
Carya laciniosa	*Carya laciniosa*	*Boehmaria cylindrica*
Celtis laevigata	*Carpinus caroliniana*	*Campsis radicans*
Fraxinus pennsylvanica	*Celtis laevigata*	*Carex squarosa*
Liquidambar styraciflua	*Celtis occidentalis*	*Eragrostis alba*
Quercus pagodifolia	*Fraxinus pennsylvanica* ☒ ☒	*Glyceria striata*
Quercus phellos	~~*Ilex decidua*~~	*Hypericum* sp.
Quercus lyrata	*Liquidambar styraciflua*	*Impatiens capensis*
Quercus imbricaria	*Nyssa sylvatica*	*Panicum* sp.
Quercus michauxii	*Quercus imbricaria*	*Parthenocissus quinquefolia*
Quercus stellata	*Quercus lyrata*	*Pilea pumila*
Quercus palustris	*Quercus phellos*	*Quercus phellos*
Salix nigra ✓	*Quercus palustris*	*Salix nigra*
	Quercus pagodifolia	*Sauraurus cernuus*
	Quercus stellata	*Smilacina racemosa*
	Platanus occidentalis	*Smilax rotundifolia*
	Salix nigra	*Sparganium* sp.
	Ulmus americana	*Toxicodendron radicans*

0.437
20% = 0.087

✓BL. WILLOW 0.167	38%	✓GR ASH 26	49%	CAREX SP. 25%
✓SILVER MAPLE 0.098	22%	✓BL WILLOW 6	11%	CREEPING JENNY 10%
GR ASH 0.063	14%	AM ELM 3	5%	RUMEX SP. 1%
RED MAPLE 0.051				
BOX ELDER 0.04				
AM ELM 0.017				

PFO

Field Data Sheet: Low Gradient Riverine Wetlands in Western Kentucky

Assessment Team : A-Team
Project Name/Location: 7 HILLS PLOT 3 **Date :** 4-6-2017

Sample variables 1-6 using aerial photos, topographic maps, scenic overlooks, local informants, etc.

1. V_{TRACT} Area of wetland that is contiguous with the WAA *and* of the same subclass ..... 890 ha
2. V_{CORE} Percent of wetland tract that is >300 m from unsuitable habitat ..... 47 %
3. $V_{CONNECT}$ Percent of wetland tract perimeter that is "connected" to suitable habitat .. 72 %
4. V_{SLOPE} Percent floodplain slope ..... 0.02 %
5. V_{STORE} Floodplain width to channel width ratio ... 3198/50 64
6. V_{MACRO} Percent of WAA covered with macrotopographic features ..... 6 %

Sample variables 7-17 based on a walking reconnaissance of the WAA

7. V_{FREQ} Overbank flood recurrence interval ..... 1 years
   Check data source: gage data ✓, local knowledge ✓, flood frequency curves __, regional dimensionless curve __, hydrologic modeling __, other _____.
8. V_{ROUGH} Roughness Coefficient .03 (n_{BASE}) + .005 (n_{TOPO}) + 0.025 (n_{OBS}) + .01 (n_{VEG}) = ... 0.16
9. $V_{SOILINT}$ Percent of WAA with altered soils ..... 0 %.
10. V_{WTF} Water table fluctuation is (check one): ..... present ✓ absent ____
    Check data source: groundwater well, __ redoximorphic features, ✓ County Soil Survey __.
11. V_{WTD} Water table depth is ..... 1 inches
    Check data source: groundwater well, __ redoximorphic features, ✓ County Soil Survey ✓.
12. $V_{WTSLOPE}$ Percent of WAA with an altered water table slope ..... 38 %
13. $V_{SOILPERM}$ Soil permeability ..... 0.4 (in./hr)
14. V_{PORE} Percent effective soil porosity ..... 43 %
15. $V_{SURFCON}$ Percent of adjacent stream reach with altered surface connections ..... 100 %
16. V_{CLAY} Percent of WAA with altered clay content in soil profile ... SILTY CLAY ... 0 %
17. V_{REDOX} Redoximorphic features are (check one): ..... present ✓ absent ____

PLOT 3

Sample variables 18-20 from a representative number of locations in the WAA using a 0.04 ha circular plot (11.3 m (37 ft) radius)

18. V_{TBA} Tree basal area (average of 0.04 ha plot values on next line) . . . . . 40.63 m^2/ha
0.04 ha plots: 1 ____ m^2/ha 2 ____ m^2/ha 3 ____ m^2/ha 4 ____ m^2/ha

19. V_{TDEN} Number of tree stems (average of 0.04 ha plot values on next line) . . . . . 700 stems / ha
0.04 ha plots: 1 ____ stems/ha 2 ____ stems/ha 3 ____ stems/ha 4 ____ stems/ha

20. V_{SNAG} Number of snags (average of 0.04 ha plot values on next line) . . . . . 100 stems / ha
0.04 ha plots: 1 ____ stems/ha 2 ____ stems/ha 3 ____ stems/ha 4 ____ stems/ha

Sample variables 21-22 on two (2) 15 m transects partially within the 0.04 ha plot

21. V_{WD} Volume of woody debris (average of transect values on next line) . . . . . 6.2 m^3/ha
Transect: 1 ____ m^3/ha 2 ____ m^3/ha 3 ____ m^3/ha 4 ____ m^3/ha

22. V_{LOG} Volume of logs (average of transect values on next line) . . . . . 10.4 m^3/ha
Transect: 1 ____ m^3/ha 2 ____ m^3/ha 3 ____ m^3/ha 4 ____ m^3/ha

Sample variable 23 in two (2) 0.004 ha circular subplots (3.6 m (11.8 ft) radius) placed in representative locations of the 0.04 ha plot

23. V_{SSD} Number of woody understory stems (average of 0.04 ha plot values on next line)
. . . . . 250 stems / ha
0.04 ha plots: 1 ____ stems/ha 2 ____ stem/ha 3 ____ stems/ha 4 ____ stems/ha

Sample variables 24-26 in four (4) m^2 subplots placed in representative locations of each quadrant of the 0.04 ha plot

24. V_{GVC} Average cover of ground vegetation (average of 0.04 ha plot values on next line) . . 38 %
Average of 0.04 ha plots sampled: 1 ____ % 2 ____ % 3 ____ % 4 ____ %

25. V_{OHOR} Average cover of "O" Horizon (average of 0.04 ha plot values on next line) . . . . . 95 %
Average of 0.04 ha plots sampled: 1 ____ % 2 ____ % 3 ____ % 4 ____ %

26. V_{AHOR} Average cover of "A" Horizon (average of 0.04 ha plot values on next line) . . . . . 0 %
Average of 0.04 ha plots sampled: 1 ____ % 2 ____ % 3 ____ % 4 ____ %

27. V_{COMP} Concurrence with all strata dominants (average of 0.04 ha plot values on next line) 33 %
Average of 0.04 ha plots sampled: 1 ____ % 2 ____ % 3 ____ % 4 ____ %

Plot Worksheet: Low Gradient Riverine Wetlands in Western Kentucky

Assessment Team : A-Team

Project Name/Location : 7 HILLS **Plot Number :** 3 **Date :** 4-6-2017

Record dbh (cm) of trees by species below, square dbh values (cm^2), multiply result by 0.000079 (m^2), and sum resulting values in shaded columns (m^2/0.04 ha). Record in 18. V_{TBA}, multiply by 25 (m^2/ha).

Species	dbh ~~(cm)~~ IN.	dbh^2 (cm^2)	× 0.00079 (m^2/0.04 ha)	Species	dbh (cm)	dbh^2 (cm^2)	× 0.00079 (m^2/0.04 ha)
GR ASH	11			PIN OAK	10.1		
GR ASH	9.4			SILVER M	10.4		
CARYA SP.	4.1			SILVER M	4.4		
SWEETGUM	17.5			AM. ELM	7.3		
BOXELDER	8.5			SW. GUM	5.2		
GR. ASH	8.4			SW. GUM	21.3		
AM ELM	5.0			SW. GUM	4.4		
SW. GUM	7.9			R. BIRCH	13.3		
SW. GUM	15			SW. GUM	9.9		
IRONWOOD	4.5			Q. MICHAUXII	4.1		
SW. GUM	20.4			AM. ELM	4.5		
SILVER M	13.2			SW. GUM	14.5		

18. V_{TBA} Sum of values from shaded columns above = 1.625 (m^2/0.04 ha) × 25 = 40.63 m^2/ha

19. V_{TDEN} Total number of tree stems from above = 28 (stems/0.04 ha) × 25 = 700 stems/ha

20. V_{SNAG} Total number of snag stems from above= ∅ (stems/0.04 ha) × 25 = 100 stems/ha

21/22. V_{WD} / V_{LOG}

Record number of stems in Size Class 1 (0.6-2.5 cm / 0.25-1 in) along a 6 ft section of Transect 1 and 2

Transect 1 _____ Transect 2 _____ *Total number of stems* = 1

Size Class 1 tons /acre = 0.187 × *total number of stems* = ... 0.2 tons/acre

Record number of stems in Size Class 2 (2.5 - 7.6 cm / 1-3 in) along 12 ft section of Transect 1 and 2

Transect 1 _____ Transect 2 _____ *Total number of stems* = 1

Size Class 2 tons / acre = 0.892 × *total number of stems* = ... 0.9 tons/acre

Record diameter of stems in Size Class 3 (> 7.6 cm / >3 in) along 50 ft section of Transect 1 and 2

Transect 1	diameter	diameter^2	Transect 2	diameter	diameter^2
Stem 1 =	3.4	11.56	Stem 1 =	3.5	12.25
Stem 2 =			Stem 2 =		
Stem 3 =			Stem 3 =		
Stem 4 =			Stem 4 =		
Total diameter^2		11.56	Total diameter^2		12.25

Total diameter^2 of stems from both transects = 23.8

SW. GUM - 11 | 9.7 | 7.0

AM. ELM - 4.6

PLOT 3

Size Class 3 tons / acre = 0.0687 × *Total diameter* ^{2} *of stems from both transects* = . 1.6 tons/acre
Total tons / acre (sum of Size Classes 1-3 from above) = ... 2.7 tons/acre
Cubic feet / acre = (32.05 × *total tons / acre*) / 0.58 = ... 149.2 cubic feet/acre
Cubic meters / ha = *cubic feet / acre* × 0.069 ..... 10.3 cubic meters/ha

23. V_{SSD} Tally woody understory stems two 0.004 ha subplots then average and multiply by 250:
~~Subplot 1~~ 𝍸 𝍸 ~~Subplot 2~~ _____ Average 10 × 250 = . 250 stems/ha

24. V_{GVC} Estimate percent cover of ground vegetation in four m^2 subplots then average:
1 85 % 2 2 % 3 7 % 4 60 % ..... Average 38 %

25. V_{OHOR} Estimate percent cover of "O" Horizon in four m^2 subplots then average:
1 85 % 2 95 % 3 100 % 4 100 % ..... Average 95 %

26. V_{AHOR} Estimate percent cover of "A" Horizon in four m^2 subplots then average:
1 0 % 2 0 % 3 0 % 4 0 % ..... Average 0 %

27. V_{COMP} Determine percent concurrence with each strata using the table below
Tree = 100 % Shrub/Sapling = 0 % Ground Vegetation = 0 % .... Average 33 %

Dominant Species by Strata in Western Kentucky Low Gradient Riverine Wetlands		
Tree	Shrub/Sapling	Ground Vegetation
Acer rubrum	*Acer rubrum*	*Arundinaria gigantea*
Betula nigra	*Betula nigra*	*Aster* sp. ✓
Carya laciniosa	*Carya laciniosa*	*Boehmaria cylindrica*
Celtis laevigata	*Carpinus caroliniana*	*Campsis radicans* ✓
Fraxinus pennsylvanica	*Celtis laevigata*	*Carex squarosa*
Liquidambar styraciflua ✓	*Celtis occidentalis*	*Eragrostis alba*
Quercus pagodifolia	*Fraxinus pennsylvanica*	*Glyceria striata*
Quercus phellos	*Ilex decidua* *	*Hypericum* sp.
Quercus lyrata	*Liquidambar styraciflua* *	*Impatiens capensis*
Quercus imbricaria	*Nyssa sylvatica*	*Panicum* sp.
Quercus michauxii	*Quercus imbricaria*	*Parthenocissus quinquefolia*
Quercus stellata	*Quercus lyrata*	*Pilea pumila*
Quercus palustris	*Quercus phellos*	*Quercus phellos*
Salix nigra	*Quercus palustris*	*Salix nigra*
	Quercus pagodifolia	*Sauraurus cernuus*
	Quercus stellata	*Smilacina racemosa*
	Platanus occidentalis	*Smilax rotundifolia*
	Salix nigra	*Sparganium* sp.
	Ulmus americana *	*Toxicodendron radicans* ✓

1.625
20% - 0.325

SWEETGUM 0.959 59%

ILEX 10%
SWEETGUM 10%
ULMUS AM. 10%

CREEPING JENNY 75% ✓
CAREX SP. 1%
ASTER SP. 4%
RANCUNCLUS SP. 5%

PFO

Field Data Sheet: Low Gradient Riverine Wetlands in Western Kentucky

Assessment Team : A-Team
Project Name/Location: 7 HILLS | PLOT 4 **Date :** 4-6-2017

Sample variables 1-6 using aerial photos, topographic maps, scenic overlooks, local informants, etc.

1. V_{TRACT} Area of wetland that is contiguous with the WAA *and* of the same subclass ..... 890 ha
2. V_{CORE} Percent of wetland tract that is >300 m from unsuitable habitat ..... 47 %
3. $V_{CONNECT}$ Percent of wetland tract perimeter that is "connected" to suitable habitat .. 72 %
4. V_{SLOPE} Percent floodplain slope ..... 0.02 %
5. V_{STORE} Floodplain width to channel width ratio 5635/50 112
6. V_{MACRO} Percent of WAA covered with macrotopographic features ..... 0 %

Sample variables 7-17 based on a walking reconnaissance of the WAA

7. V_{FREQ} Overbank flood recurrence interval ..... 1 years
   Check data source: gage data ✓, local knowledge ✓, flood frequency curves __, regional dimensionless curve __, hydrologic modeling __, other _____ .
8. V_{ROUGH} Roughness Coefficient .03 (n_{BASE}) + .005 (n_{TOPO}) + .01 (n_{OBS}) + .1 (n_{VEG}) = ... 0.145
9. $V_{SOILINT}$ Percent of WAA with altered soils ..... 0 %.
10. V_{WTF} Water table fluctuation is (check one): ..... present ✓ absent ____
    Check data source: groundwater well, __ redoximorphic features, ✓ County Soil Survey __.
11. V_{WTD} Water table depth is ..... 1 inches
    Check data source: groundwater well, __ redoximorphic features, ✓ County Soil Survey ✓.
12. $V_{WTSLOPE}$ Percent of WAA with an altered water table slope ..... 38 %
13. $V_{SOILPERM}$ Soil permeability ..... 0.4 (in./hr)
14. V_{PORE} Percent effective soil porosity ..... 43 %
15. $V_{SURFCON}$ Percent of adjacent stream reach with altered surface connections ..... 100 %
16. V_{CLAY} Percent of WAA with altered clay content in soil profile ..... SILTY CLAY ..... 0 %
17. V_{REDOX} Redoximorphic features are (check one): ..... present ✓ absent ____

PLOT 4

Sample variables 18-20 from a representative number of locations in the WAA using a 0.04 ha circular plot (11.3 m (37 ft) radius)

18. V_{TBA} Tree basal area (average of 0.04 ha plot values on next line) . . . . . 52.08 m^2/ha
0.04 ha plots: 1 ____ m^2/ha 2 ____ m^2/ha 3 ____ m^2/ha 4 ____ m^2/ha

19. V_{TDEN} Number of tree stems (average of 0.04 ha plot values on next line) . . . . . 1125 stems / ha
0.04 ha plots: 1 ____ stems/ha 2 ____ stems/ha 3 ____ stems/ha 4 ____ stems/ha

20. V_{SNAG} Number of snags (average of 0.04 ha plot values on next line) . . . . . 50 stems / ha
0.04 ha plots: 1 ____ stems/ha 2 ____ stems/ha 3 ____ stems/ha 4 ____ stems/ha

Sample variables 21-22 on two (2) 15 m transects partially within the 0.04 ha plot

21. V_{WD} Volume of woody debris (average of transect values on next line) . . . . . 11.1 m^3/ha
Transect: 1 ____ m^3/ha 2 ____ m^3/ha 3 ____ m^3/ha 4 ____ m^3/ha

22. V_{LOG} Volume of logs (average of transect values on next line) . . . . . 0 m^3/ha
Transect: 1 ____ m^3/ha 2 ____ m^3/ha 3 ____ m^3/ha 4 ____ m^3/ha

Sample variable 23 in two (2) 0.004 ha circular subplots (3.6 m (11.8 ft) radius) placed in representative locations of the 0.04 ha plot

23. V_{SSD} Number of woody understory stems (average of 0.04 ha plot values on next line)
. . . . . 2500 stems / ha
0.04 ha plots: 1 ____ stems/ha 2 ____ stem/ha 3 ____ stems/ha 4 ____ stems/ha

Sample variables 24-26 in four (4) m^2 subplots placed in representative locations of each quadrant of the 0.04 ha plot

24. V_{GVC} Average cover of ground vegetation (average of 0.04 ha plot values on next line) . . 30 %
Average of 0.04 ha plots sampled: 1 ____ % 2 ____ % 3 ____ % 4 ____ %

25. V_{OHOR} Average cover of "O" Horizon (average of 0.04 ha plot values on next line) . . . . . 81 %
Average of 0.04 ha plots sampled: 1 ____ % 2 ____ % 3 ____ % 4 ____ %

26. V_{AHOR} Average cover of "A" Horizon (average of 0.04 ha plot values on next line) . . . . . 0 %
Average of 0.04 ha plots sampled: 1 ____ % 2 ____ % 3 ____ % 4 ____ %

27. V_{COMP} Concurrence with all strata dominants (average of 0.04 ha plot values on next line) 83 %
Average of 0.04 ha plots sampled: 1 ____ % 2 ____ % 3 ____ % 4 ____ %

PFO

Plot Worksheet: Low Gradient Riverine Wetlands in Western Kentucky

Assessment Team : A-Team

Project Name/Location : 7HILLS **Plot Number :** 4 **Date :** 4-6-2017

Record dbh (cm) of trees by species below, square dbh values (cm^2), multiply result by 0.000079 (m^2), and sum resulting values in shaded columns (m^2/0.04 ha). Record in 18. V_{TBA}, multiply by 25 (m^2/ha).

Species	dbh (cm)	dbh² (cm²)	× 0.00079 (m²/0.04 ha)	Species	dbh (cm)	dbh² (cm²)	× 0.00079 (m²/0.04 ha)
SILVERMAPLE	6.2			R. BIRCH	7.9		
SILVER M.	12			SILVER M.	4.7		
R. BIRCH	8.9			SYCAMORE	6.8		
R. BIRCH	12			SILVER M	5.0		
SILVER M.	6.4			R. BIRCH	10.9		
R. BIRCH	8.9			R. BIRCH	7.5		
R. BIRCH	8.5			R. BIRCH	9.5		
R. BIRCH	10.3			PIN OAK	6.2		
SILVER M	7.9			R. BIRCH	8.0		
BOX ELD	4.1			R. BIRCH	10.5		
BOX ELD.	4.2			R. BIRCH	9.9		
R. BIRCH	9.7			AM ELM	3.9		

18. V_{TBA} Sum of values from shaded columns above = 2.13 (m^2/0.04 ha) × 25 = 53.36 m^2/ha

19. V_{TDEN} Total number of tree stems from above = 45 (stems/0.04 ha) × 25 = 1125 stems/ha

20. V_{SNAG} Total number of snag stems from above= 2 (stems/0.04 ha) × 25 = 50 stems/ha

21/22. V_{WD} / V_{LOG}

Record number of stems in Size Class 1 (0.6-2.5 cm / 0.25-1 in) along a 6 ft section of Transect 1 and 2

Transect 1 ** Transect 2 ** *Total number of stems* = 6

Size Class 1 tons /acre = 0.187 × *total number of stems* = ... 1.1 tons/acre

Record number of stems in Size Class 2 (2.5 - 7.6 cm / 1-3 in) along 12 ft section of Transect 1 and 2

Transect 1 ___ Transect 2 ** *Total number of stems* = 2

Size Class 2 tons / acre = 0.892 × *total number of stems* = ... 1.8 tons/acre

Record diameter of stems in Size Class 3 (> 7.6 cm / >3 in) along 50 ft section of Transect 1 and 2

Transect 1	diameter	diameter²	Transect 2	diameter	diameter²
Stem 1 =			Stem 1 =		
Stem 2 =			Stem 2 =		
Stem 3 =			Stem 3 =		
Stem 4 =			Stem 4 =		
Total diameter²		0	Total diameter²		0

Total diameter² of stems from both transects = 0

PIN OAK - 4.1

R BIRCH - 11.7 | 11.6 | 11 | 8.5 | 9.9 | 6.7 | 11.4

SILVER M. - 5.8 | 6.8 | 7.2 | 7.5

AM ELM - 9.2

R BIRCH 11.5 | 12.0 | 10 | 7.8

SYCAMORE 14.3 | 5.3

GR. ASH - 4.4

COTTONWOOD 28.8

PLOT 4

Size Class 3 tons / acre = 0.0687 × *Total diameter* ^{2} *of stems from both transects* = . 0 tons/acre
Total tons / acre (sum of Size Classes 1-3 from above) = ... 2.9 tons/acre
Cubic feet / acre = (32.05 × *total tons / acre*) / 0.58 = ... 160.3 cubic feet/acre
Cubic meters / ha = *cubic feet / acre* × 0.069 ..... 11.1 cubic meters/ha

23. V_{SSD} Tally woody understory stems two 0.004 ha subplots then average and multiply by 250:
Subplot 1 ~~HH~~ III Subplot 2 II Average 10 × 250 = . 2500 stems/ha

24. V_{GVC} Estimate percent cover of ground vegetation in four m^2 subplots then average:
1 25 % 2 25 % 3 30 % 4 40 % ..... Average 30 %

25. V_{OHOR} Estimate percent cover of "O" Horizon in four m^2 subplots then average:
1 95 % 2 100 % 3 50 % 4 80 % ..... Average 81 %

26. V_{AHOR} Estimate percent cover of "A" Horizon in four m^2 subplots then average:
1 0 % 2 0 % 3 0 % 4 0 % ..... Average 0 %

27. V_{COMP} Determine percent concurrence with each strata using the table below
Tree = 100 % Shrub/Sapling = 100 % Ground Vegetation = 50 % .... Average 83 %

Dominant Species by Strata in Western Kentucky Low Gradient Riverine Wetlands		
Tree	Shrub/Sapling	Ground Vegetation
Acer rubrum	*Acer rubrum*	*Arundinaria gigantea*
Betula nigra ✓	*Betula nigra*	*Aster* sp. 15
Carya laciniosa	*Carya laciniosa*	*Boehmaria cylindrica*
Celtis laevigata	*Carpinus caroliniana*	*Campsis radicans* ✓
Fraxinus pennsylvanica	*Celtis laevigata*	*Carex squarosa*
Liquidambar styraciflua	*Celtis occidentalis*	*Eragrostis alba*
Quercus pagodifolia	*Fraxinus pennsylvanica* ✓	*Glyceria striata*
Quercus phellos	*Ilex decidua*	*Hypericum* sp.
Quercus lyrata	*Liquidambar styraciflua*	*Impatiens capensis*
Quercus imbricaria	*Nyssa sylvatica*	*Panicum* sp.
Quercus michauxii	*Quercus imbricaria*	*Parthenocissus quinquefolia*
Quercus stellata	*Quercus lyrata*	*Pilea pumila*
Quercus palustris	*Quercus phellos*	*Quercus phellos*
Salix nigra	*Quercus palustris*	*Salix nigra*
	Quercus pagodifolia	*Sauraurus cernuus*
	Quercus stellata	*Smilacina racemosa*
	Platanus occidentalis	*Smilax rotundifolia*
	Salix nigra	*Sparganium* sp.
	Ulmus americana ✓	*Toxicodendron radicans* ✓

2.13
50% - 1.06
70% - H3

RIVERBRCH 1.2 | 56
~~COTTONWOOD 0.42~~

GRASH 6 | 60%
AM ELM 2 | 20%

CREEPING SEMINY 5% ✓
ASTER SP. 15% ✓
RANUNCLUS SP. 4%
CAREX SP. 1%
25%

plot 5

DSS

Field Data Sheet: Low Gradient Riverine Wetlands in Western Kentucky

Assessment Team : A-Team
Project Name/Location: 7 HILLS PLOT 5 **Date :** 4-6-2017

Sample variables 1-6 using aerial photos, topographic maps, scenic overlooks, local informants, etc.

1. V_{TRACT} Area of wetland that is contiguous with the WAA *and* of the same subclass ..... 890 ha
2. V_{CORE} Percent of wetland tract that is >300 m from unsuitable habitat ..... 47 %
3. $V_{CONNECT}$ Percent of wetland tract perimeter that is "connected" to suitable habitat .. 72 %
4. V_{SLOPE} Percent floodplain slope ..... 0.02 %
5. V_{STORE} Floodplain width to channel width ratio 4742/50 95
6. V_{MACRO} Percent of WAA covered with macrotopographic features ..... 6 %

Sample variables 7-17 based on a walking reconnaissance of the WAA

7. V_{FREQ} Overbank flood recurrence interval ..... 1 years
   Check data source: gage data ✓, local knowledge ✓, flood frequency curves __, regional dimensionless curve __, hydrologic modeling __, other _____.
8. V_{ROUGH} Roughness Coefficient .03 (n_{BASE}) + .01 (n_{TOPO}) + .025 (n_{OBS}) + .1 (n_{VEG}) = ... 0.165
9. $V_{SOILINT}$ Percent of WAA with altered soils ..... 0 %.
10. V_{WTF} Water table fluctuation is (check one): ..... present ✓ absent ____
    Check data source: groundwater well, __ redoximorphic features, ✓ County Soil Survey __.
11. V_{WTD} Water table depth is ..... 1 inches
    Check data source: groundwater well, __ redoximorphic features, ✓ County Soil Survey ✓.
12. $V_{WTSLOPE}$ Percent of WAA with an altered water table slope ..... 38 %
13. $V_{SOILPERM}$ Soil permeability ..... 0.4 (in./hr)
14. V_{PORE} Percent effective soil porosity ..... 43 %
15. $V_{SURFCON}$ Percent of adjacent stream reach with altered surface connections ..... 100 %
16. V_{CLAY} Percent of WAA with altered clay content in soil profile ..... SILT LOAM ..... 0 %
17. V_{REDOX} Redoximorphic features are (check one): ..... present ✓ absent ____

PLOT 5

Sample variables 18-20 from a representative number of locations in the WAA using a 0.04 ha circular plot (11.3 m (37 ft) radius)

18. V_{TBA} Tree basal area (average of 0.04 ha plot values on next line) . . . . . 12.77 m^2/ha
0.04 ha plots: 1 ____ m^2/ha 2 ____ m^2/ha 3 ____ m^2/ha 4 ____ m^2/ha

19. V_{TDEN} Number of tree stems (average of 0.04 ha plot values on next line) . . . . . 925 stems / ha
0.04 ha plots: 1 ____ stems/ha 2 ____ stems/ha 3 ____ stems/ha 4 ____ stems/ha

20. V_{SNAG} Number of snags (average of 0.04 ha plot values on next line) . . . . . 0 stems / ha
0.04 ha plots: 1 ____ stems/ha 2 ____ stems/ha 3 ____ stems/ha 4 ____ stems/ha

Sample variables 21-22 on two (2) 15 m transects partially within the 0.04 ha plot

21. V_{WD} Volume of woody debris (average of transect values on next line) . . . . . 23.6 m^3/ha
Transect: 1 ____ m^3/ha 2 ____ m^3/ha 3 ____ m^3/ha 4 ____ m^3/ha

22. V_{LOG} Volume of logs (average of transect values on next line) . . . . . 17.34 m^3/ha
Transect: 1 ____ m^3/ha 2 ____ m^3/ha 3 ____ m^3/ha 4 ____ m^3/ha

Sample variable 23 in two (2) 0.004 ha circular subplots (3.6 m (11.8 ft) radius) placed in representative locations of the 0.04 ha plot

23. V_{SSD} Number of woody understory stems (average of 0.04 ha plot values on next line)
. . . . . 7000 stems / ha
0.04 ha plots: 1 ____ stems/ha 2 ____ stem/ha 3 ____ stems/ha 4 ____ stems/ha

Sample variables 24-26 in four (4) m^2 subplots placed in representative locations of each quadrant of the 0.04 ha plot

24. V_{GVC} Average cover of ground vegetation (average of 0.04 ha plot values on next line) . . 75 %
Average of 0.04 ha plots sampled: 1 ____ % 2 ____ % 3 ____ % 4 ____ %

25. V_{OHOR} Average cover of "O" Horizon (average of 0.04 ha plot values on next line) . . . . . 100 %
Average of 0.04 ha plots sampled: 1 ____ % 2 ____ % 3 ____ % 4 ____ %

26. V_{AHOR} Average cover of "A" Horizon (average of 0.04 ha plot values on next line) . . . . . 0 %
Average of 0.04 ha plots sampled: 1 ____ % 2 ____ % 3 ____ % 4 ____ %

27. V_{COMP} Concurrence with all strata dominants (average of 0.04 ha plot values on next line) 67 %
Average of 0.04 ha plots sampled: 1 ____ % 2 ____ % 3 ____ % 4 ____ %

Plot Worksheet: Low Gradient Riverine Wetlands in Western Kentucky

Assessment Team : A-TEAM

Project Name/Location : 7 HILLS **Plot Number :** 5 **Date :** 4-6-2017

Record dbh (cm) of trees by species below, square dbh values (cm^2), multiply result by 0.000079 (m^2), and sum resulting values in shaded columns (m^2/0.04 ha). Record in 18. V_{TBA}, multiply by 25 (m^2/ha).

Species	dbh (cm)	dbh^2 (cm^2)	× 0.00079 (m^2/0.04 ha)	Species	dbh (cm)	dbh^2 (cm^2)	× 0.00079 (m^2/0.04 ha)
BL willow	6.0			" "	5.3		
BL willow	4.9			" "	4.6		
BL willow	4.4			" "	5.0		
" "	4.1			" "	4.9		
" "	4.5			" "	4.8		
" "	5.3			" "	5.7		
" "	4.2			" "	3.9		
" "	7.4			" "	4.5		
" "	8.6			" "	5.0		
" "	5.4			" "	5.7		
" "	6.0			" "	6.2		
" "	5.9			" "	4.3		

BL wi. 5.5
" " 4.0
" " 4.0
" " 5.4
" " 4.3
" " 4.9
" " 4.8
" " 5.1
" " 4.3
" " 5.4
" " 4.6
" " 4.5
" " 6.0

18. V_{TBA} Sum of values from shaded columns above = .51 (m^2/0.04 ha) × 25 = 12.77 m^2/ha

19. V_{TDEN} Total number of tree stems from above = 37 (stems/0.04 ha) × 25 = 925 stems/ha

20. V_{SNAG} Total number of snag stems from above= 0 (stems/0.04 ha) × 25 = 0 stems/ha

21/22. V_{WD} / V_{LOG}

Record number of stems in Size Class 1 (0.6-2.5 cm / 0.25-1 in) along a 6 ft section of Transect 1 and 2

Transect 1 ____ Transect 2 ____ *Total number of stems* = 4

Size Class 1 tons /acre = 0.187 × *total number of stems* = ... 0.7 tons/acre

Record number of stems in Size Class 2 (2.5 - 7.6 cm / 1-3 in) along 12 ft section of Transect 1 and 2

Transect 1 ____ Transect 2 ____ *Total number of stems* = 1

Size Class 2 tons / acre = 0.892 × *total number of stems* = ... 0.9 tons/acre

Record diameter of stems in Size Class 3 (> 7.6 cm / >3 in) along 50 ft section of Transect 1 and 2

Transect 1	diameter	diameter^2	Transect 2	diameter	diameter^2
Stem 1 =	7.3	53.29	Stem 1 =	3.6	12.96
Stem 2 =			Stem 2 =		
Stem 3 =			Stem 3 =		
Stem 4 =			Stem 4 =		
Total diameter^2		53.29	Total diameter^2		13.00

Total diameter^2 of stems from both transects = 66.3

PLOT 5

Size Class 3 tons / acre = 0.0687 × *Total diameter² of stems from both transects* = . 4.6 tons/acre
Total tons / acre (sum of Size Classes 1-3 from above) = ... 6.2 tons/acre
Cubic feet / acre = (32.05 × *total tons / acre*) / 0.58 = ... 342.6 cubic feet/acre
Cubic meters / ha = *cubic feet / acre* × 0.069 . . . . . 23.6 cubic meters/ha

23. V_{SSD} Tally woody understory stems two 0.004 ha subplots then average and multiply by 250:
Subplot 1 ~~IIII~~ Subplot 2 ~~IIII~~ ~~IIII~~ ~~IIII~~ ~~IIII~~ IIII Average 28 × 250 = . 7000 stems/ha

24. V_{GVC} Estimate percent cover of ground vegetation in four m² subplots then average:
1 10 % 2 5 % 3 15 % 4 0 % . . . . . Average 7.5 %

25. V_{OHOR} Estimate percent cover of "O" Horizon in four m² subplots then average:
1 100 % 2 100 % 3 100 % 4 100 % . . . . . Average 100 %

26. V_{AHOR} Estimate percent cover of "A" Horizon in four m² subplots then average:
1 0 % 2 0 % 3 0 % 4 0 % . . . . . Average 0 %

27. V_{COMP} Determine percent concurrence with each strata using the table below
Tree = 100 % Shrub/Sapling = 100 % Ground Vegetation = 0 % . . . . Average 67 %

Dominant Species by Strata in Western Kentucky Low Gradient Riverine Wetlands		
Tree	Shrub/Sapling	Ground Vegetation
Acer rubrum	*Acer rubrum*	*Arundinaria gigantea*
Betula nigra	*Betula nigra*	*Aster* sp.
Carya laciniosa	*Carya laciniosa*	*Boehmaria cylindrica*
Celtis laevigata	*Carpinus caroliniana*	*Campsis radicans*
Fraxinus pennsylvanica	*Celtis laevigata*	*Carex squarosa*
Liquidambar styraciflua	*Celtis occidentalis*	*Eragrostis alba*
Quercus pagodifolia	*Fraxinus pennsylvanica* ✓	*Glyceria striata*
Quercus phellos	*Ilex decidua*	*Hypericum* sp.
Quercus lyrata	*Liquidambar styraciflua*	*Impatiens capensis*
Quercus imbricaria	*Nyssa sylvatica*	*Panicum* sp.
Quercus michauxii	*Quercus imbricaria*	*Parthenocissus quinquefolia*
Quercus stellata	*Quercus lyrata*	*Pilea pumila*
Quercus palustris	*Quercus phellos*	*Quercus phellos*
Salix nigra ✓	*Quercus palustris*	*Salix nigra*
	Quercus pagodifolia	*Sauraurus cernuus*
	Quercus stellata	*Smilacina racemosa*
	Platanus occidentalis	*Smilax rotundifolia*
	Salix nigra ✓	*Sparganium* sp.
	Ulmus americana	*Toxicodendron radicans*

GR ASH 13 | 46%
BL WILLOW 15 | 53

LIZARD'S TAIL 10%

Field Data Sheet: Low Gradient Riverine Wetlands in Western Kentucky

Assessment Team : A-TEAM
Project Name/Location: 7 HILLS SITE 6 **Date :** 4-6-2017

Sample variables 1-6 using aerial photos, topographic maps, scenic overlooks, local informants, etc.

1. V_{TRACT} Area of wetland that is contiguous with the WAA *and* of the same subclass ..... 890 ha
2. V_{CORE} Percent of wetland tract that is >300 m from unsuitable habitat ..... 47 %
3. $V_{CONNECT}$ Percent of wetland tract perimeter that is "connected" to suitable habitat .. 72 %
4. V_{SLOPE} Percent floodplain slope ..... 0.02 %
5. V_{STORE} Floodplain width to channel width ratio .... 3375/50 ..... 60:1
6. V_{MACRO} Percent of WAA covered with macrotopographic features ..... 6 %

Sample variables 7-17 based on a walking reconnaissance of the WAA

7. V_{FREQ} Overbank flood recurrence interval ..... 1 years
   Check data source: gage data ✓, local knowledge ✓, flood frequency curves __, regional dimensionless curve __, hydrologic modeling __, other _____ .
8. V_{ROUGH} Roughness Coefficient .03 (n_{BASE}) + .01 (n_{TOPO}) + .025 (n_{OBS}) + .1 (n_{VEG}) = ... 0.165
9. $V_{SOILINT}$ Percent of WAA with altered soils ..... 0 %.
10. V_{WTF} Water table fluctuation is (check one): ..... present ✓ absent ____
    Check data source: groundwater well, __ redoximorphic features, ✓ County Soil Survey __.
11. V_{WTD} Water table depth is ..... 1 inches
    Check data source: groundwater well, __ redoximorphic features, ✓ County Soil Survey __.
12. $V_{WTSLOPE}$ Percent of WAA with an altered water table slope ..... 38 %
13. $V_{SOILPERM}$ Soil permeability ..... 0.4 (in./hr)
14. V_{PORE} Percent effective soil porosity ..... 43 %
15. $V_{SURFCON}$ Percent of adjacent stream reach with altered surface connections ..... 100 %
16. V_{CLAY} Percent of WAA with altered clay content in soil profile .... SILTY CLAY .. 0 %
17. V_{REDOX} Redoximorphic features are (check one): ..... present ✓ absent ____

Plot 6

Sample variables 18-20 from a representative number of locations in the WAA using a 0.04 ha circular plot (11.3 m (37 ft) radius)

18. V_{TBA} Tree basal area (average of 0.04 ha plot values on next line) . . . . . 39.07 m^2/ha
0.04 ha plots: 1 ____ m^2/ha 2 ____ m^2/ha 3 ____ m^2/ha 4 ____ m^2/ha

19. V_{TDEN} Number of tree stems (average of 0.04 ha plot values on next line) . . . . . 675 stems / ha
0.04 ha plots: 1 ____ stems/ha 2 ____ stems/ha 3 ____ stems/ha 4 ____ stems/ha

20. V_{SNAG} Number of snags (average of 0.04 ha plot values on next line) . . . . . 50 stems / ha
0.04 ha plots: 1 ____ stems/ha 2 ____ stems/ha 3 ____ stems/ha 4 ____ stems/ha

Sample variables 21-22 on two (2) 15 m transects partially within the 0.04 ha plot

21. V_{WD} Volume of woody debris (average of transect values on next line) . . . . . 85.7 m^3/ha
Transect: 1 ____ m^3/ha 2 ____ m^3/ha 3 ____ m^3/ha 4 ____ m^3/ha

22. V_{LOG} Volume of logs (average of transect values on next line) . . . . . 80.8 m^3/ha
Transect: 1 ____ m^3/ha 2 ____ m^3/ha 3 ____ m^3/ha 4 ____ m^3/ha

Sample variable 23 in two (2) 0.004 ha circular subplots (3.6 m (11.8 ft) radius) placed in representative locations of the 0.04 ha plot

23. V_{SSD} Number of woody understory stems (average of 0.04 ha plot values on next line)
. . . . . 450 stems / ha
0.04 ha plots: 1 ____ stems/ha 2 ____ stem/ha 3 ____ stems/ha 4 ____ stems/ha

Sample variables 24-26 in four (4) m^2 subplots placed in representative locations of each quadrant of the 0.04 ha plot

24. V_{GVC} Average cover of ground vegetation (average of 0.04 ha plot values on next line) . . 11.3 %
Average of 0.04 ha plots sampled: 1 ____ % 2 ____ % 3 ____ % 4 ____ %

25. V_{OHOR} Average cover of "O" Horizon (average of 0.04 ha plot values on next line) . . . . . 83.8 %
Average of 0.04 ha plots sampled: 1 ____ % 2 ____ % 3 ____ % 4 ____ %

26. V_{AHOR} Average cover of "A" Horizon (average of 0.04 ha plot values on next line) . . . . . 0 %
Average of 0.04 ha plots sampled: 1 ____ % 2 ____ % 3 ____ % 4 ____ %

27. V_{COMP} Concurrence with all strata dominants (average of 0.04 ha plot values on next line) 44.3 %
Average of 0.04 ha plots sampled: 1 ____ % 2 ____ % 3 ____ % 4 ____ %

PFO

Plot Worksheet: Low Gradient Riverine Wetlands in Western Kentucky

Assessment Team : A-TEAM

Project Name/Location : 7 HILLS **Plot Number :** 6 **Date :** 4-6-2017

Record dbh (cm) of trees by species below, square dbh values (cm^2), multiply result by 0.000079 (m^2), and sum resulting values in shaded columns (m^2/0.04 ha). Record in 18. V_{TBA}, multiply by 25 (m^2/ha).

Species	dbh (cm)	dbh² (cm²)	× 0.00079 (m²/0.04 ha)	Species	dbh (cm)	dbh² (cm²)	× 0.00079 (m²/0.04 ha)
HACKBERRY 6.2 SILVER M.	12.4			SILVER M	9.6		
SYCAMORE	10.4			" "	12.2		
SILVER M	8.7			" "	4.5		
SILVER M	6.3			" "	5.3		
SUGARBERRY 6.0 SILVER M	21.2			BOX ELDER	10.1		
SILVER M.	9.0			SUGARBERRY	4.8		
SILVER M	7.8			SUGARBERRY	6.6		
COTTONWOOD 22.5 SILVER M.	10.3			AM. ELM	10.1		
SILVER M.	12.1			BOX ELDER	7.9		
" "	15.7			AM. ELM	4.0		
" "	6.5			BOX ELDER	6.0		
" "	15.2			" "	5.9		

18. V_{TBA} Sum of values from shaded columns above = 1.56 (m^2/0.04 ha) × 25 = 39.07 m^2/ha

19. V_{TDEN} Total number of tree stems from above = 27 (stems/0.04 ha) × 25 = 675 stems/ha

20. V_{SNAG} Total number of snag stems from above= ** (stems/0.04 ha) × 25 = 50 stems/ha

21/22. V_{WD} / V_{LOG}

Record number of stems in Size Class 1 (0.6-2.5 cm / 0.25-1 in) along a 6 ft section of Transect 1 and 2

Transect 1 0 Transect 2 ** *Total number of stems* = 2

Size Class 1 tons /acre = 0.187 × *total number of stems* = ... 0.4 tons/acre

Record number of stems in Size Class 2 (2.5 - 7.6 cm / 1-3 in) along 12 ft section of Transect 1 and 2

Transect 1 0 Transect 2 * *Total number of stems* = 1

Size Class 2 tons / acre = 0.892 × *total number of stems* = ... 0.9 tons/acre

Record diameter of stems in Size Class 3 (> 7.6 cm / >3 in) along 50 ft section of Transect 1 and 2

Transect 1	diameter	diameter²	Transect 2	diameter	diameter²
Stem 1 =	15.5	240.3	Stem 1 =	4.7	22.1
Stem 2 =			Stem 2 =	3.2	10.2
Stem 3 =			Stem 3 =	6.0	36
Stem 4 =			Stem 4 =		
Total diameter²		240.3	Total diameter²		68.3

Total diameter² of stems from both transects = 308.6

Plot 6

Size Class 3 tons / acre = 0.0687 × *Total diameter² of stems from both transects* = . 21.2 tons/acre
Total tons / acre (sum of Size Classes 1-3 from above) = ... 22.5 tons/acre
Cubic feet / acre = (32.05 × *total tons / acre*) / 0.58 = ... 1241.7 cubic feet/acre
Cubic meters / ha = *cubic feet / acre* × 0.069 ..... 85.7 cubic meters/ha

23. V_{SSD} Tally woody understory stems two 0.004 ha subplots then average and multiply by 250:
~~Subplot 1~~ 𝍸 𝍸 𝍸 ~~Subplot 2~~ _____ Average 18 × 250 = . 450 stems/ha

24. V_{GVC} Estimate percent cover of ground vegetation in four m² subplots then average:
1 20 % 2 10 % 3 5 % 4 10 % ..... Average 11.3 %

25. V_{OHOR} Estimate percent cover of "O" Horizon in four m² subplots then average:
1 90 % 2 90 % 3 60 % 4 95 % ..... Average 83.8 %

26. V_{AHOR} Estimate percent cover of "A" Horizon in four m² subplots then average:
1 0 % 2 0 % 3 0 % 4 0 % ..... Average 0 %

27. V_{COMP} Determine percent concurrence with each strata using the table below
Tree = 0 % Shrub/Sapling = 100 % Ground Vegetation = 33 % .... Average 44.3 %

Dominant Species by Strata in Western Kentucky Low Gradient Riverine Wetlands		
Tree	Shrub/Sapling	Ground Vegetation
Acer rubrum	*Acer rubrum*	*Arundinaria gigantea*
Betula nigra	*Betula nigra*	*Aster* sp. ✓
Carya laciniosa	*Carya laciniosa*	*Boehmaria cylindrica*
Celtis laevigata	*Carpinus caroliniana*	*Campsis radicans* ✓
Fraxinus pennsylvanica	*Celtis laevigata*	*Carex squarosa*
Liquidambar styraciflua	*Celtis occidentalis*	*Eragrostis alba*
Quercus pagodifolia	*Fraxinus pennsylvanica*	*Glyceria striata*
Quercus phellos	*Ilex decidua*	*Hypericum* sp.
Quercus lyrata	*Liquidambar styraciflua*	*Impatiens capensis*
Quercus imbricaria	*Nyssa sylvatica*	*Panicum* sp.
Quercus michauxii	*Quercus imbricaria*	*Parthenocissus quinquefolia*
Quercus stellata	*Quercus lyrata*	*Pilea pumila*
Quercus palustris	*Quercus phellos*	*Quercus phellos*
Salix nigra	*Quercus palustris*	*Salix nigra*
	Quercus pagodifolia	*Saururus cernuus*
	Quercus stellata	*Smilacina racemosa*
	Platanus occidentalis	*Smilax rotundifolia*
	Salix nigra	*Sparganium* sp.
	Ulmus americana ?!	*Toxicodendron radicans*

✓ COMMON BLUE VIOLET 5%
✓ ASTER SP. 10%
✓ CREEPING JENNY 5%

PSS

Field Data Sheet: Low Gradient Riverine Wetlands in Western Kentucky

Assessment Team : A-TEAM
Project Name/Location: 7 HILLS PLOT 7 **Date :** 4-6-2017

Sample variables 1-6 using aerial photos, topographic maps, scenic overlooks, local informants, etc.

1. V_{TRACT} Area of wetland that is contiguous with the WAA *and* of the same subclass ..... 890 ha
2. V_{CORE} Percent of wetland tract that is >300 m from unsuitable habitat ..... 47 %
3. $V_{CONNECT}$ Percent of wetland tract perimeter that is "connected" to suitable habitat .. 72 %
4. V_{SLOPE} Percent floodplain slope ..... 0.02 %
5. V_{STORE} Floodplain width to channel width ratio ... 3375/50 67
6. V_{MACRO} Percent of WAA covered with macrotopographic features ..... 6 %

Sample variables 7-17 based on a walking reconnaissance of the WAA

7. V_{FREQ} Overbank flood recurrence interval ..... 1 years
   Check data source: gage data ✓, local knowledge ✓, flood frequency curves __, regional dimensionless curve __, hydrologic modeling __, other _____.
8. V_{ROUGH} Roughness Coefficient .08 (n_{BASE}) + .05 (n_{TOPO}) + .002 (n_{OBS}) + .05 (n_{VEG}) = ... 0.132
9. $V_{SOILINT}$ Percent of WAA with altered soils ..... 0 %.
10. V_{WTF} Water table fluctuation is (check one): ..... present ✓ absent ____
    Check data source: groundwater well, __ redoximorphic features, ✓ County Soil Survey __.
11. V_{WTD} Water table depth is ..... 1 inches
    Check data source: groundwater well, __ redoximorphic features, ✓ County Soil Survey ✓.
12. $V_{WTSLOPE}$ Percent of WAA with an altered water table slope ..... 38 %
13. $V_{SOILPERM}$ Soil permeability ..... 0.4 (in./hr)
14. V_{PORE} Percent effective soil porosity ..... 43 %
15. $V_{SURFCON}$ Percent of adjacent stream reach with altered surface connections ..... 100 %
16. V_{CLAY} Percent of WAA with altered clay content in soil profile ... SILTY CLAY ..... 0 %
17. V_{REDOX} Redoximorphic features are (check one): ..... present ✓ absent ____

PLOT 7

Sample variables 18-20 from a representative number of locations in the WAA using a 0.04 ha circular plot (11.3 m (37 ft) radius)

18. V_{TBA} Tree basal area (average of 0.04 ha plot values on next line) . . . . . 1.2 m^2/ha
0.04 ha plots: 1 ____ m^2/ha 2 ____ m^2/ha 3 ____ m^2/ha 4 ____ m^2/ha

19. V_{TDEN} Number of tree stems (average of 0.04 ha plot values on next line) . . . . . 25 stems / ha
0.04 ha plots: 1 ____ stems/ha 2 ____ stems/ha 3 ____ stems/ha 4 ____ stems/ha

20. V_{SNAG} Number of snags (average of 0.04 ha plot values on next line) . . . . . 0 stems / ha
0.04 ha plots: 1 ____ stems/ha 2 ____ stems/ha 3 ____ stems/ha 4 ____ stems/ha

Sample variables 21-22 on two (2) 15 m transects partially within the 0.04 ha plot

21. V_{WD} Volume of woody debris (average of transect values on next line) . . . . . 0 m^3/ha
Transect: 1 ____ m^3/ha 2 ____ m^3/ha 3 ____ m^3/ha 4 ____ m^3/ha

22. V_{LOG} Volume of logs (average of transect values on next line) . . . . . 0 m^3/ha
Transect: 1 ____ m^3/ha 2 ____ m^3/ha 3 ____ m^3/ha 4 ____ m^3/ha

Sample variable 23 in two (2) 0.004 ha circular subplots (3.6 m (11.8 ft) radius) placed in representative locations of the 0.04 ha plot

23. V_{SSD} Number of woody understory stems (average of 0.04 ha plot values on next line)
. . . . . 575 stems / ha
0.04 ha plots: 1 ____ stems/ha 2 ____ stem/ha 3 ____ stems/ha 4 ____ stems/ha

Sample variables 24-26 in four (4) m^2 subplots placed in representative locations of each quadrant of the 0.04 ha plot

24. V_{GVC} Average cover of ground vegetation (average of 0.04 ha plot values on next line) . . 72 %
Average of 0.04 ha plots sampled: 1 ____ % 2 ____ % 3 ____ % 4 ____ %

25. V_{OHOR} Average cover of "O" Horizon (average of 0.04 ha plot values on next line) . . . . . 100 %
Average of 0.04 ha plots sampled: 1 ____ % 2 ____ % 3 ____ % 4 ____ %

26. V_{AHOR} Average cover of "A" Horizon (average of 0.04 ha plot values on next line) . . . . . 0 %
Average of 0.04 ha plots sampled: 1 ____ % 2 ____ % 3 ____ % 4 ____ %

27. V_{COMP} Concurrence with all strata dominants (average of 0.04 ha plot values on next line) 33 %
Average of 0.04 ha plots sampled: 1 ____ % 2 ____ % 3 ____ % 4 ____ %

Plot Worksheet: Low Gradient Riverine Wetlands in Western Kentucky

Assessment Team : A-TBAm

Project Name/Location : 7 HILLS **Plot Number :** 7 **Date :** 4-6-2017

Record dbh (cm) of trees by species below, square dbh values (cm^2), multiply result by 0.000079 (m^2), and sum resulting values in shaded columns (m^2/0.04 ha). Record in 18. V_{TBA}, multiply by 25 (m^2/ha).

Species	dbh (cm)	dbh^2 (cm^2)	× 0.00079 (m^2/0.04 ha)	Species	dbh (cm)	dbh^2 (cm^2)	× 0.00079 (m^2/0.04 ha)
GR. ASH	9.8						

18. V_{TBA} Sum of values from shaded columns above = 0.105 (m^2/0.04 ha) × 25 = 1.2 m^2/ha

19. V_{TDEN} Total number of tree stems from above = 1 (stems/0.04 ha) × 25 = 25 stems/ha

20. V_{SNAG} Total number of snag stems from above= 0 (stems/0.04 ha) × 25 = 0 stems/ha

21/22. V_{WD} / V_{LOG}

Record number of stems in Size Class 1 (0.6-2.5 cm / 0.25-1 in) along a 6 ft section of Transect 1 and 2

Transect 1 0 Transect 2 0 *Total number of stems* = _____

Size Class 1 tons /acre = 0.187 × *total number of stems* = ... 0 tons/acre

Record number of stems in Size Class 2 (2.5 - 7.6 cm / 1-3 in) along 12 ft section of Transect 1 and 2

Transect 1 0 Transect 2 0 *Total number of stems* = _____

Size Class 2 tons / acre = 0.892 × *total number of stems* = ... 0 tons/acre

Record diameter of stems in Size Class 3 (> 7.6 cm / >3 in) along 50 ft section of Transect 1 and 2

Transect 1	diameter	diameter^2	Transect 2	diameter	diameter^2
Stem 1 =	0	0	Stem 1 =	0	0
Stem 2 =			Stem 2 =		
Stem 3 =			Stem 3 =		
Stem 4 =			Stem 4 =		
Total diameter^2		0	Total diameter^2		0

Total diameter^2 of stems from both transects = 0

PLOT 7

Size Class 3 tons / acre = 0.0687 × *Total diameter² of stems from both transects* = . 0 tons/acre
Total tons / acre (sum of Size Classes 1-3 from above) = ... 0 tons/acre
Cubic feet / acre = (32.05 × *total tons / acre*) / 0.58 = ... 0 cubic feet/acre
Cubic meters / ha = *cubic feet / acre* × 0.069 . . . . . 0 cubic meters/ha

23. V_{SSD} Tally woody understory stems two 0.004 ha subplots then average and multiply by 250:
~~Subplot 1~~ ~~IIII IIII IIII~~ ~~Subplot 2~~ _____ Average 23 × 250 = . 575 stems/ha
IIII III

24. V_{GVC} Estimate percent cover of ground vegetation in four m² subplots then average:
1 90 % 2 80 % 3 40 % 4 80 % . . . . . Average 72 %

25. V_{OHOR} Estimate percent cover of "O" Horizon in four m² subplots then average:
1 100 % 2 100 % 3 100 % 4 100 % . . . . . Average 100 %

26. V_{AHOR} Estimate percent cover of "A" Horizon in four m² subplots then average:
1 0 % 2 0 % 3 0 % 4 0 % . . . . . Average 0 %

27. V_{COMP} Determine percent concurrence with each strata using the table below
Tree = 100 % Shrub/Sapling = 0 % Ground Vegetation = 0 % . . . . Average 33 %

Dominant Species by Strata in Western Kentucky Low Gradient Riverine Wetlands		
Tree	Shrub/Sapling	Ground Vegetation
Acer rubrum	*Acer rubrum*	*Arundinaria gigantea*
Betula nigra	*Betula nigra*	*Aster* sp.
Carya laciniosa	*Carya laciniosa*	*Boehmaria cylindrica*
Celtis laevigata	*Carpinus caroliniana*	*Campsis radicans*
Fraxinus pennsylvanica ✓	*Celtis laevigata*	*Carex squarosa*
Liquidambar styraciflua	*Celtis occidentalis*	*Eragrostis alba*
Quercus pagodifolia	*Fraxinus pennsylvanica*	*Glyceria striata*
Quercus phellos	*Ilex decidua*	*Hypericum* sp.
Quercus lyrata	*Liquidambar styraciflua*	*Impatiens capensis*
Quercus imbricaria	*Nyssa sylvatica*	*Panicum* sp.
Quercus michauxii	*Quercus imbricaria*	*Parthenocissus quinquefolia*
Quercus stellata	*Quercus lyrata*	*Pilea pumila*
Quercus palustris	*Quercus phellos*	*Quercus phellos*
Salix nigra	*Quercus palustris*	*Salix nigra*
	Quercus pagodifolia	*Saururus cernuus*
	Quercus stellata	*Smilacina racemosa*
	Platanus occidentalis	*Smilax rotundifolia*
	Salix nigra	*Sparganium* sp.
	Ulmus americana	*Toxicodendron radicans*

PHALARIS 90%

P55

Field Data Sheet: Low Gradient Riverine Wetlands in Western Kentucky

Assessment Team : A-Team
Project Name/Location: 7 Hills Plot 8 **Date :** 4-7-2017

Sample variables 1-6 using aerial photos, topographic maps, scenic overlooks, local informants, etc.

1. V_{TRACT} Area of wetland that is contiguous with the WAA *and* of the same subclass ..... 890 ha

2. V_{CORE} Percent of wetland tract that is >300 m from unsuitable habitat ..... 47 %

3. $V_{CONNECT}$ Percent of wetland tract perimeter that is "connected" to suitable habitat .. 72 %

4. V_{SLOPE} Percent floodplain slope ..... 0.02 %

5. V_{STORE} Floodplain width to channel width ratio 63

6. V_{MACRO} Percent of WAA covered with macrotopographic features ..... 6 %

Sample variables 7-17 based on a walking reconnaissance of the WAA

7. V_{FREQ} Overbank flood recurrence interval ..... 1 years
Check data source: gage data __, ✓ local knowledge ✓, flood frequency curves __, regional dimensionless curve __, hydrologic modeling __, other _____.

8. V_{ROUGH} Roughness Coefficient .03 (n_{BASE}) + .005 (n_{TOPO}) + .01 (n_{OBS}) + .05 (n_{VEG}) = ... .095

9. $V_{SOILINT}$ Percent of WAA with altered soils ..... 0 %.

10. V_{WTF} Water table fluctuation is (check one): ..... present ✓ absent ____
Check data source: groundwater well, __ redoximorphic features, ✓ County Soil Survey __.

11. V_{WTD} Water table depth is ..... 1 inches
Check data source: groundwater well, __ redoximorphic features, ✓ County Soil Survey ✓.

12. $V_{WTSLOPE}$ Percent of WAA with an altered water table slope ..... 38 %

13. $V_{SOILPERM}$ Soil permeability ..... 0.4 (in./hr)

14. V_{PORE} Percent effective soil porosity ..... 43 %

15. $V_{SURFCON}$ Percent of adjacent stream reach with altered surface connections ..... 100 %

16. V_{CLAY} Percent of WAA with altered clay content in soil profile SILTY CLAY ..... 0 %

17. V_{REDOX} Redoximorphic features are (check one): ..... present ✓ absent ____

Plot 8

Sample variables 18-20 from a representative number of locations in the WAA using a 0.04 ha circular plot (11.3 m (37 ft) radius)

18. V_{TBA} Tree basal area (average of 0.04 ha plot values on next line) . . . . . 0 m^2/ha
0.04 ha plots: 1 ____ m^2/ha 2 ____ m^2/ha 3 ____ m^2/ha 4 ____ m^2/ha

19. V_{TDEN} Number of tree stems (average of 0.04 ha plot values on next line) . . . . . 0 stems / ha
0.04 ha plots: 1 ____ stems/ha 2 ____ stems/ha 3 ____ stems/ha 4 ____ stems/ha

20. V_{SNAG} Number of snags (average of 0.04 ha plot values on next line) . . . . . 0 stems / ha
0.04 ha plots: 1 ____ stems/ha 2 ____ stems/ha 3 ____ stems/ha 4 ____ stems/ha

Sample variables 21-22 on two (2) 15 m transects partially within the 0.04 ha plot

21. V_{WD} Volume of woody debris (average of transect values on next line) . . . . . 9.4 m^3/ha
Transect: 1 ____ m^3/ha 2 ____ m^3/ha 3 ____ m^3/ha 4 ____ m^3/ha

22. V_{LOG} Volume of logs (average of transect values on next line) . . . . . 9.5 m^3/ha
Transect: 1 ____ m^3/ha 2 ____ m^3/ha 3 ____ m^3/ha 4 ____ m^3/ha

Sample variable 23 in two (2) 0.004 ha circular subplots (3.6 m (11.8 ft) radius) placed in representative locations of the 0.04 ha plot

23. V_{SSD} Number of woody understory stems (average of 0.04 ha plot values on next line)
. . . . . 20,000 stems / ha
0.04 ha plots: 1 ____ stems/ha 2 ____ stem/ha 3 ____ stems/ha 4 ____ stems/ha

Sample variables 24-26 in four (4) m^2 subplots placed in representative locations of each quadrant of the 0.04 ha plot

24. V_{GVC} Average cover of ground vegetation (average of 0.04 ha plot values on next line) . . 0 %
Average of 0.04 ha plots sampled: 1 ____ % 2 ____ % 3 ____ % 4 ____ %

25. V_{OHOR} Average cover of "O" Horizon (average of 0.04 ha plot values on next line) . . . . . 100 %
Average of 0.04 ha plots sampled: 1 ____ % 2 ____ % 3 ____ % 4 ____ %

26. V_{AHOR} Average cover of "A" Horizon (average of 0.04 ha plot values on next line) . . . . . 0 %
Average of 0.04 ha plots sampled: 1 ____ % 2 ____ % 3 ____ % 4 ____ %

27. V_{COMP} Concurrence with all strata dominants (average of 0.04 ha plot values on next line) 0 %
Average of 0.04 ha plots sampled: 1 ____ % 2 ____ % 3 ____ % 4 ____ %

Plot Worksheet: Low Gradient Riverine Wetlands in Western Kentucky

Assessment Team : A - Team

Project Name/Location : THILS **Plot Number :** 8 **Date :** 4.7.2017

Record dbh (cm) of trees by species below, square dbh values (cm^2), multiply result by 0.000079 (m^2), and sum resulting values in shaded columns (m^2/0.04 ha). Record in 18. V_{TBA}, multiply by 25 (m^2/ha).

Species	dbh (cm)	dbh^2 (cm^2)	× 0.00079 (m^2/0.04 ha)	Species	dbh (cm)	dbh^2 (cm^2)	× 0.00079 (m^2/0.04 ha)
None							

18. V_{TBA} Sum of values from shaded columns above = 0 (m^2/0.04 ha) × 25 = 0 m^2/ha

19. V_{TDEN} Total number of tree stems from above = 0 (stems/0.04 ha) × 25 = 0 stems/ha

20. V_{SNAG} Total number of snag stems from above= 0 (stems/0.04 ha) × 25 = 0 stems/ha

21/22. V_{WD} / V_{LOG}

Record number of stems in Size Class 1 (0.6-2.5 cm / 0.25-1 in) along a 6 ft section of Transect 1 and 2

Transect 1 0 Transect 2 0 *Total number of stems* = _____

Size Class 1 tons /acre = 0.187 × *total number of stems* = ... 0 tons/acre

Record number of stems in Size Class 2 (2.5 - 7.6 cm / 1-3 in) along 12 ft section of Transect 1 and 2

Transect 1 0 Transect 2 0 *Total number of stems* = _____

Size Class 2 tons / acre = 0.892 × *total number of stems* = ... 0 tons/acre

Record diameter of stems in Size Class 3 (> 7.6 cm / >3 in) along 50 ft section of Transect 1 and 2

Transect 1	diameter	diameter^2	Transect 2	diameter	diameter^2
Stem 1 =	6	36	Stem 1 =		0
Stem 2 =			Stem 2 =		
Stem 3 =			Stem 3 =		
Stem 4 =			Stem 4 =		
Total diameter^2		36	Total diameter^2		0

Total diameter^2 of stems from both transects = 36

PLOT 8

Size Class 3 tons / acre = 0.0687 × *Total diameter* ^{2} *of stems from both transects* = . 2.5 tons/acre
Total tons / acre (sum of Size Classes 1-3 from above) = ... 2.5 tons/acre
Cubic feet / acre = (32.05 × *total tons / acre*) / 0.58 = ... 138.1 cubic feet/acre
Cubic meters / ha = *cubic feet / acre* × 0.069 . . . . . 9.5 cubic meters/ha

23. V_{SSD} Tally woody understory stems two 0.004 ha subplots then average and multiply by 250:
Subplot 1 (71) Subplot 2 (93) Average 80 × 250 = . 20,000 stems/ha

24. V_{GVC} Estimate percent cover of ground vegetation in four m^2 subplots then average:
1 0 % 2 0 % 3 0 % 4 0 % . . . . . Average 0 %

25. V_{OHOR} Estimate percent cover of "O" Horizon in four m^2 subplots then average:
1 100 % 2 100 % 3 100 % 4 100 % . . . . . Average 100 %

26. V_{AHOR} Estimate percent cover of "A" Horizon in four m^2 subplots then average:
1 0 % 2 0 % 3 0 % 4 0 % . . . . . Average 0 %

27. V_{COMP} Determine percent concurrence with each strata using the table below
Tree = 0 % Shrub/Sapling = 0 % Ground Vegetation = 0 % . . . . Average 0 %

Dominant Species by Strata in Western Kentucky Low Gradient Riverine Wetlands		
Tree	Shrub/Sapling	Ground Vegetation
Acer rubrum	*Acer rubrum*	*Arundinaria gigantea*
Betula nigra	*Betula nigra*	*Aster* sp.
Carya laciniosa	*Carya laciniosa*	*Boehmaria cylindrica*
Celtis laevigata	*Carpinus caroliniana*	*Campsis radicans*
Fraxinus pennsylvanica	*Celtis laevigata*	*Carex squarosa*
Liquidambar styraciflua	*Celtis occidentalis*	*Eragrostis alba*
Quercus pagodifolia	*Fraxinus pennsylvanica*	*Glyceria striata*
Quercus phellos	*Ilex decidua*	*Hypericum* sp.
Quercus lyrata	*Liquidambar styraciflua*	*Impatiens capensis*
Quercus imbricaria	*Nyssa sylvatica*	*Panicum* sp.
Quercus michauxii	*Quercus imbricaria*	*Parthenocissus quinquefolia*
Quercus stellata	*Quercus lyrata*	*Pilea pumila*
Quercus palustris	*Quercus phellos*	*Quercus phellos*
Salix nigra	*Quercus palustris*	*Salix nigra*
	Quercus pagodifolia	*Saururus cernuus*
	Quercus stellata	*Smilacina racemosa*
	Platanus occidentalis	*Smilax rotundifolia*
	Salix nigra	*Sparganium* sp.
	Ulmus americana	*Toxicodendron radicans*

PFO
PLOT 9

Field Data Sheet: Low Gradient Riverine Wetlands in Western Kentucky

Assessment Team : _____
Project Name/Location: 7 HILLS PLOT 9 **Date :** 4-7-2017

Sample variables 1-6 using aerial photos, topographic maps, scenic overlooks, local informants, etc.

1. V_{TRACT} Area of wetland that is contiguous with the WAA *and* of the same subclass ..... 890 ha
2. V_{CORE} Percent of wetland tract that is >300 m from unsuitable habitat ..... 47 %
3. $V_{CONNECT}$ Percent of wetland tract perimeter that is "connected" to suitable habitat .. 72 %
4. V_{SLOPE} Percent floodplain slope ..... .02 %
5. V_{STORE} Floodplain width to channel width ratio ..... 3155/50 ..... 63:1
6. V_{MACRO} Percent of WAA covered with macrotopographic features ..... 6 %

Sample variables 7-17 based on a walking reconnaissance of the WAA

7. V_{FREQ} Overbank flood recurrence interval ..... 1 years
   Check data source: gage data ✓, local knowledge ✓, flood frequency curves __, regional dimensionless curve __, hydrologic modeling __, other _____.
8. V_{ROUGH} Roughness Coefficient .03 (n_{BASE}) + .005 (n_{TOPO}) + .01 (n_{OBS}) + .1 (n_{VEG}) = ... .145
9. $V_{SOILINT}$ Percent of WAA with altered soils ..... 0 %.
10. V_{WTF} Water table fluctuation is (check one): ..... present ✓ absent ____
    Check data source: groundwater well, __ redoximorphic features, ✓ County Soil Survey __.
11. V_{WTD} Water table depth is ..... 1 inches
    Check data source: groundwater well, __ redoximorphic features, ✓ County Soil Survey ✓.
12. $V_{WTSLOPE}$ Percent of WAA with an altered water table slope ..... 38 %
13. $V_{SOILPERM}$ Soil permeability ..... 0.4 (in./hr)
14. V_{PORE} Percent effective soil porosity ..... 43 %
15. $V_{SURFCON}$ Percent of adjacent stream reach with altered surface connections ..... 100 %
16. V_{CLAY} Percent of WAA with altered clay content in soil profile ..... SILTY CLAY ..... 0 %
17. V_{REDOX} Redoximorphic features are (check one): ..... present ✓ absent ____

PLOT 9

Sample variables 18-20 from a representative number of locations in the WAA using a 0.04 ha circular plot (11.3 m (37 ft) radius)

18. V_{TBA} Tree basal area (average of 0.04 ha plot values on next line) . . . . . 32.1 m^2/ha
0.04 ha plots: 1 ____ m^2/ha 2 ____ m^2/ha 3 ____ m^2/ha 4 ____ m^2/ha

19. V_{TDEN} Number of tree stems (average of 0.04 ha plot values on next line) . . . . . 750 stems / ha
0.04 ha plots: 1 ____ stems/ha 2 ____ stems/ha 3 ____ stems/ha 4 ____ stems/ha

20. V_{SNAG} Number of snags (average of 0.04 ha plot values on next line) . . . . . 25 stems / ha
0.04 ha plots: 1 ____ stems/ha 2 ____ stems/ha 3 ____ stems/ha 4 ____ stems/ha

Sample variables 21-22 on two (2) 15 m transects partially within the 0.04 ha plot

21. V_{WD} Volume of woody debris (average of transect values on next line) . . . . . 32.5 m^3/ha
Transect: 1 ____ m^3/ha 2 ____ m^3/ha 3 ____ m^3/ha 4 ____ m^3/ha

22. V_{LOG} Volume of logs (average of transect values on next line) . . . . . 24.1 m^3/ha
Transect: 1 ____ m^3/ha 2 ____ m^3/ha 3 ____ m^3/ha 4 ____ m^3/ha

Sample variable 23 in two (2) 0.004 ha circular subplots (3.6 m (11.8 ft) radius) placed in representative locations of the 0.04 ha plot

23. V_{SSD} Number of woody understory stems (average of 0.04 ha plot values on next line)
. . . . . 375 stems / ha
0.04 ha plots: 1 ____ stems/ha 2 ____ stem/ha 3 ____ stems/ha 4 ____ stems/ha

Sample variables 24-26 in four (4) m^2 subplots placed in representative locations of each quadrant of the 0.04 ha plot

24. V_{GVC} Average cover of ground vegetation (average of 0.04 ha plot values on next line) . . 46 %
Average of 0.04 ha plots sampled: 1 ____ % 2 ____ % 3 ____ % 4 ____ %

25. V_{OHOR} Average cover of "O" Horizon (average of 0.04 ha plot values on next line) . . . . . 97.5 %
Average of 0.04 ha plots sampled: 1 ____ % 2 ____ % 3 ____ % 4 ____ %

26. V_{AHOR} Average cover of "A" Horizon (average of 0.04 ha plot values on next line) . . . . . 0 %
Average of 0.04 ha plots sampled: 1 ____ % 2 ____ % 3 ____ % 4 ____ %

27. V_{COMP} Concurrence with all strata dominants (average of 0.04 ha plot values on next line) 100 %
Average of 0.04 ha plots sampled: 1 ____ % 2 ____ % 3 ____ % 4 ____ %

Plot Worksheet: Low Gradient Riverine Wetlands in Western Kentucky

Assessment Team : A-Team

Project Name/Location : 7HILLS **Plot Number :** 9 **Date :** 4-7-2017

Record dbh (cm) of trees by species below, square dbh values (cm^2), multiply result by 0.000079 (m^2), and sum resulting values in shaded columns (m^2/0.04 ha). Record in 18. V_{TBA}, multiply by 25 (m^2/ha).

Species	dbh ~~(cm)~~ 11	dbh^2 (cm^2)	× 0.00079 (m^2/0.04 ha)	Species	dbh (cm)	dbh^2 (cm^2)	× 0.00079 (m^2/0.04 ha)
PIN OAK	17.8			Q. BICOLOR	14.1		
GR ASH	11.1			PIN OAK	5.4		
PIN OAK	4.6			Am. ELM	11.0		
GR. ASH	8.7			Am. ELM	4.2		
GR. ASH	7.0			GR ASH	7.6		
AM. ELM	5.4			GR. ASH	13.0		
GR. ASH	12.6			AM. ELM	4.8		
PIN OAK	4.1			GR. ASH	10.6		
GR. ASH	13.1			AM. ELM	3.9		
GR. ASH	8.5			Q. BICOLOR	14.8		
GR. ASH	7.3			GR ASH	6.4		
AM. ELM	4.1			PIN OAK	11.2		

18. V_{TBA} Sum of values from shaded columns above = 1.285 (m^2/0.04 ha) × 25 = 32.1 m^2/ha

19. V_{TDEN} Total number of tree stems from above = 30 (stems/0.04 ha) × 25 = 750 stems/ha

20. V_{SNAG} Total number of snag stems from above= 1 (stems/0.04 ha) × 25 = 25 stems/ha

21/22. V_{WD} / V_{LOG}

Record number of stems in Size Class 1 (0.6-2.5 cm / 0.25-1 in) along a 6 ft section of Transect 1 and 2

Transect 1 ____ Transect 2 ____ *Total number of stems* = 7

Size Class 1 tons /acre = 0.187 × *total number of stems* = ... 1.3 tons/acre

Record number of stems in Size Class 2 (2.5 - 7.6 cm / 1-3 in) along 12 ft section of Transect 1 and 2

Transect 1 0 Transect 2 ____ *Total number of stems* = 1

Size Class 2 tons / acre = 0.892 × *total number of stems* = ...9 tons/acre

Record diameter of stems in Size Class 3 (> 7.6 cm / >3 in) along 50 ft section of Transect 1 and 2

Transect 1	diameter	diameter^2	Transect 2	diameter	diameter^2
Stem 1 =	9.6	92.2	Stem 1 =	0	0
Stem 2 =			Stem 2 =		
Stem 3 =			Stem 3 =		
Stem 4 =			Stem 4 =		
Total diameter^2		92.2	Total diameter^2		0

Total diameter^2 of stems from both transects = 92.2

BOX ELDER - 6.0

GR. ASH - 6.2 | 10.7

AM. ELM - 4.7 | 5.8

PIN OAK - 6.2

PLOT 9

Size Class 3 tons / acre = 0.0687 × *Total diameter² of stems from both transects* = . 6.3 tons/acre
Total tons / acre (sum of Size Classes 1-3 from above) = ... 8.5 tons/acre
Cubic feet / acre = (32.05 × *total tons / acre*) / 0.58 = ... 469.7 cubic feet/acre
Cubic meters / ha = *cubic feet / acre* × 0.069 ..... 32.4 cubic meters/ha

23. V_{SSD} Tally woody understory stems two 0.004 ha subplots then average and multiply by 250:
~~Subplot~~ 1 ~~IIII~~ ~~IIII~~ ~~IIII~~ ~~Subplot~~ 2 _____ Average 15 × 250 = . 375 stems/ha

24. V_{GVC} Estimate percent cover of ground vegetation in four m² subplots then average:
1 49 % 2 65 % 3 30 % 4 40 % ..... Average 46 %

25. V_{OHOR} Estimate percent cover of "O" Horizon in four m² subplots then average:
1 95 % 2 100 % 3 100 % 4 95 % ..... Average 97.5 %

26. V_{AHOR} Estimate percent cover of "A" Horizon in four m² subplots then average:
1 0 % 2 0 % 3 0 % 4 0 % ..... Average 0 %

27. V_{COMP} Determine percent concurrence with each strata using the table below
Tree = 100 % Shrub/Sapling = 100 % Ground Vegetation = 100 % .... Average 100 %

Dominant Species by Strata in Western Kentucky Low Gradient Riverine Wetlands		
Tree	Shrub/Sapling	Ground Vegetation
Acer rubrum	*Acer rubrum*	*Arundinaria gigantea*
Betula nigra	*Betula nigra*	*Aster* sp. ✓
Carya laciniosa	*Carya laciniosa*	*Boehmaria cylindrica*
Celtis laevigata	*Carpinus caroliniana*	*Campsis radicans*
Fraxinus pennsylvanica	*Celtis laevigata*	*Carex squarosa*
Liquidambar styraciflua	*Celtis occidentalis*	*Eragrostis alba*
Quercus pagodifolia	*Fraxinus pennsylvanica*	*Glyceria striata*
Quercus phellos	*Ilex decidua*	*Hypericum* sp.
Quercus lyrata	*Liquidambar styraciflua*	*Impatiens capensis*
Quercus imbricaria	*Nyssa sylvatica*	*Panicum* sp.
Quercus michauxii	*Quercus imbricaria*	*Parthenocissus quinquefolia*
Quercus stellata	*Quercus lyrata*	*Pilea pumila*
Quercus palustris	*Quercus phellos*	*Quercus phellos*
Salix nigra	*Quercus palustris*	*Salix nigra*
	Quercus pagodifolia	*Sauraurus cernuus*
	Quercus stellata	*Smilacina racemosa*
	Platanus occidentalis	*Smilax rotundifolia*
	Salix nigra	*Sparganium* sp.
	Ulmus americana	*Toxicodendron radicans* ✓

*ASTER SP. – 35%
① CAREX SP. – 2%
VIOLA SORORIA – 7%
② CAREX SP. – 3%
CREEPING JENNY – 2%

49% total