

Large Filing Separator Sheet

Case Number: 10-2439-EL-BSB

File Date: 5/4/2011

Section: 4

Number of Pages: 158

Description of Document: Application

APPENDIX A
WETLAND DELINEATION DATA FORMS

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Meldahl-Ohio Transmission City/County: Clermont Sampling Date: 9-14-10
 Applicant/Owner: City of Hamilton State: OH Sampling Point: OH-1
 Investigator(s): T. King, C. Leasure Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Drainage swale Local relief (concave, convex, none): Concave Slope (%): 5%
 Subregion (LRR or MLRA): _____ Lat: 38d 47m 59.939s Long: 84d 10m 27.002s Datum: NAD83 SP
 Soil Map Unit Name: Cut and fill land NWI classification: PEM 1A Ohio South
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No X (If no, explain in Remarks.) FIPS 3402
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____
Hydric Soil Present? Yes <u>X</u> No _____	
Wetland Hydrology Present? Yes <u>X</u> No _____	
Remarks: 2 months of no rain.	

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply) _____ Surface Water (A1) _____ High Water Table (A2) _____ Saturation (A3) _____ Water Marks (B1) <u>X</u> Sediment Deposits (B2) _____ Drift Deposits (B3) _____ Algal Mat or Crust (B4) _____ Iron Deposits (B5) _____ Inundation Visible on Aerial Imagery (B7) _____ Water-Stained Leaves (B9) _____ Aquatic Fauna (B13) _____ True Aquatic Plants (B14) _____ Hydrogen Sulfide Odor (C1) <u>X</u> Oxidized Rhizospheres on Living Roots (C3) <u>X</u> Presence of Reduced Iron (C4) _____ Recent Iron Reduction in Tilled Soils (C6) _____ Thin Muck Surface (C7) _____ Other (Explain in Remarks)		Secondary Indicators (minimum of two required) _____ Surface Soil Cracks (B6) _____ Sparsely Vegetated Concave Surface (B8) _____ Drainage Patterns (B10) _____ Moss Trim Lines (B16) _____ Dry-Season Water Table (C2) _____ Crayfish Burrows (C8) _____ Saturation Visible on Aerial Imagery (C9) _____ Stunted or Stressed Plants (D1) _____ Geomorphic Position (D2) _____ Shallow Aquitard (D3) _____ Microtopographic Relief (D4) _____ FAC-Neutral Test (D5)
Field Observations: Surface Water Present? Yes _____ No <u>X</u> Depth (inches): _____ Water Table Present? Yes _____ No <u>X</u> Depth (inches): _____ Saturation Present? Yes _____ No <u>X</u> Depth (inches): _____ (includes capillary fringe)	Wetland Hydrology Present? Yes <u>X</u> No _____	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:		
Remarks:		

VEGETATION (Four Strata) – Use scientific names of plants.

 Sampling Point: OH-1

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
7. _____				
8. _____				
			= Total Cover	
Sapling/Shrub Stratum (Plot size: _____)				
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
7. _____				
8. _____				
9. _____				
10. _____				
			= Total Cover	
Herb Stratum (Plot size: _____)				
1. <u>Pennsylvania Smartweed</u>	<u>40</u>	<u>Y</u>	<u>FACW</u>	
2. <u>Cattail</u>	<u>2</u>		<u>OBL</u>	
3. <u>Nut Sedge</u>	<u>25</u>	<u>Y</u>	<u>FACW</u>	
4. <u>Creeping Jenny</u>	<u>20</u>		<u>OBL</u>	
5. <u>Blunt Spikerush</u>	<u>10</u>		<u>OBL</u>	
6. <u>Barnyard Grass</u>	<u>5</u>		<u>FACU</u>	
7. <u>Common Milkweed</u>	<u>2</u>			
8. <u>Curly Dock</u>	<u>5</u>		<u>FACU</u>	
9. <u>Small Carpgrass</u>	<u>5</u>		<u>NI</u>	
10. _____				
11. _____				
12. _____				
			<u>114</u>	= Total Cover
Woody Vine Stratum (Plot size: _____)				
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
			= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0¹

___ 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Four Vegetation Strata:

Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vine – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes X No _____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: OH-1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-7	10YR4/2	100					Alluvial deposits	
7-12	10YR4/2	75	10YR5/6	25	C	M	Silt loam	
12-18	10YR4/1	80	10YR4/2	20	C	M	Silt loam	
SS-2 Upland Soil Sample								
0-2	10YR5/3	100					Silt	
2-8	10YR5/4	100					Silt	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ☐ Histosol (A1)
☐ Histic Epipedon (A2)
☐ Black Histic (A3)
☐ Hydrogen Sulfide (A4)
☐ Stratified Layers (A5)
☐ 2 cm Muck (A10) (LRR N)
☐ Depleted Below Dark Surface (A11)
☐ Thick Dark Surface (A12)
☐ Sandy Mucky Mineral (S1) (LRR N, MLRA 147, 148)
☐ Sandy Gleyed Matrix (S4)
☐ Sandy Redox (S5)
☐ Stripped Matrix (S6)

- ☐ Dark Surface (S7)
☐ Polyvalue Below Surface (S8) (MLRA 147, 148)
☐ Thin Dark Surface (S9) (MLRA 147, 148)
☐ Loamy Gleyed Matrix (F2)
☒ Depleted Matrix (F3)
☐ Redox Dark Surface (F6)
☐ Depleted Dark Surface (F7)
☐ Redox Depressions (F8)
☒ Iron-Manganese Masses (F12) (LRR N, MLRA 136)
☐ Umbric Surface (F13) (MLRA 136, 122)
☐ Piedmont Floodplain Soils (F19) (MLRA 148)

Indicators for Problematic Hydric Soils³:

- ☐ 2 cm Muck (A10) (MLRA 147)
☐ Coast Prairie Redox (A16) (MLRA 147, 148)
☐ Piedmont Floodplain Soils (F19) (MLRA 136, 147)
☐ Red Parent Material (TF2)
☐ Very Shallow Dark Surface (TF12)
☐ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☒ No _____

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Meldahl-Ohio Transmission City/County: Clermont Sampling Date: 9-14-10
 Applicant/Owner: City of Hamilton State: OH Sampling Point: OH-2
 Investigator(s): T. King, C. Leasure Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Toe of slope Local relief (concave, convex, none): Concave Slope (%): <5%
 Subregion (LRR or MLRA): _____ Lat: 38d 47m 57.162s Long: 84d 10m 1.402s Datum: NAD83 SP
 Soil Map Unit Name: Cut and fill land NWI classification: PEM 1A Ohio South
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No X (If no, explain in Remarks.) FIPS 3402
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland?	Yes <u>X</u> No _____
Hydric Soil Present?	Yes <u>X</u> No _____		
Wetland Hydrology Present?	Yes <u>X</u> No _____		
Remarks: Lack of rain.			

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)	
Primary Indicators (minimum of one is required; check all that apply)			
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> Surface Soil Cracks (B6)	
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	
<input type="checkbox"/> Saturation (A3)	<input checked="" type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Drainage Patterns (B10)	
<input type="checkbox"/> Water Marks (B1)	<input checked="" type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Moss Trim Lines (B16)	
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Dry-Season Water Table (C2)	
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Crayfish Burrows (C8)	
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)	
<input type="checkbox"/> Iron Deposits (B5)		<input type="checkbox"/> Stunted or Stressed Plants (D1)	
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)		<input type="checkbox"/> Geomorphic Position (D2)	
<input type="checkbox"/> Water-Stained Leaves (B9)		<input type="checkbox"/> Shallow Aquitard (D3)	
<input type="checkbox"/> Aquatic Fauna (B13)		<input type="checkbox"/> Microtopographic Relief (D4)	
		<input type="checkbox"/> FAC-Neutral Test (D5)	
Field Observations:			
Surface Water Present?	Yes _____ No <u>X</u> Depth (inches): _____	Wetland Hydrology Present? Yes <u>X</u> No _____	
Water Table Present?	Yes _____ No <u>X</u> Depth (inches): _____		
Saturation Present? (includes capillary fringe)	Yes _____ No <u>X</u> Depth (inches): _____		
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:			
Remarks: P3 - East P4 - North			

VEGETATION (Four Strata) – Use scientific names of plants.

 Sampling Point: OH-2

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:																
1. _____				Number of Dominant Species That Are OBL, FACW, or FAC: <u>2</u> (A)																
2. _____				Total Number of Dominant Species Across All Strata: <u>2</u> (B)																
3. _____				Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)																
4. _____				Prevalence Index worksheet: <table style="width: 100%;"> <tr> <th style="width: 50%;">Total % Cover of:</th> <th style="width: 50%;">Multiply by:</th> </tr> <tr> <td>OBL species _____</td> <td>x 1 = _____</td> </tr> <tr> <td>FACW species _____</td> <td>x 2 = _____</td> </tr> <tr> <td>FAC species _____</td> <td>x 3 = _____</td> </tr> <tr> <td>FACU species _____</td> <td>x 4 = _____</td> </tr> <tr> <td>UPL species _____</td> <td>x 5 = _____</td> </tr> <tr> <td>Column Totals: _____</td> <td>(A) _____ (B) _____</td> </tr> <tr> <td colspan="2">Prevalence Index = B/A = _____</td> </tr> </table>	Total % Cover of:	Multiply by:	OBL species _____	x 1 = _____	FACW species _____	x 2 = _____	FAC species _____	x 3 = _____	FACU species _____	x 4 = _____	UPL species _____	x 5 = _____	Column Totals: _____	(A) _____ (B) _____	Prevalence Index = B/A = _____	
Total % Cover of:	Multiply by:																			
OBL species _____	x 1 = _____																			
FACW species _____	x 2 = _____																			
FAC species _____	x 3 = _____																			
FACU species _____	x 4 = _____																			
UPL species _____	x 5 = _____																			
Column Totals: _____	(A) _____ (B) _____																			
Prevalence Index = B/A = _____																				
5. _____																				
6. _____																				
7. _____																				
8. _____																				
_____ = Total Cover				Hydrophytic Vegetation Indicators: ___ 1 - Rapid Test for Hydrophytic Vegetation <input checked="" type="checkbox"/> 2 - Dominance Test is >50% ___ 3 - Prevalence Index is ≤3.0 ¹ ___ 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) ___ Problematic Hydrophytic Vegetation ¹ (Explain)																
_____ = Total Cover																				
_____ = Total Cover																				
_____ = Total Cover																				
_____ = Total Cover																				
Sapling/Shrub Stratum (Plot size: _____)				¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic. Definitions of Four Vegetation Strata: Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody vine – All woody vines greater than 3.28 ft in height.																
1. _____																				
2. _____																				
3. _____																				
4. _____																				
Herb Stratum (Plot size: _____)				Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____																
1. <u>Nut Sedge</u>	<u>35</u>	<u>Y</u>	<u>FACW</u>																	
2. <u>Mistflower</u>	<u>10</u>		<u>FAC</u>																	
3. <u>Bluestem</u>	<u>10</u>																			
4. <u>NY Ironweed</u>	<u>10</u>		<u>FACW+</u>																	
5. <u>Swamp Milkweed</u>	<u>5</u>		<u>OBL</u>																	
6. <u>Narrow Lespedeza</u>	<u>20</u>																			
7. <u>Showy Lobelia</u>	<u>10</u>																			
8. <u>Green Bulrush</u>	<u>25</u>	<u>Y</u>	<u>OBL</u>																	
9. _____																				
10. _____																				
11. _____																				
12. _____																				
<u>115</u> = Total Cover																				
Woody Vine Stratum (Plot size: _____)																				
1. _____																				
2. _____																				
3. _____																				
4. _____																				
5. _____																				
6. _____																				
_____ = Total Cover																				

Remarks: (Include photo numbers here or on a separate sheet.)

Sampling Point: OH-2

Eastern Mountains and Piedmont – Interim Version

WETLAND DETERMINATION DATA FORM - Eastern Mountains and Piedmont

Project/Site: Meldahl-Ohio Transmission City/County: Clermont Sampling Date: 9-15-10
 Applicant/Owner: City of Hamilton State: OH Sampling Point: OH-3
 Investigator(s): T. King, C. Leasure Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): Pond on hillside Local relief (concave, convex, none): Concave Slope (%): 5%
 Subregion (LRR or MLRA): Terrace Lat: 38d 48m 59.912s Long: 84d 8m 42.065s Datum: NAD83 SP
 Soil Map Unit Name: Edenton loam, 25-50% slopes, mod eroded NWI classification: PEM1A Ohio South
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No X (If no, explain in Remarks.) FIPS 3402
 Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
 Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u> No _____	Is the Sampled Area within a Wetland? Yes <u>X</u> No _____
Hydric Soil Present?	Yes <u>X</u> No _____	
Wetland Hydrology Present?	Yes <u>X</u> No _____	
Remarks: Drought like conditions.		

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply) _____ Surface Water (A1) _____ True Aquatic Plants (B14) _____ High Water Table (A2) _____ Hydrogen Sulfide Odor (C1) <u>X</u> Saturation (A3) <u>X</u> Oxidized Rhizospheres on Living Roots (C3) <u>X</u> Water Marks (B1) _____ Presence of Reduced Iron (C4) _____ Sediment Deposits (B2) _____ Recent Iron Reduction in Tilled Soils (C6) _____ Drift Deposits (B3) _____ Thin Muck Surface (C7) <u>X</u> Algal Mat or Crust (B4) _____ Other (Explain in Remarks) _____ Iron Deposits (B5) <u>X</u> Inundation Visible on Aerial Imagery (B7) <u>X</u> Water-Stained Leaves (B9) _____ Aquatic Fauna (B13)		Secondary Indicators (minimum of two required) <u>X</u> Surface Soil Cracks (B6) <u>X</u> Sparsely Vegetated Concave Surface (B8) _____ Drainage Patterns (B10) <u>X</u> Moss Trim Lines (B16) _____ Dry-Season Water Table (C2) _____ Crayfish Burrows (C8) _____ Saturation Visible on Aerial Imagery (C9) <u>X</u> Stunted or Stressed Plants (D1) _____ Geomorphic Position (D2) _____ Shallow Aquitard (D3) _____ Microtopographic Relief (D4) _____ FAC-Neutral Test (D5)
Field Observations: Surface Water Present? Yes _____ No _____ Depth (inches): _____ Water Table Present? Yes _____ No _____ Depth (inches): _____ Saturation Present? Yes <u>X</u> No _____ Depth (inches): <u>Surface</u> (includes capillary fringe)	Wetland Hydrology Present? Yes <u>X</u> No _____	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:		
Remarks: P4 - East P5 - West		

VEGETATION (Four Strata) – Use scientific names of plants.

 Sampling Point: OH-3

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
1. _____	_____	_____	_____	Number of Dominant Species That Are OBL, FACW, or FAC: <u>3</u> (A) Total Number of Dominant Species Across All Strata: <u>3</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species _____ x 1 = _____ FACW species _____ x 2 = _____ FAC species _____ x 3 = _____ FACU species _____ x 4 = _____ UPL species _____ x 5 = _____ Column Totals: _____ (A) _____ (B) Prevalence Index = B/A = _____
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
_____ = Total Cover				Hydrophytic Vegetation Indicators: ___ 1 - Rapid Test for Hydrophytic Vegetation <u>X</u> 2 - Dominance Test is >50% ___ 3 - Prevalence Index is ≤3.0' ___ 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) ___ Problematic Hydrophytic Vegetation ¹ (Explain)
Sapling/Shrub Stratum (Plot size: _____) 1. _____ 2. _____ 3. _____ 4. _____ 5. _____ 6. _____ 7. _____ 8. _____ 9. _____ 10. _____				
_____ = Total Cover				
Herb Stratum (Plot size: _____) 1. <u>Rice Cutgrass</u> <u>20</u> <u>Y</u> <u>OBL</u> 2. <u>Blunt Spikerush</u> <u>10</u> <u>Y</u> <u>OBL</u> 3. <u>Soft Rush</u> <u>10</u> <u>Y</u> <u>OBL</u> 4. _____ 5. _____ 6. _____ 7. _____ 8. _____ 9. _____ 10. _____ 11. _____ 12. _____				
_____ = Total Cover				Definitions of Four Vegetation Strata: Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody vine – All woody vines greater than 3.28 ft in height.
Woody Vine Stratum (Plot size: _____) 1. _____ 2. _____ 3. _____ 4. _____ 5. _____ 6. _____				
_____ = Total Cover				
Hydrophytic Vegetation Present? Yes <u>X</u> No _____				

Remarks: (Include photo numbers here or on a separate sheet.)

Sampling Point: OH-3

[illegible]

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

²Location: PL=Pore Lining, M=Matrix.

Indicators for Problematic Hydric Soils³:

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☒ X Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ 2 cm Muck (A10) (**LRR N**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1) (**LRR N, MLRA 147, 148**)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)

- ☐ Dark Surface (S7)
- ☐ Polyvalue Below Surface (S8) (MLRA 147, 148)
- ☐ Thin Dark Surface (S9) (MLRA 147, 148)
- ☒ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Iron-Manganese Masses (F12) (LRR N, MLRA 136)
- ☐ Umbric Surface (F13) (MLRA 136, 122)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 148)

- 2 cm Muck (A10) (MLRA 147)
- Coast Prairie Redox (A16)
(MLRA 147, 148)
- Piedmont Floodplain Soils (F19)
(MLRA 136, 147)
- Red Parent Material (TF2)
- Very Shallow Dark Surface (TF12)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

APPENDIX B

OHIO RAPID ASSESSMENT METHOD DATA FORMS

Version 5.0	Ohio Rapid Assessment Method for Wetlands 10 Page Form for Wetland Categorization	
	Background Information Scoring Boundary Worksheet Narrative Rating Field Form Quantitative Rating ORAM Summary Worksheet Wetland Categorization Worksheet	Ohio EPA, Division of Surface Water Final: February 1, 2001

Instructions

The investigator is *STRONGLY URGED* to read the Manual for Using the Ohio Rapid Assessment Method for Wetlands for further elaboration and discussion of the questions below prior to using the rating forms.

The Narrative Rating is designed to categorize a wetland or to provide alerts to the Rater based on the presence or possible presence of threatened or endangered species. The presence or proximity of such species is often an indicator of the quality and lack of disturbance of the wetland being evaluated. In addition, it is designed to categorize certain wetlands as very low quality (Category 1) or very high quality (Category 3) regardless of the wetland's score on the Quantitative Rating. In addition, the Narrative Rating also alerts the investigator that a particular wetland *may* be a Category 3 wetland, again, regardless of the wetland's score on the Quantitative Rating.

It is *VERY IMPORTANT* to properly and thoroughly answer each of the questions in the ORAM in order to properly categorize a wetland. To *properly* answer all the questions, the boundaries of the wetland being assessed must be correctly identified. Refer to Scoring Boundary worksheet and the User's Manual for a discussion of how to determine the "scoring boundaries." In some instances, the scoring boundaries may differ from the "jurisdictional boundaries."

Refer to the most recent ORAM Score Calibration Report for the scoring breakpoints between wetland categories. The most recent version of this document is posted on Ohio EPA's Division of Surface Water web page at: <http://www.epa.ohio.gov/dsw/wetlands/WetlandEcologySection.aspx>

Background Information

Name:	
Thomas King	
Date:	
11-23-2010	
Affiliation:	
EA Engineering, Science, and Technology, Inc.	
Address:	
15 Loveton Circle Sparks, MD 21152	
Phone Number:	
410-771-4950	
e-mail address:	
tking@eaest.com	
Name of Wetland:	
OH-1	
Vegetation Community(ies):	
Palustrine Emergent	
HGM Class(es):	
<p>Location of Wetland: Include map, address, north arrow, landmarks, distances, roads, etc.</p> <p>See Figure #4.</p> <p>Located southwest of the Meldahl Lock entrance road.</p>	
Lat/Long or UTM Coordinate	38d 47m 57.939s N, 84d 10m 27.002s W
USGS Quad Name	Moscow, OH
County	Clermont
Township	Felicity
Section and Subsection	
Hydrologic Unit Code	HUC-10-0509020111-Bullskoncrk
Site Visit	9-13-10
National Wetland Inventory Map	No Mapped Wetlands
Ohio Wetland Inventory Map	
Soil Survey	Cut and Fill - Clermont County
Delineation report/map	Captain Anthony Meldahl Hydroelectric Project Wetland

Name of Wetland:	
OH-1	
Wetland Size (acres, hectares): 0.05 acres	
Sketch: Include north arrow, relationship with other surface waters, vegetation zones, etc.	
<p>See Figure #4 for more detail.</p>	
Comments, Narrative Discussion, Justification of Category Changes:	
Virginia Mallow identified in OH-DNR records, however, no stems were identified during the RTE site visits.	
Final score : 9	Category: 1

Scoring Boundary Worksheet

INSTRUCTIONS. The initial step in completing the ORAM is to identify the "scoring boundaries" of the wetland being rated. In many instances this determination will be relatively easy and the scoring boundaries will coincide with the "jurisdictional boundaries." For example, the scoring boundary of an isolated cattail marsh located in the middle of a farm field will likely be the same as that wetland's jurisdictional boundaries. In other instances, however, the scoring boundary will not be as easily determined. Wetlands that are small or isolated from other surface waters often form large contiguous areas or heterogeneous complexes of wetland and upland. In separating wetlands for scoring purposes, the hydrologic regime of the wetland is the main criterion that should be used. Boundaries between contiguous or connected wetlands should be established where the volume, flow, or velocity of water moving through the wetland changes significantly. *Areas with a high degree of hydrologic interaction should be scored as a single wetland.* In determining a wetland's scoring boundaries, use the guidelines in the ORAM Manual Section 5.0. In certain instances, it may be difficult to establish the scoring boundary for the wetland being rated. These problem situations include wetlands that form a patchwork on the landscape, wetlands divided by artificial boundaries like property fences, roads, or railroad embankments, wetlands that are contiguous with streams, lakes, or rivers, and estuarine or coastal wetlands. These situations are discussed below, however, it is recommended that Rater contact Ohio EPA, Division of Surface Water, 401/Wetlands Section if there are additional questions or a need for further clarification of the appropriate scoring boundaries of a particular wetland.

#	Steps in properly establishing scoring boundaries	done?	not applicable
Step 1	Identify the wetland area of interest. This may be the site of a proposed impact, a reference site, conservation site, etc.	X	
Step 2	Identify the locations where there is physical evidence that hydrology changes rapidly. Such evidence includes both natural and human-induced changes including, constrictions caused by berms or dikes, points where the water velocity changes rapidly at rapids or falls, points where significant inflows occur at the confluence of rivers, or other factors that may restrict hydrologic interaction between the wetlands or parts of a single wetland.	X	
Step 3	Delineate the boundary of the wetland to be rated such that all areas of interest that are contiguous to and within the areas where the hydrology does not change significantly, i.e. areas that have a high degree of hydrologic interaction are included within the scoring boundary.	X	
Step 4	Determine if artificial boundaries, such as property lines, state lines, roads, railroad embankments, etc., are present. These should not be used to establish scoring boundaries unless they coincide with areas where the hydrologic regime changes.	X	
Step 5	In all instances, the Rater may enlarge the minimum scoring boundaries discussed here to score together wetlands that could be scored separately.	X	
Step 6	Consult ORAM Manual Section 5.0 for how to establish scoring boundaries for wetlands that form a patchwork on the landscape, divided by artificial boundaries, contiguous to streams, lakes or rivers, or for dual classifications.	X	

End of Scoring Boundary Determination. Begin Narrative Rating on next page.

Narrative Rating

INSTRUCTIONS. Answer each of the following questions. Questions 1, 2, 3 and 4 should be answered based on information obtained from the site visit or the literature *and* by submitting a Data Services Request to the Ohio Department of Natural Resources, Division of Natural Areas and Preserves, Natural Heritage Data Services, 1889 Fountain Square Court, Building F-1, Columbus, Ohio 43224, 614-265-6453 (phone), 614-265-3096 (fax), <http://www.dnr.state.oh.us/dnap>. The remaining questions are designed to be answered primarily by the results of the site visit. Refer to the User's Manual for descriptions of these wetland types. Note: "Critical habitat" is legally defined in the Endangered Species Act and is the geographic area containing physical or biological features essential to the conservation of a listed species or as an area that may require special management considerations or protection. The Rater should contact the Region 3 Headquarters or the Columbus Ecological Services Office for updates as to whether critical habitat has been designated for other federally listed threatened or endangered species. "Documented" means the wetland is listed in the appropriate State of Ohio database.

#	Question	Circle one	
1	Critical Habitat. Is the wetland in a township, section, or subsection of a United States Geological Survey 7.5 minute Quadrangle that has been designated by the U.S. Fish and Wildlife Service as "critical habitat" for any threatened or endangered plant or animal species? Note: as of January 1, 2001, of the federally listed endangered or threatened species which can be found in Ohio, the Indiana Bat has had critical habitat designated (50 CFR 17.95(a)) and the piping plover has had critical habitat proposed (65 FR 41812 July 6, 2000).	YES Wetland should be evaluated for possible Category 3 status Go to Question 2	<input checked="" type="radio"/> NO Go to Question 2
2	Threatened or Endangered Species. Is the wetland known to contain an individual of, or documented occurrences of federal or state-listed threatened or endangered plant or animal species?	YES Wetland is a Category 3 wetland. Go to Question 3	<input checked="" type="radio"/> NO Go to Question 3
3	Documented High Quality Wetland. Is the wetland on record in Natural Heritage Database as a high quality wetland?	YES Wetland is a Category 3 wetland Go to Question 4	<input checked="" type="radio"/> NO Go to Question 4
4	Significant Breeding or Concentration Area. Does the wetland contain documented regionally significant breeding or nonbreeding waterfowl, neotropical songbird, or shorebird concentration areas?	YES Wetland is a Category 3 wetland Go to Question 5	<input checked="" type="radio"/> NO Go to Question 5
5	Category 1 Wetlands. Is the wetland less than 0.5 hectares (1 acre) in size and hydrologically isolated and either 1) comprised of vegetation that is dominated (greater than eighty per cent areal cover) by <i>Phalaris arundinacea</i> , <i>Lythrum salicaria</i> , or <i>Phragmites australis</i> , or 2) an acidic pond created or excavated on mined lands that has little or no vegetation?	<input checked="" type="radio"/> YES Wetland is a Category 1 wetland Go to Question 6	NO Go to Question 6
6	Bogs. Is the wetland a peat-accumulating wetland that 1) has no significant inflows or outflows, 2) supports acidophilic mosses, particularly <i>Sphagnum</i> spp., 3) the acidophilic mosses have >30% cover, 4) at least one species from Table 1 is present, and 5) the cover of invasive species (see Table 1) is <25%?	YES Wetland is a Category 3 wetland Go to Question 7	<input checked="" type="radio"/> NO Go to Question 7
7	Fens. Is the wetland a carbon accumulating (peat, muck) wetland that is saturated during most of the year, primarily by a discharge of free flowing, mineral rich, ground water with a circumneutral pH (5.5-9.0) and with one or more plant species listed in Table 1 and the cover of invasive species listed in Table 1 is <25%?	YES Wetland is a Category 3 wetland Go to Question 8a	<input checked="" type="radio"/> NO Go to Question 8a
8a	"Old Growth Forest." Is the wetland a forested wetland and is the forest characterized by, but not limited to, the following characteristics: overstory canopy trees of great age (exceeding at least 50% of a projected maximum attainable age for a species); little or no evidence of human-caused understory disturbance during the past 80 to 100 years; an all-aged structure and multilayered canopies; aggregations of canopy trees interspersed with canopy gaps; and significant numbers of standing dead snags and downed logs?	YES Wetland is a Category 3 wetland. Go to Question 8b	<input checked="" type="radio"/> NO Go to Question 8b

8b	Mature forested wetlands. Is the wetland a forested wetland with 50% or more of the cover of upper forest canopy consisting of deciduous trees with large diameters at breast height (dbh), generally diameters greater than 45cm (17.7in) dbh?	YES Wetland should be evaluated for possible Category 3 status. Go to Question 9a	(NO) Go to Question 9a
9a	Lake Erie coastal and tributary wetlands. Is the wetland located at an elevation less than 575 feet on the USGS map, adjacent to this elevation, or along a tributary to Lake Erie that is accessible to fish?	YES Go to Question 9b	(NO) Go to Question 10
9b	Does the wetland's hydrology result from measures designed to prevent erosion and the loss of aquatic plants, i.e. the wetland is partially hydrologically restricted from Lake Erie due to lakeward or landward dikes or other hydrological controls?	YES Wetland should be evaluated for possible Category 3 status Go to Question 10	NO Go to Question 9c
9c	Are Lake Erie water levels the wetland's primary hydrological influence, i.e. the wetland is hydrologically unrestricted (no lakeward or upland border alterations), or the wetland can be characterized as an "estuarine" wetland with lake and river influenced hydrology. These include sandbar deposition wetlands, estuarine wetlands, river mouth wetlands, or those dominated by submersed aquatic vegetation.	YES Go to Question 9d	NO Go to Question 10
9d	Does the wetland have a predominance of native species within its vegetation communities, although non-native or disturbance tolerant native species can also be present?	YES Wetland is a Category 3 wetland Go to Question 10	NO Go to Question 9e
9e	Does the wetland have a predominance of non-native or disturbance tolerant native plant species within its vegetation communities?	YES Wetland should be evaluated for possible Category 3 status Go to Question 10	NO Go to Question 10
10	Lake Plain Sand Prairies (Oak Openings) Is the wetland located in Lucas, Fulton, Henry, or Wood Counties and can the wetland be characterized by the following description: the wetland has a sandy substrate with interspersed organic matter, a water table often within several inches of the surface, and often with a dominance of the gramineous vegetation listed in Table 1 (woody species may also be present). The Ohio Department of Natural Resources Division of Natural Areas and Preserves can provide assistance in confirming this type of wetland and its quality.	YES Wetland is a Category 3 wetland. Go to Question 11	(NO) Go to Question 11
11	Relict Wet Prairies. Is the wetland a relict wet prairie community dominated by some or all of the species in Table 1. Extensive prairies were formerly located in the Darby Plains (Madison and Union Counties), Sandusky Plains (Wyandot, Crawford, and Marion Counties), northwest Ohio (e.g. Erie, Huron, Lucas, Wood Counties), and portions of western Ohio Counties (e.g. Darke, Mercer, Miami, Montgomery, Van Wert etc.).	YES Wetland should be evaluated for possible Category 3 status Complete Quantitative Rating	(NO) Complete Quantitative Rating

Table 1. Characteristic plant species.

invasive/exotic spp	fen species	bog species	Oak Opening species	wet prairie species
<i>Lythrum salicaria</i>	<i>Zygadenus elegans</i> var. <i>glaucus</i>	<i>Calla palustris</i>	<i>Carex cryptolepis</i>	<i>Calamagrostis canadensis</i>
<i>Myriophyllum spicatum</i>	<i>Cacalia plantaginea</i>	<i>Carex atlantica</i> var. <i>capillacea</i>	<i>Carex lasiocarpa</i>	<i>Calamagrostis stricta</i>
<i>Najas minor</i>	<i>Carex flava</i>	<i>Carex echinata</i>	<i>Carex stricta</i>	<i>Carex atherodes</i>
<i>Phalaris arundinacea</i>	<i>Carex sterilis</i>	<i>Carex oligosperma</i>	<i>Cladium mariscoides</i>	<i>Carex buxbaumii</i>
<i>Phragmites australis</i>	<i>Carex stricta</i>	<i>Carex trisperma</i>	<i>Calamagrostis stricta</i>	<i>Carex pellita</i>
<i>Potamogeton crispus</i>	<i>Deschampsia caespitosa</i>	<i>Chamaedaphne calyculata</i>	<i>Calamagrostis canadensis</i>	<i>Carex sartwellii</i>
<i>Ranunculus ficaria</i>	<i>Eleocharis rostellata</i>	<i>Decodon verticillatus</i>	<i>Quercus palustris</i>	<i>Gentiana andrewsii</i>
<i>Rhamnus frangula</i>	<i>Eriophorum viridicarinatum</i>	<i>Eriophorum virginicum</i>		<i>Helianthus grosseserratus</i>
<i>Typha angustifolia</i>	<i>Gentianopsis</i> spp.	<i>Larix laricina</i>		<i>Liatris spicata</i>
<i>Typha xglauca</i>	<i>Lobelia kalmii</i>	<i>Nemopanthus mucronatus</i>		<i>Lysimachia quadriflora</i>
	<i>Parnassia glauca</i>	<i>Scheuchzeria palustris</i>		<i>Lythrum alatum</i>
	<i>Potentilla fruticosa</i>	<i>Sphagnum</i> spp.		<i>Pycnanthemum virginianum</i>
	<i>Rhamnus alnifolia</i>	<i>Vaccinium macrocarpon</i>		<i>Silphium terebinthinaceum</i>
	<i>Rhynchospora capillacea</i>	<i>Vaccinium corymbosum</i>		<i>Sorghastrum nutans</i>
	<i>Salix candida</i>	<i>Vaccinium oxycoccos</i>		<i>Spartina pectinata</i>
	<i>Salix myricoides</i>	<i>Woodwardia virginica</i>		<i>Solidago riddellii</i>
	<i>Salix serissima</i>	<i>Xyris difformis</i>		
	<i>Solidago ohioensis</i>			
	<i>Tofieldia glutinosa</i>			
	<i>Triglochin maritimum</i>			
	<i>Triglochin palustre</i>			

End of Narrative Rating. Begin Quantitative Rating on next page.

Site: OH-1	Rater(s): T. King	Date: 9-13-2010
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0	0
max 6 pts.	subtotal

Metric 1. Wetland Area (size).

Select one size class and assign score.

- ☐ >50 acres (>20.2ha) (6 pts)
- ☐ 25 to <50 acres (10.1 to <20.2ha) (5 pts)
- ☐ 10 to <25 acres (4 to <10.1ha) (4 pts)
- ☐ 3 to <10 acres (1.2 to <4ha) (3 pts)
- ☐ 0.3 to <3 acres (0.12 to <1.2ha) (2pts)
- ☐ 0.1 to <0.3 acres (0.04 to <0.12ha) (1 pt)
- ☒ <0.1 acres (0.04ha) (0 pts)

4	1+3
max 14 pts.	subtotal

Metric 2. Upland buffers and surrounding land use.

2a. Calculate average buffer width. Select only one and assign score. Do not double check.

- ☐ WIDE. Buffers average 50m (164ft) or more around wetland perimeter (7)
- ☐ MEDIUM. Buffers average 25m to <50m (82 to <164ft) around wetland perimeter (4)
- ☒ NARROW. Buffers average 10m to <25m (32ft to <82ft) around wetland perimeter (1)
- ☐ VERY NARROW. Buffers average <10m (<32ft) around wetland perimeter (0)

2b. Intensity of surrounding land use. Select one or double check and average.

- ☐ VERY LOW. 2nd growth or older forest, prairie, savannah, wildlife area, etc. (7)
- ☐ LOW. Old field (>10 years), shrub land, young second growth forest. (5)
- ☒ MODERATELY HIGH. Residential, fenced pasture, park, conservation tillage, new fallow field. (3)
- ☐ HIGH. Urban, industrial, open pasture, row cropping, mining, construction. (1)

6	
max 30 pts.	subtotal

Metric 3. Hydrology.

3a. Sources of Water. Score all that apply.

- ☐ High pH groundwater (5)
 - ☐ Other groundwater (3)
 - ☒ Precipitation (1)
 - ☐ Seasonal/Intermittent surface water (3)
 - ☐ Perennial surface water (lake or stream) (5)
- 3c. Maximum water depth. Select only one and assign score.
- ☐ >0.7 (27.6in) (3)
 - ☐ 0.4 to 0.7m (15.7 to 27.6in) (2)
 - ☒ <0.4m (<15.7in) (1)

3b. Connectivity. Score all that apply.

- ☐ 100 year floodplain (1)
- ☐ Between stream/lake and other human use (1)
- ☐ Part of wetland/upland (e.g. forest), complex (1)
- ☒ Part of riparian or upland corridor (1)

3d. Duration inundation/saturation. Score one or dbl check.

- ☐ Semi- to permanently inundated/saturated (4)
- ☐ Regularly inundated/saturated (3)
- ☒ Seasonally inundated (2)
- ☐ Seasonally saturated in upper 30cm (12in) (1)

3e. Modifications to natural hydrologic regime. Score one or double check and average.

- ☐ None or none apparent (12)
- ☐ Recovered (7)
- ☐ Recovering (3)
- ☒ Recent or no recovery (1)

Check all disturbances observed

- | | |
|---|---|
| <ul style="list-style-type: none"> <input type="checkbox"/> ditch <input type="checkbox"/> tile <input type="checkbox"/> dike <input type="checkbox"/> weir <input checked="" type="checkbox"/> stormwater input | <ul style="list-style-type: none"> <input type="checkbox"/> point source (nonstormwater) <input type="checkbox"/> filling/grading <input checked="" type="checkbox"/> road bed/RR track <input type="checkbox"/> dredging <input type="checkbox"/> other _____ |
|---|---|

5	
max 20 pts.	subtotal

Metric 4. Habitat Alteration and Development.

4a. Substrate disturbance. Score one or double check and average.

- ☐ None or none apparent (4)
- ☒ Recovered (3)
- ☐ Recovering (2)
- ☐ Recent or no recovery (1)

4b. Habitat development. Select only one and assign score.

- ☐ Excellent (7)
- ☐ Very good (6)
- ☐ Good (5)
- ☐ Moderately good (4)
- ☐ Fair (3)
- ☐ Poor to fair (2)
- ☒ Poor (1)

4c. Habitat alteration. Score one or double check and average.

- ☐ None or none apparent (9)
- ☐ Recovered (6)
- ☐ Recovering (3)
- ☒ Recent or no recovery (1)

Check all disturbances observed

- | | |
|---|--|
| <ul style="list-style-type: none"> <input checked="" type="checkbox"/> mowing <input type="checkbox"/> grazing <input type="checkbox"/> clearcutting <input type="checkbox"/> selective cutting <input type="checkbox"/> woody debris removal <input type="checkbox"/> toxic pollutants | <ul style="list-style-type: none"> <input type="checkbox"/> shrub/sapling removal <input type="checkbox"/> herbaceous/aquatic bed removal <input type="checkbox"/> sedimentation <input type="checkbox"/> dredging <input type="checkbox"/> farming <input type="checkbox"/> nutrient enrichment |
|---|--|

15
subtotal this page

Site: OH-1

Rater(s): T. King

Date: 9-13-2010

15

subtotal first page

-10

max 10 pts.

subtotal

Metric 5. Special Wetlands.

Check all that apply and score as indicated.

- ☐ Bog (10)
- ☐ Fen (10)
- ☐ Old growth forest (10)
- ☐ Mature forested wetland (5)
- ☐ Lake Erie coastal/tributary wetland-unrestricted hydrology (10)
- ☐ Lake Erie coastal/tributary wetland-restricted hydrology (5)
- ☐ Lake Plain Sand Prairies (Oak Openings) (10)
- ☐ Relict Wet Prairies (10)
- ☐ Known occurrence state/federal threatened or endangered species (10)
- ☐ Significant migratory songbird/water fowl habitat or usage (10)
- ☒ Category 1 Wetland. See Question 1 Qualitative Rating (-10)

4

max 20 pts.

subtotal

Metric 6. Plant communities, interspersions, microtopography.

6a. Wetland Vegetation Communities.

Score all present using 0 to 3 scale.

- ☐ Aquatic bed
- ☒ Emergent 1
- ☐ Shrub
- ☐ Forest
- ☐ Mudflats
- ☐ Open water
- ☐ Other

6b. horizontal (plan view) Interspersion.

Select only one.

- ☐ High (5)
- ☐ Moderately high(4)
- ☒ Moderate (3)
- ☐ Moderately low (2)
- ☐ Low (1)
- ☐ None (0)

6c. Coverage of invasive plants. Refer to Table 1 ORAM long form for list. Add or deduct points for coverage

- ☐ Extensive >75% cover (-5)
- ☐ Moderate 25-75% cover (-3)
- ☐ Sparse 5-25% cover (-1)
- ☒ Nearly absent <5% cover (0)
- ☐ Absent (1)

6d. Microtopography.

Score all present using 0 to 3 scale.

- ☐ Vegetated hummocks/tussucks
- ☐ Coarse woody debris >15cm (6in)
- ☐ Standing dead >25cm (10in) dbh
- ☐ Amphibian breeding pools

Vegetation Community Cover Scale

0	Absent or comprises <0.1ha (0.2471 acres) contiguous area
1	Present and either comprises small part of wetland's vegetation and is of moderate quality, or comprises a significant part but is of low quality
2	Present and either comprises significant part of wetland's vegetation and is of moderate quality or comprises a small part and is of high quality
3	Present and comprises significant part, or more, of wetland's vegetation and is of high quality

Narrative Description of Vegetation Quality

low	Low spp diversity and/or predominance of nonnative or disturbance tolerant native species
mod	Native spp are dominant component of the vegetation, although nonnative and/or disturbance tolerant native spp can also be present, and species diversity moderate to moderately high, but generally w/o presence of rare threatened or endangered spp
high	A predominance of native species, with nonnative spp and/or disturbance tolerant native spp absent or virtually absent, and high spp diversity and often, but not always, the presence of rare, threatened, or endangered spp

Mudflat and Open Water Class Quality

0	Absent <0.1ha (0.247 acres)
1	Low 0.1 to <1ha (0.247 to 2.47 acres)
2	Moderate 1 to <4ha (2.47 to 9.88 acres)
3	High 4ha (9.88 acres) or more

Microtopography Cover Scale

0	Absent
1	Present very small amounts or if more common of marginal quality
2	Present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of highest quality

9

End of Quantitative Rating. Complete Categorization Worksheets.

ORAM Summary Worksheet

		circle answer or insert score	Result
Narrative Rating	Question 1. Critical Habitat	YES <input checked="" type="radio"/> NO	If yes, Category 3.
	Question 2. Threatened or Endangered Species	YES <input checked="" type="radio"/> NO	If yes, Category 3.
	Question 3. High Quality Natural Wetland	YES <input checked="" type="radio"/> NO	If yes, Category 3.
	Question 4. Significant bird habitat	YES <input checked="" type="radio"/> NO	If yes, Category 3.
	Question 5. Category 1 Wetlands	<input checked="" type="radio"/> YES NO	If yes, Category 1.
	Question 6. Bogs	YES <input checked="" type="radio"/> NO	If yes, Category 3.
	Question 7. Fens	YES <input checked="" type="radio"/> NO	If yes, Category 3.
	Question 8a. Old Growth Forest	YES <input checked="" type="radio"/> NO	If yes, Category 3.
	Question 8b. Mature Forested Wetland	YES <input checked="" type="radio"/> NO	If yes, evaluate for Category 3; may also be 1 or 2.
	Question 9b. Lake Erie Wetlands - Restricted	YES <input checked="" type="radio"/> NO	If yes, evaluate for Category 3; may also be 1 or 2.
	Question 9d. Lake Erie Wetlands - Unrestricted with native plants	YES NO	If yes, Category 3
	Question 9e. Lake Erie Wetlands - Unrestricted with invasive plants	YES NO	If yes, evaluate for Category 3; may also be 1 or 2.
Question 10. Oak Openings	YES <input checked="" type="radio"/> NO	If yes, Category 3	
Question 11. Relict Wet Prairies	YES <input checked="" type="radio"/> NO	If yes, evaluate for Category 3; may also be 1 or 2.	
Quantitative Rating	Metric 1. Size	0	
	Metric 2. Buffers and surrounding land use	4	
	Metric 3. Hydrology	6	
	Metric 4. Habitat	5	
	Metric 5. Special Wetland Communities	-10	
	Metric 6. Plant communities, interspersed, microtopography	4	
	TOTAL SCORE	9	Category based on score breakpoints

Complete Wetland Categorization Worksheet.

Wetland Categorization Worksheet

Choices	Circle one		Evaluation of Categorization Result of ORAM
Did you answer "Yes" to any of the following questions: Narrative Rating Nos. 2, 3, 4, 6, 7, 8a, 9d, 10	YES Wetland is categorized as a Category 3 wetland	(NO)	Is quantitative rating score less than the Category 2 scoring threshold (<i>excluding</i> gray zone)? If yes, reevaluate the category of the wetland using the narrative criteria in OAC Rule 3745-1-54(C) and biological and/or functional assessments to determine if the wetland has been over-categorized by the ORAM
Did you answer "Yes" to any of the following questions: Narrative Rating Nos. 1, 8b, 9b, 9e, 11	YES Wetland should be evaluated for possible Category 3 status	(NO)	Evaluate the wetland using the 1) narrative criteria in OAC Rule 3745-1-54(C) and 2) the quantitative rating score. If the wetland is determined to be a Category 3 wetland using either of these, it should be categorized as a Category 3 wetland. Detailed biological and/or functional assessments may also be used to determine the wetland's category.
Did you answer "Yes" to Narrative Rating No. 5	(YES) Wetland is categorized as a Category 1 wetland	NO	Is quantitative rating score <i>greater</i> than the Category 2 scoring threshold (<i>including</i> any gray zone)? If yes, reevaluate the category of the wetland using the narrative criteria in OAC Rule 3745-1-54(C) and biological and/or functional assessments to determine if the wetland has been under-categorized by the ORAM
Does the quantitative score fall within the scoring range of a Category 1, 2, or 3 wetland?	YES Wetland is assigned to the appropriate category based on the scoring range	(NO)	If the score of the wetland is located within the scoring range for a particular category, the wetland should be assigned to that category. In all instances however, the narrative criteria described in OAC Rule 3745-1-54(C) can be used to clarify or change a categorization based on a quantitative score.
Does the quantitative score fall with the "gray zone" for Category 1 or 2 or Category 2 or 3 wetlands?	YES Wetland is assigned to the higher of the two categories or assigned to a category based on detailed assessments and the narrative criteria	(NO)	Rater has the option of assigning the wetland to the higher of the two categories or to assign a category based on the results of a nonrapid wetland assessment method, e.g. functional assessment, biological assessment, etc. and a consideration of the narrative criteria in OAC rule 3745-1-54(C).
Does the wetland otherwise exhibit <i>moderate</i> OR <i>superior</i> hydrologic OR habitat, OR recreational functions AND the wetland was <i>not</i> categorized as a Category 2 wetland (in the case of moderate functions) or a Category 3 wetland (in the case of superior functions) by this method?	YES Wetland was undercategorized by this method. A written justification for recategorization should be provided on Background Information Form	(NO) Wetland is assigned to category as determined by the ORAM.	A wetland may be undercategorized using this method, but still exhibit one or more superior functions, e.g. a wetland's biotic communities may be degraded by human activities, but the wetland may still exhibit superior hydrologic functions because of its type, landscape position, size, local or regional significance, etc. In this circumstance, the narrative criteria in OAC Rule 3745-1-54(C)(2) and (3) are controlling, and the under-categorization should be corrected. A written justification with supporting reasons or information for this determination should be provided.

Final Category			
Choose one	Category 1	Category 2	Category 3

End of Ohio Rapid Assessment Method for Wetlands.

Version 5.0	Ohio Rapid Assessment Method for Wetlands 10 Page Form for Wetland Categorization	
	Background Information Scoring Boundary Worksheet Narrative Rating Field Form Quantitative Rating ORAM Summary Worksheet Wetland Categorization Worksheet	Ohio EPA, Division of Surface Water Final: February 1, 2001

Instructions

The investigator is ***STRONGLY URGED*** to read the Manual for Using the Ohio Rapid Assessment Method for Wetlands for further elaboration and discussion of the questions below prior to using the rating forms.

The Narrative Rating is designed to categorize a wetland or to provide alerts to the Rater based on the presence or possible presence of threatened or endangered species. The presence or proximity of such species is often an indicator of the quality and lack of disturbance of the wetland being evaluated. In addition, it is designed to categorize certain wetlands as very low quality (Category 1) or very high quality (Category 3) regardless of the wetland's score on the Quantitative Rating. In addition, the Narrative Rating also alerts the investigator that a particular wetland *may* be a Category 3 wetland, again, regardless of the wetland's score on the Quantitative Rating.

It is ***VERY IMPORTANT*** to properly and thoroughly answer each of the questions in the ORAM in order to properly categorize a wetland. To *properly* answer all the questions, the boundaries of the wetland being assessed must be correctly identified. Refer to Scoring Boundary worksheet and the User's Manual for a discussion of how to determine the "scoring boundaries." In some instances, the scoring boundaries may differ from the "jurisdictional boundaries."

Refer to the most recent ORAM Score Calibration Report for the scoring breakpoints between wetland categories. The most recent version of this document is posted on Ohio EPA's Division of Surface Water web page at: <http://www.epa.ohio.gov/dsw/wetlands/WetlandEcologySection.aspx>

Background Information

Name:	Thomas King	
Date:	11-23-2010	
Affiliation:	EA Engineering, Science, and Technology, Inc.	
Address:	15 Loveton Circle Sparks, MD 21152	
Phone Number:	410-771-4950	
e-mail address:	tking@eaest.com	
Name of Wetland:	OH-2	
Vegetation Community(ies):	Palustrine Emergent	
HGM Class(es):		
Location of Wetland: include map, address, north arrow, landmarks, distances, roads, etc.		
<p>See Figure #4.</p> <p>Located to the north of the eastern end of the access road to to the Meldahl Locks (Near the picnic areas).</p>		
Lat/Long or UTM Coordinate	38d 47m 56.162s N, 84d 10m 1.402s W	
USGS Quad Name	Moscow, OH	
County	Clermont	
Township	Felicity	
Section and Subsection		
Hydrologic Unit Code	0509020111 - Bullsckm Creek	
Site Visit	9-14-2010	
National Wetland Inventory Map	No mapped wetalnds	
Ohio Wetland Inventory Map		
Soil Survey	Clermont County Soil Survey - Cut and Fill	
Delineation report/map	Captain Anthony Meldahl Hydroelectric Project -	

Name of Wetland:		OH-2	
Wetland Size (acres, hectares):		0.05 acres	
Sketch: Include north arrow, relationship with other surface waters, vegetation zones, etc.			
See Figure #4 for more detail.			
Comments, Narrative Discussion, Justification of Category Changes:			
Final score :		9	Category: 1

Scoring Boundary Worksheet

INSTRUCTIONS. The initial step in completing the ORAM is to identify the "scoring boundaries" of the wetland being rated. In many instances this determination will be relatively easy and the scoring boundaries will coincide with the "jurisdictional boundaries." For example, the scoring boundary of an isolated cattail marsh located in the middle of a farm field will likely be the same as that wetland's jurisdictional boundaries. In other instances, however, the scoring boundary will not be as easily determined. Wetlands that are small or isolated from other surface waters often form large contiguous areas or heterogeneous complexes of wetland and upland. In separating wetlands for scoring purposes, the hydrologic regime of the wetland is the main criterion that should be used. Boundaries between contiguous or connected wetlands should be established where the volume, flow, or velocity of water moving through the wetland changes significantly. *Areas with a high degree of hydrologic interaction should be scored as a single wetland.* In determining a wetland's scoring boundaries, use the guidelines in the ORAM Manual Section 5.0. In certain instances, it may be difficult to establish the scoring boundary for the wetland being rated. These problem situations include wetlands that form a patchwork on the landscape, wetlands divided by artificial boundaries like property fences, roads, or railroad embankments, wetlands that are contiguous with streams, lakes, or rivers, and estuarine or coastal wetlands. These situations are discussed below, however, it is recommended that Rater contact Ohio EPA, Division of Surface Water, 401/Wetlands Section if there are additional questions or a need for further clarification of the appropriate scoring boundaries of a particular wetland.

#	Steps in properly establishing scoring boundaries	done?	not applicable
Step 1	Identify the wetland area of interest. This may be the site of a proposed impact, a reference site, conservation site, etc.	X	
Step 2	Identify the locations where there is physical evidence that hydrology changes rapidly. Such evidence includes both natural and human-induced changes including, constrictions caused by berms or dikes, points where the water velocity changes rapidly at rapids or falls, points where significant inflows occur at the confluence of rivers, or other factors that may restrict hydrologic interaction between the wetlands or parts of a single wetland.		X
Step 3	Delineate the boundary of the wetland to be rated such that all areas of interest that are contiguous to and within the areas where the hydrology does not change significantly, i.e. areas that have a high degree of hydrologic interaction are included within the scoring boundary.	X	
Step 4	Determine if artificial boundaries, such as property lines, state lines, roads, railroad embankments, etc., are present. These should not be used to establish scoring boundaries unless they coincide with areas where the hydrologic regime changes.	X	
Step 5	In all instances, the Rater may enlarge the minimum scoring boundaries discussed here to score together wetlands that could be scored separately.		X
Step 6	Consult ORAM Manual Section 5.0 for how to establish scoring boundaries for wetlands that form a patchwork on the landscape, divided by artificial boundaries, contiguous to streams, lakes or rivers, or for dual classifications.		X

End of Scoring Boundary Determination. Begin Narrative Rating on next page.

Narrative Rating

INSTRUCTIONS. Answer each of the following questions. Questions 1, 2, 3 and 4 should be answered based on information obtained from the site visit or the literature *and* by submitting a Data Services Request to the Ohio Department of Natural Resources, Division of Natural Areas and Preserves, Natural Heritage Data Services, 1889 Fountain Square Court, Building F-1, Columbus, Ohio 43224, 614-265-6453 (phone), 614-265-3096 (fax), <http://www.dnr.state.oh.us/dnap>. The remaining questions are designed to be answered primarily by the results of the site visit. Refer to the User's Manual for descriptions of these wetland types. Note: "Critical habitat" is legally defined in the Endangered Species Act and is the geographic area containing physical or biological features essential to the conservation of a listed species or as an area that may require special management considerations or protection. The Rater should contact the Region 3 Headquarters or the Columbus Ecological Services Office for updates as to whether critical habitat has been designated for other federally listed threatened or endangered species. "Documented" means the wetland is listed in the appropriate State of Ohio database.

#	Question	Circle one	
1	Critical Habitat. Is the wetland in a township, section, or subsection of a United States Geological Survey 7.5 minute Quadrangle that has been designated by the U.S. Fish and Wildlife Service as "critical habitat" for any threatened or endangered plant or animal species? Note: as of January 1, 2001, of the federally listed endangered or threatened species which can be found in Ohio, the Indiana Bat has had critical habitat designated (50 CFR 17.95(a)) and the piping plover has had critical habitat proposed (65 FR 41812 July 6, 2000).	YES Wetland should be evaluated for possible Category 3 status Go to Question 2	<input checked="" type="radio"/> NO Go to Question 2
2	Threatened or Endangered Species. Is the wetland known to contain an individual of, or documented occurrences of federal or state-listed threatened or endangered plant or animal species?	YES Wetland is a Category 3 wetland. Go to Question 3	<input checked="" type="radio"/> NO Go to Question 3
3	Documented High Quality Wetland. Is the wetland on record in Natural Heritage Database as a high quality wetland?	YES Wetland is a Category 3 wetland Go to Question 4	<input checked="" type="radio"/> NO Go to Question 4
4	Significant Breeding or Concentration Area. Does the wetland contain documented regionally significant breeding or nonbreeding waterfowl, neotropical songbird, or shorebird concentration areas?	YES Wetland is a Category 3 wetland Go to Question 5	<input checked="" type="radio"/> NO Go to Question 5
5	Category 1 Wetlands. Is the wetland less than 0.5 hectares (1 acre) in size and hydrologically isolated and either 1) comprised of vegetation that is dominated (greater than eighty per cent areal cover) by <i>Phalaris arundinacea</i> , <i>Lythrum salicaria</i> , or <i>Phragmites australis</i> , or 2) an acidic pond created or excavated on mined lands that has little or no vegetation?	<input checked="" type="radio"/> YES Wetland is a Category 1 wetland Go to Question 6	NO Go to Question 6
6	Bogs. Is the wetland a peat-accumulating wetland that 1) has no significant inflows or outflows, 2) supports acidophilic mosses, particularly <i>Sphagnum</i> spp., 3) the acidophilic mosses have >30% cover, 4) at least one species from Table 1 is present, and 5) the cover of invasive species (see Table 1) is <25%?	YES Wetland is a Category 3 wetland Go to Question 7	<input checked="" type="radio"/> NO Go to Question 7
7	Fens. Is the wetland a carbon accumulating (peat, muck) wetland that is saturated during most of the year, primarily by a discharge of free flowing, mineral rich, ground water with a circumneutral pH (5.5-9.0) and with one or more plant species listed in Table 1 and the cover of invasive species listed in Table 1 is <25%?	YES Wetland is a Category 3 wetland Go to Question 8a	<input checked="" type="radio"/> NO Go to Question 8a
8a	"Old Growth Forest." Is the wetland a forested wetland and is the forest characterized by, but not limited to, the following characteristics: overstory canopy trees of great age (exceeding at least 50% of a projected maximum attainable age for a species); little or no evidence of human-caused understory disturbance during the past 80 to 100 years; an all-aged structure and multilayered canopies; aggregations of canopy trees interspersed with canopy gaps; and significant numbers of standing dead snags and downed logs?	YES Wetland is a Category 3 wetland. Go to Question 8b	<input checked="" type="radio"/> NO Go to Question 8b

8b	Mature forested wetlands. Is the wetland a forested wetland with 50% or more of the cover of upper forest canopy consisting of deciduous trees with large diameters at breast height (dbh), generally diameters greater than 45cm (17.7in) dbh?	YES Wetland should be evaluated for possible Category 3 status. Go to Question 9a	<input checked="" type="radio"/> NO Go to Question 9a
9a	Lake Erie coastal and tributary wetlands. Is the wetland located at an elevation less than 575 feet on the USGS map, adjacent to this elevation, or along a tributary to Lake Erie that is accessible to fish?	YES Go to Question 9b	NO Go to Question 10
9b	Does the wetland's hydrology result from measures designed to prevent erosion and the loss of aquatic plants, i.e. the wetland is partially hydrologically restricted from Lake Erie due to lakeward or landward dikes or other hydrological controls?	YES Wetland should be evaluated for possible Category 3 status Go to Question 10	NO Go to Question 9c
9c	Are Lake Erie water levels the wetland's primary hydrological influence, i.e. the wetland is hydrologically unrestricted (no lakeward or upland border alterations), or the wetland can be characterized as an "estuarine" wetland with lake and river influenced hydrology. These include sandbar deposition wetlands, estuarine wetlands, river mouth wetlands, or those dominated by submersed aquatic vegetation.	YES Go to Question 9d	NO Go to Question 10
9d	Does the wetland have a predominance of native species within its vegetation communities, although non-native or disturbance tolerant native species can also be present?	YES Wetland is a Category 3 wetland Go to Question 10	NO Go to Question 9e
9e	Does the wetland have a predominance of non-native or disturbance tolerant native plant species within its vegetation communities?	YES Wetland should be evaluated for possible Category 3 status Go to Question 10	NO Go to Question 10
10	Lake Plain Sand Prairies (Oak Openings) Is the wetland located in Lucas, Fulton, Henry, or Wood Counties and can the wetland be characterized by the following description: the wetland has a sandy substrate with interspersed organic matter, a water table often within several inches of the surface, and often with a dominance of the gramineous vegetation listed in Table 1 (woody species may also be present). The Ohio Department of Natural Resources Division of Natural Areas and Preserves can provide assistance in confirming this type of wetland and its quality.	YES Wetland is a Category 3 wetland. Go to Question 11	<input checked="" type="radio"/> NO Go to Question 11
11	Relict Wet Prairies. Is the wetland a relict wet prairie community dominated by some or all of the species in Table 1. Extensive prairies were formerly located in the Darby Plains (Madison and Union Counties), Sandusky Plains (Wyandot, Crawford, and Marion Counties), northwest Ohio (e.g. Erie, Huron, Lucas, Wood Counties), and portions of western Ohio Counties (e.g. Darke, Mercer, Miami, Montgomery, Van Wert etc.).	YES Wetland should be evaluated for possible Category 3 status Complete Quantitative Rating	<input checked="" type="radio"/> NO Complete Quantitative Rating

Table 1. Characteristic plant species.

invasive/exotic spp	fen species	bog species	Oak Opening species	wet prairie species
<i>Lythrum salicaria</i>	<i>Zygadenus elegans</i> var. <i>glaucus</i>	<i>Calla palustris</i>	<i>Carex cryptolepis</i>	<i>Calamagrostis canadensis</i>
<i>Myriophyllum spicatum</i>	<i>Cacalia plantaginea</i>	<i>Carex atlantica</i> var. <i>capillacea</i>	<i>Carex lasiocarpa</i>	<i>Calamagrostis stricta</i>
<i>Najas minor</i>	<i>Carex flava</i>	<i>Carex echinata</i>	<i>Carex stricta</i>	<i>Carex atherodes</i>
<i>Phalaris arundinacea</i>	<i>Carex sterilis</i>	<i>Carex oligosperma</i>	<i>Cladium mariscoides</i>	<i>Carex buxbaumii</i>
<i>Phragmites australis</i>	<i>Carex stricta</i>	<i>Carex trisperma</i>	<i>Calamagrostis stricta</i>	<i>Carex pellita</i>
<i>Potamogeton crispus</i>	<i>Deschampsia caespitosa</i>	<i>Chamaedaphne calyculata</i>	<i>Calamagrostis canadensis</i>	<i>Carex sartwellii</i>
<i>Ranunculus ficaria</i>	<i>Eleocharis rostellata</i>	<i>Decodon verticillatus</i>	<i>Quercus palustris</i>	<i>Gentiana andrewsii</i>
<i>Rhamnus frangula</i>	<i>Eriophorum viridicarinatum</i>	<i>Eriophorum virginicum</i>		<i>Helianthus grosseserratus</i>
<i>Typha angustifolia</i>	<i>Gentianopsis</i> spp.	<i>Larix laricina</i>		<i>Liatris spicata</i>
<i>Typha x glauca</i>	<i>Lobelia kalmii</i>	<i>Nemopanthus mucronatus</i>		<i>Lysimachia quadriflora</i>
	<i>Parnassia glauca</i>	<i>Scheuchzeria palustris</i>		<i>Lythrum alatum</i>
	<i>Potentilla fruticosa</i>	<i>Sphagnum</i> spp.		<i>Pycnanthemum virginianum</i>
	<i>Rhamnus alnifolia</i>	<i>Vaccinium macrocarpon</i>		<i>Silphium terebinthinaceum</i>
	<i>Rhynchospora capillacea</i>	<i>Vaccinium corymbosum</i>		<i>Sorghastrum nutans</i>
	<i>Salix candida</i>	<i>Vaccinium oxycoccos</i>		<i>Spartina pectinata</i>
	<i>Salix myricoides</i>	<i>Woodwardia virginica</i>		<i>Solidago riddellii</i>
	<i>Salix serotima</i>	<i>Xyris difformis</i>		
	<i>Solidago ohioensis</i>			
	<i>Tofieldia glutinosa</i>			
	<i>Triglochin maritimum</i>			
	<i>Triglochin palustre</i>			

End of Narrative Rating. Begin Quantitative Rating on next page.

Site: OH-2	Rater(s): T. King	Date: 9-14-2010
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0	
max 6 pts.	subtotal

Metric 1. Wetland Area (size).

Select one size class and assign score.

- ☐ >50 acres (>20.2ha) (6 pts)
- ☐ 25 to <50 acres (10.1 to <20.2ha) (5 pts)
- ☐ 10 to <25 acres (4 to <10.1ha) (4 pts)
- ☐ 3 to <10 acres (1.2 to <4ha) (3 pts)
- ☐ 0.3 to <3 acres (0.12 to <1.2ha) (2pts)
- ☐ 0.1 to <0.3 acres (0.04 to <0.12ha) (1 pt)
- ☒ <0.1 acres (0.04ha) (0 pts)

4	
max 14 pts.	subtotal

Metric 2. Upland buffers and surrounding land use.

2a. Calculate average buffer width. Select only one and assign score. Do not double check.

- ☐ WIDE. Buffers average 50m (164ft) or more around wetland perimeter (7)
- ☐ MEDIUM. Buffers average 25m to <50m (82 to <164ft) around wetland perimeter (4)
- ☒ NARROW. Buffers average 10m to <25m (32ft to <82ft) around wetland perimeter (1)
- ☐ VERY NARROW. Buffers average <10m (<32ft) around wetland perimeter (0)

2b. Intensity of surrounding land use. Select one or double check and average.

- ☐ VERY LOW. 2nd growth or older forest, prairie, savannah, wildlife area, etc. (7)
- ☐ LOW. Old field (>10 years), shrub land, young second growth forest. (5)
- ☒ MODERATELY HIGH. Residential, fenced pasture, park, conservation tillage, new fallow field. (3)
- ☐ HIGH. Urban, industrial, open pasture, row cropping, mining, construction. (1)

6	
max 30 pts.	subtotal

Metric 3. Hydrology.

3a. Sources of Water. Score all that apply.

- ☐ High pH groundwater (5)
- ☐ Other groundwater (3)
- ☒ Precipitation (1)
- ☐ Seasonal/intermittent surface water (3)
- ☐ Perennial surface water (lake or stream) (5)

3c. Maximum water depth. Select only one and assign score.

- ☐ >0.7 (27.6in) (3)
- ☐ 0.4 to 0.7m (15.7 to 27.6in) (2)
- ☒ <0.4m (<15.7in) (1)

3e. Modifications to natural hydrologic regime. Score one or double check and average.

- ☐ None or none apparent (12)
- ☐ Recovered (7)
- ☐ Recovering (3)
- ☒ Recent or no recovery (1)

3b. Connectivity. Score all that apply.

- ☐ 100 year floodplain (1)
- ☐ Between stream/lake and other human use (1)
- ☐ Part of wetland/upland (e.g. forest), complex (1)
- ☒ Part of riparian or upland corridor (1)

3d. Duration inundation/saturation. Score one or dbl check.

- ☐ Semi- to permanently inundated/saturated (4)
- ☐ Regularly inundated/saturated (3)
- ☒ Seasonally inundated (2)
- ☐ Seasonally saturated in upper 30cm (12in) (1)

Check all disturbances observed

- ☐ ditch
- ☐ tile
- ☐ dike
- ☐ weir
- ☐ stormwater input

- ☐ point source (nonstormwater)
- ☐ filling/grading
- ☒ road bed/RR track
- ☐ dredging
- ☐ other _____

5	
max 20 pts.	subtotal

Metric 4. Habitat Alteration and Development.

4a. Substrate disturbance. Score one or double check and average.

- ☐ None or none apparent (4)
- ☒ Recovered (3)
- ☐ Recovering (2)
- ☐ Recent or no recovery (1)

4b. Habitat development. Select only one and assign score.

- ☐ Excellent (7)
- ☐ Very good (6)
- ☐ Good (5)
- ☐ Moderately good (4)
- ☐ Fair (3)
- ☐ Poor to fair (2)
- ☒ Poor (1)

4c. Habitat alteration. Score one or double check and average.

- ☐ None or none apparent (9)
- ☐ Recovered (6)
- ☐ Recovering (3)
- ☒ Recent or no recovery (1)

Check all disturbances observed

- ☒ mowing
- ☐ grazing
- ☐ clearcutting
- ☐ selective cutting
- ☐ woody debris removal
- ☐ toxic pollutants

- ☐ shrub/sapling removal
- ☐ herbaceous/aquatic bed removal
- ☐ sedimentation
- ☐ dredging
- ☐ farming
- ☐ nutrient enrichment

15
subtotal this page

Site: OH-2	Rater(s): T. King	Date: 9-14-2010
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15

subtotal first page

-10

max 10 pts.
subtotal

Metric 5. Special Wetlands.

Check all that apply and score as indicated.

- ☐ Bog (10)
- ☐ Fen (10)
- ☐ Old growth forest (10)
- ☐ Mature forested wetland (5)
- ☐ Lake Erie coastal/tributary wetland-unrestricted hydrology (10)
- ☐ Lake Erie coastal/tributary wetland-restricted hydrology (5)
- ☐ Lake Plain Sand Prairies (Oak Openings) (10)
- ☐ Relict Wet Prairies (10)
- ☐ Known occurrence state/federal threatened or endangered species (10)
- ☐ Significant migratory songbird/water fowl habitat or usage (10)
- ☒ Category 1 Wetland. See Question 1 Qualitative Rating (-10)

4

max 20 pts.
subtotal

Metric 6. Plant communities, interspersions, microtopography.

6a. Wetland Vegetation Communities.

Score all present using 0 to 3 scale.

- ☐ Aquatic bed
- ☒ Emergent 1
- ☐ Shrub
- ☐ Forest
- ☐ Mudflats
- ☐ Open water
- ☐ Other

6b. horizontal (plan view) Interspersion.

Select only one.

- ☐ High (5)
- ☐ Moderately high(4)
- ☒ Moderate (3)
- ☐ Moderately low (2)
- ☐ Low (1)
- ☐ None (0)

6c. Coverage of invasive plants. Refer to Table 1 ORAM long form for list. Add or deduct points for coverage

- ☐ Extensive >75% cover (-5)
- ☐ Moderate 25-75% cover (-3)
- ☐ Sparse 5-25% cover (-1)
- ☒ Nearly absent <5% cover (0)
- ☐ Absent (1)

6d. Microtopography.

Score all present using 0 to 3 scale.

- ☐ Vegetated hummocks/tussucks
- ☐ Coarse woody debris >15cm (6in)
- ☐ Standing dead >25cm (10in) dbh
- ☐ Amphibian breeding pools

Vegetation Community Cover Scale

0	Absent or comprises <0.1ha (0.2471 acres) contiguous area
1	Present and either comprises small part of wetland's vegetation and is of moderate quality, or comprises a significant part but is of low quality
2	Present and either comprises significant part of wetland's vegetation and is of moderate quality or comprises a small part and is of high quality
3	Present and comprises significant part, or more, of wetland's vegetation and is of high quality

Narrative Description of Vegetation Quality

low	Low spp diversity and/or predominance of nonnative or disturbance tolerant native species
mod	Native spp are dominant component of the vegetation, although nonnative and/or disturbance tolerant native spp can also be present, and species diversity moderate to moderately high, but generally w/o presence of rare threatened or endangered spp
high	A predominance of native species, with nonnative spp and/or disturbance tolerant native spp absent or virtually absent, and high spp diversity and often, but not always, the presence of rare, threatened, or endangered spp

Mudflat and Open Water Class Quality

0	Absent <0.1ha (0.247 acres)
1	Low 0.1 to <1ha (0.247 to 2.47 acres)
2	Moderate 1 to <4ha (2.47 to 9.88 acres)
3	High 4ha (9.88 acres) or more

Microtopography Cover Scale

0	Absent
1	Present very small amounts or if more common of marginal quality
2	Present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of highest quality

9

End of Quantitative Rating. Complete Categorization Worksheets.

ORAM Summary Worksheet

		circle answer or insert score	Result
Narrative Rating	Question 1. Critical Habitat	YES <input checked="" type="radio"/> NO	If yes, Category 3.
	Question 2. Threatened or Endangered Species	YES <input checked="" type="radio"/> NO	If yes, Category 3.
	Question 3. High Quality Natural Wetland	YES <input checked="" type="radio"/> NO	If yes, Category 3.
	Question 4. Significant bird habitat	YES <input checked="" type="radio"/> NO	If yes, Category 3.
	Question 5. Category 1 Wetlands	<input checked="" type="radio"/> YES NO	If yes, Category 1.
	Question 6. Bogs	YES <input checked="" type="radio"/> NO	If yes, Category 3.
	Question 7. Fens	YES <input checked="" type="radio"/> NO	If yes, Category 3.
	Question 8a. Old Growth Forest	YES <input checked="" type="radio"/> NO	If yes, Category 3.
	Question 8b. Mature Forested Wetland	YES <input checked="" type="radio"/> NO	If yes, evaluate for Category 3; may also be 1 or 2.
	Question 9b. Lake Erie Wetlands - Restricted	YES <input checked="" type="radio"/> NO	If yes, evaluate for Category 3; may also be 1 or 2.
	Question 9d. Lake Erie Wetlands - Unrestricted with native plants	YES <input checked="" type="radio"/> NO	If yes, Category 3
	Question 9e. Lake Erie Wetlands - Unrestricted with invasive plants	YES <input checked="" type="radio"/> NO	If yes, evaluate for Category 3; may also be 1 or 2.
Question 10. Oak Openings	YES <input checked="" type="radio"/> NO	If yes, Category 3	
Question 11. Relict Wet Prairies	YES <input checked="" type="radio"/> NO	If yes, evaluate for Category 3; may also be 1 or 2.	
Quantitative Rating	Metric 1. Size	0	
	Metric 2. Buffers and surrounding land use	4	
	Metric 3. Hydrology	6	
	Metric 4. Habitat	5	
	Metric 5. Special Wetland Communities	-10	
	Metric 6. Plant communities, interspersed, microtopography	4	
	TOTAL SCORE	9	Category based on score breakpoints

Complete Wetland Categorization Worksheet.

Wetland Categorization Worksheet

Choices	Circle one	Evaluation of Categorization Result of ORAM
Did you answer "Yes" to any of the following questions: Narrative Rating Nos. 2, 3, 4, 6, 7, 8a, 9d, 10	YES Wetland is categorized as a Category 3 wetland	<input checked="" type="radio"/> NO Is quantitative rating score <i>less</i> than the Category 2 scoring threshold (<i>excluding</i> gray zone)? If yes, reevaluate the category of the wetland using the narrative criteria in OAC Rule 3745-1-54(C) and biological and/or functional assessments to determine if the wetland has been over-categorized by the ORAM
Did you answer "Yes" to any of the following questions: Narrative Rating Nos. 1, 8b, 9b, 9e, 11	YES Wetland should be evaluated for possible Category 3 status	<input checked="" type="radio"/> NO Evaluate the wetland using the 1) narrative criteria in OAC Rule 3745-1-54(C) and 2) the quantitative rating score. If the wetland is determined to be a Category 3 wetland using either of these, it should be categorized as a Category 3 wetland. Detailed biological and/or functional assessments may also be used to determine the wetland's category.
Did you answer "Yes" to Narrative Rating No. 5	<input checked="" type="radio"/> YES Wetland is categorized as a Category 1 wetland	NO Is quantitative rating score <i>greater</i> than the Category 2 scoring threshold (<i>including</i> any gray zone)? If yes, reevaluate the category of the wetland <i>using the narrative</i> criteria in OAC Rule 3745-1-54(C) and biological and/or functional assessments to determine if the wetland has been under-categorized by the ORAM
Does the quantitative score fall within the scoring range of a Category 1, 2, or 3 wetland?	YES Wetland is assigned to the appropriate category based on the scoring range	<input checked="" type="radio"/> NO If the score of the wetland is located within the scoring range for a particular category, the wetland should be assigned to that category. In all instances however, the narrative criteria described in OAC Rule 3745-1-54(C) can be used to clarify or change a categorization based on a quantitative score.
Does the quantitative score fall with the "gray zone" for Category 1 or 2 or Category 2 or 3 wetlands?	YES Wetland is assigned to the higher of the two categories or assigned to a category based on detailed assessments and the narrative criteria	<input checked="" type="radio"/> NO Rater has the option of assigning the wetland to the higher of the two categories or to assign a category based on the results of a nonrapid wetland assessment method, e.g. functional assessment, biological assessment, etc, and a consideration of the narrative criteria in OAC rule 3745-1-54(C).
Does the wetland otherwise exhibit <i>moderate OR superior</i> hydrologic OR habitat, OR recreational functions AND the wetland was <i>not</i> categorized as a Category 2 wetland (in the case of moderate functions) or a Category 3 wetland (in the case of superior functions) by this method?	YES Wetland was undercategorized by this method. A written justification for recategorization should be provided on Background Information Form	<input checked="" type="radio"/> NO Wetland is assigned to category as determined by the ORAM. A wetland may be undercategorized using this method, but still exhibit one or more superior functions, e.g. a wetland's biotic communities may be degraded by human activities, but the wetland may still exhibit superior hydrologic functions because of its type, landscape position, size, local or regional significance, etc. In this circumstance, the narrative criteria in OAC Rule 3745-1-54(C)(2) and (3) are controlling, and the under-categorization should be corrected. A written justification with supporting reasons or information for this determination should be provided.

	Final Category	
Choose one	Category 1	Category 2 Category 3

End of Ohio Rapid Assessment Method for Wetlands.

Version 5.0	Ohio Rapid Assessment Method for Wetlands 10 Page Form for Wetland Categorization	
	Background Information Scoring Boundary Worksheet Narrative Rating Field Form Quantitative Rating ORAM Summary Worksheet Wetland Categorization Worksheet	Ohio EPA, Division of Surface Water Final: February 1, 2001

Instructions

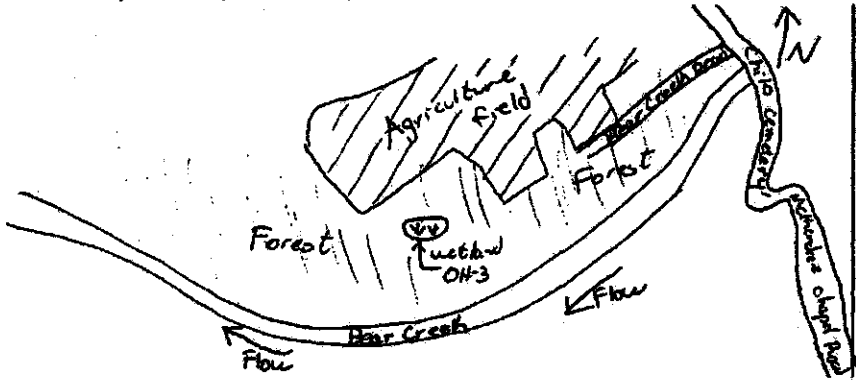
The investigator is ***STRONGLY URGED*** to read the Manual for Using the Ohio Rapid Assessment Method for Wetlands for further elaboration and discussion of the questions below prior to using the rating forms.

The Narrative Rating is designed to categorize a wetland or to provide alerts to the Rater based on the presence or possible presence of threatened or endangered species. The presence or proximity of such species is often an indicator of the quality and lack of disturbance of the wetland being evaluated. In addition, it is designed to categorize certain wetlands as very low quality (Category 1) or very high quality (Category 3) regardless of the wetland's score on the Quantitative Rating. In addition, the Narrative Rating also alerts the investigator that a particular wetland *may* be a Category 3 wetland, again, regardless of the wetland's score on the Quantitative Rating.

It is ***VERY IMPORTANT*** to properly and thoroughly answer each of the questions in the ORAM in order to properly categorize a wetland. To *properly* answer all the questions, the boundaries of the wetland being assessed must be correctly identified. Refer to Scoring Boundary worksheet and the User's Manual for a discussion of how to determine the "scoring boundaries." In some instances, the scoring boundaries may differ from the "jurisdictional boundaries."

Refer to the most recent ORAM Score Calibration Report for the scoring breakpoints between wetland categories. The most recent version of this document is posted on Ohio EPA's Division of Surface Water web page at: <http://www.epa.ohio.gov/dsw/wetlands/WetlandEcologySection.aspx>

Background Information

Name:	
Thomas King	
Date:	
11-23-2010	
Affiliation:	
EA Engineering, Science, and Technology, Inc.	
Address:	
15 Loveton Circle Sparks, MD 21152	
Phone Number:	
410-771-4950	
e-mail address:	
tking@eaest.com	
Name of Wetland:	
OH-3	
Vegetation Community(ies):	
Palustrine Emergent	
HGM Class(es):	
Location of Wetland: Include map, address, north arrow, landmarks, distances, roads, etc.	
	
See Figure #4 for more details.	
Lat/Long or UTM Coordinate	38d 48m 59.912s N, 84d 8m 42.065s W
USGS Quad Name	Moscow, OH
County	Clermont
Township	Felicity
Section and Subsection	
Hydrologic Unit Code	HUC-0509020111-Bullskin Creek
Site Visit	9-15-2010
National Wetland Inventory Map	No mapped wetlands
Ohio Wetland Inventory Map	
Soil Survey	Clermont County Soil Survey - Cincinnati Silt Loam
Delineation report/map	Captain Anthony Meldahl Hydroelectric Project -

Name of Wetland: OH-3	
Wetland Size (acres, hectares): 0.06 acres	
Sketch: Include north arrow, relationship with other surface waters, vegetation zones, etc.	
<p>See Figure #4 for more detail.</p>	
Comments, Narrative Discussion, Justification of Category Changes:	
Final score : 31	Category: 1

Scoring Boundary Worksheet

INSTRUCTIONS. The initial step in completing the ORAM is to identify the "scoring boundaries" of the wetland being rated. In many instances this determination will be relatively easy and the scoring boundaries will coincide with the "jurisdictional boundaries." For example, the scoring boundary of an isolated cattail marsh located in the middle of a farm field will likely be the same as that wetland's jurisdictional boundaries. In other instances, however, the scoring boundary will not be as easily determined. Wetlands that are small or isolated from other surface waters often form large contiguous areas or heterogeneous complexes of wetland and upland. In separating wetlands for scoring purposes, the hydrologic regime of the wetland is the main criterion that should be used. Boundaries between contiguous or connected wetlands should be established where the volume, flow, or velocity of water moving through the wetland changes significantly. *Areas with a high degree of hydrologic interaction should be scored as a single wetland.* In determining a wetland's scoring boundaries, use the guidelines in the ORAM Manual Section 5.0. In certain instances, it may be difficult to establish the scoring boundary for the wetland being rated. These problem situations include wetlands that form a patchwork on the landscape, wetlands divided by artificial boundaries like property fences, roads, or railroad embankments, wetlands that are contiguous with streams, lakes, or rivers, and estuarine or coastal wetlands. These situations are discussed below, however, it is recommended that Rater contact Ohio EPA, Division of Surface Water, 401/Wetlands Section if there are additional questions or a need for further clarification of the appropriate scoring boundaries of a particular wetland.

#	Steps in properly establishing scoring boundaries	done?	not applicable
Step 1	Identify the wetland area of interest. This may be the site of a proposed impact, a reference site, conservation site, etc.	X	
Step 2	Identify the locations where there is physical evidence that hydrology changes rapidly. Such evidence includes both natural and human-induced changes including, constrictions caused by berms or dikes, points where the water velocity changes rapidly at rapids or falls, points where significant inflows occur at the confluence of rivers, or other factors that may restrict hydrologic interaction between the wetlands or parts of a single wetland.		X
Step 3	Delineate the boundary of the wetland to be rated such that all areas of interest that are contiguous to and within the areas where the hydrology does not change significantly, i.e. areas that have a high degree of hydrologic interaction are included within the scoring boundary.	X	
Step 4	Determine if artificial boundaries, such as property lines, state lines, roads, railroad embankments, etc., are present. These should not be used to establish scoring boundaries unless they coincide with areas where the hydrologic regime changes.	X	
Step 5	In all instances, the Rater may enlarge the minimum scoring boundaries discussed here to score together wetlands that could be scored separately.		X
Step 6	Consult ORAM Manual Section 5.0 for how to establish scoring boundaries for wetlands that form a patchwork on the landscape, divided by artificial boundaries, contiguous to streams, lakes or rivers, or for dual classifications.		X

End of Scoring Boundary Determination. Begin Narrative Rating on next page.

Narrative Rating

INSTRUCTIONS. Answer each of the following questions. Questions 1, 2, 3 and 4 should be answered based on information obtained from the site visit or the literature *and* by submitting a Data Services Request to the Ohio Department of Natural Resources, Division of Natural Areas and Preserves, Natural Heritage Data Services, 1889 Fountain Square Court, Building F-1, Columbus, Ohio 43224, 614-265-6453 (phone), 614-265-3096 (fax), <http://www.dnr.state.oh.us/dnap>. The remaining questions are designed to be answered primarily by the results of the site visit. Refer to the User's Manual for descriptions of these wetland types. Note: "Critical habitat" is legally defined in the Endangered Species Act and is the geographic area containing physical or biological features essential to the conservation of a listed species or as an area that may require special management considerations or protection. The Rater should contact the Region 3 Headquarters or the Columbus Ecological Services Office for updates as to whether critical habitat has been designated for other federally listed threatened or endangered species. "Documented" means the wetland is listed in the appropriate State of Ohio database.

#	Question	Circle one	
1	Critical Habitat. Is the wetland in a township, section, or subsection of a United States Geological Survey 7.5 minute Quadrangle that has been designated by the U.S. Fish and Wildlife Service as "critical habitat" for any threatened or endangered plant or animal species? Note: as of January 1, 2001, of the federally listed endangered or threatened species which can be found in Ohio, the Indiana Bat has had critical habitat designated (50 CFR 17.95(a)) and the piping plover has had critical habitat proposed (65 FR 41812 July 6, 2000).	YES Wetland should be evaluated for possible Category 3 status Go to Question 2	NO Go to Question 2
2	Threatened or Endangered Species. Is the wetland known to contain an individual of, or documented occurrences of federal or state-listed threatened or endangered plant or animal species?	YES Wetland is a Category 3 wetland. Go to Question 3	NO Go to Question 3
3	Documented High Quality Wetland. Is the wetland on record in Natural Heritage Database as a high quality wetland?	YES Wetland is a Category 3 wetland Go to Question 4	NO Go to Question 4
4	Significant Breeding or Concentration Area. Does the wetland contain documented regionally significant breeding or nonbreeding waterfowl, neotropical songbird, or shorebird concentration areas?	YES Wetland is a Category 3 wetland Go to Question 5	NO Go to Question 5
5	Category 1 Wetlands. Is the wetland less than 0.5 hectares (1 acre) in size and hydrologically isolated and either 1) comprised of vegetation that is dominated (greater than eighty per cent areal cover) by <i>Phalaris arundinacea</i> , <i>Lythrum salicaria</i> , or <i>Phragmites australis</i> , or 2) an acidic pond created or excavated on mined lands that has little or no vegetation?	YES Wetland is a Category 1 wetland Go to Question 6	NO Go to Question 6
6	Bogs. Is the wetland a peat-accumulating wetland that 1) has no significant inflows or outflows, 2) supports acidophilic mosses, particularly <i>Sphagnum</i> spp., 3) the acidophilic mosses have >30% cover, 4) at least one species from Table 1 is present, and 5) the cover of invasive species (see Table 1) is <25%?	YES Wetland is a Category 3 wetland Go to Question 7	NO Go to Question 7
7	Fens. Is the wetland a carbon accumulating (peat, muck) wetland that is saturated during most of the year, primarily by a discharge of free flowing, mineral rich, ground water with a circumneutral pH (5.5-9.0) and with one or more plant species listed in Table 1 and the cover of invasive species listed in Table 1 is <25%?	YES Wetland is a Category 3 wetland Go to Question 8a	NO Go to Question 8a
8a	"Old Growth Forest." Is the wetland a forested wetland and is the forest characterized by, but not limited to, the following characteristics: overstory canopy trees of great age (exceeding at least 50% of a projected maximum attainable age for a species); little or no evidence of human-caused understory disturbance during the past 80 to 100 years; an all-aged structure and multilayered canopies; aggregations of canopy trees interspersed with canopy gaps; and significant numbers of standing dead snags and downed logs?	YES Wetland is a Category 3 wetland. Go to Question 8b	NO Go to Question 8b

8b	Mature forested wetlands. Is the wetland a forested wetland with 50% or more of the cover of upper forest canopy consisting of deciduous trees with large diameters at breast height (dbh), generally diameters greater than 45cm (17.7in) dbh?	YES Wetland should be evaluated for possible Category 3 status. Go to Question 9a	(NO) Go to Question 9a
9a	Lake Erie coastal and tributary wetlands. Is the wetland located at an elevation less than 575 feet on the USGS map, adjacent to this elevation, or along a tributary to Lake Erie that is accessible to fish?	YES Go to Question 9b	(NO) Go to Question 10
9b	Does the wetland's hydrology result from measures designed to prevent erosion and the loss of aquatic plants, i.e. the wetland is partially hydrologically restricted from Lake Erie due to lakeward or landward dikes or other hydrological controls?	YES Wetland should be evaluated for possible Category 3 status Go to Question 10	(NO) Go to Question 9c
9c	Are Lake Erie water levels the wetland's primary hydrological influence, i.e. the wetland is hydrologically unrestricted (no lakeward or upland border alterations), or the wetland can be characterized as an "estuarine" wetland with lake and river influenced hydrology. These include sandbar deposition wetlands, estuarine wetlands, river mouth wetlands, or those dominated by submersed aquatic vegetation.	YES Go to Question 9d	(NO) Go to Question 10
9d	Does the wetland have a predominance of native species within its vegetation communities, although non-native or disturbance tolerant native species can also be present?	YES Wetland is a Category 3 wetland Go to Question 10	(NO) Go to Question 9e
9e	Does the wetland have a predominance of non-native or disturbance tolerant native plant species within its vegetation communities?	YES Wetland should be evaluated for possible Category 3 status Go to Question 10	(NO) Go to Question 10
10	Lake Plain Sand Prairies (Oak Openings) Is the wetland located in Lucas, Fulton, Henry, or Wood Counties and can the wetland be characterized by the following description: the wetland has a sandy substrate with interspersed organic matter, a water table often within several inches of the surface, and often with a dominance of the gramineous vegetation listed in Table 1 (woody species may also be present). The Ohio Department of Natural Resources Division of Natural Areas and Preserves can provide assistance in confirming this type of wetland and its quality.	YES Wetland is a Category 3 wetland. Go to Question 11	(NO) Go to Question 11
11	Relict Wet Prairies. Is the wetland a relict wet prairie community dominated by some or all of the species in Table 1. Extensive prairies were formerly located in the Darby Plains (Madison and Union Counties), Sandusky Plains (Wyandot, Crawford, and Marion Counties), northwest Ohio (e.g. Erie, Huron, Lucas, Wood Counties), and portions of western Ohio Counties (e.g. Darke, Mercer, Miami, Montgomery, Van Wert etc.).	YES Wetland should be evaluated for possible Category 3 status Complete Quantitative Rating	(NO) Complete Quantitative Rating

Table 1. Characteristic plant species.

invasive/exotic spp	fen species	bog species	Oak Opening species	wet prairie species
<i>Lythrum salicaria</i>	<i>Zygadenus elegans</i> var. <i>glaucus</i>	<i>Calla palustris</i>	<i>Carex cryptolepis</i>	<i>Calamagrostis canadensis</i>
<i>Myriophyllum spicatum</i>	<i>Cacalia plantaginea</i>	<i>Carex atlantica</i> var. <i>capillacea</i>	<i>Carex lasiocarpa</i>	<i>Calamagrostis stricta</i>
<i>Najas minor</i>	<i>Carex flava</i>	<i>Carex echinata</i>	<i>Carex stricta</i>	<i>Carex atherodes</i>
<i>Phalaris arundinacea</i>	<i>Carex sterilis</i>	<i>Carex oligosperma</i>	<i>Cladium mariscoides</i>	<i>Carex buxbaumii</i>
<i>Phragmites australis</i>	<i>Carex stricta</i>	<i>Carex trisperma</i>	<i>Calamagrostis stricta</i>	<i>Carex pellita</i>
<i>Potamogeton crispus</i>	<i>Deschampsia caespitosa</i>	<i>Chamaedaphne calyculata</i>	<i>Calamagrostis canadensis</i>	<i>Carex sartwellii</i>
<i>Ranunculus ficaria</i>	<i>Eleocharis rostellata</i>	<i>Decodon verticillatus</i>	<i>Quercus palustris</i>	<i>Gentiana andrewsii</i>
<i>Rhamnus frangula</i>	<i>Eriophorum viridicarinatum</i>	<i>Eriophorum virginicum</i>		<i>Helianthus grosseserratus</i>
<i>Typha angustifolia</i>	<i>Gentianopsis</i> spp.	<i>Larix laricina</i>		<i>Liatris spicata</i>
<i>Typha xglauca</i>	<i>Lobelia kalmii</i>	<i>Nemopanthus mucronatus</i>		<i>Lysimachia quadriflora</i>
	<i>Parnassia glauca</i>	<i>Scheuchzeria palustris</i>		<i>Lythrum alatum</i>
	<i>Potentilla fruticosa</i>	<i>Sphagnum</i> spp.		<i>Pycnanthemum virginianum</i>
	<i>Rhamnus alnifolia</i>	<i>Vaccinium macrocarpon</i>		<i>Silphium terebinthinaceum</i>
	<i>Rhynchospora capillacea</i>	<i>Vaccinium corymbosum</i>		<i>Sorghastrum nutans</i>
	<i>Salix candida</i>	<i>Vaccinium oxycoccos</i>		<i>Spartina pectinata</i>
	<i>Salix myricoides</i>	<i>Woodwardia virginica</i>		<i>Solidago riddellii</i>
	<i>Salix serissima</i>	<i>Xyris difformis</i>		
	<i>Solidago ohioensis</i>			
	<i>Tofieldia glutinosa</i>			
	<i>Triglochin maritimum</i>			
	<i>Triglochin palustre</i>			

End of Narrative Rating. Begin Quantitative Rating on next page.

Site: OH-3	Rater(s): T. King	Date: 9-15-2010
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0	
max 6 pts.	subtotal

Metric 1. Wetland Area (size).

- Select one size class and assign score.
- ☐ >50 acres (>20.2ha) (6 pts)
 - ☐ 25 to <50 acres (10.1 to <20.2ha) (5 pts)
 - ☐ 10 to <25 acres (4 to <10.1ha) (4 pts)
 - ☐ 3 to <10 acres (1.2 to <4ha) (3 pts)
 - ☐ 0.3 to <3 acres (0.12 to <1.2ha) (2pts)
 - ☐ 0.1 to <0.3 acres (0.04 to <0.12ha) (1 pt)
 - ☒ <0.1 acres (0.04ha) (0 pts)

11	
max 14 pts.	subtotal

Metric 2. Upland buffers and surrounding land use.

- 2a. Calculate average buffer width. Select only one and assign score. Do not double check.
- ☒ WIDE. Buffers average 50m (164ft) or more around wetland perimeter (7)
 - ☐ MEDIUM. Buffers average 25m to <50m (82 to <164ft) around wetland perimeter (4)
 - ☐ NARROW. Buffers average 10m to <25m (32ft to <82ft) around wetland perimeter (1)
 - ☐ VERY NARROW. Buffers average <10m (<32ft) around wetland perimeter (0)
- 2b. Intensity of surrounding land use. Select one or double check and average.
- ☒ VERY LOW. 2nd growth or older forest, prairie, savannah, wildlife area, etc. (7)
 - ☐ LOW. Old field (>10 years), shrub land, young second growth forest. (5)
 - ☐ MODERATELY HIGH. Residential, fenced pasture, park, conservation tillage, new fallow field. (3)
 - ☒ HIGH. Urban, industrial, open pasture, row cropping, mining, construction. (1)

17	
max 30 pts.	subtotal

Metric 3. Hydrology.

- 3a. Sources of Water. Score all that apply.
- ☐ High pH groundwater (5)
 - ☐ Other groundwater (3)
 - ☐ Precipitation (1)
 - ☒ Seasonal/Intermittent surface water (3)
 - ☐ Perennial surface water (lake or stream) (5)
- 3b. Connectivity. Score all that apply.
- ☐ 100 year floodplain (1)
 - ☐ Between stream/lake and other human use (1)
 - ☒ Part of wetland/upland (e.g. forest), complex (1)
 - ☐ Part of riparian or upland corridor (1)
- 3c. Maximum water depth. Select only one and assign score.
- ☐ >0.7 (27.6in) (3)
 - ☒ 0.4 to 0.7m (15.7 to 27.6in) (2)
 - ☐ <0.4m (<15.7in) (1)
- 3d. Duration inundation/saturation. Score one or dbl check.
- ☒ Semi- to permanently inundated/saturated (4)
 - ☐ Regularly inundated/saturated (3)
 - ☐ Seasonally inundated (2)
 - ☐ Seasonally saturated in upper 30cm (12in) (1)
- 3e. Modifications to natural hydrologic regime. Score one or double check and average.
- | | | | | | | | | | | | |
|---|---|--------------------------------|---|-------------------------------|--|-------------------------------|--|-------------------------------|-----------------------------------|---|--------------------------------------|
| <ul style="list-style-type: none"> <input type="checkbox"/> None or none apparent (12) <input checked="" type="checkbox"/> Recovered (7) <input type="checkbox"/> Recovering (3) <input type="checkbox"/> Recent or no recovery (1) | <p>Check all disturbances observed</p> <table style="width: 100%;"> <tr> <td><input type="checkbox"/> ditch</td> <td><input type="checkbox"/> point source (nonstormwater)</td> </tr> <tr> <td><input type="checkbox"/> tile</td> <td><input type="checkbox"/> filling/grading</td> </tr> <tr> <td><input type="checkbox"/> dike</td> <td><input type="checkbox"/> road bed/RR track</td> </tr> <tr> <td><input type="checkbox"/> weir</td> <td><input type="checkbox"/> dredging</td> </tr> <tr> <td><input type="checkbox"/> stormwater input</td> <td><input type="checkbox"/> other _____</td> </tr> </table> | <input type="checkbox"/> ditch | <input type="checkbox"/> point source (nonstormwater) | <input type="checkbox"/> tile | <input type="checkbox"/> filling/grading | <input type="checkbox"/> dike | <input type="checkbox"/> road bed/RR track | <input type="checkbox"/> weir | <input type="checkbox"/> dredging | <input type="checkbox"/> stormwater input | <input type="checkbox"/> other _____ |
| <input type="checkbox"/> ditch | <input type="checkbox"/> point source (nonstormwater) | | | | | | | | | | |
| <input type="checkbox"/> tile | <input type="checkbox"/> filling/grading | | | | | | | | | | |
| <input type="checkbox"/> dike | <input type="checkbox"/> road bed/RR track | | | | | | | | | | |
| <input type="checkbox"/> weir | <input type="checkbox"/> dredging | | | | | | | | | | |
| <input type="checkbox"/> stormwater input | <input type="checkbox"/> other _____ | | | | | | | | | | |

9	
max 20 pts.	subtotal

Metric 4. Habitat Alteration and Development.

- 4a. Substrate disturbance. Score one or double check and average.
- ☐ None or none apparent (4)
 - ☒ Recovered (3)
 - ☐ Recovering (2)
 - ☐ Recent or no recovery (1)
- 4b. Habitat development. Select only one and assign score.
- ☐ Excellent (7)
 - ☐ Very good (6)
 - ☐ Good (5)
 - ☐ Moderately good (4)
 - ☒ Fair (3)
 - ☐ Poor to fair (2)
 - ☐ Poor (1)
- 4c. Habitat alteration. Score one or double check and average.
- | | | | | | | | | | | | | | |
|--|--|---------------------------------|--|----------------------------------|---|---------------------------------------|--|--|-----------------------------------|---|----------------------------------|---|--|
| <ul style="list-style-type: none"> <input type="checkbox"/> None or none apparent (9) <input type="checkbox"/> Recovered (6) <input checked="" type="checkbox"/> Recovering (3) <input type="checkbox"/> Recent or no recovery (1) | <p>Check all disturbances observed</p> <table style="width: 100%;"> <tr> <td><input type="checkbox"/> mowing</td> <td><input type="checkbox"/> shrub/sapling removal</td> </tr> <tr> <td><input type="checkbox"/> grazing</td> <td><input type="checkbox"/> herbaceous/aquatic bed removal</td> </tr> <tr> <td><input type="checkbox"/> clearcutting</td> <td><input type="checkbox"/> sedimentation</td> </tr> <tr> <td><input type="checkbox"/> selective cutting</td> <td><input type="checkbox"/> dredging</td> </tr> <tr> <td><input type="checkbox"/> woody debris removal</td> <td><input type="checkbox"/> farming</td> </tr> <tr> <td><input type="checkbox"/> toxic pollutants</td> <td><input type="checkbox"/> nutrient enrichment</td> </tr> </table> | <input type="checkbox"/> mowing | <input type="checkbox"/> shrub/sapling removal | <input type="checkbox"/> grazing | <input type="checkbox"/> herbaceous/aquatic bed removal | <input type="checkbox"/> clearcutting | <input type="checkbox"/> sedimentation | <input type="checkbox"/> selective cutting | <input type="checkbox"/> dredging | <input type="checkbox"/> woody debris removal | <input type="checkbox"/> farming | <input type="checkbox"/> toxic pollutants | <input type="checkbox"/> nutrient enrichment |
| <input type="checkbox"/> mowing | <input type="checkbox"/> shrub/sapling removal | | | | | | | | | | | | |
| <input type="checkbox"/> grazing | <input type="checkbox"/> herbaceous/aquatic bed removal | | | | | | | | | | | | |
| <input type="checkbox"/> clearcutting | <input type="checkbox"/> sedimentation | | | | | | | | | | | | |
| <input type="checkbox"/> selective cutting | <input type="checkbox"/> dredging | | | | | | | | | | | | |
| <input type="checkbox"/> woody debris removal | <input type="checkbox"/> farming | | | | | | | | | | | | |
| <input type="checkbox"/> toxic pollutants | <input type="checkbox"/> nutrient enrichment | | | | | | | | | | | | |

37	
subtotal this page	

Site: OH-3	Rater(s): T. King	Date: 9-15-2010
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37

subtotal first page

-10

max 10 pts. subtotal

Metric 5. Special Wetlands.

Check all that apply and score as indicated.

- ☐ Bog (10)
- ☐ Fen (10)
- ☐ Old growth forest (10)
- ☐ Mature forested wetland (5)
- ☐ Lake Erie coastal/tributary wetland-unrestricted hydrology (10)
- ☐ Lake Erie coastal/tributary wetland-restricted hydrology (5)
- ☐ Lake Plain Sand Prairies (Oak Openings) (10)
- ☐ Relict Wet Prairies (10)
- ☐ Known occurrence state/federal threatened or endangered species (10)
- ☐ Significant migratory songbird/water fowl habitat or usage (10)
- ☒ Category 1 Wetland. See Question 1 Qualitative Rating (-10)

4

max 20 pts. subtotal

Metric 6. Plant communities, interspersions, microtopography.

6a. Wetland Vegetation Communities.

Score all present using 0 to 3 scale.

- ☐ Aquatic bed
- ☒ 1 Emergent
- ☐ Shrub
- ☐ Forest
- ☒ 2 Mudflats
- ☐ Open water
- ☐ Other _____

6b. horizontal (plan view) Interspersion.

Select only one.

- ☐ High (5)
- ☐ Moderately high(4)
- ☐ Moderate (3)
- ☐ Moderately low (2)
- ☒ Low (1)
- ☐ None (0)

6c. Coverage of invasive plants. Refer to Table 1 ORAM long form for list. Add or deduct points for coverage

- ☐ Extensive >75% cover (-5)
- ☐ Moderate 25-75% cover (-3)
- ☐ Sparse 5-25% cover (-1)
- ☒ Nearly absent <5% cover (0)
- ☐ Absent (1)

6d. Microtopography.

Score all present using 0 to 3 scale.

- ☐ 0 Vegetated hummocks/mounds
- ☐ 0 Coarse woody debris >15cm (6in)
- ☐ 0 Standing dead >25cm (10in) dbh
- ☐ 0 Amphibian breeding pools

Vegetation Community Cover Scale

0	Absent or comprises <0.1ha (0.2471 acres) contiguous area
1	Present and either comprises small part of wetland's vegetation and is of moderate quality, or comprises a significant part but is of low quality
2	Present and either comprises significant part of wetland's vegetation and is of moderate quality or comprises a small part and is of high quality
3	Present and comprises significant part, or more, of wetland's vegetation and is of high quality

Narrative Description of Vegetation Quality

low	Low spp diversity and/or predominance of nonnative or disturbance tolerant native species
mod	Native spp are dominant component of the vegetation, although nonnative and/or disturbance tolerant native spp can also be present, and species diversity moderate to moderately high, but generally w/o presence of rare threatened or endangered spp
high	A predominance of native species, with nonnative spp and/or disturbance tolerant native spp absent or virtually absent, and high spp diversity and often, but not always, the presence of rare, threatened, or endangered spp

Mudflat and Open Water Class Quality

0	Absent <0.1ha (0.247 acres)
1	Low 0.1 to <1ha (0.247 to 2.47 acres)
2	Moderate 1 to <4ha (2.47 to 9.88 acres)
3	High 4ha (9.88 acres) or more

Microtopography Cover Scale

0	Absent
1	Present very small amounts or if more common of marginal quality
2	Present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of highest quality

31

End of Quantitative Rating. Complete Categorization Worksheets.

ORAM Summary Worksheet

		circle answer or insert score	Result
Narrative Rating	Question 1. Critical Habitat	YES <input checked="" type="radio"/> NO	If yes, Category 3.
	Question 2. Threatened or Endangered Species	YES <input checked="" type="radio"/> NO	If yes, Category 3.
	Question 3. High Quality Natural Wetland	YES <input checked="" type="radio"/> NO	If yes, Category 3.
	Question 4. Significant bird habitat	YES <input checked="" type="radio"/> NO	If yes, Category 3.
	Question 5. Category 1 Wetlands	<input checked="" type="radio"/> YES NO	If yes, Category 1.
	Question 6. Bogs	YES <input checked="" type="radio"/> NO	If yes, Category 3.
	Question 7. Fens	YES <input checked="" type="radio"/> NO	If yes, Category 3.
	Question 8a. Old Growth Forest	YES <input checked="" type="radio"/> NO	If yes, Category 3.
	Question 8b. Mature Forested Wetland	YES <input checked="" type="radio"/> NO	If yes, evaluate for Category 3; may also be 1 or 2.
	Question 9b. Lake Erie Wetlands - Restricted	YES <input checked="" type="radio"/> NO	If yes, evaluate for Category 3; may also be 1 or 2.
	Question 9d. Lake Erie Wetlands - Unrestricted with native plants	YES <input checked="" type="radio"/> NO	If yes, Category 3
Quantitative Rating	Question 9e. Lake Erie Wetlands - Unrestricted with invasive plants	YES <input checked="" type="radio"/> NO	If yes, evaluate for Category 3; may also be 1 or 2.
	Question 10. Oak Openings	YES <input checked="" type="radio"/> NO	If yes, Category 3
	Question 11. Relict Wet Prairies	YES <input checked="" type="radio"/> NO	If yes, evaluate for Category 3; may also be 1 or 2.
	Metric 1. Size	0	
	Metric 2. Buffers and surrounding land use	11	
	Metric 3. Hydrology	17	
	Metric 4. Habitat	9	
	Metric 5. Special Wetland Communities	-10	
Metric 6. Plant communities, interspersions, microtopography	4		
	TOTAL SCORE	31	Category based on score breakpoints 1

Complete Wetland Categorization Worksheet.

Wetland Categorization Worksheet

Choices	Circle one		Evaluation of Categorization Result of ORAM
Did you answer "Yes" to any of the following questions: Narrative Rating Nos. 2, 3, 4, 6, 7, 8a, 9d, 10	YES Wetland is categorized as a Category 3 wetland	<input checked="" type="radio"/> NO	Is quantitative rating score <i>less</i> than the Category 2 scoring threshold (<i>excluding</i> gray zone)? If yes, reevaluate the category of the wetland using the narrative criteria in OAC Rule 3745-1-54(C) and biological and/or functional assessments to determine if the wetland has been over-categorized by the ORAM
Did you answer "Yes" to any of the following questions: Narrative Rating Nos. 1, 8b, 9b, 9e, 11	YES Wetland should be evaluated for possible Category 3 status	<input checked="" type="radio"/> NO	Evaluate the wetland using the 1) narrative criteria in OAC Rule 3745-1-54(C) and 2) the quantitative rating score. If the wetland is determined to be a Category 3 wetland using either of these, it should be categorized as a Category 3 wetland. Detailed biological and/or functional assessments may also be used to determine the wetland's category.
Did you answer "Yes" to Narrative Rating No. 5	<input checked="" type="radio"/> YES Wetland is categorized as a Category 1 wetland	NO	Is quantitative rating score <i>greater</i> than the Category 2 scoring threshold (<i>including</i> any gray zone)? If yes, reevaluate the category of the wetland using the narrative criteria in OAC Rule 3745-1-54(C) and biological and/or functional assessments to determine if the wetland has been under-categorized by the ORAM
Does the quantitative score fall within the scoring range of a Category 1, 2, or 3 wetland?	<input checked="" type="radio"/> YES Wetland is assigned to the appropriate category based on the scoring range	NO	If the score of the wetland is located within the scoring range for a particular category, the wetland should be assigned to that category. In all instances however, the narrative criteria described in OAC Rule 3745-1-54(C) can be used to clarify or change a categorization based on a quantitative score.
Does the quantitative score fall with the "gray zone" for Category 1 or 2 or Category 2 or 3 wetlands?	<input checked="" type="radio"/> YES Wetland is assigned to the higher of the two categories or assigned to a category based on detailed assessments and the narrative criteria	NO	Rater has the option of assigning the wetland to the higher of the two categories or to assign a category based on the results of a nonrapid wetland assessment method, e.g. functional assessment, biological assessment, etc. and a consideration of the narrative criteria in OAC rule 3745-1-54(C).
Does the wetland otherwise exhibit <i>moderate OR superior</i> hydrologic OR habitat, OR recreational functions AND the wetland was <i>not</i> categorized as a Category 2 wetland (in the case of moderate functions) or a Category 3 wetland (in the case of superior functions) by this method?	YES Wetland was undercategorized by this method. A written justification for recategorization should be provided on Background Information Form	<input checked="" type="radio"/> NO Wetland is assigned to category as determined by the ORAM.	A wetland may be undercategorized using this method, but still exhibit one or more superior functions, e.g. a wetland's biotic communities may be degraded by human activities, but the wetland may still exhibit superior hydrologic functions because of its type, landscape position, size, local or regional significance, etc. In this circumstance, the narrative criteria in OAC Rule 3745-1-54(C)(2) and (3) are controlling, and the under-categorization should be corrected. A written justification with supporting reasons or information for this determination should be provided.

Choose one		Final Category
<input checked="" type="radio"/> Category 1	<input type="radio"/> Category 2	<input type="radio"/> Category 3

End of Ohio Rapid Assessment Method for Wetlands.

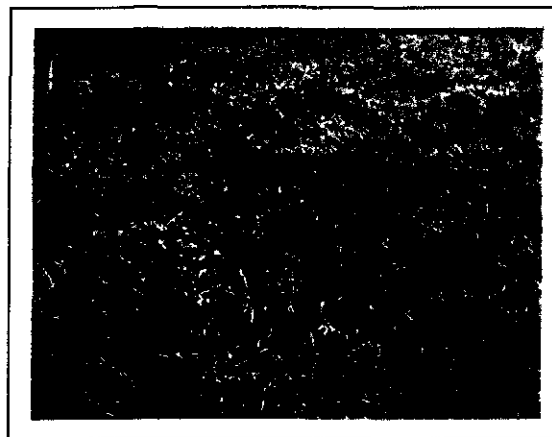
APPENDIX C
PHOTOGRAPHIC RECORD

Photographic Record

Meldahl-Ohio Transmission Line
Clermont County, OH
September 2010



Wetland 1 located to the SW of the entrance road on USACE property.



Wetland 2 in old road bed in old field on USACE property.



Wetland 3 located on the J&H Clasgens Property



United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ecological Services
4625 Morse Road, Suite 104
Columbus, Ohio 43230
(614) 416-8993 / FAX (614) 416-8994

November 10, 2010

Daniel Cox
Jackson Environmental Consulting Services, LLC
1586 Boonesborough Road
Richmond, KY 40475

Dear Mr. Cox:

TAILS #: 31420-2011-TA-0092

This is in response to your October 29, 2010 submission and request for comments on the report: Bat Species Inventory of the Meldhal Hydroelectric Project, Clermont County, Ohio. The project site is located approximately 1.3 miles west of Chilo, Ohio.

We understand that Jackson Environmental Consulting Services, LLC performed a mist net survey of the project area on August 10-11, 2010. The survey protocol and level of effort was pre-approved by this office on August 10, 2010. No Indiana bats (*Myotis sodalis*) were captured during the survey. Therefore, no further action regarding the Indiana bat is required for this proposed project. Should, during the term of this project, additional information on the Indiana bat become available, or if new information reveals effects of the action that were not previously considered, consultation with the Service should be initiated to assess any potential impacts to the Indiana bat.

These comments have been prepared under the authority of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.), the Endangered Species Act of 1973 (ESA), as amended, and are consistent with the intent of the National Environmental Policy Act of 1969 and the U. S. Fish and Wildlife Service's Mitigation Policy.

If you have questions, or if we may be of further assistance in this matter, please contact Angela Boyer at extension 22 in this office.

Sincerely,

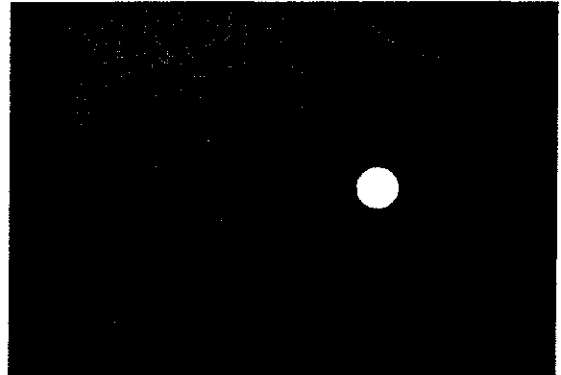
Mary M. Knapp, Ph.D.
Field Supervisor

cc: ODNR, DOW, SCEA Unit, Columbus, Ohio
Dr. Jeffrey Boltz (jboltz@eaest.com)
Jeffrey Elseroad (jelseroad@eaest.com)

Bat Species Inventory of the Meldahl Hydroelectric Project Clermont County, Ohio

Prepared For:
City of Hamilton, OH
345 High Street, Suite 450
Hamilton, OH 450111

Prepared By:
Jackson Environmental
Consulting Services, LLC
1586 Boonesborough Road
Richmond, Kentucky 40475



August 2010

**Bat Species Inventory
of the
Meldahl Hydroelectric Project
Clermont County, Ohio**

JACKSON ENVIRONMENTAL PROJECT NO. 30-032-400-02

27 October 2010

**Bat Species Inventory
of the
Meldahl Hydroelectric Project
Clermont County, Ohio**

Prepared For:

**City of Hamilton, OH
345 High Street, Suite 450
Hamilton, OH 45011**

Prepared By:

**Jackson Environmental Consulting Services, LLC
1586 Boonesborough Road
Richmond, Kentucky 40475**

27 October 2010

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LIST OF ATTACHMENTS

- ATTACHMENT 1: Map
- ATTACHMENT 2: Net Site Location Photos
- ATTACHMENT 3: Bat Capture/Weather/Site Description Data Sheets
- ATTACHMENT 4: Disinfection Protocol for Bat Field Studies,
U.S. Fish and Wildlife Service-June 2009
- ATTACHMENT 5: Scientific Collection Permits and USFWS Approvals

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1.0 INTRODUCTION

Jackson Environmental Consulting Services, LLC, (Jackson Environmental) of Richmond, Kentucky was contracted by EA Engineering, Science, & Technology, Inc., of Sparks, Maryland on behalf of the City of Hamilton, Ohio to conduct a bat species inventory for a proposed transmission corridor for the Meldahl Hydroelectric Project (project area). (Note: The City of Hamilton is currently studying three alternative transmission corridors, but only one could be surveyed within the allowable window for summer bat surveys. In spring 2011, the City intends to survey other corridors still under consideration at that time.)

1.1 Project Purpose and Objective

The purpose of this project was to 1) establish presence or probable absence of Indiana bats (*Myotis sodalis*) and 2) quantify the abundance and species composition of bats during the maternity season.

The objective of this project was to provide state and federal agencies with ecological data to assist in evaluating any potential effects upon the bat community, especially upon bat species that are federally listed as species of concern, threatened, and/or endangered, that could result from the proposed project.

Net site selection and survey methods, as detailed in the Methods and Materials section (Section 2.0), were conducted in accordance with the Mist Net Guidelines established in the Indiana Bat Revised Recovery Plan (U.S. Fish and Wildlife Service (USFWS) 2007). Additionally, survey implementation was authorized by USFWS, as discussed in the Scientific Collection Permits and USFWS Approvals section (Section 2.9).

2.0 METHODS AND MATERIALS

2.1 Project Location

The project area is generally located approximately 1.3 miles (mi) west of Chilo, Ohio (Attachment 1). The project area is mapped on the United States Geological Survey (USGS) Moscow quadrangle, 7.5-minute series map. The project area is approximately centered at Universal Transverse Mercator (UTM) coordinates E225955 N4299799, North American Datum 1983 (NAD 83), Zone 16.

2.2 General Site Description

The project area is generally characterized as an un-even age forest located in the Appalachian Forest Level II Ecoregion (USEPA, 2010). Topography in the project area is characterized as moderately hilly being adjacent to the Ohio River floodplain. Elevation in the project area ranges from approximately 500 feet (ft) above sea level on the Ohio River floodplain to 600 to 750 ft on the hills north of the floodplain.

2.3 General Habitat Characteristics

The project area corridor is approximately 3.0 mi in length. The project area is partially forested with plant communities representative of upland and riparian forest. Dominant overstory and mid-story species include box elder (*Acer negundo*), hickory (*Carya* spp.), Ohio buckeye (*Aesculus glabra*), red elm (*Ulmus rubra*), red maple (*Acer rubrum*), sugar maple (*A. saccharum*), and sycamore (*Platanus occidentalis*).

The land use within and surrounding the project area generally consists of residential properties, roads, and power lines. Specific net site characteristics for each net site are discussed in the Findings and Results section (Section 3.0).

2.4 Net Site Selection

Between 10 August 2010 and 11 August 2010, the project area was surveyed in accordance with the Mist Net Guidelines (USFWS 2007). The Mist Net Guidelines define sample level of effort (i.e., number of mist net sites) as a function of either area or linear distance. For a linear corridor, netting is required at a rate of one site per linear kilometer (km) of suitable habitat; surveys must be completed along the right-of-way (ROW) and associated access roads and temporary workspaces, ware yards, and other facilities. Blocks of land require

two net sites per 246 acres (1 km²). This project is for a new transmission line corridor. Based on the guidelines and a review of site habitat conditions, two net site locations were established and distributed across the transmission corridor in areas that provided potential foraging areas and/or flight corridors, which could serve as natural funnels, aiding in capturing bats (Attachment 2). These areas included creek corridors through forest interiors.

2.5 Bat Capture and Banding

In accordance with the Mist Net Guidelines (USFWS 2007), there were two net-sets, spaced at least 100 ft apart, at each net site location (*i.e.*, 2 net-sets/net site) and each net-set was monitored for two consecutive nights, except during inclement weather. One net-set/night equals one net-night, totaling four net-nights/net sites. Two net site locations were established and were surveyed for two nights, totaling eight net-nights (Attachments 1 – 3).

Bats were captured using black nylon mist nets (1.4-in mesh) ranging from 8.5 ft X 13 ft to 25 ft X 40 ft. Nets were opened approximately 30 minutes before sunset and checked every 15 minutes for at least five hours. The capture time, species, sex, and band presence of each captured bat were recorded while nets were opened. Bats were placed in separate brown paper bags and processed (*i.e.*, measurements taken and captured bats were banded). Data that were collected included: 1) species, sex, and age of each animal; 2) the reproductive condition of each bat, (males—non-reproductive or scrotal; females—non-reproductive, pregnant, lactating, or post-lactating); 3) measurements of the weight, forearm, tragus, and ear length; and 4) band number of any banded bats. Appropriate state bands were available for placement upon the forearm of any captured *Myotis sodalis* individuals (males—right forearm, females—left forearm).

2.6 Summer Habitat Characterization

Summer habitat characteristics were recorded at each net site location. Specific characteristics included: canopy closure and height to overstory, dominant tree species, understory closure, density of the mid- and understory, and, where applicable, stream width and substrate composition. The date and time nets were opened and closed, climatic conditions, and habitat type were also documented during each sampling effort.

2.7 Geographic Information System Metadata

The specific location of each net site was recorded using Garmin GPS units. Global Positioning System (GPS) coordinates were recorded in Universal Transverse Mercator, Zone 16S units using the NAD 83 geodetic reference system. Garmin GPS units have accuracy up to 5 ft, dependent upon, but not limited to climate and weather conditions, satellite availability and position, relative canopy closure, and topography. Data was imported into ArcGIS 9.3 for map preparation.

2.8 Disinfection Protocol for White Nose Syndrome (WNS)

Procedures used for disinfecting equipment to minimize the potential transmission of white-nose syndrome (WNS), the *Final Disinfection Protocol for Bat Field Studies* (USFWS, June 2009) are provided in Attachment 4.

2.9 Scientific Collection Permits and USFWS Approvals

Jackson Environmental's USFWS and Ohio scientific collection permits are provided in Attachment 5. Attachment 5 also includes USFWS approval of the survey study plan and authorization for survey implementation.

3.0 FINDINGS AND RESULTS

3.1 Net Site Location: Net Site 1

Net site 1 is located within riparian forest, along a creek near the center of the project area (Attachment 1). Specifically, this net site is located at UTM coordinates E746653 N4298867, which is 1.3 mi west of Chilo, Ohio.

3.1.1 Habitat Characteristics

Net site 1 is characterized as an un-even age riparian forest with a dominant canopy comprised of hickory, red elm, and sugar maple. Bear Creek traverses through the forest and provides a potential flyway for foraging bats. To sample this area, one net was placed in the creek (photo 1, Attachment 2) and another placed approximately 100 ft from the first, also in the creek (photo 2, Attachment 2). Detailed habitat characteristics are provided in Attachment 3.

3.1.2 Weather Conditions

Starting and ending temperatures on 10 August 2010 were 22.8°C and 21.3°C and on 11 August 2010 were 23.9°C and 22.0°C, respectively. There was approximately 25% cloud cover on 10 August 2010 and 51 – 75% cloud cover on 11 August 2010. Nightly weather conditions are provided on bat capture data sheets in Attachment 3.

3.1.3 Bat Captures

An eastern pipistrelle (*Perimyotis subflavus*) was captured at this net site location (Table 1). No federally listed endangered bat species were captured at this net site. Bat capture data sheets for this net site are provided in Attachment 3.

3.2 Net Site Location: Net Site 2

Net site 2 is located along riparian forest in the northern portion of the project area (Attachment 1). Specifically, this net site is located at UTM coordinates E747853 N4300099, which is 2.9 mi north of Chilo, Ohio.

Table 1. Bat species captured

Species	No. Captured At Each Net Site	
	Net 1	Net 2
<i>Perimyotis subflavus</i>	1	--
<i>Lasiurus borealis</i>	--	2
<i>Eptesicus fuscus</i>	--	1
Site Totals	1	3
Project Total	4	

3.2.1 Habitat Characteristics

Net site 2 is characterized as an un-even aged riparian forest with a dominant canopy comprised of mockernut hickory (*Carya tomentosa*), red maple and shagbarck hickory (*C. ovata*). To sample this area, one net was placed along Bear Creek (photo 3, Attachment 2) and another spaced at least 100 ft from the first net, also in the creek (photo 4, Attachment 2). Detailed habitat characteristics are provided in Attachment 3.

3.2.2 Weather Conditions

Starting and ending temperatures on 10 August 2010 were 32°C and 21°C and on 11 August 2010 were 26°C and 22°C, respectively. There was no cloud cover on 10 August 2010 and approximately 25% cloud cover on 11 August 2010. Nightly weather conditions are provided on bat capture data sheets in Attachment 3.

3.2.3 Bat Captures

Eastern red bats (*Lasiurus borealis*) (66%, n = 2) and a big brown bat (*Eptesicus fuscus*) (33%, n = 1) were captured at this site. No federally listed endangered bat species were captured at this net site. Bat capture data sheets for this net site are provided in Attachment 3.

4.0 SUMMARY AND DISCUSSION

Two net site locations were surveyed, totaling 8 net-nights on the proposed Meldahl Hydroelectric Project in Clermont County, Ohio. Eastern red bats (50%, $n = 2$), a big brown bat (25%, $n = 1$), and an eastern pipistrelle (25%, $n = 1$) were captured during the survey. Species captured during the survey were representative of chiropteroфаuna known to occur in the region, and each is ubiquitous on the landscape. No federally threatened or endangered species were captured during the survey.

Winter habitat was also qualitatively evaluated within the project area. No potential winter habitat, including caves, deep mine portals or any other man-made structure that could be considered as potential suitable Indiana bat winter habitat was observed.

5.0 REFERENCES

- Gardner, L.E., J.D. Garner, and J.E. Hofmann. 1991. Summer roost selection and roosting behavior of *Myotis sodalis* (Indiana bat) in Illinois. Final Rep. Champaign, IL: Illinois Natural History Survey and Illinois Department of Conservation. 56 pp.
- Menzel M.A., J.M. Menzel, T.C. Carter, WM Ford, and J.W. Edwards. 2001. Review of the forest habitat relationships of the Indiana bat (*Myotis sodalis*). 5-8 pp.
- Salyers J., K. Tyrell, and V. Brack. 1996. Artificial roost structure use by Indiana bats in wooded areas in central Indiana. Bat Research News 37: 148.
- United States Environmental Protection Agency (USEPA). 2010. Ecoregions of North America. <http://www.epa.gov/wed/pages/ecoregions/na_eco.htm#CEC%201997>. Accessed 30 August 2010.
- United States Fish and Wildlife Service (USFWS). 207. Revised Indiana bat (*Myotis sodalis*) recovery plan.
- United States Fish and Wildlife Service (USFWS). 2009. Disinfection protocol for bat field research and monitoring.

Attachment 1

Map



City of Hamilton, Ohio
Meldahl
Hydroelectric Project
Project Area Map

Legend

- Net-sites
- Project Area

Project: JWH
Contract: 100-05
Scale: 1" = 100'

State: Ohio
County: Gloucester County
Quad: Moscow

Prepared for:
City of Hamilton, OH
300 King Street, Suite 400
Hamilton, OH 45001

0 200 400 600 800 1000

0 200 400 600 800 1000

The inset map shows the project area location within the Ohio River valley. It includes labels for various locations: Present, Moscow, Neville, Felica, and Upton. The Ohio River is shown flowing through the area. The project area is shaded in black.

Attachment 2

Net Site Location Photos



Photo 1. Representative photo of
Net Site 1 Net A

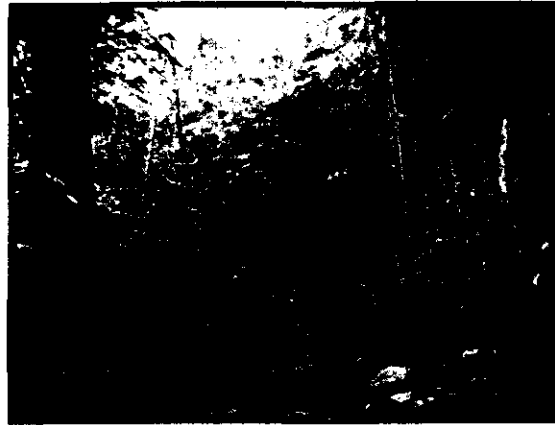


Photo 2. Representative photo of
Net Site 1 Net B



Photo 3. Representative photo of
Net Site 2 Net A



Photo 4. Representative photo of
Net Site 2 Net B

Attachment 3

Bat Capture/Weather/Site Description Data Sheets

BAT SURVEY SUMMARY SHEET

Please fill out and submit a summary sheet when you complete each mist netting project

Study Area/Project Name: Meldahl

General Location: Clermont County, Ohio

Distance & direction to nearest town: a few miles west of Chilo, OH

Counties where netting took place: Clermont

Conducted by: Affiliation/Company: TECS

Principle Investigator: Jeremy Jackson

Telephone number: _____ Fax: _____

Email address: _____

Conducted for: E.A. Engineering

Begin Date: 10 Aug 2010 End Date: 11 Aug 2010

Total number of sites netted: 2

Total number of net nights (count multiple-tiered nets as one net): 8

Total number of sites harp trapped: 0

Total number of trap nights: 0

Number of bats captured: 4

Species	NUM.	Species	NUM.
<i>Myotis lucifugus</i>		<i>Eptesicus fuscus</i>	<u>1</u>
<i>Myotis septentrionalis</i>		<i>Lasiurus borealis</i>	<u>2</u>
<i>Myotis sodalis</i>		<i>Lasiurus cinereus</i>	
<i>Myotis leibii</i>		<i>Lasiurus seminolus</i>	
<i>Myotis grisescens</i>		<i>Nycticeius humeralis</i>	
<i>Lasionycteris noctivagans</i>		<i>Corynorhinus virginianus</i>	
<i>Pipistrellus subflavus</i>	<u>1</u>	<i>Corynorhinus rafinesquii</i>	

Date: 10 Aug 2010		Project #: 1001		Project Name: Melaleuca	
Mist-net Site Location I.D. #		Road		Survey Area: Route	
Structure Notified: Road/Rut		Forest		Start Time (24 hr) 2135	
Other: Stream		Pond		Finish Time (24 hr) 0150	
County: Clark		State: OH		Samplers Name: Dan Sax	
GPS Location: E 46.54 N 42.16		Quadrangle: NAD83		GPS Accuracy: 1.15 ft	
General Location Description (eg. 1000 m North of Intersection of State Hwy 1 and 2): Approx. 0.5 miles north of intersection of Rt. 52 & Bear Creek Rd.					
Net A: Size: (m)	Width 10	Height 5	Net B: Size: (m)	Width 6	Height 5
Mist-Net Site Habitat Description and Condition:					
Dominant Canopy Species (3)		Dominant Understory Species (3)			
Sugar Maple		Silver Birch			
Bittersweet		Box Elder			
60%		40%			
Average Canopy DBH: 10"		Average Canopy DBH: 6"			
Relative Density: (Circle One) Very Moderate Open		Relative Density: (Circle One) Very Moderate Open			
General Nightly Weather Conditions:		Sketch net and label net configuration:			
Wind Speed: 1 mph (Calm; smoke rises vertically; no perceivable movement)		dry creek bed			
1-3 mph (Smoke drift shows wind direction; barely moves tree leaves)		Hank's Creek Rd			
4-7 mph (Wind felt on face; leaves rustle; small twigs move)		Bear Creek Rd			
7-12 mph (Leaves and small twigs in constant motion; blows up dry leaves from ground)		B152			
> 13 mph (Moves small branches)					
Precipitation:	None	Cloud Cover:	Clear		
	Fog		25% Overcast		
	Mist		26-50% Overcast		
	Light rain		51-75% Overcast		
	Heavy rain		> 75% Overcast		

[illegible]

Date: <u>11 Aug 2010</u>		Project #: <u>110001</u>	
Mist-net Site Location I.D. # <u>110001</u>		Project Name: <u>Melinda</u>	
Road <u>Pond</u>		Survey Area: <u>Route</u>	
Structure Netted: <u>Road/Rut</u>		Start Time (24 hr) <u>2040</u>	
Forest <u>Stream</u>		Finish Time (24 hr) <u>0140</u>	
Other: <u>Stream</u>		Start Temp <u>23.90</u>	
County: <u>Lernmont</u>		Finish Temp <u>22.0</u>	
State: <u>OH</u>		Samplers Name: <u>Das CA</u>	
GPS Location: <u>421867</u>		GPS Accuracy: <u>15 ft</u>	
Projection/Units: <u>NAD83</u>		Approx. <u>0.5 miles north</u>	
General Location Description (eg. 1000 m North of Intersection of State Hwy 1 and 2):		Net A: Size: (m) <u>6</u> Height <u>5</u> Width <u>6</u> Net C: Size: (m) <u>5</u> Width <u>6</u> Height <u>5</u>	
of intersection of Rt. 52 & Bear Creek Rd.		Net B: Size: (m) <u>5</u> Width <u>6</u> Height <u>5</u>	
Mist-Net Site Habitat Description and Condition:		Dominant Understory Species (3) <u>sp. canopy</u>	
Dominant Canopy Species (3) <u>red elm</u>		<u>chickadee</u>	
<u>junco</u>		<u>box elder</u>	
<u>hickory spp (not shagbark)</u>		<u>40%</u>	
% Canopy Closure: <u>60%</u>		Average Canopy DBH: <u>6</u>	
Average Canopy DBH: <u>10</u>		Relative Density: (Circle One) Very <u>Moderate</u> Open	
General Nightly Weather Conditions:		Sketch net and label net configuration:	
Wind Speed: <u>< 1 mph (Calm; smoke rises vertically; no perceivable movement)</u>		<u>dry creek bed</u>	
1-3 mph (Smoke drift shows wind direction: barely moves tree leaves)		<u>Bear Creek Rd.</u>	
4-7 mph (Wind felt on face; leaves rustle; small twigs move)		<u>10</u>	
7-12 mph (Leaves and small twigs in constant motion; blows up dry leaves from ground)		<u>Rt. 52</u>	
> 13 mph (Moves small branches)			
Precipitation: <u>None</u>		Cloud Cover: <u>Clear</u>	
Fog <u>< 25 % Overcast</u>			
Mist <u>26-50% Overcast</u>			
Light rain <u>51-75 % Overcast</u>			
Heavy rain <u>> 75% Overcast</u>			

Date: <u>10 Aug 2010</u>		Project #: <u>2</u>		Project Name: <u>McLach</u>	
Mist-net Site Location I.D. #		Road		Survey Area: <u>Route 1</u>	
Structure Netted: Road Rut Forest		Pond		Start Time (24 hr) <u>2030</u> Start Temp <u>32.0</u>	
Stream Other:		Forest		Finish Time (24 hr) <u>2145</u> Finish Temp <u>21.0</u>	
County: <u>Clarendon</u> State: <u>OH</u> Quadrangle:		Samplers Name: <u>Jeremy Jackson</u>			
GPS Location: <u>16S 747853/430089</u> Projection: <u>Units</u> GPS Accuracy: <u> </u>					
General Location Description (eg. 1000 m North of Intersection of State Hwy 1 and 2):					
Net A: Size: (m) <u>Width 7.0</u> Height <u>2.8</u> Net B: Size: (m) <u>Width 6.0</u> Height <u>2.8</u> Net C: Size: (m) <u>Width</u> Height <u> </u>					
Mist-Net Site Habitat Description and Condition:					
Dominant Canopy Species (3) <u>Asar rubra</u>		Dominant Understory Species (3) <u>Asar rubra</u>			
<u>Carya tomentosa</u>		<u>Carya spp.</u>			
<u>Carya ovata</u>					
% Canopy Closure: <u>20%</u>		% Canopy Closure: <u>20</u>			
Average Canopy DBH: <u>2.0"</u>		Average Canopy DBH: <u>1 in</u>			
Relative Density: (Circle One) Very <u>Moderate</u> Open		Relative Density: (Circle One) Very <u>Moderate</u> Open			
General Nightly Weather Conditions:		Sketch net and label net configuration:			
Wind Speed: <u>< 1 mph</u> (Calm; smoke rises vertically; no perceivable movement)					
1-3 mph (Smoke drift shows wind direction: barely moves tree leaves)					
4-7 mph (Wind fell on face; leaves rustle; small twigs move)					
7-12 mph (Leaves and small twigs in constant motion; blows up dry leaves from ground)					
> 13 mph (Moves small branches)					
Precipitation: <u>None</u> Cloud Cover: <u>Clear</u>					
Fog					
Mist					
Light rain					
Heavy rain					

Date: <u>11 Aug 2010</u>		Project #: <u>0</u>	
Mist-net Site Location I.D. #		Project Name: <u>McLach</u>	
Road Pond		Survey Area: <u>Route 1</u>	
Structure Netted: Road Rut Forest		Start Time (24 hr): <u>20:25</u>	
Stream Other:		Finish Time (24 hr): <u>21:00</u>	
County: <u>clerk</u>		Sample Name: <u>Jeremy Jackson</u>	
State: <u>OH</u>		GPS Accuracy: <u>3/10m</u>	
GPS Location: <u>16S 747853/480099</u>			
General Location Description (eg. 1000 m North of intersection of State Hwy 1 and 2):			
Net A: Size: (m) Width <u>9.0</u> Height <u>1.2</u> Net B: Size: (m) Width <u>3.0</u> Height <u>2.8</u> Net C: Size: (m) Width <u>1.0</u> Height <u>1.0</u>			
Mist-Net Site Habitat Description and Condition:			
Dominant Canopy Species (3) <u>Acer rubra</u>		Dominant Understory Species (3) <u>Acer rubra</u>	
<u>Carya tomentosa</u>		<u>Carya spp</u>	
<u>Carya ovata</u>			
% Canopy Closure: <u>80%</u>		% Canopy Closure: <u>20</u>	
Average Canopy DBH: <u>2.0-4</u>		Average Canopy DBH: <u>1 in</u>	
Relative Density: (Circle One) Very <u>Moderate</u> Open		Relative Density: (Circle One) Very <u>Moderate</u> Open	
General Nightly Weather Conditions:			
Wind Speed: <u>< 1 mph</u> (Calm; smoke rises vertically; no perceptible movement)			
1-3 mph (Smoke drift shows wind direction; barely moves tree leaves)			
4-7 mph (Wind felt on face; leaves rustle; small twigs move)			
7-12 mph (Leaves and small twigs in constant motion; blows up dry leaves from ground)			
> 13 mph (Moves small branches)			
Precipitation: <u>None</u>		Cloud Cover: <u>Clear</u>	
Fog		< 25% Overcast	
Mist		26-50% Overcast	
Light rain		51-75% Overcast	
Heavy rain		> 75% Overcast	
Sketch net and label net configuration:			

Attachment 4

**Disinfection Protocol for Bat Field Research/Monitoring
U.S. Fish and Wildlife Service, June 2009**

Disinfection Protocol for Bat Field Research/Monitoring
U.S. Fish and Wildlife Service
June 2009

To minimize the potential for transmission of white-nose syndrome (WNS) while handling bats (both between handler and bats, between bats, and between handler and environment), these procedures are highly recommended. To date, WNS has been discovered in the northeastern US and mid-Atlantic states¹. The U.S. Fish and Wildlife Service (USFWS) advises implementation of equipment decontamination protocols to reduce the risk of unintentional, human-assisted spread of WNS. In addition, we recommend that similar guidelines be used any time people handle wildlife to minimize potential disease-related impacts to wildlife and people. *Please note that individual states/agencies may have additional permitting requirements above and beyond these general procedures.* Additional restrictions apply for individuals conducting research in USFWS Region 3 - Ohio, Indiana, Illinois, Missouri, Iowa, Wisconsin, Michigan and Minnesota - either under a federal permit or Section 6 authorities as these states are currently unaffected by WNS. The requirements for Region 3 are posted at:
<http://www.fws.gov/midwest/Endangered/mammals/BatDisinfectionProtocol.html>
These guidelines may be revised upon review of new information.

Any equipment that comes in contact with bats, individuals handling bats, or the environments where bats occur has the potential to be a vector for the spread of WNS. Examples include mist nets, harp traps, bat bags, wing biopsy punches, weighing tubes, rulers, clothing, and gloves.

Decontamination recommendations target the fungus *Geomyces* sp., which to date has been the most consistent pathogen recovered from bats exhibiting signs of WNS. Fortunately, many of the disinfectants/techniques tested for efficacy against the fungus are also suitable to kill other bacterial or viral agents should another causative agent of this disease be identified.

CAUTION: Disinfectant efficacy is based on application to hard, nonporous surfaces and the ability to prevent the regrowth of *Geomyces* sp. on artificial culture media. Tests are currently being conducted on porous fiber materials such as ropes and harnesses to determine disinfectant efficacy to kill the fungus on these substrates and their effects on gear integrity. The repeated use of disinfecting agents may compromise the effective use of vertical equipment; therefore, this equipment should be dedicated to one cave or not used at all.

Although a site may be affected with WNS, it should not be assumed that all individual bats within the site are infected or will become infected, and thus, care should be taken not to cross-contaminate specimens by lax handling methods. This is especially true if samples are to be submitted for diagnostic purposes.

Decontaminate all clothing, footwear, and gear prior to departing for a bat netting or cave outing if you did not decontaminate these items after last netting activity or exiting a cave. In affected and unaffected states, we ask that you not take gear into a cave if that gear cannot be thoroughly decontaminated or disposed of (i.e. if harnesses, ropes, or webbing cannot be decontaminated, we advise that you not enter caves or parts of caves requiring use of this gear).

In addition, only bring essential equipment used for bat netting and processing to a site, other non-essential items should be left home as they may contribute to spreading the fungus.

PROCEDURES:

Vehicles:

Do not work on live bats in vehicles. Vehicles used to transport equipment may harbor spores. Do all processing on vehicle hood or on a table away from the vehicle. The tailgate is not preferred since it is likely near netting equipment. A drawstring garbage bag should be placed at each site outside the field vehicle each night so all contaminated bags, gloves, wipes, etc., are contained. Dead bats should be placed in a sealed plastic container and placed inside a second bag or container handled only with clean gloves. This outer packaging layer is considered clean and uncontaminated and safe to transport inside the vehicle (preferably contained within a clean cooler).

Submersible Gear (i.e. clothing and soft-sided equipment):

- **For clothing** – Wash all clothing and any appropriate equipment in washing machine using the hottest cycle possible for material and conventional detergents. Laboratory testing has found Woolite® fabric wash to be the best surfactant for clothing. Rinse thoroughly, and then follow by soaking with sodium hypochlorite bleach (i.e. household bleach) solution diluted to 1 part bleach to 9 parts water in a tub or plastic container. Soak for 10 minutes, then rinse and air dry. If field projects necessitate extended efforts at remote locations, with no travel to new or additional sites, and daily washing or decontamination is not possible, then at the least, wash/decontaminate all clothing and other soft-sided equipment that has had direct contact with bats using the recommended procedures specified above.
- **For other submersible gear** (i.e. bags, gloves, nets, etc.) – Disinfect any equipment that can be submersed in a solution with an appropriate and compatible disinfectant such as sodium hypochlorite bleach (i.e. household bleach) solution diluted to 1 part bleach to 9 parts water in a tub or plastic container or $\geq 0.3\%$ concentration of quaternary ammonium compounds (i.e. Sparquat 256, Lysol® All-purpose Professional Cleaner, or the antibacterial form of Formula 409®). Keep submersed for 10 minutes, then rinse and air dry.

Nets:

- Use separate sets between states known to be affected by WNS¹ and states currently unaffected. Realizing that some WNS affected states contain both affected and unaffected sites, under no circumstances should nets that have been used in an affected site be used in an unaffected site. Contact your state wildlife agency for updated information regarding WNS affected sites by visiting the following webpage <http://www.fws.gov/offices/statelinks.html>.

Bats should be kept in breathable holding bags rather than holding cages. To avoid cross-contamination of samples, it is imperative to keep bats separated using holding bags that are kept as clean as possible. Non-disposable holding bags should be used only once per night of field work and should be washed and decontaminated (following procedures above) and dried between nights of use. Disposable paper bags are also a convenient option for holding bats temporarily. Only one bat should be in a given bag, and that bag should not be reused for a new bat.

Disposable exam gloves should be worn over handling gloves and changed in between handling each bat. Disposable gloves should be one size larger than the handling gloves. Smooth leather gloves may be wiped down with a disinfectant (i.e. Purell®, Lysol® disinfecting wipes or alcohol wipes) in between handling bats. If only using leather gloves, each handler should have several sets of gloves to interchange in between handling bats. This allows time to effectively kill the fungus and for the disinfectant to completely dry. After each night of netting, remove heavy soil deposits from surface of bags and gloves, soak in an appropriate disinfectant, then dry completely.

For situations when gloves may hinder field work (i.e. transmitter attachment) and bats come in contact with bare hands, apply hand sanitizer with alcohol (i.e. Purell®) after handling each bat. Make sure it dries completely before handling the next bat.

Non-submersible Gear (i.e. hard-sided equipment):

- For non-submersible gear (i.e. bat processing equipment, mist net poles, harp trap frames and legs, folding chairs, etc.) – Disinfect any equipment that cannot be submersed by applying an appropriate and compatible disinfectant to the outside surface by using $\geq 0.3\%$ concentration of quaternary ammonium compounds such as Sparquat 256, Lysol® All-purpose Professional Cleaner or the antibacterial form of Formula 409®, or use sodium hypochlorite bleach (i.e. household bleach) solution diluted to 1 part bleach to 9 parts water. Keep on surface for 10 minutes, then rinse and air dry.
- For boots – Boots need to be fully scrubbed and rinsed so that all soil and organic material is removed. The entire rubber and leather boots, including soles and leather uppers, can then be disinfected with an appropriate disinfectant such as $\geq 0.3\%$ concentration of quaternary ammonium compounds (i.e. Sparquat 256, Lysol® All-purpose Professional Cleaner or the antibacterial form of Formula 409®) or sodium hypochlorite bleach (i.e. household bleach) solution diluted to 1 part bleach to 9 parts water. Keep on surface for 10 minutes, then rinse and air dry.

Use one of the disinfecting agents listed above to sanitize all equipment that comes into contact with a bat's body, including light boxes, banding pliers, rulers, calipers, scale, etc. Any instrument coming into direct contact with bat skin should be rinsed free of chemical disinfectant using clean water or physiologic (0.9%) saline. Clean items after handling each bat. If using containers to weigh bats, separate containers used to weigh tree bats from cave bats, do not place tree bats in the same container previously used for a cave bat. Containers used to weigh bats (film canisters, baggies, cardboard rolls) should be disinfected in between handling each bat.

Paper lunch bags can be used for holding and weighing individual bats, and can be immediately discarded after each use. Plastic baggies can also be used to line weighing containers, and bats can even be held in unsealed plastic bags during forearm measurements, reducing contact with wing rulers or calipers. Discard used bags after each bat. Disinfect gloves or discard disposable gloves after handling each bat.

Harp traps:

- Use separate traps between states known to be affected by WNS¹ and states currently unaffected. Realizing that some WNS affected states contain both affected and unaffected sites, under no circumstances should traps that have been used in an affected site be used in an unaffected site. Contact your state wildlife agency for updated information regarding WNS affected sites by visiting the following webpage <http://www.fws.gov/offices/statelinks.html>.
- In both affected¹ and unaffected states, we recommend that traps be cleaned nightly after use to remove any dirt/debris from wires/lines and bags. Following cleaning, all surfaces should be sprayed with one of the disinfecting agents listed above. Swab the bag with disinfectant and allow to dry completely (preferably in the sun) prior to the next use. Do not use equipment in an unaffected site following use in an affected site.
- We recognize that when working at a maternity colony using harp traps where regular bat to bat contact occurs, that some of the recommended decontamination procedures may not be practical. Therefore, we recommend checking the catch bag more frequently in order to reduce the amount of time that bats are in contact with each other and the bag. To reduce cross-contamination, the catch bag may be lined with a sheet of plastic and replaced with new plastic periodically or wiped down with one of the disinfecting agents above. Disposable gloves should be worn over handling gloves and swapped out regularly throughout the night, or frequently disinfected using Lysol[®] disinfecting wipes or alcohol wipes.

Cameras, Computers, and Other Electronic Equipment:

If possible, do not bring electronic equipment to a netting site. If practical, cameras and other similar equipment that must be brought to a site may be wrapped in plastic wrap where only the lens is left unwrapped to allow for photos to be taken. The plastic wrap can then be decontaminated by using Lysol[®] disinfecting wipes and discarded after use. If using plastic wrap is not practical, alcohol wipes or Lysol[®] disinfecting wipes can be applied directly on surfaces.

Wing Biopsies:

If collecting wing biopsies for any approved research studies on Federally threatened or endangered bats, use a new (unused) sterile punch for each bat. For other bats, punches may be reused, but only if they are still sharp enough to make clean punches. If there is evidence of fungal infection on any individual, use new punches. Be sure to completely sterilize recycled punches between bats by dipping the cutting end in alcohol. Pass the cutting end through a flame 3-4 times, and then allow the flaming punch to naturally extinguish, and cool completely. The

cutting board must also be disinfected between processing individual bats using one of the agents detailed above. Disposable, stiff cardboard squares (1 per individual) can be used as an alternate support for biopsy.

Notification of Signs of WNS

As a reminder, the white fungus is only one of the signs of WNS. We do not expect to find bats with fungus on them during the summer or fall, but bats could still be infected during these seasons. Other possible signs of WNS may be damage to wings and tail membranes in the form of lesions, flakiness or dehydrated skin, discolored spots/scarring, multiple holes, or tears to leading edge of membranes. We encourage the use of Reichard's Wing Damage Index (link below) for assessing bats. Please photograph any damage you observe and report it to the nearest U.S. Fish and Wildlife Service Field Office and your state agency that issued your bat handling permit within 24 hours.

http://www.fws.gov/northeast/PDF/Reichard_Scarring%20index%20bat%20wings.pdf

Important Note: These protocols are posted on the U.S. Fish and Wildlife Service Northeast Region website at: http://www.fws.gov/northeast/white_nose.html. We recommend that you visit the site at least once every six weeks to ensure that you are using the most recent protocol in your permitted activities.

¹ WNS Affected States: Connecticut, Massachusetts, New York, Pennsylvania, Vermont, New Hampshire, New Jersey, West Virginia, and Virginia

Note: The listed WNS affected and adjacent states are current as of 6-9-09, please visit http://www.fws.gov/northeast/white_nose.html for the most updated information.

What is known about *Geomyces* sp. viability:

- The fungus survives exposure to mammalian body temperature (38°C/100°F) for at least 3 days, but does not remain viable after 8 days (W. Stone, NYSDEC, pers. communication 4/14/09).
- The fungus survives exposure to temperature (30°C/86°F) for at least 15 days. (W. Stone, NYSDEC, pers. communication 4/14/09).
- Short-term incubation of fungus at higher temperatures reduces the number of conidia present and alters the morphology of the hyphae which may not inhibit growth once returned to colder temperatures (W. Stone, NYSDEC and D. Blehert, USGS NWHC, pers. communication 4/14/09).
- Clothes dryer heat treatment (49°C/ 120°F) alone increases fungal spore germination and does not kill the fungus (H. Barton, NKU, pers. communication 4/22/09).

What kills the *Geomyces* sp. fungus:

Method	Conditions	Kill Time	Source	Cautions*
Disinfectant				
5.25% Chlorine bleach	10% bath solution (1 part bleach: 9 parts water)	10 min	Over the counter	Inactivated by organic material, detergents; corrosive to metals; produces toxic gas if combined with ammonia; skin irritant
Lysol® Professional Antibacterial All Purpose Cleaner	1:128 bath solution (1 oz per 1 gal water)	10 min	Janitorial supply	Corrosive; skin & eye irritant
	1:64 bath solution (2 oz per 1 gal water)	5 min		
Sparquat 256	½ oz per 1 gal water	10 min	www.chemsearch.com	May require license to obtain; requires special disposal methods
Promicidal™	1:128 bath solution (1 oz per 1 gal water)	10 min	www.chemsearch.com	May require license to obtain; requires special disposal methods
Grenadier™	1:64 bath solution (2 oz per 1 gal water)	10 min	www.chemsearch.com	May require license to obtain; requires hazardous waste disposal methods
	1:32 bath solution (4 oz per 1 gal water)	5 min		
Formula 409®	At least 0.3% concentration	10 min	Over the counter	
Woolite®	Refer to product label		Over the counter	
Dawn® antibacterial hand soap	Refer to product label		Over the counter	
Purell®	Refer to product label		Over the counter	
Lysol® disinfecting wipes	Refer to product label		Over the counter	

70%-95% ethanol	Undiluted bath	2 min	Lab supply distributor	Flammable, skin irritant
Temperature				
Dry heat	110°F/ 43°C	12 hr	Oven, incubators	
	165°F/ 74°C	15 min		
	175°F/ 79°C	5 min		
	180°F/ 82°C	5 min		
Sterilization				
Steam autoclave	121°C; 15 psi	15 min	Laboratory or hospital settings	
Gas sterilization	Ethylene oxide	16-18 hr	Only available at hospitals	
Flame sterilization	Alcohol & open flame	15-20 sec		Fire hazard; burn injuries

* Effects of different decontamination methods on the integrity of caving equipment are currently being tested.

Attachment 5

Scientific Collection Permits and USFWS Approvals

DEPARTMENT OF THE INTERIOR
U.S. FISH AND WILDLIFE SERVICE

FEDERAL FISH AND WILDLIFE PERMIT



1 PERMITTEE

JEREMY LYNN JACKSON
203 NORTH MAYO TRAIL
PINEVILLE, KENTUCKY 40301

TELEPHONE: 606/432-9345
FACSIMILE: 606/431-6563

2 AUTHORITY-STATUTES

16 USC 1531-1542

REGULATIONS-Attached

50 CFR 22.1-22.101

3 NUMBER

TE102391-

4 RENEWABLE

5 MAY COPY

(X) YES () NO

1.1 N 1.1 N

6 EFFECTIVE

7 EXPIRES

6/22/07

8 NAME AND TITLE OF PERSONAL OFFICER (if not a business)

9 TYPE OF PERMIT

ENDANGERED SPECIES

10 LOCATION WHERE AUTHORIZED ACTIVITY MAY BE CONDUCTED

THROUGHOUT THE SPECIES RANGES IN WEST VIRGINIA, VIRGINIA, OHIO, PENNSYLVANIA, ALABAMA, ARKANSAS, TENNESSEE, NORTH CAROLINA, KENTUCKY, ILLINOIS, INDIANA, AND MISSOURI.

11 CONDITIONS AND SPECIAL INSTRUCTIONS

- A. GENERAL CONDITIONS SET OUT IN SUBPART 2 OF 50 CFR 13, AND SPECIFIC CONDITIONS CONTAINED IN OTHER REGULATIONS CITED IN BLOCK 11 ABOVE, ARE HEREBY MADE A PART OF THIS PERMIT. ALL ACTIVITIES AUTHORIZED HEREIN MUST BE CARRIED OUT IN ACCORD WITH AND FOR THE PURPOSES DESCRIBED IN THE APPLICATION SUBMITTED. CONTINUED VALIDITY, OR RENEWAL, OF THIS PERMIT IS CONDITIONED UPON TIMELY COMPLIANCE WITH ALL APPLICABLE CONDITIONS, INCLUDING THE FILING OF ALL REPORTS AND RECORDS AND REPORTS.
- B. THE VALIDITY OF THIS PERMIT IS ALSO CONDITIONED UPON STRICT OBEYANCE OF ALL APPLICABLE FEDERAL, STATE, LOCAL OR OTHER FEDERAL LAW.
- C. VALID FOR USE BY PERMITTEE NAMED ABOVE.
- D. PERMITTEE IS AUTHORIZED TO TAKE, CAPTURE, IDENTIFY, AND RELEASE THE GRAY BAT (*Myotis grisescens*), INDIANA BAT (*Myotis sodalis*), AND VIRGINIA BIG-EARED BAT (*Corynorhinus yarrowi*) FOR THE PURPOSE OF CONDUCTING PRESENCE/ABSENCE SURVEYS, AS CONDITIONED BELOW:

XX. BLOCK 11 OF THIS PERMIT CONSISTS OF ITEMS A - M (6 PAGES TOTAL).

12 REPORTING REQUIREMENTS

REPORTS WILL BE PROVIDED TO THE U.S. FISH AND WILDLIFE SERVICE OFFICES APPEARING IN CONDITIONS 1 AND 2 OF THIS PERMIT. REPORTING CONTENT, FORMAT, FREQUENCY, AND FREQUENCY IS CONTAINED IN PERMIT 50-101-1 PERMIT.

SIGNED BY

Amor LHA

SPECIAL AGENT

Adams

CHIEF, PLANNING AND
PERMITTING, SOUTHEAST REGION

DATE

6-22-07



DIVISION OF WILDLIFE

Ohio Department of Natural Resources

Division of Wildlife Headquarters
2045 Morse Road, Bldg. C
Columbus, Ohio 43229-6693
1-800-WILDLIFE

WILD ANIMAL PERMIT: 11-243
SCIENTIFIC COLLECTION

JEREMY L. JACKSON
1586 BOONESBOROUGH RD.
RICHMOND, KY 40475

David M. Graham
Chief, Division of Wildlife

DATE ISSUED
7/19/2010

Others authorized on permit

YES (SEE ATTACHMENT)

SOCIAL SECURITY NUMBER: XXX-XX-0953

is hereby granted permission to take, possess, and transport at any time and in any manner specimens of wild animals, subject to the conditions and restrictions listed below or any documents accompanying this permit.

This permit, unless revoked earlier by the Chief, Division of Wildlife, is effective
from 5/22/2008 to 3/15/2011

This permit must be carried while collecting wild animals and be exhibited to any person on demand

THIS PERMIT IS RESTRICTED TO THE FOLLOWING:

1. MAY COLLECT BATS, INCLUDING ENDANGERED SPECIES, FOR SURVEY AND INVENTORY.
2. COLLECTION BY MISTNETS
3. ALL SPECIMENS ARE TO BE IMMEDIATELY RELEASE AFTER IDENTIFICATION, MEASUREMENT, EVALUATION, TAGGING AND RADIO ATTACHMENT. MUST MAINTAIN CURRENT U.S. FISH AND WILDLIFE SERVICE ENDANGERED SPECIES PERMIT # TE102292-3
4. AN ANNUAL REPORT MUST BE SUBMITTED DENOTING SPECIES, QUANTITY AND LOCATIONS WHERE SPECIMANS WERE COLLECTED.

Locations of Collecting

STATEWIDE

Equipment and method used in collection:

MISTNETTING

Name and number of each species to be collected:

BATS, INCLUDING THE ENDANGERED INDIANA BAT. MUST MAINTAIN A CURRENT ENDANGERED SPECIES LETTER PERMIT WITH THE DIVISION OF WILDLIFE. CURRENT LETTER EXPIRES 16 MARCH, 2011.

RESTRICTIVE DOCUMENTS ACCOMPANYING THIS PERMIT? YES

This permit is not valid for collecting migratory birds, their nests, or eggs unless a current permit from the U.S. Fish and Wildlife Service has been obtained.

NO ENDANGERED SPECIES MAY BE TAKEN WITHOUT WRITTEN PERMISSION FROM THE CHIEF



ATTACHMENT

This attachment to Scientific Collecting Permit # 11-243 authorizes the following persons to conduct the activities listed on the permit, within the conditions and restrictions set forth. Each person must carry and exhibit upon request, a copy of the permit and this attachment when conducting any of the listed activities. The person named on the permit assumes full responsibility for the actions of the persons on this list and for completing and submitting all required reports.

<u>Name</u>	<u>SSN or Driver License</u>
ERIC R. BRITZKE	XXX-XX-8167
ROBERT S. PRESCOTT	XXX-XX-7929
DANIEL COX	XXX-XX-8134
LANN WILF	XXX-XX-0000
JONATHAN HOOTMAN	XXX-XX-1506



STANDARD CONDITIONS FOR SCIENTIFIC COLLECTING AND EDUCATION PERMITS (ORC 1533.08 AND 1533.09)

The standard conditions listed below apply to all permit holders unless otherwise stated on an issued permit. The standard conditions below are in addition to the provisions listed on the permit. Failure to comply with the conditions of the permit may result in the suspension or termination of your permit. If you need an amendment to your permit, or have questions regarding these conditions, contact the Division of Wildlife Permit Coordinator at (614)265-6315. Please allow a minimum of two weeks for amendments.

1. When collecting or sampling you and any subpermittees must carry a copy of your permit and present to any officer upon request.
2. Only persons listed on the permit may conduct permitted activities.
3. Collection on all Department of Natural Resources properties is prohibited without authorization from the appropriate landholding division.
4. Collection is prohibited in the Little Darby Creek, Big Darby Creek, Killbuck Creek, Fish Creek (Williams County) and the upper portions of the Grand River watershed without written authorization from the Chief.
5. The collection and possession of state endangered and threatened species is prohibited without prior approval from the Chief.
6. The possession of Aquatic Nuisance Species(ANS) for educational or scientific purposes is prohibited without authorization from the Chief.
7. A migratory bird permit issued by the United States Fish and Wildlife Service may be required for all persons collecting or in possession of migratory birds.
8. Twenty-four hours prior to all stream collection, the permit holder must contact the local wildlife officer or nearest district office to advise the location and duration of sampling. Messages are acceptable.
9. All voucher specimens must be ascensioned to the Cleveland Museum of Natural History, The Ohio State University, Museum of Biological Diversity or the Cincinnati Museum of Natural History.
10. Traps and nets must be checked and all animals removed every twenty-four hours.
11. Traps and nets must bear a durable waterproof tag bearing the name and address of the user in English letters, legible at all times.
12. Unless otherwise provided, all specimens must be released at the point of capture.
13. When sampling on public properties or over water, non-toxic shot shall be used.
14. Newly discovered Aquatic Nuisance Species (ANS) must be reported to the Division of Wildlife within twenty-four hours of capture.
15. All Starlings, house sparrows and aquatic nuisance species collected for laboratory use must be euthanized upon completion of project.

From: Angela_Boyer@fws.gov [mailto:Angela_Boyer@fws.gov]
Sent: Tuesday, August 10, 2010 7:28 AM
To: Jeremy Jackson
Cc: Boltz, Jeff; Koenek, Mary-Alice; Jennifer_Finera@fws.gov
Subject: Re: Meldahl Bat Study Project Authorization Request

Dear Mr. Jackson,

This is in response to your August 9, 2010 request for an amendment to your Federal Fish and Wildlife Permit No. TE102292-5 to conduct a 2010-2011 mist net survey for the Indiana bat (*Myotis sodalis*) at the proposed Meldahl Locks and Dam Hydroelectric Project site in southern Clermont County, Ohio.

This notification serves as written concurrence that Jeremy Jackson is authorized to proceed with the Indiana bat survey as described in the request. Upon completion of the survey, we request that you submit an electronic copy of the survey results to this office for review. Please include the latitude and longitude coordinates for each survey site in the report. If any Indiana bats are found during the survey, please notify this office within 48 hours. Please include the GPS coordinates of the capture site in the initial notification and any roost trees found during radio-tracking as soon as they become available.

Due to concerns over White-nose Syndrome, we are requiring that the Disinfection Protocol for Bat Field Studies be followed for all bat survey work conducted in Ohio. Please be advised that the current protocol (attached) is subject to revision. Please visit the following link prior to conducting the survey to ensure the most current protocol is being followed.

<http://www.fws.gov/midwest/Endangered/mammals/BatDisinfectionProtocol.html>

(See attached file: *USFWS Region 3 Bat Disinfection Protocol.pdf*)

We request that all Indiana bats be banded utilizing the Ohio Department of Natural Resources, Division of Wildlife (DOW) bands. Please contact Keith Lott (DOW) for questions and to request bands (419) 466-4601.

Please carry a copy of this site specific authorization and your Federal permit while conducting the survey. If you have questions, or if we may be of further assistance in this matter, please contact me.

Sincerely,
Angela Boyer
Endangered Species Coordinator for Ohio
U.S. Fish and Wildlife Service
4625 Morse Road, Suite 104
Columbus, OH 43230
(614) 416-8993, ext. 22
(614) 416-8994 FAX
angela_boyer@fws.gov

"Jeremy Jackson" jjj@jacksonenvironmental.com
08/09/2010 04:22 PM

To Angela_Boyer@fws.gov

Cc "Koeneker, Mary-Alice" <makoeneke@eaest.com>, jboltz@eaest.com.

Subject: Meldahl Bat Study Project Authorization Request

Mrs. Boyer,

As per our conversation earlier today, Jackson Environmental request project authorization to conduct a summer mist-net survey for bats along the Ohio River in Clermont County, Ohio. The project consists of three proposed linear transmission lines as illustrated on attached map. These transmission lines are labeled as Route 1, Route 2, and Route 3. The forested portion of Route 1 is 2.6 km length, Route 2 is 1.3 km in length, and Route 3 is 2.8 km in length.

Based upon a preliminary map reconnaissance and the relative amount of forested areas where the transmission line routes are proposed and the time available in the year in which surveys can be conducted, we are proposing to survey route 2, (the preferred route), in 2010 and the two alternate routes in 2011.

We are proposing to establish 2 net-site locations along route 2, with at least two nets sets at each and survey them for a total of 2 nights as per the US Fish Wildlife Protocol. We will begin the survey of August 10, 2010 and complete the survey on August 11, 2010, weather dependent.

We are proposing to establish 1 site in the forested area closest to the Ohio River and 1 site in the middle of the larger forested area near the north central portion of the project area.

If any female Indiana bats are captured, we will immediately begin radio tracking to locate roost trees and to conduct emergence counts for a period of at least 5 days.

Thank you for your rapid response and coordination.

Kindest Regards,

Jeremy Jackson

Jackson Environmental[attachment "Meldahl_Bat_Study_Area_Figure_1.pdf" deleted by Angela Boyer/R3/FWS/DOI]

MELDAHL HYDROELECTRIC PROJECT

OHIO TRANSMISSION LINE AND SUBSTATION

FERC PROJECT NO. 12667

OPSB CASE NOS.

10-2440-EL-BTX AND 10-2439-EL-BSB

**RARE, THREATENED, AND ENDANGERED
PLANT SPECIES SURVEYS**

Prepared by



**EA Engineering, Science,
and Technology, Inc.**

April 2011

For



**The City of Hamilton, Ohio &
American Municipal Power**

****Privileged and Confidential****

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1.0 INTRODUCTION

The City of Hamilton, Ohio (Hamilton) and American Municipal Power (AMP) are currently constructing and preparing to operate the 105-megawatt Meldahl Hydroelectric Project (Federal Energy Regulatory Commission [FERC] Project No. 12667). The site of the project is the existing U.S. Army Corps of Engineers' (USACE's) Captain Anthony Meldahl Locks and Dam (Meldahl Locks and Dam), located on the Ohio River at river mile (RM) 436, approximately 35 miles southeast of Cincinnati, Ohio. The Meldahl Locks and Dam are located in Bracken County, Kentucky, and Clermont County, Ohio (Figure 1). The navigation locks are located on the northern, or Ohio, side of the river, between the towns of Neville and Chilo, Ohio off U.S. Route 52. The powerhouse is licensed (issued June 25, 2008) and under construction on the southern, or Kentucky, side of the river. The proposed 138-kilovolt (kV) transmission line will be constructed from the powerhouse and run southeast before crossing the river to Ohio where it will connect with a new substation.

Two potential transmission line corridors (known as the preferred and alternate routes) have been identified in Ohio (Figure 2). Depending on the route selected, the transmission line within the State of Ohio will be 2.2 to 3.4 miles long. The transmission line will connect to the existing 345-kV Zimmer-Spurlock transmission line in Ohio. A new substation, approximately 400 feet by 400 feet in area, will be constructed for the interconnection. Depending on the route chosen, the transmission line will be supported by roughly 34 to 69 towers constructed at intervals of 105 to 820 feet, allowing for variations in topography. The width of the right-of-way for the transmission line will be approximately 125 feet, extending 62.5 feet from the centerline of the transmission line along each side.

The following rare, threatened, and endangered (RTE) plant species report analyzes aspects of the project related to the two transmission line routes under consideration. EA Engineering, Science, and Technology (EA) performed initial RTE plant surveys during the week of September 13, 2010, during the week of September 27, 2010, and from February 22 to 24, 2011, on land within the preferred and alternate route under consideration for the transmission line project.

2.0 OBJECTIVES

The objectives of the RTE plant surveys were to observe habitat types within the proposed project area (transmission line routes only) that may potentially support plant species of interest and to determine if RTE plant species were present.

3.0 METHODOLOGY

3.1 Agency Correspondence

Pursuant to Section 7 of the Endangered Species Act, information was requested from the Ohio Department of Natural Resources (DNR) and the U.S. Fish and Wildlife Service (USFWS) in 2010 on the potential existence of federally or state-listed RTE plant species within the project-affected area. USFWS' response indicated running buffalo clover (*Trifolium stoloniferum*) was the only federally-listed plant species found in Clermont County, Ohio. The Ohio DNR's

response identified one state-listed “endangered” plant species and three state-listed “potentially threatened” plant species whose presence has been recorded in the region. The “endangered” plant species was the running buffalo clover and the “potentially threatened” plant species were the Virginia-mallow (*Sida hermaphrodita*), smooth buttonweed (*Spermacoce giabra*), and southern black-haw (*Viburnum rufidulum*). None of these species were identified by the resource agencies as occurring within the footprint of the project. A description of each of the species of interest is provided below.

- Running buffalo clover is a perennial herb that grows approximately 2 to 8 inches tall and flowers from late spring to early summer. It grows in partly sunny locations with moist, fertile soils that have been exposed to some disturbance patterns, but cannot tolerate full sun, full shade, or severe disturbance. It is often found in the ecotone between open forest and prairie in rich soils. The species is found in partially shaded woodlots, mowed areas, and along streams and trails. This species is a federally and state-listed endangered species (Ohio DNR 2010, USFWS 2010).
- Virginia-mallow is a perennial herb that grows approximately 10 feet tall and flowers in early July to late August. Virginia-mallow prefers to grow in unstable habitats with loose sandy or rocky soil of scoured riversides, floodplains, and disturbed areas. This species is listed as potentially threatened in Ohio (Ohio DNR 2010).
- Smooth buttonweed is an herbaceous perennial plant that grows from 0.5 feet to 2 feet tall. Smooth buttonweed flowers from July through September. This species is found in swamps, wet woods, and openings. In Ohio, it is most commonly found on the muddy shores and low banks of the Ohio River. This species is listed as potentially threatened in Ohio (Ohio DNR 2010).
- Southern black-haw, also known as rusty black-haw, is a small tree or shrub that can range from 10 feet to 30 feet tall depending on its environment. In Ohio, it is found in open woods or sunny banks in dry, rocky, calcareous soils. It flowers in the spring in white clusters and bears blue fruit in the fall. The leaves turn pink to mauve to dark purple in autumn. This species has been listed as potentially threatened in Ohio (Ohio DNR 2010).

3.2 Data Collection

Botanical resources were identified and documented at each habitat using a plant survey field data sheet. Data sheets specific to the RTE survey activities were developed prior to beginning the field investigation. Each data sheet contained entries for the sample (station) number, date, name of investigator(s), observed plant species, and observation times. Spaces for general weather observations, habitat information, and photographic notes were also designed into the data sheets. Data sheets are included in Appendix A.

A timed meander search (TMS) procedure (Goff et al. 1982) was used to conduct botanical examinations of distinct habitat types to determine the presence of RTE plant species. The TMS procedure demonstrates the level of effort expended at each station as well as in the discrete habitat types. An access point within the particular habitat was chosen as the survey area's point

of entry, and the time the RTE survey began was recorded. The sampling route meandered throughout the chosen habitat type randomly to ensure a constant search for new and unique plant species within the mapped habitat type. The route at a particular habitat type was complete when no new species were encountered. The goal of the TMS procedure was maximum coverage of variation within the field unit.

A TMS procedure is a semi-quantitative method that focuses on the discovery of RTE plant species. Results of the TMS procedure have value in the discovery of an actual RTE species and also as a means of documenting a low probability of occurrence of such species if not found during an application of the procedure. This TMS procedure was conducted within and adjacent to the potential routes in discrete habitat units that were delineated using aerial photography to ensure sampling was conducted in areas of homogeneous vegetation communities. These habitat types included: deciduous woodland, oldfield/pioneer, and agricultural fields. All observed plant species within each habitat were recorded on a field data sheet as they were encountered.

4.0 RESULTS

In total, 20 habitat areas across 94 acres were surveyed for RTE plant species. Three vegetative community types were classified within these habitat areas. The plant species observed in each habitat unit are described in the following section (4.1). RTE survey findings, including TMS results, are summarized and discussed in section 4.2.

4.1 Vegetative Communities

The surveyed portions of the project area overlap two ecoregions: the Outer (also referred to as "Northern") Bluegrass ecoregion and the Pre-Wisconsin Drift Plains ecoregion. The Alternate route, and most of the preferred route, each lie within the Outer Bluegrass ecoregion (Figure 3). The Outer Bluegrass ecoregion runs along much of the Ohio River and extends into Kentucky. It lies within the broader boundaries of the Interior Plateau ecoregion, characterized by hilly to rugged terrain, and presently represents a transition zone between the crop and livestock farms to the north and the forested lands to the east (USEPA 2010a, 2010b). The Outer Bluegrass ecoregion is fairly rugged and underlain by Ordovician limestone and shale with Alfisol soils. Historically in Ohio, the region included mixed mesophytic forests, mixed oak forests, and bottomland hardwood forests. These forests potentially contain more than 30 dominant tree species, although generally two or three species dominate any particular area. Currently, the region is a mixture of forest and agriculture, with some urban-industrial activity along the Ohio River. The steeper slopes are generally wooded, while dairy and tobacco farms occur on flatter sites (USEPA 2010a).

A small part of the preferred route lies within the Pre-Wisconsin Drift Plains ecoregion. This ecoregion falls within the broader boundaries of the Eastern Corn Belt ecoregion, which is much less rugged than the Interior Plateau and is characterized by rich soils and rolling hills. In particular, the Pre-Wisconsin Drift Plains are characterized by flat areas with poorly drained acidic and deeply leached soils. Originally, beech forests and elm-ash swamp forests were dominant within this ecoregion; however, currently the region is used for soybean, corn, tobacco, and livestock production (USEPA 2010a).

The surveyed project area encompassing the preferred and alternative transmission line corridors covers approximately 94 acres of land, and is located in Clermont County, Ohio. This area is characterized by a variety of vegetative communities typical of mixed woodland and pastureland habitats found in the previously described ecoregions. Elevation in the study area for the proposed transmission line corridors is variable and ranges between 500 and 800 ft.

Three vegetative communities were observed during the surveys, including deciduous woodland (11 sites), agricultural field (six sites), and oldfield/pioneer (three sites). Photographs taken during the survey are located in Appendix B. Figure 4 depicts the habitat areas surveyed and their locations (also presented in Table 1).

Table 1. Locations/Counts of Habitat Areas within Potential Transmission Line Corridors

	Alternate Route	Preferred Route
Habitat Types Present (# of Habitat Areas)	<ul style="list-style-type: none"> •Deciduous Woodland* (6) •Agricultural Field* (4) •Oldfield/Pioneer (1) 	<ul style="list-style-type: none"> • Deciduous Woodland* (6) • Agricultural Field* (3) • Oldfield/Pioneer (2)

*Deciduous woodland and agricultural field habitats are located on land common to both potential transmission line corridors, before the two routes diverge after crossing the Ohio River (Figure 4); as a result common habitat areas are listed in each corridor.

The number of species recorded and number of acres surveyed in each of the three habitat types are shown in Table 2. Agricultural field habitats had the most acres surveyed, followed by deciduous woodland, which had the most plant species, and oldfield/pioneer habitats. A species list (cumulative for all habitat types) is shown in Table 3.

Table 2. Number of Unique Plant Species Observed and Acres Surveyed in Each Habitat Type and Corridor

Habitat Type	Plant Species Observed Within Each Corridor		Plant Species Identified within each Habitat*	Total Acres Surveyed Within the Habitat Corridor
	Alternate Route	Preferred Route		
Deciduous Woodland	114	96	147*	34.2
Agricultural Field	79	54	101*	47.2
Oldfield/Pioneer	74	31	83*	12.9

*Column totals do not equal the sum of the routes because the routes represent unique plant species within each route, and totaling them would "double count" some plant species.

4.1.1 Deciduous Woodland

Deciduous woodland communities found in this region are typified by a variety of tree species that can potentially dominate the canopy depending on differences in microclimate and other

factors, such as levels of historical disturbances to the region (USEPA 2010a). There are more than 30 commonly found dominant tree species in these forests, including (but not limited to) oak species (*Quercus* spp.), walnut species (*Juglans* spp.), elm species (*Ulmus* spp.), maple species (*Acer* spp.), black locust (*Robinia pseudacacia*), and black cherry (*Prunus serotina*). The understory is composed of shrubs, dominated by spicebush (*Lindera benzoin*), dogwood species (*Cornus* spp.), and elderberry (*Sambucus canadensis*); vines, dominated by Virginia creeper (*Parthenocissus quinquefolia*), poison ivy (*Toxicodendron radicans*), and grape species (*Vitis* spp.); and herbaceous ground cover, including wingstem (*Actinomeris alternifolia*) and touch-me-not species (*Impatiens* spp.). A mixture of invasive non-native plants, such as Japanese knotweed (*Polygonum cuspidatum*) and garlic mustard (*Alliaria petiolata*), can also be found depending on the level of disturbance (Ohio DNR 2000).

Deciduous woodland habitats occupied the second largest acreage within the survey area along the transmission line routes, totaling 11 sites and 34.2 acres, and accounted for the highest number of species (147) within the transmission line corridors. Deciduous woodland habitats were located along the alternate and preferred transmission line routes. Tree species found in this habitat type were box elder (*Acer negundo*), black locust, honey locust (*Gleditsia triacanthos*), slippery elm (*Ulmus rubra*), and eastern red cedar (*Juniperus virginiana*). The most common understory species observed was buttonbush (*Cephalanthus occidentalis*), poison ivy (*Toxicodendron radicans*), multiflora rose (*Rosa multiflora*), and Japanese honeysuckle (*Lonicera japonica*)—the latter two are invasive species in Ohio.

4.1.2 Agricultural Fields

Agricultural fields include cropland and grazing fields. These areas have a variety of herbs and grasses present. This habitat type was the most common habitat (acreage) found (6 sites total), had the second largest number of species surveyed within the preferred and alternate transmission line corridors (101), and contained the largest amount of surveyed land (47.2 acres). Agricultural field habitats were located along both the proposed and the alternate transmission line routes. Common tree species found (typically along the edges) in this habitat type were slippery elm, white ash (*Fraxinus americana*), and box elder. Most common were herbaceous species, including common dandelion (*Taraxacum officinale*), common ragweed (*Ambrosia artemisiifolia*), New York ironweed (*Vernonia noveboracensis*), common plantain (*Plantago major*), crabgrass (*Digitaria sanguinalis*), curly dock (*Rumex crispus*), and Pennsylvania smartweed (*Polygonum pensylvanicum*). Common shrubs and vines encountered included Allegheny blackberry (*Rubus allegheniensis*) and Japanese honeysuckle.

4.1.3 Oldfield/Pioneer

The oldfield/pioneer habitat type was dominated by herbaceous vegetation, with occasional woody trees and shrubs also present. Generally, this habitat refers to abandoned agricultural land that is in the early stages of succession when grasses and wildflowers dominate the habitat type. Oldfield/pioneer was the third most common vegetative community surveyed (three sites total), had the third highest number of species (83), and was the third largest in terms of surveyed area within the transmission line corridor (12.9 acres). These habitats were located along both the proposed and the alternate transmission line routes. Trees observed in this habitat type included box elder, black locust, honey locust, and eastern red cedar. The most common herbaceous

plants were Queen Anne's lace (*Daucus carota*), common ragweed, New York ironweed, and English plantain (*Plantago lanceolata*). Common shrubs and vines included multiflora rose, Japanese honeysuckle, and Virginia creeper.

4.2 RTE Survey Findings

4.2.1 General Observations

A TMS procedure was used to demonstrate the completeness of the survey within each habitat unit. The procedure included the observation, identification, and recording of each plant species encountered within each habitat. A running time was recorded at the observation of each new species encountered. Using this method, 217 unique plant species were observed across 94 acres throughout the 20 habitat areas surveyed.

Within the proposed transmission line routes, 37 deciduous canopy species and 1 coniferous canopy species were observed. Shrub, vine, understory, and herbaceous species observed totaled 15, 21, 2 and 141, respectively.

The data generated by using the TMS procedure were graphed (number of species observed versus time) to determine specific habitat characteristics. Species effort curves that contained a more diverse habitat typically had a plateau near the end of the survey period. Less diverse stations had species effort curves that displayed a plateau after a relatively short period of time. Achieving a plateau during the survey period indicated that data obtained were complete and the habitat had been exhausted.

Several surveys using the TMS procedure were carried out on the three habitat types observed within the proposed and the alternative transmission line routes. The agricultural field habitat type attained a plateau more quickly than other habitat types (i.e., unique plant species were exhausted more quickly than other habitat types). The average number of species in the oldfield/pioneer, agricultural field, and deciduous woodland habitats were similar at 30, 31, and 33, respectively. The generally extended duration of the deciduous woodland TMS surveys suggests that this habitat was typically the most diverse of the vegetative communities observed. The species effort curves are presented in Appendix C.

4.2.2 RTE Species Observed

No federally or state-listed species were observed during the RTE plant species surveys conducted in September 2010 and February 2011 in Clermont County, Ohio along the alternate and preferred transmission line routes for the licensed Meldahl Hydroelectric project.

4.2.3 Running Buffalo Clover

Though running buffalo clover, a federally-listed endangered species, was not observed during the onsite surveys, an additional desktop analysis was completed to further evaluate the potential for the species to occur in the project area. "The Running Buffalo Clover (*Trifolium stoloniferum*) Recovery Plan: First Revision" includes a map of all known running buffalo clover occurrences (USFWS 2010). This map shows a number of documented populations of running

buffalo clover approximately 23 miles north of the project, near Cincinnati, Ohio, and one occurrence approximately 23 miles southeast of the project area near Maysville, Kentucky. There are no documented occurrences in the vicinity of the project. This map, with a notation showing the project area, is included as Appendix D.

As described in Section 3.1, running buffalo clover (*Trifolium stoloniferum*) requires habitat that has periodic disturbance and is partially open. This species cannot tolerate full sun, full shade, or severe disturbances. These habitat requirements were compared to the habitat types found in the project area. Two of the habitat types identified, agricultural field and deciduous woodland, do not provide suitable habitat for running buffalo clover. Generally, agricultural fields are severely disturbed annually as part of plowing and planting activities and are areas with very little shade. Deciduous woodlands are typically fully shaded and would not provide the open areas needed to support running buffalo clover. The remaining habitat type observed during the onsite surveys, oldfield/pioneer, could potentially provide habitat for running buffalo clover. Fourteen percent of the habitat within the alternate route and 12 percent of the habitat in the preferred route provided potentially suitable habitat for running buffalo clover.

Running buffalo clover was not observed within the habitats surveyed. Further, three other species of clover were observed: red clover (*Trifolium pratense*), pink clover (*Trifolium arvense*), and white clover (*Trifolium repens*). All clover species observed were identified to the species level. Based on the field observations, small area of suitable habitat, and USFWS and Ohio DNR records for the region; it is unlikely that running buffalo clover is present within the transmission line routes.

5.0 CONCLUSIONS

Rare, threatened, and endangered plant surveys were conducted across two potential transmission line routes associated with the Meldahl Hydroelectric Project in Clermont County, Ohio. Three habitat types were identified across the 20 distinct habitat areas and 94 acres that were surveyed. Within these habitat areas, 217 unique plant species were identified during TMS surveys. The most common vegetative community observed was agricultural fields (6 sites, 47.2 acres), followed by deciduous woodland (11 sites, 34.2 acres), and oldfield/pioneer (three sites, 12.9 acres). Overall, the deciduous woodland habitat was the most diverse; it contained the highest number of unique plant species (147) observed during the TMS surveys.

No federally or state-listed plant species were observed during the RTE plant species surveys.

6.0 REFERENCES

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**Table 3. Plant Species Observed Along Transmission Line Corridors,
September 2010 – February 2011**

FAMILY	SCIENTIFIC NAME	COMMON NAME
Coniferous Canopy Species		
Cupressaceae	<i>Juniperus virginiana</i>	Eastern red cedar
Deciduous Canopy Species		
Aceraceae	<i>Acer negundo</i>	Box elder
	<i>Acer rubrum</i>	Red maple
	<i>Acer saccharinum</i>	Silver maple
	<i>Acer saccharum</i>	Sugar maple
Annonaceae	<i>Asimina triloba</i>	Common pawpaw
Betulaceae	<i>Carpinus caroliniana</i>	Carolina hornbeam
Caesalpiniaceae	<i>Gleditsia triacanthos</i>	Honey locust
Fabaceae	<i>Robinia pseudoacacia</i>	Black locust
Fagaceae	<i>Fagus grandifolia</i>	American beech
	<i>Quercus alba</i>	White oak
	<i>Quercus bicolor</i>	Swamp white oak
	<i>Quercus imbricaria</i>	Shingle Oak
	<i>Quercus macrocarpa</i>	Bur oak
	<i>Quercus michauxii</i>	Basket oak
	<i>Quercus palustris</i>	Pin oak
	<i>Quercus prinus</i>	Chestnut oak
	<i>Quercus rubra</i>	Northern red oak
	<i>Quercus velutina</i>	Black oak
Juglandaceae	<i>Carya cordiformis</i>	Bitternut hickory
	<i>Carya glabra</i>	Pignut hickory
	<i>Carya ovata</i>	Shagbark hickory
	<i>Carya tomentosa</i>	Mockernut hickory
	<i>Juglans cinerea</i>	White walnut
	<i>Juglans nigra</i>	Black walnut
Lauraceae	<i>Sassafras albidum</i>	Sassafras
Magnoliaceae	<i>Liriodendron tulipifera</i>	Tulip poplar
Moraceae	<i>Maclura pomifera</i>	Osage orange
Oleaceae	<i>Fraxinus americana</i>	White ash
	<i>Fraxinus pennsylvanica</i>	Green ash
Platanaceae	<i>Platanus occidentalis</i>	Sycamore
Rosaceae	<i>Prunus serotina</i>	Black cherry
Salicaceae	<i>Populus deltoides</i>	Eastern cottonwood
	<i>Populus grandidentata</i>	Bigtooth aspen
Simaroubaceae	<i>Ailanthus altissima</i>	Tree-of-heaven

FAMILY	SCIENTIFIC NAME	COMMON NAME
Deciduous Canopy Species (Continued)		
Ulmaceae	<i>Ulmus americana</i>	American elm
	<i>Ulmus pumila</i>	Siberian Elm
	<i>Ulmus rubra</i>	Slippery elm
Herbaceous Species		
Amaranthaceae	<i>Amaranthus retroflexus</i>	Green amaranth
	<i>Chenopodium album</i>	Lamb's quarters
Apiaceae	<i>Conium maculatum</i>	Poison hemlock
	<i>Daucus carota</i>	Queen Anne's lace
Apocynaceae	<i>Apocynum androsaemifolium</i>	Spreading dogbane
	<i>Apocynum cannabinum</i>	Indian hemp
Aristolochiaceae	<i>Asarum canadense</i>	Canadian wild ginger
Asclepiadaceae	<i>Asclepias purpurascens</i>	Purple milkweed
	<i>Asclepias syriaca</i>	Common milkweed
	<i>Asclepias tuberosa</i>	Butterfly weed
Aspleniaceae	<i>Asplenium platyneuron</i>	Ebony spleenwort
Asteraceae	<i>Achillea millefolium</i>	Common yarrow
	<i>Actinomeris alternifolia</i>	Wingstem
	<i>Ambrosia artemisiifolia</i>	Common ragweed
	<i>Ambrosia trifida</i>	Giant ragweed
	<i>Anaphalis margaritacea</i>	Pearly everlasting
	<i>Arctium minus</i>	Common burdock
	<i>Artemisia annua</i>	Sweet Annie
	<i>Aster lateriflorus</i>	Starved aster
	<i>Aster novi-belgii</i>	New York aster
	<i>Aster sp.</i>	Aster species 1
	<i>Aster vimineus</i>	Small white aster
	<i>Bidens coronata</i>	Tickseed sunflower
	<i>Bidens sp.</i>	Beggar-ticks species
	<i>Centaurea jacea</i>	Brownray knapweed
	<i>Cichorium intybus</i>	Chicory
	<i>Cirsium arvense</i>	Canada thistle
	<i>Cirsium vulgare</i>	Bull thistle
	<i>Conoclinium coelestinum</i>	Hardy ageratum
	<i>Erigeron annuus</i>	Daisy fleabane
	<i>Erigeron canadensis</i>	Horseweed
	<i>Eupatorium album</i>	White boneset
	<i>Eupatorium coelestinum</i>	Mist flower
	<i>Eupatorium hyssopifolium</i>	Hyssop-leaved boneset
	<i>Eupatorium perfoliatum</i>	Boneset

FAMILY	SCIENTIFIC NAME	COMMON NAME
Herbaceous Species (Continued)		
Asteraceae	<i>Eupatorium rugosum</i>	White snakeroot
	<i>Eupatorium</i> sp.	Boneset species
	<i>Helianthus tuberosus</i>	Jerusalem artichoke
	<i>Lactuca canadensis</i>	Wild lettuce
	<i>Rudbeckia serotina</i>	Black-eyed susan
	<i>Rudbeckia triloba</i>	Browneyed susan
	<i>Solidago graminifolia</i>	Flat-top goldenrod
	<i>Solidago rugosa</i>	Rough-stemmed goldenrod
	<i>Solidago</i> spp.	Goldenrod species
	<i>Symphyotrichum ericoides</i>	White heath aster
	<i>Taraxacum officinale</i>	Common dandelion
	<i>Vernonia noveboracensis</i>	New York ironweed
Balsaminaceae	<i>Impatiens capensis</i>	Spotted touch-me-not
Brassicaceae	<i>Alliaria petiolata</i>	Garlic mustard
	<i>Cardamine</i> sp.	Cress species
Caryophyllaceae	<i>Stellaria media</i>	Common chickweed
Commelinaceae	<i>Commelina</i> sp.	Dayflower species
	<i>Tradescantia</i> sp.	Spiderwort species
Compositae	<i>Xanthium chinense</i>	Common clotbur
Cyperaceae	<i>Carex intumescens</i>	Greater bladder sedge
	<i>Cyperus esculentus</i>	Nut sedge
	<i>Cyperus strigosus</i>	Straw-colored flatsedge
	<i>Scirpus atrovirens</i>	Green bulrush
	<i>Scirpus cyperinus</i>	Woolgrass
Dipsacaceae	<i>Dipsacus sylvestris</i>	Wild teasel
Dryopteridaceae	<i>Polystichum acrostichoides</i>	Christmas fern
Euphorbiaceae	<i>Acalypha gracilens</i>	Three-seeded mercury
Fabaceae	<i>Baptisia</i> sp.	Wild indigo species
	<i>Desmodium canescens</i>	Hoary tick-trefoil
	<i>Desmodium ciliare</i>	Hairy small-leaf tricktrefoil
	<i>Desmodium paniculatum</i>	Panicled tick-trefoil
	<i>Lespedeza intermedia</i>	Wandlike bushclover
	<i>Lespedeza</i> sp.	Bush clover species
	<i>Lespedeza virginica</i>	Slender bush clover
	<i>Medicago lupulina</i>	Black medick
	<i>Medicago sativa</i>	Alfalfa
	<i>Trifolium pratense</i>	Red clover
	<i>Trifolium repens</i>	White clover
Gramineae	<i>Triodia flava</i>	Purple-top grass

FAMILY	SCIENTIFIC NAME	COMMON NAME
Herbaceous Species (Continued)		
Hippocastanaceae	<i>Aesculus hippocastanum</i>	Horse chestnut
Hypericaceae	<i>Hypericum punctatum</i>	Spotted St. John's wort
Lamiaceae	<i>Glechoma hederacea</i>	Ground ivy
	<i>Monarda bradburiana</i>	Eastern beebalm
	<i>Prunella vulgaris</i>	Heal-all
	<i>Pycnanthemum muticum</i>	Short-toothed mountain mint
	<i>Scutellaria elliptica</i>	Hairy skullcap
	<i>Scutellaria incana</i>	Downy skullcap
	<i>Scutellaria</i> sp.	Skullcap species
Liliaceae	<i>Allium vineale</i>	Wild garlic
	<i>Hemerocallis fulva</i>	Daylily
Lobeliaceae	<i>Lobelia</i> sp.	Lobelia species
Malvaceae	<i>Abutilon theophrasti</i>	Indian mallow
	<i>Hibiscus moscheutos</i>	Swamp rose-mallow
	<i>Sida spinosa</i>	Prickly mallow
Onagraceae	<i>Oenothera biennis</i>	Common evening primrose
Oxalidaceae	<i>Oxalis europaea</i>	Yellow wood sorrel
Phytolaccaceae	<i>Phytolacca americana</i>	Pokeweed
Plantaginaceae	<i>Plantago lanceolata</i>	English plantain
	<i>Plantago major</i>	Common plantain
Poaceae	<i>Agrostis alba</i>	Red top grass
	<i>Andropogon virginicus</i>	Broom sedge
	<i>Arthraxon hispidus</i>	Joint-head arthraxon
	<i>Dichanthelium clandestinum</i>	Deertongue grass
	<i>Digitaria sanguinalis</i>	Crabgrass
	<i>Echinochloa crus-galli</i>	Barnyard grass
	<i>Elymus virginicus</i>	Virginia wildrye
	<i>Festuca</i> sp.	Grass species
	<i>Hystrix patula</i>	Bottle-brush grass
	<i>Leersia oryzoides</i>	Rice cutgrass
	<i>Microstegium vimineum</i>	Nepalese browntop
	<i>Miscanthus sinensis</i>	Chinese silvergrass
	<i>Panicum virgatum</i>	Switchgrass
	<i>Setaria faberi</i>	Foxtail grass
	<i>Setaria italica</i>	Foxtail millet
	<i>Setaria pumila</i>	Yellow bristle grass
	<i>Sorghum halepense</i>	Johnson grass
	<i>Zea mays</i>	Corn

FAMILY	SCIENTIFIC NAME	COMMON NAME
Herbaceous Species (Continued)		
Polygonaceae	<i>Polygonum pennsylvanicum</i>	Pennsylvania smartweed
	<i>Polygonum persicaria</i>	Lady's thumb
	<i>Rumex crispus</i>	Curly dock
	<i>Tovara virginiana</i>	Virginia knotweed
Portulacaceae	<i>Portulaca oleracea</i>	Purslane
Primulaceae	<i>Lysimachia ciliata</i>	Fringed loosestrife
	<i>Lysimachia nummularia</i>	Creeping jenny
	<i>Lysimachia quadrifolia</i>	Whorled loosestrife
Rosaceae	<i>Agrimonia parviflora</i>	Small-flowered agrimony
	<i>Duchesnea indica</i>	Indian strawberry
	<i>Fragaria virginiana</i>	Virginia strawberry
	<i>Geum</i> sp.	Avens species
Rubiaceae	<i>Diodia teres</i>	Buttonweed
	<i>Galium aparine</i>	Cleavers
Scrophulariaceae	<i>Chelone lyonii</i>	Pink turtlehead
	<i>Mimulus alatus</i>	Sharpwing monkeyflower
	<i>Penstemon grandiflorus</i>	Large beardtongue
	<i>Verbascum thapsus</i>	Common mullein
Solanaceae	<i>Datura stramonium</i>	Jimsonweed
	<i>Solanum carolinense</i>	Horsenettle
Urticaceae	<i>Boehmeria cylindrica</i>	Small-spike false nettle
	<i>Laportea canadensis</i>	Wood Nettle
	<i>Pilea pumila</i>	Clearweed
	<i>Urtica dioica</i>	Stinging nettle
Verbenaceae	<i>Phryma leptostachya</i>	American lopseed
	<i>Verbena hastata</i>	Blue vervain
Violaceae	<i>Viola conspersa</i>	Dog violet
	<i>Viola papilionacea</i>	Common blue violet
	<i>Viola</i> sp.	Violet species
Shrub Species		
Aquifoliaceae	<i>Ilex verticillata</i>	Common winterberry
Berberidaceae	<i>Berberis thunbergii</i>	Japanese barberry
Caprifoliaceae	<i>Diervilla lonicera</i>	Bush honeysuckle
	<i>Lonicera tatarica</i>	Tartarian honeysuckle
	<i>Lonicera tatarica</i>	Tatarian bush honeysuckle
	<i>Sambucus canadensis</i>	Common elder
Fabaceae	<i>Lespedeza cuneata</i>	Chinese Bushclover
Lauraceae	<i>Lindera benzoin</i>	Spicebush
Moraceae	<i>Morus rubra</i>	Red mulberry
Oleaceae	<i>Ligustrum vulgare</i>	Privet species

FAMILY	SCIENTIFIC NAME	COMMON NAME
Shrub Species (Continued)		
Rosaceae	<i>Amelanchier arborea</i>	Downy serviceberry
	<i>Rosa multiflora</i>	Multiflora rose
	<i>Rubus allegheniensis</i>	Allegheny blackberry
	<i>Rubus occidentalis</i>	Black raspberry
Rubiaceae	<i>Cephalanthus occidentalis</i>	Buttonbush
Understory Species		
Cornaceae	<i>Cornus florida</i>	Flowering dogwood
Fabaceae	<i>Cercis canadensis</i>	Redbud
Vine Species		
Anacardiaceae	<i>Toxicodendron radicans</i>	Poison ivy
Araliaceae	<i>Hedera helix</i>	English ivy
Bignoniaceae	<i>Bignonia capreolata</i>	Crossvine
	<i>Campsis radicans</i>	Trumpet creeper
Caprifoliaceae	<i>Lonicera japonica</i>	Japanese honeysuckle
Celastraceae	<i>Euonymus</i> sp.	Euonymus species
	<i>Euonymus fortunei</i>	Winter creeper
Convolvulaceae	<i>Convolvulus sepium</i>	Hedge Bindweed
	<i>Convolvulus</i> sp.	Bindweed species
	<i>Ipomoea hederacea</i>	Ivy-leaved morning glory
	<i>Ipomoea</i> sp.	Morning glory species
Fabaceae	<i>Amphicarpaea bracteata</i>	Hog peanut
	<i>Coronilla varia</i>	Crown vetch
Smilacaceae	<i>Smilax rotundifolia</i>	Greenbrier
	<i>Smilax tamnoides</i>	Bristly greenbrier
Vitaceae	<i>Ampelopsis brevipedunculata</i>	Porcelainberry
	<i>Parthenocissus quinquefolia</i>	Virginia creeper
	<i>Vitis aestivalis</i>	Summer grape
	<i>Vitis labrusca</i>	Fox grape
	<i>Vitis riparia</i>	River-bank grape
	<i>Vitis</i> spp.	Grape species

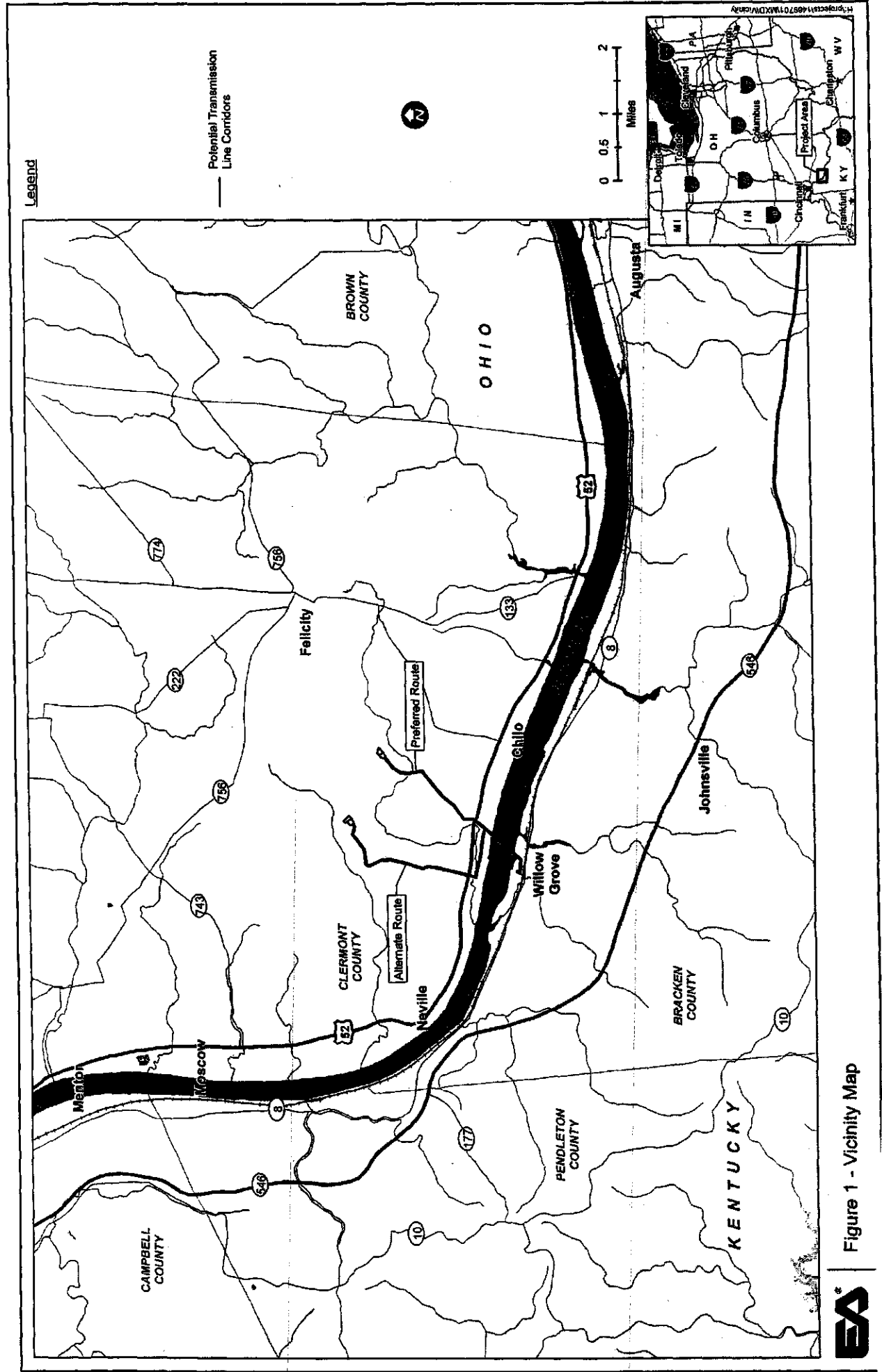


Figure 1 - Vicinity Map

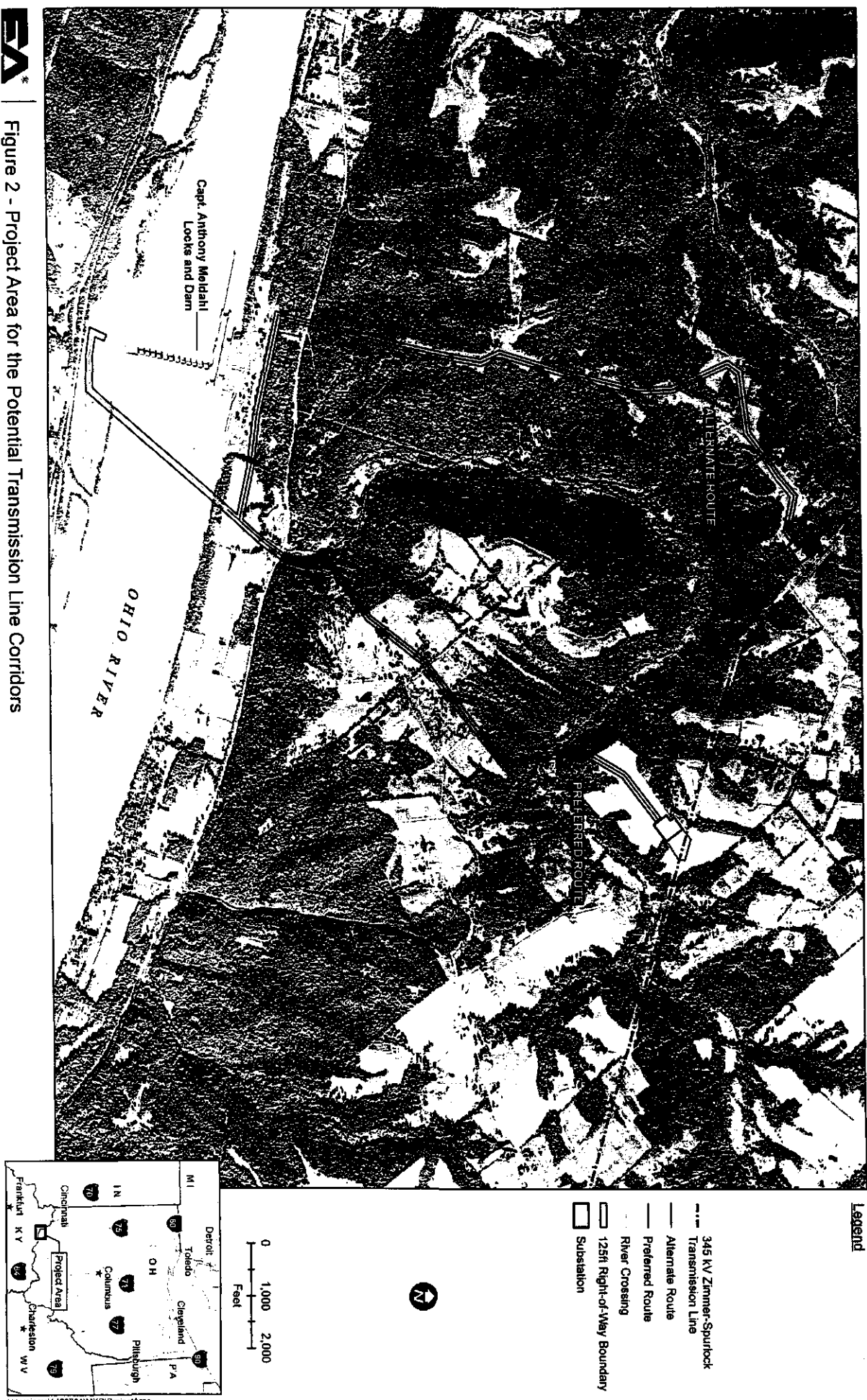




Figure 3 - Ecoregion Map with Potential Transmission Line Corridors

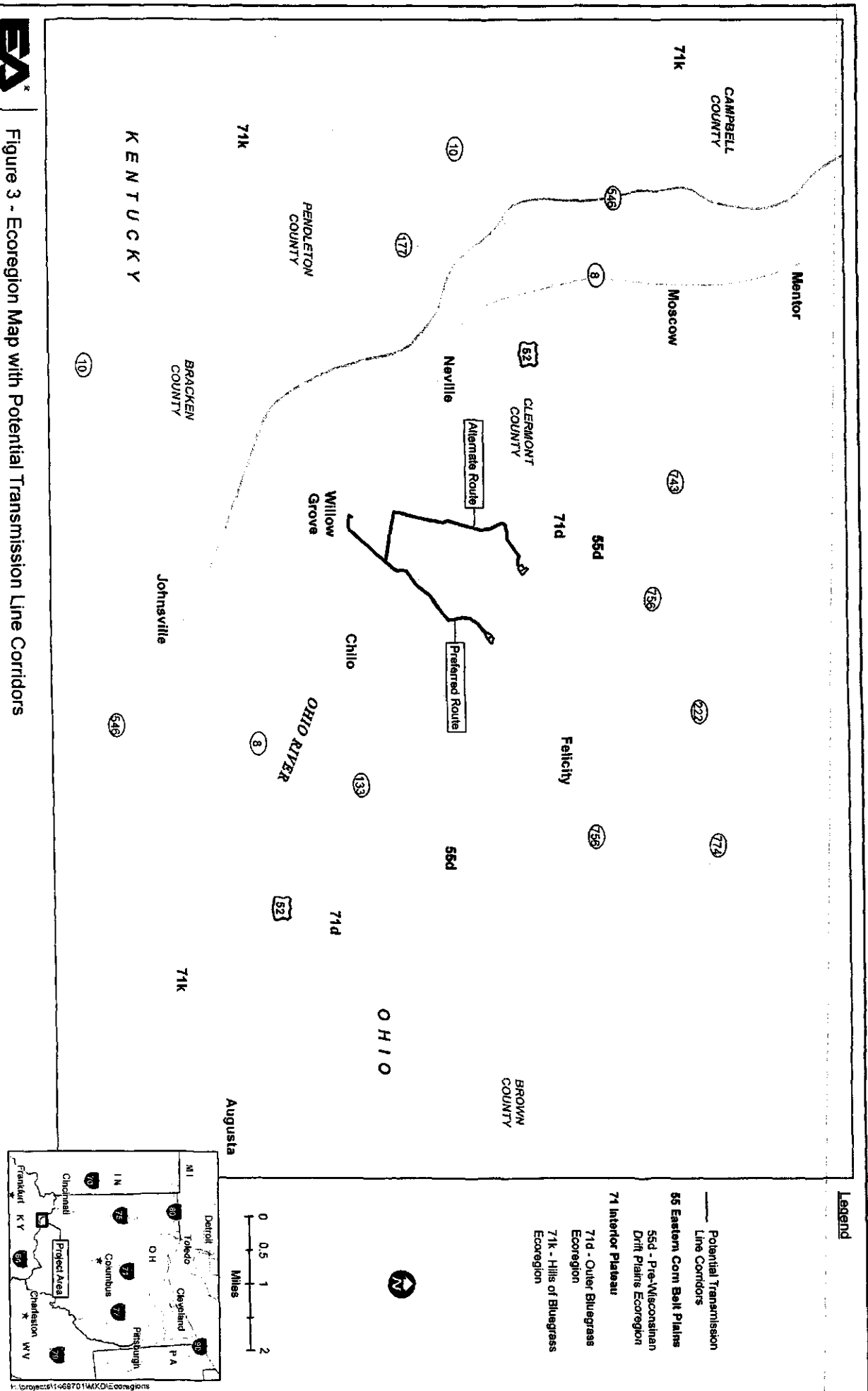




Figure 4. Habitats Surveyed for RTE Plant Species in Ohio



APPENDIX A
RTE PLANT SURVEY DATA SHEETS



Habitat Survey: Meldahl Hydroelectric Project

Station: AG 1 Game Control: Survey Date: 09/14/2010 Survey Time: 13:34

Event: 2010 - 2011 Surveys Database ID: 30 Investigator: Leasure, King

X coord: Y coord: Dominant Habitat: agricultural field

Habitat Type: agricultural field

Status of all Plants and Wildlife Observed at Station, and Off-Station:

PLANT

Common Name	Latin name	Obs. Time	Native	Fed End	Fed Th	Fed SOC	State End	State Th	State SC	Global Herit.	State Herit.
GROUP: Deciduous canopy											
Box elder	<i>Acer negundo</i>	14:27	Y								
Tree-of-heaven	<i>Ailanthus altissima</i>	14:38	N								
Honey locust	<i>Gleditsia triacanthos</i>	14:25	Y								
Black walnut	<i>Juglans nigra</i>	14:15	Y								
Tulip poplar	<i>Liriodendron tulipifera</i>	14:27	Y								
GROUP: Herbaceous plants											
Wingstem	<i>Actinomeris alternifolia</i>	14:24	Y								
Red top grass	<i>Agrostis alba</i>	14:19	Y								
Green amaranth	<i>Amaranthus retroflexus</i>	13:37	Y								
Spreading dogbane	<i>Apocynum androsaemifolium</i>	14:46	Y								
Sweet Annie	<i>Artemisia annua</i>	14:19	Y								
Joint-head arthraxon	<i>Arthraxon hispidus</i>	14:27	N								
Common milkweed	<i>Asclepias syriaca</i>	13:39	Y								
Butterfly weed	<i>Asclepias tuberosa</i>	14:42	Y								
Beggar-ticks species	<i>Bidens sp.</i>	14:21	Y								
Canada thistle	<i>Cirsium arvense</i>	14:47	N								
Bull thistle	<i>Cirsium vulgare</i>	14:24	N								
Hardy ageratum	<i>Conoclinium coelestinum</i>	14:27	Y								
Nut sedge	<i>Cyperus esculentus</i>	13:50	Y								
Panicled tick-trefoil	<i>Desmodium paniculatum</i>	14:45	Y								
Crabgrass	<i>Digitaria sanguinalis</i>	13:35	Y								
Barnyard grass	<i>Echinochloa crus-galli</i>	13:37	N								
Daisy fleabane	<i>Erigeron annuus</i>	14:21	Y								
Horseweed	<i>Erigeron canadensis</i>	14:18	Y								
Hyssop-leaved boneset	<i>Eupatorium hyssopifolium</i>	14:27	Y								
Creeping jenny	<i>Lysimachia nummularia</i>	14:29	Y								
Alfalfa	<i>Medicago sativa</i>	13:41	N								
Yellow wood sorrel	<i>Oxalis europaea</i>	14:17	Y								
Common plantain	<i>Plantago major</i>	13:46	Y								
Pennsylvania smartweed	<i>Polygonum pensylvanicum</i>	13:37	Y								
Heal-all	<i>Prunella vulgaris</i>	14:24	Y								
Curly dock	<i>Rumex crispus</i>	13:34	Y								
Foxtail millet	<i>Setaria italica</i>	14:17	Y								
Johnson grass	<i>Sorghum halepense</i>	14:17	Y								
Common dandelion	<i>Taraxacum officinale</i>	13:58	Y								
Red clover	<i>Trifolium pratense</i>	14:49	N								
White clover	<i>Trifolium repens</i>	13:34	N								
New York ironweed	<i>Vernonia noveboracensis</i>	13:49	Y								
Dog violet	<i>Viola conspersa</i>	14:28	Y								
Common clotbur	<i>Xanthium chinense</i>	14:16	Y								
Corn	<i>Zea mays</i>	15:00	Y								
GROUP: Shrubs											
Multiflora rose	<i>Rosa multiflora</i>	14:21	N								



Habitat Survey: Meldahl Hydroelectric Project

Station: Game Control: Survey Date: Survey Time:

Event: Database ID: Investigator:

X coord: Y coord: Dominant Habitat:

Habitat Type:

Status of all Plants and Wildlife Observed at Station, and Off-Station:

PLANT

Common Name Latin name Obs. Time Native Fed End Fed Th Fed SOC State End State Th State SC Global Herit. State Herit.

GROUP: Vines

Bindweed species	<i>Convolvulus sp.</i>	14:21	Y													
Japanese honeysuckle	<i>Lonicera japonica</i>	14:29	N													
River-bank grape	<i>Vitis riparia</i>	14:30	Y													

Legal Category:

LE = Listed endangered

LT = Listed threatened

PDL = Proposed de-listing

SC = Special Concern (no legal status)

State Rank:

S1 = extremely rare, usually 5 or fewer populations per occurrences in the state.

S2 = very rare, usually 5-20 populations or occurrences in the state

S3 = rare to uncommon, 20-100 populations or occurrences in the state

S4 = common >100 populations or occurrences in the state

S5 = very common

SU = status uncertain

Global Rank:

G1 = Extremely rare throughout range

G2 = Very rare throughout range

G3 = Rare to common throughout range

G4 = Common throughout range

G5 = Very common throughout range



Habitat Survey: Meldahl Hydroelectric Project

Station: AG 110 Game Control: Survey Date: 09/30/2010 Survey Time: 9:39

Event: 2010 - 2011 Surveys Database ID: 35 Investigator: Leasure, Cockerham

X coord: Y coord: Dominant Habitat: agricultural field

Habitat Type: agricultural field

Status of all Plants and Wildlife Observed at Station, and Off-Station:

PLANT

Common Name	Latin name	Obs. Time	Native	Fed End	Fed Th	Fed SOC	State End	State Th	State SC	Global Herit.	State Herit.
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GROUP: Deciduous canopy

Box elder	<i>Acer negundo</i>	10:15	Y								
White ash	<i>Fraxinus americana</i>	9:46	Y								
Honey locust	<i>Gleditsia triacanthos</i>	10:04	Y								
Black cherry	<i>Prunus serotina</i>	10:15	Y								
Slippery elm	<i>Ulmus rubra</i>	10:12	Y								

GROUP: Herbaceous plants

Common yarrow	<i>Achillea millefolium</i>	10:02	Y								
Wingstem	<i>Actinomeris alternifolia</i>	10:19	Y								
Broom sedge	<i>Andropogon virginicus</i>	9:54	Y								
Common milkweed	<i>Asclepias syriaca</i>	9:46	Y								
Butterfly weed	<i>Asclepias tuberosa</i>	10:04	Y								
Starved aster	<i>Aster lateriflorus</i>	9:46	Y								
Nut sedge	<i>Cyperus esculentus</i>	9:54	Y								
Queen Anne's lace	<i>Daucus carota</i>	9:40	N								
Hairy small-leaf tricktrefoil	<i>Desmodium ciliare</i>	10:09	Y								
Deertongue grass	<i>Dichanthelium clandestinum</i>	10:26	Y								
Horseweed	<i>Erigeron canadensis</i>	10:09	Y								
White snakeroot	<i>Eupatorium rugosum</i>	10:27	Y								
White snakeroot	<i>Eupatorium rugosum</i>	9:46	Y								
Spotted St. John's wort	<i>Hypericum punctatum</i>	10:30	Y								
Wandlike bushclover	<i>Lespedeza intermedia</i>	10:10	Y								
English plantain	<i>Plantago lanceolata</i>	10:05	N								
Common plantain	<i>Plantago major</i>	9:48	Y								
Yellow bristle grass	<i>Setaria pumila</i>	9:39	N								
Horsenettle	<i>Solanum carolinense</i>	9:40	Y								
Goldenrod species	<i>Solidago spp.</i>	9:39	Y								
White heath aster	<i>Symphotrichum ericoides</i>	10:25	Y								
Common dandelion	<i>Taraxacum officinale</i>	9:47	Y								
White clover	<i>Trifolium repens</i>	9:48	N								
Purple-top grass	<i>Triodia flava</i>	9:39	Y								
New York ironweed	<i>Vernonia noveboracensis</i>	9:39	Y								

GROUP: Shrubs

Chinese Bushclover	<i>Lespedeza cuneata</i>	9:53	Y								
Multiflora rose	<i>Rosa multiflora</i>	9:40	N								
Allegheny blackberry	<i>Rubus allegheniensis</i>	9:40	Y								

GROUP: Vines

Japanese honeysuckle	<i>Lonicera japonica</i>	9:40	N								
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Legal Category:

LE = Listed endangered
LT = Listed threatened
PDL = Proposed de-listing

SC = Special Concern (no legal status)

State Rank:

S1 = extremely rare, usually 5 or fewer populations per occurrences in the state.
S2 = very rare, usually 5-20 populations or occurrences in the state
S3 = rare to uncommon, 20-100 populations or occurrences in the state
S4 = common >100 populations or occurrences in the state
S5 = very common
SU = status uncertain

Global Rank:

G1 = Extremely rare throughout range
G2 = Very rare throughout range
G3 = Rare to common throughout range
G4 = Common throughout range
G5 = Very common throughout range



Habitat Survey: Meldahl Hydroelectric Project

Station: AG 112 Game Control: Survey Date: 09/30/2010 Survey Time: 12:15

Event: 2010 - 2011 Surveys Database ID: 36 Investigator: Leasure, Cockerham

X coord: Y coord: Dominant Habitat: agricultural field

Habitat Type: agricultural field

Status of all Plants and Wildlife Observed at Station, and Off-Station:

PLANT

Common Name	Latin name	Obs. Time	Native	Fed End	Fed Th	Fed SOC	State End	State Th	State SC	Global Herit.	State Herit.
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GROUP: Deciduous canopy

White ash	<i>Fraxinus americana</i>	12:15	Y								
Slippery elm	<i>Ulmus rubra</i>	12:18	Y								

GROUP: Herbaceous plants

Three-seeded mercury	<i>Acalypha gracilens</i>	12:43	Y								
Common yarrow	<i>Achillea millefolium</i>	12:26	Y								
Indian hemp	<i>Apocynum cannabinum</i>	12:21	Y								
Small white aster	<i>Aster vimineus</i>	12:15	Y								
Canada thistle	<i>Cirsium arvense</i>	12:20	N								
Bull thistle	<i>Cirsium vulgare</i>	12:19	N								
Straw-colored flatsedge	<i>Cyperus strigosus</i>	12:19	Y								
Crabgrass	<i>Digitaria sanguinalis</i>	12:49	Y								
Buttonweed	<i>Diodia teres</i>	12:39	Y								
Barnyard grass	<i>Echinochloa crus-galli</i>	12:34	N								
White snakeroot	<i>Eupatorium rugosum</i>	12:27	Y								
Grass species	<i>Festuca sp.</i>	12:15	Y								
Wandlike bushclover	<i>Lespedeza intermedia</i>	12:26	Y								
English plantain	<i>Plantago lanceolata</i>	12:19	N								
Common plantain	<i>Plantago major</i>	12:19	Y								
Pennsylvania smartweed	<i>Polygonum pennsylvanicum</i>	12:34	Y								
Curly dock	<i>Rumex crispus</i>	12:18	Y								
Yellow bristle grass	<i>Setaria pumila</i>	12:19	N								
Prickly mallow	<i>Sida spinosa</i>	12:31	Y								
Horsenettle	<i>Solanum carolinense</i>	12:15	Y								
Goldenrod species	<i>Solidago spp.</i>	12:15	Y								
Common dandelion	<i>Taraxacum officinale</i>	12:21	Y								
Purple-top grass	<i>Triodia flava</i>	12:20	Y								
New York ironweed	<i>Vernonia noveboracensis</i>	12:21	Y								
Common blue violet	<i>Viola papilionacea</i>	12:41	Y								
Common clotbur	<i>Xanthium chinense</i>	13:44	Y								

GROUP: Shrubs

Chinese Bushclover	<i>Lespedeza cuneata</i>	12:46	Y								
Allegheny blackberry	<i>Rubus allegheniensis</i>	12:42	Y								

GROUP: Vines

Trumpet creeper	<i>Campsis radicans</i>	12:42	Y								
Hedge Bindweed	<i>Convolvulus sepium</i>	12:18	Y								
Morning glory species	<i>Ipomoea sp.</i>	12:24	Y								
Japanese honeysuckle	<i>Lonicera japonica</i>	12:15	N								
Virginia creeper	<i>Parthenocissus quinquefolia</i>	12:16	Y								

Legal Category:

LE = Listed endangered
LT = Listed threatened
PDL = Proposed de-listing

SC = Special Concern (no legal status)

State Rank:

S1 = extremely rare, usually 5 or fewer populations per occurrences in the state.
S2 = very rare, usually 5-20 populations or occurrences in the state
S3 = rare to uncommon, 20-100 populations or occurrences in the state
S4 = common >100 populations or occurrences in the state
S5 = very common
SU = status uncertain

Global Rank:

G1 = Extremely rare throughout range
G2 = Very rare throughout range
G3 = Rare to common throughout range
G4 = Common throughout range
G5 = Very common throughout range



Habitat Survey: Meldahl Hydroelectric Project

Station: **AG 115** Game Control: Survey Date: **10/01/2010** Survey Time: **11:02**

Event: **2010 - 2011 Surveys** Database ID: **37** Investigator: **Leasure, Cockerham**

X coord: Y coord: Dominant Habitat: **agricultural field**

Habitat Type: **agricultural field**

Status of all Plants and Wildlife Observed at Station, and Off-Station:

PLANT

Common Name	Latin name	Obs. Time	Native	Fed End	Fed Th	Fed SOC	State End	State Th	State SC	Global Herit.	State Herit.
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GROUP: Deciduous canopy

White ash	<i>Fraxinus americana</i>	11:04	Y								
Black walnut	<i>Juglans nigra</i>	11:02	Y								
Black locust	<i>Robinia pseudoacacia</i>	11:04	Y								
Slippery elm	<i>Ulmus rubra</i>	11:03	Y								

GROUP: Herbaceous plants

Broom sedge	<i>Andropogon virginicus</i>	11:03	Y								
Small white aster	<i>Aster vimineus</i>	11:03	Y								
Bull thistle	<i>Cirsium vulgare</i>	11:05	N								
Straw-colored flatsedge	<i>Cyperus strigosus</i>	11:03	Y								
Barnyard grass	<i>Echinochloa crus-galli</i>	11:02	N								
White snakeroot	<i>Eupatorium rugosum</i>	11:03	Y								
Grass species	<i>Festuca sp.</i>	11:02	Y								
Wandlike bushclover	<i>Lespedeza intermedia</i>	11:02	Y								
Yellow bristle grass	<i>Setaria pumila</i>	11:02	N								

GROUP: Shrubs

Chinese Bushclover	<i>Lespedeza cuneata</i>	11:02	Y								
Allegheny blackberry	<i>Rubus allegheniensis</i>	11:03	Y								

GROUP: Vines

Summer grape	<i>Vitis aestivalis</i>	11:04	Y								
Fox grape	<i>Vitis labrusca</i>	11:03	Y								

Legal Category:

LE = Listed endangered
LT = Listed threatened
PDL = Proposed de-listing

SC = Special Concern (no legal status)

State Rank:

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S2 = very rare, usually 5-20 populations or occurrences in the state
S3 = rare to uncommon, 20-100 populations or occurrences in the state
S4 = common > 100 populations or occurrences in the state
S5 = very common
SU = status uncertain

Global Rank:

G1 = Extremely rare throughout range
G2 = Very rare throughout range
G3 = Rare to common throughout range
G4 = Common throughout range
G5 = Very common throughout range



Habitat Survey: Meldahl Hydroelectric Project

Station: **AG 2** Game Control: Survey Date: **09/15/2010** Survey Time: **11:00**

Event: **2010 - 2011 Surveys** Database ID: **31** Investigator: **Leasure, King**

X coord: Y coord: Dominant Habitat: **agricultural field**

Habitat Type: **agricultural field**

Status of all Plants and Wildlife Observed at Station, and Off-Station:

PLANT

Common Name	Latin name	Obs. Time	Native	Fed End	Fed Th	Fed SOC	State End	State Th	State SC	Global Herit.	State Herit.
GROUP: Herbaceous plants											
Indian mallow	<i>Abutilon theophrasti</i>	11:06	N								
Green amaranth	<i>Amaranthus retroflexus</i>	11:26	Y								
Common ragweed	<i>Ambrosia artemisiifolia</i>	11:00	Y								
Giant ragweed	<i>Ambrosia trifida</i>	11:00	Y								
Sweet Annie	<i>Artemisia annua</i>	11:26	Y								
Lamb's quarters	<i>Chenopodium album</i>	11:06	Y								
Chicory	<i>Cichorium intybus</i>	11:00	N								
Poison hemlock	<i>Conium maculatum</i>	11:16	Y								
Nut sedge	<i>Cyperus esculentus</i>	11:06	Y								
Jimsonweed	<i>Datura stramonium</i>	11:26	N								
Queen Anne's lace	<i>Daucus carota</i>	11:00	N								
Crabgrass	<i>Digitaria sanguinalis</i>	11:34	Y								
Horseweed	<i>Erigeron canadensis</i>	11:06	Y								
Cleavers	<i>Galium aparine</i>	11:26	Y								
Yellow wood sorrel	<i>Oxalis europaea</i>	11:16	Y								
Pokeweed	<i>Phytolacca americana</i>	11:12	Y								
Common plantain	<i>Plantago major</i>	11:00	Y								
Pennsylvania smartweed	<i>Polygonum pensylvanicum</i>	11:06	Y								
Purslane	<i>Portulaca oleracea</i>	11:16	Y								
Curly dock	<i>Rumex crispus</i>	11:00	Y								
Hairy skullcap	<i>Scutellaria elliptica</i>	11:06	Y								
Foxtail millet	<i>Setaria italica</i>	11:16	Y								
Flat-top goldenrod	<i>Solidago graminifolia</i>	11:00	Y								
Johnson grass	<i>Sorghum halepense</i>	11:12	Y								
Common dandelion	<i>Taraxacum officinale</i>	11:12	Y								
Common mullein	<i>Verbascum thapsus</i>	11:12	N								
New York ironweed	<i>Vernonia noveboracensis</i>	11:12	Y								
Common clotbur	<i>Xanthium chinense</i>	11:16	Y								
Com	<i>Zea mays</i>	11:00	Y								

GROUP: Shrubs

Allegheny blackberry	<i>Rubus allegheniensis</i>	11:00	Y								
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GROUP: Vines

Trumpet creeper	<i>Campsis radicans</i>	11:30	Y								
Bindweed species	<i>Convolvulus sp.</i>	11:06	Y								
Ivy-leaved morning glory	<i>Ipomoea hederacea</i>	11:16	N								
Japanese honeysuckle	<i>Lonicera japonica</i>	11:00	N								
Poison ivy	<i>Toxicodendron radicans</i>	11:00	Y								

Legal Category:

LE = Listed endangered
LT = Listed threatened
PDL = Proposed de-listing

SC = Special Concern (no legal status)

State Rank:

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S4 = common >100 populations or occurrences in the state
S5 = very common
SU = status uncertain

Global Rank:

G1 = Extremely rare throughout range
G2 = Very rare throughout range
G3 = Rare to common throughout range
G4 = Common throughout range
G5 = Very common throughout range



Habitat Survey: Meldahl Hydroelectric Project

Station: **AG 3** Game Control: Survey Date: **09/15/2010** Survey Time: **15:27**
Event: **2010 - 2011 Surveys** Database ID: **32** Investigator: **Leasure, King**
X coord: Y coord: Dominant Habitat: **agricultural field**

Habitat Type: **agricultural field**

Status of all Plants and Wildlife Observed at Station, and Off-Station:

PLANT

Common Name	Latin name	Obs. Time	Native	Fed End	Fed Th	Fed SOC	State End	State Th	State SC	Global Herit.	State Herit.
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GROUP: Deciduous canopy

Sycamore	<i>Platanus occidentalis</i>	15:29	Y								
Black cherry	<i>Prunus serotina</i>	15:29	Y								

GROUP: Herbaceous plants

Wingstem	<i>Actinomeris alternifolia</i>	15:37	Y								
Red top grass	<i>Agrostis alba</i>	15:28	Y								
Green amaranth	<i>Amaranthus retroflexus</i>	15:36	Y								
Common ragweed	<i>Ambrosia artemisiifolia</i>	15:28	Y								
Broom sedge	<i>Andropogon virginicus</i>	15:28	Y								
Common burdock	<i>Arctium minus</i>	15:33	N								
Sweet Annie	<i>Artemisia annua</i>	15:33	Y								
Canada thistle	<i>Cirsium arvense</i>	15:36	N								
Bull thistle	<i>Cirsium vulgare</i>	15:36	N								
Hardy ageratum	<i>Conoclinium coelestinum</i>	15:28	Y								
Queen Anne's lace	<i>Daucus carota</i>	15:28	N								
Panicked tick-trefoil	<i>Desmodium paniculatum</i>	15:29	Y								
Crabgrass	<i>Digitaria sanguinalis</i>	15:33	Y								
Horseweed	<i>Erigeron canadensis</i>	15:29	Y								
Spotted touch-me-not	<i>Impatiens capensis</i>	15:44	Y								
Wild lettuce	<i>Lactuca canadensis</i>	15:29	Y								
Lobelia species	<i>Lobelia sp.</i>	15:29	Y								
English plantain	<i>Plantago lanceolata</i>	15:29	N								
Pennsylvania smartweed	<i>Polygonum pensylvanicum</i>	15:36	Y								
Curly dock	<i>Rumex crispus</i>	15:33	Y								
Foxtail grass	<i>Setaria faberi</i>	15:29	N								
Foxtail millet	<i>Setaria italica</i>	15:36	Y								
Rough-stemmed goldenrod	<i>Solidago rugosa</i>	15:28	Y								
Red clover	<i>Trifolium pratense</i>	15:29	N								
White clover	<i>Trifolium repens</i>	15:36	N								
New York ironweed	<i>Vernonia noveboracensis</i>	15:28	Y								
Common clotbur	<i>Xanthium chinense</i>	15:29	Y								

GROUP: Shrubs

Allegheny blackberry	<i>Rubus allegheniensis</i>	15:29	Y								
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GROUP: Vines

Summer grape	<i>Vitis aestivalis</i>	15:29	Y								
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Legal Category:

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PDL = Proposed de-listing

State Rank:

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S4 = common >100 populations or occurrences in the state
S5 = very common
SU = status uncertain

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G3 = Rare to common throughout range
G4 = Common throughout range
G5 = Very common throughout range

SC = Special Concern (no legal status)



Habitat Survey: Meldahl Hydroelectric Project

Station: DEC 1 Game Control: Survey Date: 09/14/2010 Survey Time: 11:49

Event: 2010 - 2011 Surveys Database ID: 16 Investigator: Leasure, King

X coord: Y coord: Dominant Habitat: deciduous woodland

Habitat Type: deciduous woodland

Status of all Plants and Wildlife Observed at Station, and Off-Station:

PLANT

Common Name Latin name Obs. Time Native Fed End Fed Th Fed SOC State End State Th State SC Global Herit. State Herit.

GROUP: Coniferous canopy

Eastern red cedar	<i>Juniperus virginiana</i>	12:11	Y												
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GROUP: Deciduous canopy

Box elder	<i>Acer negundo</i>	11:49	Y												
Silver maple	<i>Acer saccharinum</i>	11:49	Y												
Tree-of-heaven	<i>Ailanthus altissima</i>	11:58	N												
Common pawpaw	<i>Asimina triloba</i>	11:50	Y												
Pignut hickory	<i>Carya glabra</i>	11:55	Y												
Shagbark hickory	<i>Carya ovata</i>	12:53	Y												
Honey locust	<i>Gleditsia triacanthos</i>	12:04	Y												
Black walnut	<i>Juglans nigra</i>	12:30	Y												
Tulip poplar	<i>Liriodendron tulipifera</i>	12:44	Y												
Sycamore	<i>Platanus occidentalis</i>	11:49	Y												
Eastern cottonwood	<i>Populus deltoides</i>	12:15	Y												
Black cherry	<i>Prunus serotina</i>	12:10	Y												
Black locust	<i>Robinia pseudoacacia</i>	11:55	Y												
Slippery elm	<i>Ulmus rubra</i>	11:55	Y												

GROUP: Herbaceous plants

Wingstem	<i>Actinomeris alternifolia</i>	11:51	Y												
Garlic mustard	<i>Alliaria petiolata</i>	11:58	N												
Giant ragweed	<i>Ambrosia trifida</i>	13:15	Y												
New York aster	<i>Aster novi-belgii</i>	15:10	Y												
Tickseed sunflower	<i>Bidens coronata</i>	13:56	Y												
Poison hemlock	<i>Conium maculatum</i>	13:56	Y												
Hardy ageratum	<i>Conoclinium coelestinum</i>	13:55	Y												
Wild teasel	<i>Dipsacus sylvestris</i>	15:13	N												
Virginia wildrye	<i>Elymus virginicus</i>	11:51	Y												
White snakeroot	<i>Eupatorium rugosum</i>	11:58	Y												
Ground ivy	<i>Glechoma hederacea</i>	11:54	N												
Daylily	<i>Hemerocallis fulva</i>	11:54	N												
Spotted touch-me-not	<i>Impatiens capensis</i>	13:55	Y												
Wood Nettle	<i>Laportea canadensis</i>	14:05	Y												
Lobelia species	<i>Lobelia sp.</i>	13:55	Y												
Creeping jenny	<i>Lysimachia nummularia</i>	11:51	Y												
Nepalese browntop	<i>Microstegium vimineum</i>	11:53	N												
American lopseed	<i>Phryma leptostachya</i>	14:05	Y												
Pokeweed	<i>Phytolacca americana</i>	13:58	Y												
Clearweed	<i>Pilea pumila</i>	13:15	Y												
Black-eyed susan	<i>Rudbeckia serotina</i>	11:54	Y												
Rough-stemmed goldenrod	<i>Solidago rugosa</i>	13:56	Y												
Goldenrod species	<i>Solidago spp.</i>	15:13	Y												
Virginia knotweed	<i>Tovara virginiana</i>	11:53	Y												
Spiderwort species	<i>Tradescantia sp.</i>	14:07	Y												
Stinging nettle	<i>Urtica dioica</i>	13:56	Y												
New York ironweed	<i>Vernonia noveboracensis</i>	12:00	Y												



Habitat Survey: Meldahl Hydroelectric Project

Station: DEC 1 Game Control: Survey Date: 09/14/2010 Survey Time: 11:49

Event: 2010 - 2011 Surveys Database ID: 16 Investigator: Leasure, King

X coord: Y coord: Dominant Habitat: deciduous woodland

Habitat Type: deciduous woodland

Status of all Plants and Wildlife Observed at Station, and Off-Station:

PLANT

Common Name	Latin name	Obs. Time	Native	Fed End	Fed Th	Fed SOC	State End	State Th	State SC	Global Herit.	State Herit.
GROUP: Shrubs											
Bush honeysuckle	<i>Diervilla lonicera</i>	12:12	Y								
Spicebush	<i>Lindera benzoin</i>	12:19	Y								
Red mulberry	<i>Morus rubra</i>	12:04	Y								
Multiflora rose	<i>Rosa multiflora</i>	11:58	N								
Black raspberry	<i>Rubus occidentalis</i>	12:10	Y								
Common elder	<i>Sambucus canadensis</i>	13:20	Y								

GROUP: Vines

Bindweed species	<i>Convolvulus sp.</i>	11:54	Y								
Crown vetch	<i>Coronilla varia</i>	12:10	N								
Euonymous species	<i>Euonymous sp.</i>	12:35	Y								
Japanese honeysuckle	<i>Lonicera japonica</i>	11:58	N								
Virginia creeper	<i>Parthenocissus quinquefolia</i>	12:22	Y								
Greenbrier	<i>Smilax rotundifolia</i>	12:38	Y								
Poison ivy	<i>Toxicodendron radicans</i>	11:49	Y								
Summer grape	<i>Vitis aestivalis</i>	12:04	Y								

Legal Category:

LE= Listed endangered

LT = Listed threatened

PDL = Proposed de-listing

SC = Special Concern (no legal status)

State Rank:

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S5 = very common

SU = status uncertain

Global Rank:

G1= Extremely rare throughout range

G2= Very rare throughout range

G3= Rare to common throughout range

G4= Common throughout range

G5= Very common throughout range



Habitat Survey: Meldahl Hydroelectric Project

Station: DEC 111 Game Control: Survey Date: 09/30/2010 Survey Time: 10:31
 Event: 2010 - 2011 Surveys Database ID: 27 Investigator: Leasure, Cockerham
 X coord: Y coord: Dominant Habitat: deciduous woodland

Habitat Type: deciduous woodland

Status of all Plants and Wildlife Observed at Station, and Off-Station:

PLANT

Common Name Latin name Obs. Time Native Fed End Fed Th Fed SOC State End State Th State SC Global Herit. State Herit.

GROUP: Deciduous canopy

Box elder	<i>Acer negundo</i>	10:34	Y									
Sugar maple	<i>Acer saccharum</i>	10:34	Y									
Tree-of-heaven	<i>Ailanthus altissima</i>	10:33	N									
Bitternut hickory	<i>Carya cordiformis</i>	10:52	Y									
White ash	<i>Fraxinus americana</i>	10:31	Y									
Black walnut	<i>Juglans nigra</i>	10:31	Y									
Sycamore	<i>Platanus occidentalis</i>	10:35	Y									
Black cherry	<i>Prunus serotina</i>	10:31	Y									
White oak	<i>Quercus alba</i>	10:35	Y									
Basket oak	<i>Quercus michauxii</i>	10:51	Y									
Black locust	<i>Robinia pseudoacacia</i>	10:31	Y									
Sassafras	<i>Sassafras albidum</i>	10:53	Y									
Slippery elm	<i>Ulmus rubra</i>	10:48	Y									

GROUP: Herbaceous plants

Wingstem	<i>Actinomeris alternifolia</i>	10:34	Y									
Garlic mustard	<i>Alliaria petiolata</i>	10:34	N									
White snakeroot	<i>Eupatorium rugosum</i>	10:34	Y									
Fringed loosestrife	<i>Lysimachia ciliata</i>	10:49	Y									
Nepalese browntop	<i>Microstegium vimineum</i>	10:50	N									
Pennsylvania smartweed	<i>Polygonum pennsylvanicum</i>	10:50	Y									
New York ironweed	<i>Vernonia noveboracensis</i>	10:48	Y									

GROUP: Shrubs

Buttonbush	<i>Cephalanthus occidentalis</i>	10:34	Y									
Spicebush	<i>Lindera benzoin</i>	10:48	Y									
Tatarian bush honeysuckle	<i>Lonicera tatarica</i>	10:34	Y									
Multiflora rose	<i>Rosa multiflora</i>	10:34	N									
Allegheny blackberry	<i>Rubus allegheniensis</i>	10:53	Y									
Black raspberry	<i>Rubus occidentalis</i>	10:34	Y									

GROUP: Vines

Japanese honeysuckle	<i>Lonicera japonica</i>	10:34	N									
Greenbrier	<i>Smilax rotundifolia</i>	10:34	Y									
Poison ivy	<i>Toxicodendron radicans</i>	10:49	Y									

Legal Category:

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 PDL = Proposed de-listing

SC = Special Concern (no legal status)

State Rank:

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 S4 = common >100 populations or occurrences in the state
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Global Rank:

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 G4 = Common throughout range
 G5 = Very common throughout range



Habitat Survey: Meldahl Hydroelectric Project

Station: DEC 113 Game Control: Survey Date: 09/30/2010 Survey Time: 12:51

Event: 2010 - 2011 Surveys Database ID: 28 Investigator: Leasure, Cockerham

X coord: Y coord: Dominant Habitat: deciduous woodland

Habitat Type: deciduous woodland

Status of all Plants and Wildlife Observed at Station, and Off-Station:

PLANT

Common Name Latin name Obs. Time Native Fed End Fed Th Fed SOC State End State Th State SC Global Herit. State Herit.

GROUP: Deciduous canopy

Box elder	<i>Acer negundo</i>	12:51	Y												
Sugar maple	<i>Acer saccharum</i>	12:52	Y												
Common pawpaw	<i>Asimina triloba</i>	12:53	Y												
Shagbark hickory	<i>Carya ovata</i>	14:01	Y												
White ash	<i>Fraxinus americana</i>	12:51	Y												
Honey locust	<i>Gleditsia triacanthos</i>	12:53	Y												
Tulip poplar	<i>Liriodendron tulipifera</i>	13:08	Y												
Osage orange	<i>Maclura pomifera</i>	12:54	Y												
Sycamore	<i>Platanus occidentalis</i>	13:12	Y												
Shingle Oak	<i>Quercus imbricaria</i>	14:01	Y												
Bur oak	<i>Quercus macrocarpa</i>	14:01	Y											G5	S1
Northern red oak	<i>Quercus rubra</i>	12:51	Y												
Black locust	<i>Robinia pseudoacacia</i>	12:53	Y												
Slippery elm	<i>Ulmus rubra</i>	12:59	Y												

GROUP: Herbaceous plants

Wingstem	<i>Actinomeris alternifolia</i>	13:10	Y												
Small-flowered agrimony	<i>Agrimonia parviflora</i>	13:07	Y												
Small white aster	<i>Aster vimineus</i>	13:07	Y												
Cress species	<i>Cardamine sp.</i>	13:28	Y												
Brownray knapweed	<i>Centaurea jacea</i>	13:52	Y												
Canada thistle	<i>Cirsium arvense</i>	13:08	N												
Deertongue grass	<i>Dichanthelium clandestinum</i>	12:51	Y												
White snakeroot	<i>Eupatorium rugosum</i>	12:52	Y												
Spotted touch-me-not	<i>Impatiens capensis</i>	13:12	Y												
Lobelia species	<i>Lobelia sp.</i>	13:20	Y												
Nepalese browntop	<i>Microstegium vimineum</i>	13:07	N												
Sharpwing monkeyflower	<i>Mimulus alatus</i>	13:29	Y												
Pokeweed	<i>Phytolacca americana</i>	13:54	Y												
Clearweed	<i>Pilea pumila</i>	14:01	Y												
Lady's thumb	<i>Polygonum persicaria</i>	13:12	N												
Christmas fern	<i>Polystichum acrostichoides</i>	13:55	Y												
Virginia knotweed	<i>Tovara virginiana</i>	13:13	Y												
Blue vervain	<i>Verbena hastata</i>	14:01	Y												

GROUP: Shrubs

Japanese barberry	<i>Berberis thunbergii</i>	13:11	N												
Buttonbush	<i>Cephalanthus occidentalis</i>	12:51	Y												
Chinese Bushclover	<i>Lespedeza cuneata</i>	13:53	Y												
Spicebush	<i>Lindera benzoin</i>	12:52	Y												
Tartarian honeysuckle	<i>Lonicera tatarica</i>	12:53	Y												
Multiflora rose	<i>Rosa multiflora</i>	12:52	N												
Allegheny blackberry	<i>Rubus allegheniensis</i>	12:56	Y												
Black raspberry	<i>Rubus occidentalis</i>	13:05	Y												

GROUP: Understory

Redbud	<i>Cercis canadensis</i>	14:01	Y												
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Habitat Survey: Meldahl Hydroelectric Project

Station: **DEC 113** Game Control: Survey Date: **09/30/2010** Survey Time: **12:51**
 Event: **2010 - 2011 Surveys** Database ID: **28** Investigator: **Leasure, Cockerham**
 X coord: Y coord: Dominant Habitat: **deciduous woodland**

Habitat Type: **deciduous woodland**

Status of all Plants and Wildlife Observed at Station, and Off-Station:

PLANT

Common Name	Latin name	Obs. Time	Native	Fed End	Fed Th	Fed SOC	State End	State Th	State SC	Global Herit.	State Herit.
GROUP: Vines											
Japanese honeysuckle	<i>Lonicera japonica</i>	12:51	N								
Greenbrier	<i>Smilax rotundifolia</i>	12:51	Y								
Poison ivy	<i>Toxicodendron radicans</i>	13:09	Y								
Fox grape	<i>Vitis labrusca</i>	13:06	Y								

Legal Category:

LE= Listed endangered
 LT = Listed threatened
 PDL = Proposed de-listing

SC = Special Concern (no legal status)

State Rank:

S1 = extremely rare, usually 5 or fewer populations per occurrences in the state.
 S2 = very rare, usually 5-20 populations or occurrences in the state
 S3 = rare to uncommon, 20-100 populations or occurrences in the state
 S4 = common >100 populations or occurrences in the state
 S5 = very common
 SU = status uncertain

Global Rank:

G1= Extremely rare throughout range
 G2= Very rare throughout range
 G3= Rare to common throughout range
 G4= Common throughout range
 G5= Very common throughout range



Habitat Survey: Meldahl Hydroelectric Project

Station: DEC 114 Game Control: Survey Date: 10/01/2010 Survey Time: 9:30

Event: 2010 - 2011 Surveys Database ID: 29 Investigator: Leasure, Cockerham

X coord: Y coord: Dominant Habitat: deciduous woodland

Habitat Type: deciduous woodland

Status of all Plants and Wildlife Observed at Station, and Off-Station:

PLANT

Common Name Latin name Obs. Time Native Fed End Fed Th Fed SOC State End State Th State SC Global Herit. State Herit.

GROUP: Coniferous canopy

Eastern red cedar	<i>Juniperus virginiana</i>	9:30	Y							
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GROUP: Deciduous canopy

Box elder	<i>Acer negundo</i>	9:30	Y							
Sugar maple	<i>Acer saccharum</i>	9:30	Y							
Common pawpaw	<i>Asimina triloba</i>	9:33	Y							
Bitternut hickory	<i>Carya cordiformis</i>	9:30	Y							
Shagbark hickory	<i>Carya ovata</i>	9:52	Y							
Mockernut hickory	<i>Carya tomentosa</i>	9:50	Y							
American beech	<i>Fagus grandifolia</i>	9:46	Y							
White ash	<i>Fraxinus americana</i>	9:34	Y							
White walnut	<i>Juglans cinerea</i>	9:50	Y							
Black walnut	<i>Juglans nigra</i>	9:30	Y							
Black cherry	<i>Prunus serotina</i>	9:32	Y							
White oak	<i>Quercus alba</i>	9:52	Y							
Basket oak	<i>Quercus michauxii</i>	9:43	Y							
Northern red oak	<i>Quercus rubra</i>	9:31	Y							
Black locust	<i>Robinia pseudoacacia</i>	9:30	Y							
Slippery elm	<i>Ulmus rubra</i>	9:34	Y							

GROUP: Herbaceous plants

Garlic mustard	<i>Alliaria petiolata</i>	9:33	N							
Indian hemp	<i>Apocynum cannabinum</i>	9:31	Y							
New York aster	<i>Aster novi-belgii</i>	9:30	Y							
Deertongue grass	<i>Dichanthelium clandestinum</i>	9:32	Y							
Virginia wildrye	<i>Elymus virginicus</i>	9:34	Y							
White snakeroot	<i>Eupatorium rugosum</i>	9:32	Y							
Fringed loosestrife	<i>Lysimachia ciliata</i>	9:33	Y							
Nepalese browntop	<i>Microstegium vimineum</i>	10:42	N							
Goldenrod species	<i>Solidago spp.</i>	9:31	Y							
Virginia knotweed	<i>Tovara virginiana</i>	10:42	Y							
Blue vervain	<i>Verbena hastata</i>	11:00	Y							

GROUP: Shrubs

Buttonbush	<i>Cephalanthus occidentalis</i>	9:53	Y							
Spicebush	<i>Lindera benzoin</i>	9:44	Y							
Tatarian bush honeysuckle	<i>Lonicera tatarica</i>	9:30	Y							
Allegheny blackberry	<i>Rubus allegheniensis</i>	9:32	Y							

GROUP: Understory

Redbud	<i>Cercis canadensis</i>	9:30	Y							
Flowering dogwood	<i>Cornus florida</i>	9:41	Y							

GROUP: Vines

Crossvine	<i>Bignonia capreolata</i>	9:40	Y							
Trumpet creeper	<i>Campsis radicans</i>	9:33	Y							
Winter creeper	<i>Euonymus fortunei</i>	9:48	N							
Japanese honeysuckle	<i>Lonicera japonica</i>	9:33	N							
Greenbrier	<i>Smilax rotundifolia</i>	9:43	Y							



Habitat Survey: Meldahl Hydroelectric Project

Station: Game Control: Survey Date: Survey Time:
 Event: Database ID: Investigator:
 X coord: Y coord: Dominant Habitat:

Habitat Type: deciduous woodland

Status of all Plants and Wildlife Observed at Station, and Off-Station:

PLANT

Common Name	Latin name	Obs. Time	Native	Fed End	Fed Th	Fed SOC	State End	State Th	State SC	Global Herit.	State Herit.
Poison ivy	<i>Toxicodendron radicans</i>	9:32	Y								
Fox grape	<i>Vitis labrusca</i>	10:00	Y								

Legal Category:

LE = Listed endangered

LT = Listed threatened

PDL = Proposed de-listing

SC = Special Concern (no legal status)

State Rank:

S1 = extremely rare, usually 5 or fewer populations per occurrences in the state.

S2 = very rare, usually 5-20 populations or occurrences in the state

S3 = rare to uncommon, 20-100 populations or occurrences in the state

S4 = common >100 populations or occurrences in the state

S5 = very common

SU = status uncertain

Global Rank:

G1 = Extremely rare throughout range

G2 = Very rare throughout range

G3 = Rare to common throughout range

G4 = Common throughout range

G5 = Very common throughout range



Habitat Survey: Meldahl Hydroelectric Project

Station: DEC 2 Game Control: Survey Date: 09/14/2010 Survey Time: 17:10

Event: 2010 - 2011 Surveys Database ID: 17 Investigator: Leasure, King

X coord: Y coord: Dominant Habitat: deciduous woodland

Habitat Type: deciduous woodland

Status of all Plants and Wildlife Observed at Station, and Off-Station:

PLANT

Common Name	Latin name	Obs. Time	Native	Fed End	Fed Th	Fed SOC	State End	State Th	State SC	Global Herit.	State Herit.
GROUP: Coniferous canopy											
Eastern red cedar	<i>Juniperus virginiana</i>	17:39	Y								
GROUP: Deciduous canopy											
Box elder	<i>Acer negundo</i>	17:11	Y								
Silver maple	<i>Acer saccharinum</i>	17:10	Y								
Common pawpaw	<i>Asimina triloba</i>	17:11	Y								
Shagbark hickory	<i>Carya ovata</i>	17:14	Y								
Sycamore	<i>Platanus occidentalis</i>	17:10	Y								
Bigtooth aspen	<i>Populus grandidentata</i>	17:10	Y								
Black cherry	<i>Prunus serotina</i>	17:38	Y								
Black oak	<i>Quercus velutina</i>	17:20	Y								
Black locust	<i>Robinia pseudoacacia</i>	17:17	Y								
Slippery elm	<i>Ulmus rubra</i>	17:15	Y								
GROUP: Herbaceous plants											
Wingstem	<i>Actinomeris alternifolia</i>	17:14	Y								
Garlic mustard	<i>Alliaria petiolata</i>	17:22	N								
Spreading dogbane	<i>Apocynum androsaemifolium</i>	17:33	Y								
Small-spike false nettle	<i>Boehmeria cylindrica</i>	17:16	Y								
Greater bladder sedge	<i>Carex intumescens</i>	17:22	Y								
Deertongue grass	<i>Dichanthelium clandestinum</i>	17:17	Y								
Virginia wildrye	<i>Elymus virginicus</i>	17:13	Y								
Ground ivy	<i>Glechoma hederacea</i>	17:12	N								
Swamp rose-mallow	<i>Hibiscus moscheutos</i>	17:39	Y								
Wood Nettle	<i>Laportea canadensis</i>	17:23	Y								
Creeping jenny	<i>Lysimachia nummularia</i>	17:14	Y								
Nepalese browntop	<i>Microstegium vimineum</i>	17:18	N								
Pokeweed	<i>Phytolacca americana</i>	17:39	Y								
Clearweed	<i>Pilea pumila</i>	17:13	Y								
Pennsylvania smartweed	<i>Polygonum pennsylvanicum</i>	17:14	Y								
Goldenrod species	<i>Solidago spp.</i>	17:11	Y								
GROUP: Shrubs											
Bush honeysuckle	<i>Diervilla lonicera</i>	17:12	Y								
Privet species	<i>Ligustrum vulgare</i>	17:11	N								
Spicebush	<i>Lindera benzoin</i>	17:11	Y								
Multiflora rose	<i>Rosa multiflora</i>	17:13	N								
Black raspberry	<i>Rubus occidentalis</i>	17:39	Y								
GROUP: Vines											
Trumpet creeper	<i>Campsis radicans</i>	17:11	Y								
Euonymous species	<i>Euonymous sp.</i>	17:35	Y								
Japanese honeysuckle	<i>Lonicera japonica</i>	17:12	N								
Bristly greenbrier	<i>Smilax tamnoides</i>	17:13	Y								
Summer grape	<i>Vitis aestivalis</i>	17:14	Y								



Habitat Survey: Meldahl Hydroelectric Project

Station: Game Control: Survey Date: Survey Time:
Event: Database ID: Investigator:
X coord: Y coord: Dominant Habitat:

Habitat Type: deciduous woodland

Status of all Plants and Wildlife Observed at Station, and Off-Station:

Legal Category:

LE= Listed endangered

LT = Listed threatened

PDL = Proposed de-listing

SC = Special Concern (no legal status)

State Rank:

S1 = extremely rare, usually 5 or fewer populations per occurrences in the state.

S2 =very rare, usually 5-20 populations or occurrences in the state

S3 =rare to uncommon, 20-100 populations or occurrences in the state

S4 =common >100 populations or occurrences in the state

S5 = very common

SU = status uncertain

Global Rank:

G1= Extremely rare throughout range

G2= Very rare throughout range

G3= Rare to common throughout range

G4= Common throughout range

G5= Very common throughout range



Habitat Survey: Meldahl Hydroelectric Project

Station: DEC 201 Game Control: Survey Date: 02/22/2011 Survey Time: 16:37
 Event: 2010 - 2011 Surveys Database ID: 40 Investigator: Leasure, Cockerham
 X coord: Y coord: Dominant Habitat: deciduous woodland

Habitat Type: deciduous woodland

Status of all Plants and Wildlife Observed at Station, and Off-Station:

PLANT

Common Name	Latin name	Obs. Time	Native	Fed End	Fed Th	Fed SOC	State End	State Th	State SC	Global Herit.	State Herit.
GROUP: Coniferous canopy											
Eastern red cedar	<i>Juniperus virginiana</i>	16:39	Y								
GROUP: Deciduous canopy											
Red maple	<i>Acer rubrum</i>	16:38	Y								
Sugar maple	<i>Acer saccharum</i>	17:05	Y								
Tree-of-heaven	<i>Ailanthus altissima</i>	16:38	N								
Common pawpaw	<i>Asimina triloba</i>	16:38	Y								
Bitternut hickory	<i>Carya cordiformis</i>	17:27	Y								
White ash	<i>Fraxinus americana</i>	16:44	Y								
White walnut	<i>Juglans cinerea</i>	17:16	Y								
Black walnut	<i>Juglans nigra</i>	16:37	Y								
Tulip poplar	<i>Liriodendron tulipifera</i>	17:44	Y								
Osage orange	<i>Maclura pomifera</i>	16:40	Y								
Sycamore	<i>Platanus occidentalis</i>	17:26	Y								
Black cherry	<i>Prunus serotina</i>	16:41	Y								
Northern red oak	<i>Quercus rubra</i>	17:15	Y								
Black locust	<i>Robinia pseudoacacia</i>	16:42	Y								
Slippery elm	<i>Ulmus rubra</i>	16:48	Y								
GROUP: Herbaceous plants											
Wingstem	<i>Actinomeris alternifolia</i>	16:46	Y								
Garlic mustard	<i>Alliaria petiolata</i>	16:46	N								
Deertongue grass	<i>Dichanthelium clandestinum</i>	16:50	Y								
Jerusalem artichoke	<i>Helianthus tuberosus</i>	16:42	Y								
Bottle-brush grass	<i>Hystrix patula</i>	16:42	Y								
Eastern beebalm	<i>Monarda bradburiana</i>	17:26	Y								
Christmas fern	<i>Polystichum acrostichoides</i>	17:15	Y								
New York ironweed	<i>Vernonia noveboracensis</i>	16:42	Y								
GROUP: Shrubs											
Buttonbush	<i>Cephalanthus occidentalis</i>	16:39	Y								
Common winterberry	<i>Ilex verticillata</i>	17:16	Y								
Spicebush	<i>Lindera benzoin</i>	16:37	Y								
Tatarian bush honeysuckle	<i>Lonicera tatarica</i>	17:46	Y								
Multiflora rose	<i>Rosa multiflora</i>	16:42	N								
Black raspberry	<i>Rubus occidentalis</i>	16:44	Y								
GROUP: Vines											
Winter creeper	<i>Euonymus fortunei</i>	16:37	N								
English ivy	<i>Hedera helix</i>	16:45	N								
Japanese honeysuckle	<i>Lonicera japonica</i>	16:37	N								
Virginia creeper	<i>Parthenocissus quinquefolia</i>	17:44	Y								
Poison ivy	<i>Toxicodendron radicans</i>	17:45	Y								
Fox grape	<i>Vitis labrusca</i>	16:38	Y								
Grape species	<i>Vitis spp.</i>	16:49	Y								



Habitat Survey: Meldahl Hydroelectric Project

Station: DEC 201 Game Control: Survey Date: 02/22/2011 Survey Time: 16:37

Event: 2010 - 2011 Surveys Database ID: 40 Investigator: Leasure, Cockerham

X coord: Y coord: Dominant Habitat: deciduous woodland

Habitat Type: deciduous woodland

Status of all Plants and Wildlife Observed at Station, and Off-Station:

Legal Category:

LE= Listed endangered

LT = Listed threatened

PDL = Proposed de-listing

SC = Special Concern (no legal status)

State Rank:

S1 = extremely rare, usually 5 or fewer populations per occurrences in the state.

S2 =very rare, usually 5-20 populations or occurrences in the state

S3 =rare to uncommon, 20-100 populations or occurrences in the state

S4 =common >100 populations or occurrences in the state

S5 = very common

SU = status uncertain

Global Rank:

G1= Extremely rare throughout range

G2= Very rare throughout range

G3= Rare to common throughout range

G4= Common throughout range

G5= Very common throughout range



Habitat Survey: Meldahl Hydroelectric Project

Station: DEC 202 Game Control: Survey Date: 02/23/2011 Survey Time: 17:16

Event: 2010 - 2011 Surveys Database ID: 41 Investigator: Leasure, Cockerham

X coord: Y coord: Dominant Habitat: deciduous woodland

Habitat Type: deciduous woodland

Status of all Plants and Wildlife Observed at Station, and Off-Station:

PLANT

Common Name	Latin name	Obs. Time	Native	Fed End	Fed Th	Fed SOC	State End	State Th	State SC	Global Herit.	State Herit.
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GROUP: Coniferous canopy

Eastern red cedar	<i>Juniperus virginiana</i>	17:16	Y								
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GROUP: Deciduous canopy

Box elder	<i>Acer negundo</i>	17:21	Y								
Red maple	<i>Acer rubrum</i>	17:17	Y								
Sugar maple	<i>Acer saccharum</i>	17:31	Y								
Common pawpaw	<i>Asimina triloba</i>	17:17	Y								
White ash	<i>Fraxinus americana</i>	17:16	Y								
Honey locust	<i>Gleditsia triacanthos</i>	17:21	Y								
Black walnut	<i>Juglans nigra</i>	17:16	Y								
Osage orange	<i>Maclura pomifera</i>	17:29	Y								
Sycamore	<i>Platanus occidentalis</i>	17:29	Y								
Black cherry	<i>Prunus serotina</i>	17:17	Y								
White oak	<i>Quercus alba</i>	17:18	Y								
Northern red oak	<i>Quercus rubra</i>	17:21	Y								
Black locust	<i>Robinia pseudoacacia</i>	17:22	Y								
Slippery elm	<i>Ulmus rubra</i>	17:23	Y								

GROUP: Herbaceous plants

Garlic mustard	<i>Alliaria petiolata</i>	17:24	N								
Wild garlic	<i>Allium vineale</i>	17:18	N								
Indian strawberry	<i>Duchesnea indica</i>	17:20	Y								
Bottle-brush grass	<i>Hystrix patula</i>	17:18	Y								
Goldenrod species	<i>Solidago spp.</i>	17:26	Y								
Common chickweed	<i>Stellaria media</i>	17:28	N								
Violet species	<i>Viola sp.</i>	17:18	Y								

GROUP: Shrubs

Buttonbush	<i>Cephalanthus occidentalis</i>	17:25	Y								
Spicebush	<i>Lindera benzoin</i>	17:17	Y								
Tatarian bush honeysuckle	<i>Lonicera tatarica</i>	17:20	Y								
Multiflora rose	<i>Rosa multiflora</i>	17:20	N								
Black raspberry	<i>Rubus occidentalis</i>	17:20	Y								

GROUP: Vines

Japanese honeysuckle	<i>Lonicera japonica</i>	17:21	N								
Greenbrier	<i>Smilax rotundifolia</i>	17:23	Y								
Fox grape	<i>Vitis labrusca</i>	17:24	Y								

Legal Category:

LE = Listed endangered
LT = Listed threatened
PDL = Proposed de-listing

SC = Special Concern (no legal status)

State Rank:

S1 = extremely rare, usually 5 or fewer populations per occurrences in the state.
S2 = very rare, usually 5-20 populations or occurrences in the state
S3 = rare to uncommon, 20-100 populations or occurrences in the state
S4 = common >100 populations or occurrences in the state
S5 = very common
SU = status uncertain

Global Rank:

G1 = Extremely rare throughout range
G2 = Very rare throughout range
G3 = Rare to common throughout range
G4 = Common throughout range
G5 = Very common throughout range



Habitat Survey: Meldahl Hydroelectric Project

Station: DEC 204 Game Control: Survey Date: 02/24/2011 Survey Time: 9:31

Event: 2010 - 2011 Surveys Database ID: 42 Investigator: Leasure, Cockerham

X coord: Y coord: Dominant Habitat: deciduous woodland

Habitat Type: deciduous woodland

Status of all Plants and Wildlife Observed at Station, and Off-Station:

PLANT

Common Name Latin name Obs. Time Native Fed End Fed Th Fed SOC State End State Th State SC Global Herit. State Herit.

GROUP: Coniferous canopy

Eastern red cedar	<i>Juniperus virginiana</i>	9:31	Y								
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GROUP: Deciduous canopy

Box elder	<i>Acer negundo</i>	10:02	Y								
Red maple	<i>Acer rubrum</i>	9:40	Y								
Sugar maple	<i>Acer saccharum</i>	9:41	Y								
Tree-of-heaven	<i>Ailanthus altissima</i>	9:36	N								
Common pawpaw	<i>Asimina triloba</i>	9:43	Y								
Bitternut hickory	<i>Carya cordiformis</i>	9:39	Y								
Shagbark hickory	<i>Carya ovata</i>	10:05	Y								
American beech	<i>Fagus grandifolia</i>	9:50	Y								
White ash	<i>Fraxinus americana</i>	9:31	Y								
Honey locust	<i>Gleditsia triacanthos</i>	9:31	Y								
Black walnut	<i>Juglans nigra</i>	9:38	Y								
Sycamore	<i>Platanus occidentalis</i>	10:15	Y								
Black cherry	<i>Prunus serotina</i>	9:36	Y								
White oak	<i>Quercus alba</i>	9:33	Y								
Chestnut oak	<i>Quercus prinus</i>	9:46	Y								
Northern red oak	<i>Quercus rubra</i>	9:46	Y								
Black locust	<i>Robinia pseudoacacia</i>	9:36	Y								
Slippery elm	<i>Ulmus rubra</i>	9:37	Y								

GROUP: Herbaceous plants

Horse chestnut	<i>Aesculus hippocastanum</i>	9:45	Y								
Garlic mustard	<i>Alliaria petiolata</i>	9:37	N								
Wild garlic	<i>Allium vineale</i>	10:16	N								
Broom sedge	<i>Andropogon virginicus</i>	10:00	Y								
Indian hemp	<i>Apocynum cannabinum</i>	10:00	Y								
Queen Anne's lace	<i>Daucus carota</i>	9:31	N								
Boneset species	<i>Eupatorium sp.</i>	9:55	Y								
Avens species	<i>Geum sp.</i>	9:55	Y								
Bottle-brush grass	<i>Hystrix patula</i>	10:06	Y								
New York ironweed	<i>Vernonia noveboracensis</i>	9:35	Y								

GROUP: Shrubs

Buttonbush	<i>Cephalanthus occidentalis</i>	9:36	Y								
Common winterberry	<i>Ilex verticillata</i>	9:47	Y								
Chinese Bushclover	<i>Lespedeza cuneata</i>	9:34	Y								
Spicebush	<i>Lindera benzoin</i>	9:47	Y								
Tatarian bush honeysuckle	<i>Lonicera tatarica</i>	9:37	Y								
Multiflora rose	<i>Rosa multiflora</i>	9:34	N								
Allegheny blackberry	<i>Rubus allegheniensis</i>	10:01	Y								
Black raspberry	<i>Rubus occidentalis</i>	9:51	Y								

GROUP: Vines

Trumpet creeper	<i>Campsis radicans</i>	9:55	Y								
Winter creeper	<i>Euonymus fortunei</i>	10:18	N								
Japanese honeysuckle	<i>Lonicera japonica</i>	9:49	N								



Habitat Survey: Meldahl Hydroelectric Project

Station: DEC 204 Game Control: Survey Date: 02/24/2011 Survey Time: 9:31
Event: 2010 - 2011 Surveys Database ID: 42 Investigator: Leasure, Cockerham
X coord: Y coord: Dominant Habitat: deciduous woodland

Habitat Type: deciduous woodland

Status of all Plants and Wildlife Observed at Station, and Off-Station:

PLANT

Common Name	Latin name	Obs. Time	Native	Fed End	Fed Th	Fed SOC	State End	State Th	State SC	Global Herit.	State Herit.
Fox grape	Vitis labrusca	9:36	Y								

Legal Category:

LE = Listed endangered

LT = Listed threatened

PDL = Proposed de-listing

SC = Special Concern (no legal status)

State Rank:

S1 = extremely rare, usually 5 or fewer populations per occurrences in the state.

S2 = very rare, usually 5-20 populations or occurrences in the state

S3 = rare to uncommon, 20-100 populations or occurrences in the state

S4 = common >100 populations or occurrences in the state

S5 = very common

SU = status uncertain

Global Rank:

G1 = Extremely rare throughout range

G2 = Very rare throughout range

G3 = Rare to common throughout range

G4 = Common throughout range

G5 = Very common throughout range



Habitat Survey: Meldahl Hydroelectric Project

Station: DEC 3 Game Control: Survey Date: 09/15/2010 Survey Time: 11:34

Event: 2010 - 2011 Surveys Database ID: 18 Investigator: Leasure, King

X coord: Y coord: Dominant Habitat: deciduous woodland

Habitat Type: deciduous woodland

Status of all Plants and Wildlife Observed at Station, and Off-Station:

PLANT

Common Name	Latin name	Obs. Time	Native	Fed End	Fed Th	Fed SOC	State End	State Th	State SC	Global Herit.	State Herit.
GROUP: Coniferous canopy											
Eastern red cedar	<i>Juniperus virginiana</i>	11:34	Y								
GROUP: Deciduous canopy											
Common pawpaw	<i>Asimina triloba</i>	12:00	Y								
Honey locust	<i>Gleditsia triacanthos</i>	11:34	Y								
Osage orange	<i>Maclura pomifera</i>	11:34	Y								
Sycamore	<i>Platanus occidentalis</i>	12:10	Y								
Slippery elm	<i>Ulmus rubra</i>	12:00	Y								
GROUP: Herbaceous plants											
Wingstem	<i>Actinomeris alternifolia</i>	16:01	Y								
Common ragweed	<i>Ambrosia artemisiifolia</i>	11:34	Y								
Canadian wild ginger	<i>Asarum canadense</i>	16:12	Y								
Ebony spleenwort	<i>Asplenium platyneuron</i>	16:01	Y								
Queen Anne's lace	<i>Daucus carota</i>	11:34	N								
Wild teasel	<i>Dipsacus sylvestris</i>	11:50	N								
Goldenrod species	<i>Solidago spp.</i>	11:34	Y								
New York ironweed	<i>Vernonia noveboracensis</i>	11:34	Y								
GROUP: Shrubs											
Japanese barberry	<i>Berberis thunbergii</i>	16:00	N								
Bush honeysuckle	<i>Diervilla lonicera</i>	12:08	Y								
Spicebush	<i>Lindera benzoin</i>	12:00	Y								
Multiflora rose	<i>Rosa multiflora</i>	11:34	N								
GROUP: Vines											
Japanese honeysuckle	<i>Lonicera japonica</i>	11:34	N								
Legal Category:		State Rank:		Global Rank:							
LE = Listed endangered		S1 = extremely rare, usually 5 or fewer populations per occurrences in the state.		G1 = Extremely rare throughout range							
LT = Listed threatened		S2 = very rare, usually 5-20 populations or occurrences in the state		G2 = Very rare throughout range							
PDL = Proposed de-listing		S3 = rare to uncommon, 20-100 populations or occurrences in the state		G3 = Rare to common throughout range							
		S4 = common >100 populations or occurrences in the state		G4 = Common throughout range							
SC = Special Concern (no legal status)		S5 = very common		G5 = Very common throughout range							
		SU = status uncertain									



Habitat Survey: Meldahl Hydroelectric Project

Station: DEC 4 Game Control: Survey Date: 09/15/2010 Survey Time: 12:53

Event: 2010 - 2011 Surveys Database ID: 19 Investigator: Leasure, King

X coord: Y coord: Dominant Habitat: deciduous woodland

Habitat Type: deciduous woodland

Status of all Plants and Wildlife Observed at Station, and Off-Station:

PLANT

Common Name Latin name Obs. Time Native Fed End Fed Th Fed SOC State End State Th State SC Global Herit. State Herit.

GROUP: Deciduous canopy

Box elder	<i>Acer negundo</i>	13:04	Y										
Red maple	<i>Acer rubrum</i>	13:03	Y										
Common pawpaw	<i>Asimina triloba</i>	13:05	Y										
Tulip poplar	<i>Liriodendron tulipifera</i>	13:23	Y										
Sycamore	<i>Platanus occidentalis</i>	12:58	Y										
Eastern cottonwood	<i>Populus deltoides</i>	13:04	Y										
Black cherry	<i>Prunus serotina</i>	12:58	Y										
American elm	<i>Ulmus americana</i>	13:05	Y										

GROUP: Herbaceous plants

Wingstem	<i>Actinomeris alternifolia</i>	13:20	Y										
Garlic mustard	<i>Alliaria petiolata</i>	14:31	N										
Dayflower species	<i>Commelina sp.</i>	13:34	Y										
Hardy ageratum	<i>Conoclinium coelestinum</i>	14:30	Y										
Virginia wildrye	<i>Elymus virginicus</i>	13:08	Y										
White boneset	<i>Eupatorium album</i>	13:07	Y										
Virginia strawberry	<i>Fragaria virginiana</i>	12:53	Y										
Spotted St. John's wort	<i>Hypericum punctatum</i>	15:14	Y										
Wood Nettle	<i>Laportea canadensis</i>	12:53	Y										
Lobelia species	<i>Lobelia sp.</i>	12:59	Y										
Creeping jenny	<i>Lysimachia nummularia</i>	12:53	Y										
Nepalese browntop	<i>Microstegium vimineum</i>	13:08	N										
Yellow wood sorrel	<i>Oxalis europaea</i>	13:03	Y										
Pennsylvania smartweed	<i>Polygonum pennsylvanicum</i>	12:57	Y										
Christmas fern	<i>Polystichum acrostichoides</i>	13:04	Y										
Short-toothed mountain mint	<i>Pycnanthemum muticum</i>	13:11	Y										
Virginia knotweed	<i>Tovara virginiana</i>	13:09	Y										
Red clover	<i>Trifolium pratense</i>	13:07	N										

GROUP: Shrubs

Spicebush	<i>Lindera benzoin</i>	12:59	Y										
Multiflora rose	<i>Rosa multiflora</i>	12:58	N										

GROUP: Vines

Hog peanut	<i>Amphicarpaea bracteata</i>	12:57	Y										
Japanese honeysuckle	<i>Lonicera japonica</i>	13:05	N										
Virginia creeper	<i>Parthenocissus quinquefolia</i>	13:05	Y										
Bristly greenbrier	<i>Smilax tamnoides</i>	13:28	Y										
Poison ivy	<i>Toxicodendron radicans</i>	13:09	Y										

Legal Category:

LE = Listed endangered
LT = Listed threatened
PDL = Proposed de-listing

SC = Special Concern (no legal status)

State Rank:

S1 = extremely rare, usually 5 or fewer populations per occurrences in the state.
S2 = very rare, usually 5-20 populations or occurrences in the state
S3 = rare to uncommon, 20-100 populations or occurrences in the state
S4 = common > 100 populations or occurrences in the state
S5 = very common
SU = status uncertain

Global Rank:

G1 = Extremely rare throughout range
G2 = Very rare throughout range
G3 = Rare to common throughout range
G4 = Common throughout range
G5 = Very common throughout range



Habitat Survey: Meldahl Hydroelectric Project

Station: DEC 5 Game Control: Survey Date: 09/15/2010 Survey Time: 17:45
 Event: 2010 - 2011 Surveys Database ID: 20 Investigator: Leare, King
 X coord: Y coord: Dominant Habitat: deciduous woodland

Habitat Type: deciduous woodland

Status of all Plants and Wildlife Observed at Station, and Off-Station:

PLANT

Common Name	Latin name	Obs. Time	Fed Native	Fed End	Fed Th	Fed SOC	State End	State Th	State SC	Global Herit.	State Herit.
GROUP: Deciduous canopy											
Common pawpaw	<i>Asimina triloba</i>	17:45	Y								
Shagbark hickory	<i>Carya ovata</i>	17:45	Y								
GROUP: Herbaceous plants											
Garlic mustard	<i>Alliaria petiolata</i>	17:45	N								
Deertongue grass	<i>Dichanthelium clandestinum</i>	17:52	Y								
Virginia wildrye	<i>Elymus virginicus</i>	17:52	Y								
Nepalese browntop	<i>Microstegium vimineum</i>	17:50	N								
Red clover	<i>Trifolium pratense</i>	17:50	N								
GROUP: Shrubs											
Downy serviceberry	<i>Amelanchier arborea</i>	17:45	Y								
Bush honeysuckle	<i>Diervilla lonicera</i>	17:45	Y								
Multiflora rose	<i>Rosa multiflora</i>	17:50	N								
GROUP: Vines											
Virginia creeper	<i>Parthenocissus quinquefolia</i>	18:15	Y								
Poison ivy	<i>Toxicodendron radicans</i>	18:10	Y								

Legal Category:

LE = Listed endangered
 LT = Listed threatened
 PDL = Proposed de-listing

SC = Special Concern (no legal status)

State Rank:

S1 = extremely rare, usually 5 or fewer populations per occurrences in the state.
 S2 = very rare, usually 5-20 populations or occurrences in the state
 S3 = rare to uncommon, 20-100 populations or occurrences in the state
 S4 = common >100 populations or occurrences in the state
 S5 = very common
 SU = status uncertain

Global Rank:

G1 = Extremely rare throughout range
 G2 = Very rare throughout range
 G3 = Rare to common throughout range
 G4 = Common throughout range
 G5 = Very common throughout range



Habitat Survey: Meldahl Hydroelectric Project

Station: DEC 6 Game Control: Survey Date: 09/16/2010 Survey Time: 14:10

Event: 2010 - 2011 Surveys Database ID: 21 Investigator: Leasure, King

X coord: Y coord: Dominant Habitat: deciduous woodland

Habitat Type: deciduous woodland

Status of all Plants and Wildlife Observed at Station, and Off-Station:

PLANT

Common Name Latin name Obs. Time Native Fed End Fed Th Fed SOC State End State Th State SC Global Herit. State Herit.

GROUP: Coniferous canopy

Eastern red cedar	<i>Juniperus virginiana</i>	14:57	Y								
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GROUP: Deciduous canopy

Box elder	<i>Acer negundo</i>	14:17	Y								
Silver maple	<i>Acer saccharinum</i>	14:40	Y								
Sugar maple	<i>Acer saccharum</i>	14:11	Y								
Green ash	<i>Fraxinus pennsylvanica</i>	15:00	Y								
Honey locust	<i>Gleditsia triacanthos</i>	14:15	Y								
Black walnut	<i>Juglans nigra</i>	14:18	Y								
Black walnut	<i>Juglans nigra</i>	14:53	Y								
Black oak	<i>Quercus velutina</i>	14:54	Y								
Slippery elm	<i>Ulmus rubra</i>	14:55	Y								

GROUP: Herbaceous plants

Wingstem	<i>Actinomeris alternifolia</i>	14:13	Y								
Common milkweed	<i>Asclepias syriaca</i>	15:01	Y								
Small white aster	<i>Aster vimineus</i>	14:54	Y								
Small-spice false nettle	<i>Boehmeria cylindrica</i>	14:41	Y								
Greater bladder sedge	<i>Carex intumescens</i>	14:17	Y								
Pink turtlehead	<i>Chelone lyonii</i>	14:54	Y								
Bull thistle	<i>Cirsium vulgare</i>	14:29	N								
Nut sedge	<i>Cyperus esculentus</i>	15:02	Y								
Queen Anne's lace	<i>Daucus carota</i>	15:00	N								
Wild teasel	<i>Dipsacus sylvestris</i>	14:59	N								
Virginia wildrye	<i>Elymus virginicus</i>	14:26	Y								
White boneset	<i>Eupatorium album</i>	15:00	Y								
Ground ivy	<i>Glechoma hederacea</i>	14:30	N								
Wood Nettle	<i>Laportea canadensis</i>	14:18	Y								
Bush clover species	<i>Lespedeza sp.</i>	15:00	Y								
Lobelia species	<i>Lobelia sp.</i>	14:50	Y								
Creeping jenny	<i>Lysimachia nummularia</i>	14:26	Y								
American lopseed	<i>Phryma leptostachya</i>	14:27	Y								
Pokeweed	<i>Phytolacca americana</i>	14:15	Y								
Clearweed	<i>Pilea pumila</i>	14:17	Y								
Pennsylvania smartweed	<i>Polygonum pensylvanicum</i>	14:25	Y								
Browneyed susan	<i>Rudbeckia triloba</i>	14:22	Y								
Skullcap species	<i>Scutellaria sp.</i>	14:38	Y								
Goldenrod species	<i>Solidago spp.</i>	15:02	Y								
Virginia knotweed	<i>Tovara virginiana</i>	14:17	Y								
New York ironweed	<i>Vernonia noveboracensis</i>	14:16	Y								
Dog violet	<i>Viola conspersa</i>	14:27	Y								

GROUP: Shrubs

Bush honeysuckle	<i>Diervilla lonicera</i>	15:00	Y								
Spicebush	<i>Lindera benzoin</i>	14:53	Y								
Red mulberry	<i>Morus rubra</i>	14:29	Y								
Multiflora rose	<i>Rosa multiflora</i>	14:15	N								



Habitat Survey: Meldahl Hydroelectric Project

Station: DEC 6 Game Control: Survey Date: 09/16/2010 Survey Time: 14:10

Event: 2010 - 2011 Surveys Database ID: 21 Investigator: Leasure, King

X coord: Y coord: Dominant Habitat: deciduous woodland

Habitat Type: deciduous woodland

Status of all Plants and Wildlife Observed at Station, and Off-Station:

PLANT

Common Name	Latin name	Obs. Time	Native	Fed End	Fed Th	Fed SOC	State End	State Th	State SC	Global Herit.	State Herit.
Allegheny blackberry	<i>Rubus allegheniensis</i>	15:02	Y								

GROUP: Vines

Hog peanut	<i>Amphicarpaea bracteata</i>	14:18	Y								
Euonymous species	<i>Euonymous sp.</i>	14:52	Y								
Japanese honeysuckle	<i>Lonicera japonica</i>	14:31	N								
Virginia creeper	<i>Parthenocissus quinquefolia</i>	14:52	Y								
Poison ivy	<i>Toxicodendron radicans</i>	14:17	Y								
Summer grape	<i>Vitis aestivalis</i>	15:00	Y								

Legal Category:

LE = Listed endangered
LT = Listed threatened
PDL = Proposed de-listing

SC = Special Concern (no legal status)

State Rank:

S1 = extremely rare, usually 5 or fewer populations per occurrences in the state.
S2 = very rare, usually 5-20 populations or occurrences in the state
S3 = rare to uncommon, 20-100 populations or occurrences in the state
S4 = common >100 populations or occurrences in the state
S5 = very common
SU = status uncertain

Global Rank:

G1 = Extremely rare throughout range
G2 = Very rare throughout range
G3 = Rare to common throughout range
G4 = Common throughout range
G5 = Very common throughout range



Habitat Survey: Meldahl Hydroelectric Project

Station: **DEC 7** Game Control: Survey Date: **09/16/2010** Survey Time: **16:25**

Event: **2010 - 2011 Surveys** Database ID: **22** Investigator: **Leasure, King**

X coord: Y coord: Dominant Habitat: **deciduous woodland**

Habitat Type: **deciduous woodland**

Status of all Plants and Wildlife Observed at Station, and Off-Station:

PLANT

Common Name	Latin name	Obs. Time	Native	Fed End	Fed Th	Fed SOC	State End	State Th	State SC	Global Herit.	State Herit.
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GROUP: Coniferous canopy

Eastern red cedar	<i>Juniperus virginiana</i>	16:26	Y								
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GROUP: Deciduous canopy

Box elder	<i>Acer negundo</i>	17:16	Y								
Red maple	<i>Acer rubrum</i>	16:35	Y								
Silver maple	<i>Acer saccharinum</i>	16:25	Y								
Sugar maple	<i>Acer saccharum</i>	16:25	Y								
Tree-of-heaven	<i>Ailanthus altissima</i>	16:48	N								
Common pawpaw	<i>Asimina triloba</i>	16:40	Y								
Carolina hornbeam	<i>Carpinus caroliniana</i>	16:28	Y								
Shagbark hickory	<i>Carya ovata</i>	16:40	Y								
Sycamore	<i>Platanus occidentalis</i>	16:38	Y								
White oak	<i>Quercus alba</i>	16:25	Y								
Swamp white oak	<i>Quercus bicolor</i>	16:48	Y								
Basket oak	<i>Quercus michauxii</i>	16:35	Y								
Black oak	<i>Quercus velutina</i>	17:15	Y								
Black locust	<i>Robinia pseudoacacia</i>	17:15	Y								
Slippery elm	<i>Ulmus rubra</i>	16:26	Y								

GROUP: Herbaceous plants

Wingstem	<i>Actinomeris alternifolia</i>	16:39	Y								
Red top grass	<i>Agrostis alba</i>	16:41	Y								
Garlic mustard	<i>Alliaria petioleta</i>	16:27	N								
Common ragweed	<i>Ambrosia artemisiifolia</i>	16:40	Y								
Spreading dogbane	<i>Apocynum androsaemifolium</i>	16:38	Y								
Ebony spleenwort	<i>Asplenium platyneuron</i>	16:42	Y								
New York aster	<i>Aster novi-belgii</i>	17:17	Y								
Poison hemlock	<i>Conium maculatum</i>	17:17	Y								
Queen Anne's lace	<i>Daucus carota</i>	17:16	N								
Deertongue grass	<i>Dichanthelium clandestinum</i>	16:41	Y								
Virginia wildrye	<i>Elymus virginicus</i>	16:28	Y								
White boneset	<i>Eupatorium album</i>	16:35	Y								
Whorled loosestrife	<i>Lysimachia quadrifolia</i>	16:33	Y								
Chinese silvergrass	<i>Miscanthus sinensis</i>	17:18	N								
Virginia knotweed	<i>Tovara virginiana</i>	16:40	Y								
White clover	<i>Trifolium repens</i>	16:41	N								

GROUP: Shrubs

Downy serviceberry	<i>Amelanchier arborea</i>	17:17	Y								
Bush honeysuckle	<i>Diervilla lonicera</i>	16:26	Y								
Spicebush	<i>Lindera benzoin</i>	16:39	Y								
Black raspberry	<i>Rubus occidentalis</i>	17:15	Y								

GROUP: Vines

Japanese honeysuckle	<i>Lonicera japonica</i>	16:25	N								
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Habitat Survey: Meldahl Hydroelectric Project

Station: Game Control: Survey Date: Survey Time:
Event: Database ID: Investigator:
X coord: Y coord: Dominant Habitat:

Habitat Type: deciduous woodland

Status of all Plants and Wildlife Observed at Station, and Off-Station:

Legal Category:

LE= Listed endangered

LT = Listed threatened

PDL = Proposed de-listing

SC = Special Concern (no legal status)

State Rank:

S1 = extremely rare, usually 5 or fewer populations per occurrences in the state.

S2 =very rare, usually 5-20 populations or occurrences in the state

S3 =rare to uncommon, 20-100 populations or occurrences in the state

S4 =common >100 populations or occurrences in the state

S5 = very common

SU = status uncertain

Global Rank:

G1= Extremely rare throughout range

G2= Very rare throughout range

G3= Rare to common throughout range

G4= Common throughout range

G5= Very common throughout range



Habitat Survey: Meldahl Hydroelectric Project

Station: OLD 1 Game Control: Survey Date: 09/13/2010 Survey Time: 14:10

Event: 2010 - 2011 Surveys Database ID: 11 Investigator: Leasure, King

X coord: Y coord: Dominant Habitat: oldfield/pioneer

Habitat Type: oldfield/pioneer

Status of all Plants and Wildlife Observed at Station, and Off-Station:

PLANT

Common Name	Latin name	Obs. Time	Native	Fed End	Fed Th	Fed SOC	State End	State Th	State SC	Global Herit.	State Herit.
GROUP: Coniferous canopy											
Eastern red cedar	<i>Juniperus virginiana</i>	15:03	Y								
GROUP: Deciduous canopy											
Box elder	<i>Acer negundo</i>	14:10	Y								
Red maple	<i>Acer rubrum</i>	14:38	Y								
Honey locust	<i>Gleditsia triacanthos</i>	14:10	Y								
Sycamore	<i>Platanus occidentalis</i>	14:46	Y								
Pin oak	<i>Quercus palustris</i>	16:08	Y								
Black oak	<i>Quercus velutina</i>	15:52	Y								
Black locust	<i>Robinia pseudoacacia</i>	15:37	Y								
Siberian Elm	<i>Ulmus pumila</i>	14:12	Y								
Slippery elm	<i>Ulmus rubra</i>	14:12	Y								
GROUP: Herbaceous plants											
Common yarrow	<i>Achillea millefolium</i>	14:16	Y								
Wingstem	<i>Actinomeris alternifolia</i>	14:10	Y								
Red top grass	<i>Agrostis alba</i>	14:18	Y								
Wild garlic	<i>Allium vineale</i>	14:22	N								
Common ragweed	<i>Ambrosia artemisiifolia</i>	14:15	Y								
Pearly everlasting	<i>Anaphalis margaritacea</i>	15:06	Y							G5	S1
Broom sedge	<i>Andropogon virginicus</i>	14:46	Y								
Spreading dogbane	<i>Apocynum androsaemifolium</i>	15:11	Y								
Joint-head arthraxon	<i>Arthraxon hispidus</i>	14:49	N								
Purple milkweed	<i>Asclepias purpurascens</i>	14:29	Y							G5?	S2
Common milkweed	<i>Asclepias syriaca</i>	15:02	Y								
Aster species 1	<i>Aster sp.</i>	15:32	Y								
Wild indigo species	<i>Baptisia sp.</i>	14:51	Y								
Tickseed sunflower	<i>Bidens coronata</i>	15:20	Y								
Bull thistle	<i>Cirsium vulgare</i>	14:10	N								
Poison hemlock	<i>Conium maculatum</i>	14:51	Y								
Hardy ageratum	<i>Conoclinium coelestinum</i>	14:40	Y								
Nut sedge	<i>Cyperus esculentus</i>	14:47	Y								
Queen Anne's lace	<i>Daucus carota</i>	15:20	N								
Hoary tick-trefoil	<i>Desmodium canescens</i>	14:37	Y								
Panicked tick-trefoil	<i>Desmodium paniculatum</i>	15:55	Y								
Crabgrass	<i>Digitaria sanguinalis</i>	16:10	Y								
Wild teasel	<i>Dipsacus sylvestris</i>	14:51	N								
Horseweed	<i>Erigeron canadensis</i>	14:12	Y								
Mist flower	<i>Eupatorium coelestinum</i>	14:41	Y								
Boneset	<i>Eupatorium perfoliatum</i>	14:41	Y								
White snakeroot	<i>Eupatorium rugosum</i>	14:42	Y								
Grass species	<i>Festuca sp.</i>	14:16	Y								
Wild lettuce	<i>Lactuca canadensis</i>	14:27	Y								
Rice cutgrass	<i>Leersia oryzoides</i>	16:10	Y								
Slender bush clover	<i>Lespedeza virginica</i>	14:24	Y								
Lobelia species	<i>Lobelia sp.</i>	14:44	Y								



Habitat Survey: Meldahl Hydroelectric Project

Station: OLD 1 Game Control: Survey Date: 09/13/2010 Survey Time: 14:10

Event: 2010 - 2011 Surveys Database ID: 11 Investigator: Leasure, King

X coord: Y coord: Dominant Habitat: oldfield/pioneer

Habitat Type: oldfield/pioneer

Status of all Plants and Wildlife Observed at Station, and Off-Station:

PLANT

Common Name	Latin name	Obs. Time	Native	Fed End	Fed Th	Fed SOC	State End	State Th	State SC	Global Herit.	State Herit.
Black medick	<i>Medicago lupulina</i>	14:05	Y								
Common evening primrose	<i>Oenothera biennis</i>	14:22	Y								
Yellow wood sorrel	<i>Oxalis europaea</i>	14:24	Y								
Switchgrass	<i>Panicum virgatum</i>	14:10	Y								
Large beardtongue	<i>Penstemon grandiflorus</i>	14:16	Y								
Pokeweed	<i>Phytolacca americana</i>	14:39	Y								
English plantain	<i>Plantago lanceolata</i>	14:16	N								
Green bulrush	<i>Scirpus atrovirens</i>	16:10	Y								
Woolgrass	<i>Scirpus cyperinus</i>	14:49	Y								
Downy skullcap	<i>Scutellaria incana</i>	14:25	Y								
Foxtail grass	<i>Setaria faberi</i>	14:12	N								
Foxtail millet	<i>Setaria italica</i>	14:51	Y								
Horsenettle	<i>Solanum carolinense</i>	15:32	Y								
Rough-stemmed goldenrod	<i>Solidago rugosa</i>	14:51	Y								
Johnson grass	<i>Sorghum halepense</i>	15:55	Y								
New York ironweed	<i>Vernonia noveboracensis</i>	14:26	Y								
Dog violet	<i>Viola conspersa</i>	15:43	Y								

GROUP: Shrubs

Bush honeysuckle	<i>Diervilla lonicera</i>	14:10	Y								
Privet species	<i>Ligustrum vulgare</i>	15:28	N								
Red mulberry	<i>Morus rubra</i>	15:20	Y								
Multiflora rose	<i>Rosa multiflora</i>	14:26	N								
Allegheny blackberry	<i>Rubus allegheniensis</i>	15:18	Y								

GROUP: Vines

Porcelainberry	<i>Ampelopsis brevipedunculata</i>	14:14	N								
Trumpet creeper	<i>Campsis radicans</i>	15:19	Y								
Bindweed species	<i>Convolvulus sp.</i>	14:26	Y								
Crown vetch	<i>Coronilla varia</i>	14:10	N								
English ivy	<i>Hedera helix</i>	15:20	N								
Japanese honeysuckle	<i>Lonicera japonica</i>	15:11	N								
Virginia creeper	<i>Parthenocissus quinquefolia</i>	14:10	Y								
Poison ivy	<i>Toxicodendron radicans</i>	14:10	Y								
Summer grape	<i>Vitis aestivalis</i>	15:04	Y								
Grape species	<i>Vitis spp.</i>	14:10	Y								

Legal Category:

LE = Listed endangered
LT = Listed threatened
PDL = Proposed de-listing

SC = Special Concern (no legal status)

State Rank:

S1 = extremely rare, usually 5 or fewer populations per occurrences in the state.
S2 = very rare, usually 5-20 populations or occurrences in the state
S3 = rare to uncommon, 20-100 populations or occurrences in the state
S4 = common >100 populations or occurrences in the state
S5 = very common
SU = status uncertain

Global Rank:

G1 = Extremely rare throughout range
G2 = Very rare throughout range
G3 = Rare to common throughout range
G4 = Common throughout range
G5 = Very common throughout range



Habitat Survey: Meldahl Hydroelectric Project

Station: OLD 2 Game Control: Survey Date: 09/15/2010 Survey Time: 17:09

Event: 2010 - 2011 Surveys Database ID: 12 Investigator: Leasure, King

X coord: Y coord: Dominant Habitat: oldfield/pioneer

Habitat Type: oldfield/pioneer

Status of all Plants and Wildlife Observed at Station, and Off-Station:

PLANT

Common Name Latin name Obs. Time Native Fed End Fed Th Fed SOC State End State Th State SC Global Herit. State Herit.

GROUP: Coniferous canopy

Eastern red cedar	<i>Juniperus virginiana</i>	17:13	Y									
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GROUP: Deciduous canopy

Box elder	<i>Acer negundo</i>	17:10	Y									
Honey locust	<i>Gleditsia triacanthos</i>	17:09	Y									
Osage orange	<i>Maclura pomifera</i>	17:09	Y									
Black cherry	<i>Prunus serotina</i>	17:15	Y									

GROUP: Herbaceous plants

Red top grass	<i>Agrostis alba</i>	17:09	Y									
Common ragweed	<i>Ambrosia artemisiifolia</i>	17:10	Y									
Small white aster	<i>Aster vimineus</i>	17:13	Y									
Hardy ageratum	<i>Conoclinium coelestinum</i>	17:18	Y									
Queen Anne's lace	<i>Daucus carota</i>	17:10	N									
Horseweed	<i>Erigeron canadensis</i>	17:11	Y									
Rough-stemmed goldenrod	<i>Solidago rugosa</i>	17:09	Y									
Common mullein	<i>Verbascum thapsus</i>	17:17	N									
New York ironweed	<i>Vernonia noveboracensis</i>	17:09	Y									

GROUP: Shrubs

Bush honeysuckle	<i>Diervilla lonicera</i>	17:16	Y									
Red mulberry	<i>Morus rubra</i>	18:30	Y									

GROUP: Vines

Japanese honeysuckle	<i>Lonicera japonica</i>	17:13	N									
Virginia creeper	<i>Parthenocissus quinquefolia</i>	18:30	Y									
Poison ivy	<i>Toxicodendron radicans</i>	17:14	Y									

Legal Category:

LE = Listed endangered
LT = Listed threatened
PDL = Proposed de-listing

SC = Special Concern (no legal status)

State Rank:

S1 = extremely rare, usually 5 or fewer populations per occurrences in the state.
S2 = very rare, usually 5-20 populations or occurrences in the state
S3 = rare to uncommon, 20-100 populations or occurrences in the state
S4 = common >100 populations or occurrences in the state
S5 = very common
SU = status uncertain

Global Rank:

G1 = Extremely rare throughout range
G2 = Very rare throughout range
G3 = Rare to common throughout range
G4 = Common throughout range
G5 = Very common throughout range



Habitat Survey: Meldahl Hydroelectric Project

Station: OLD 4 Game Control: Survey Date: 09/16/2010 Survey Time: 16:59

Event: 2010 - 2011 Surveys Database ID: 14 Investigator: Leasure, King

X coord: Y coord: Dominant Habitat: oldfield/pioneer

Habitat Type: oldfield/pioneer

Status of all Plants and Wildlife Observed at Station, and Off-Station:

PLANT

Common Name	Latin name	Obs. Time	Native	Fed End	Fed Th	Fed SOC	State End	State Th	State SC	Global Herit.	State Herit.
GROUP: Coniferous canopy											
Eastern red cedar	<i>Juniperus virginiana</i>	16:59	Y								
GROUP: Deciduous canopy											
Pignut hickory	<i>Carya glebra</i>	17:05	Y								
Green ash	<i>Fraxinus pennsylvanica</i>	16:59	Y								
Sycamore	<i>Platanus occidentalis</i>	16:59	Y								
GROUP: Herbaceous plants											
Common yarrow	<i>Achillea millefolium</i>	17:02	Y								
New York aster	<i>Aster novi-belgii</i>	16:59	Y								
Small white aster	<i>Aster vimineus</i>	17:00	Y								
Tickseed sunflower	<i>Bidens coronata</i>	16:59	Y								
Bull thistle	<i>Cirsium vulgare</i>	17:00	N								
Queen Anne's lace	<i>Daucus carota</i>	16:59	N								
Wild teasel	<i>Dipsacus sylvestris</i>	17:00	N								
Grass species	<i>Festuca sp.</i>	17:06	Y								
English plantain	<i>Plantago lanceolata</i>	17:03	N								
Heal-all	<i>Prunella vulgaris</i>	17:03	Y								
Rough-stemmed goldenrod	<i>Solidago rugosa</i>	17:00	Y								
New York ironweed	<i>Vernonia noveboracensis</i>	17:03	Y								
GROUP: Shrubs											
Bush honeysuckle	<i>Diervilla lonicera</i>	17:00	Y								
GROUP: Understory											
Redbud	<i>Cercis canadensis</i>	17:06	Y								
GROUP: Vines											
Japanese honeysuckle	<i>Lonicera japonica</i>	17:00	N								

Legal Category:

LE = Listed endangered
LT = Listed threatened
PDL = Proposed de-listing

SC = Special Concern (no legal status)

State Rank:

S1 = extremely rare, usually 5 or fewer populations per occurrences in the state.
S2 = very rare, usually 5-20 populations or occurrences in the state
S3 = rare to uncommon, 20-100 populations or occurrences in the state
S4 = common >100 populations or occurrences in the state
S5 = very common

SU = status uncertain

Global Rank:

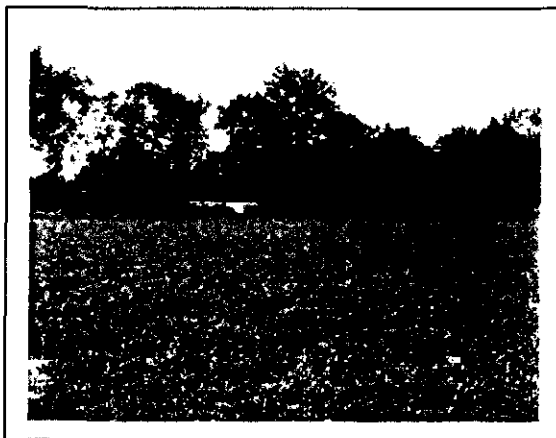
G1 = Extremely rare throughout range
G2 = Very rare throughout range
G3 = Rare to common throughout range
G4 = Common throughout range
G5 = Very common throughout range

APPENDIX B
PHOTOGRAPHIC RECORD

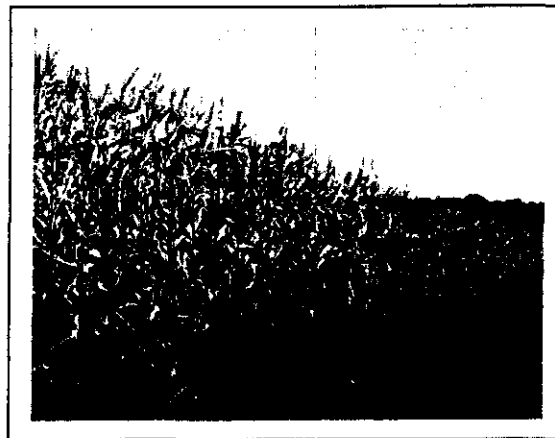
Photographic Record

Ohio Transmission Line,
Clermont County, Ohio
2010 / 2011

PREFERRED ALIGNMENT



AG 1



AG 2



AG 3



DEC 2



DEC 3



DEC 4

Photographic Record

Ohio Transmission Line,
Clermont County, Ohio
2010 / 2011

PREFERRED ALIGNMENT



DEC 5



DEC 7



DEC 201



DEC 202



DEC 204



OLD 2

Photographic Record

Ohio Transmission Line,
Clermont County, Ohio
2010 / 2011

PREFERRED ALIGNMENT



OLD 4

Photographic Record

Ohio Transmission Line
Clermont County, Ohio
2010 / 2011

ALTERNATE ALIGNMENT



AG 1



AG 110



AG -112



AG 115



DEC 1



DEC 2

Photographic Record

Ohio Transmission Line
Clermont County, Ohio
2010 / 2011

ALTERNATE ALIGNMENT



DEC 6



DEC 111



DEC 113



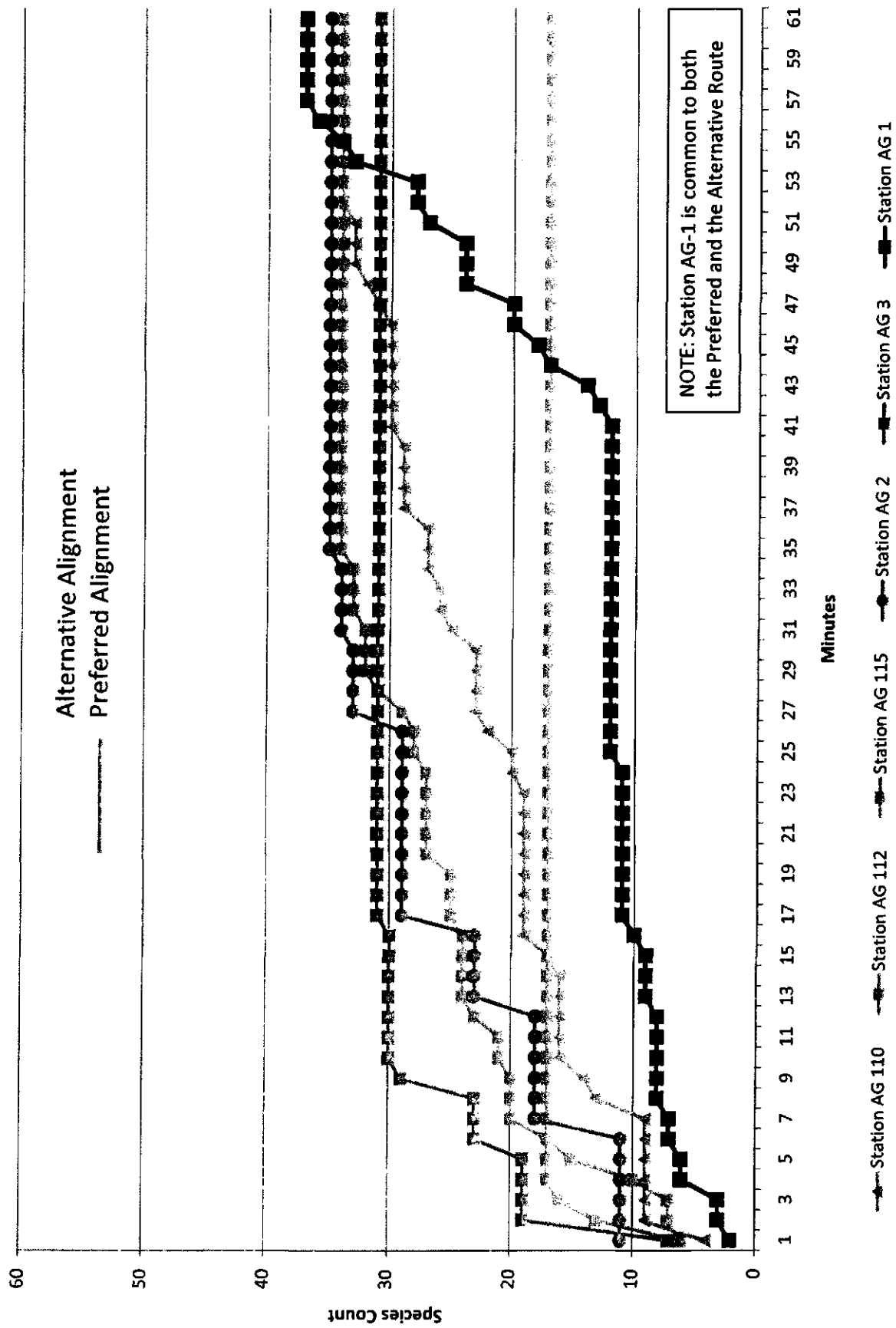
DEC 114



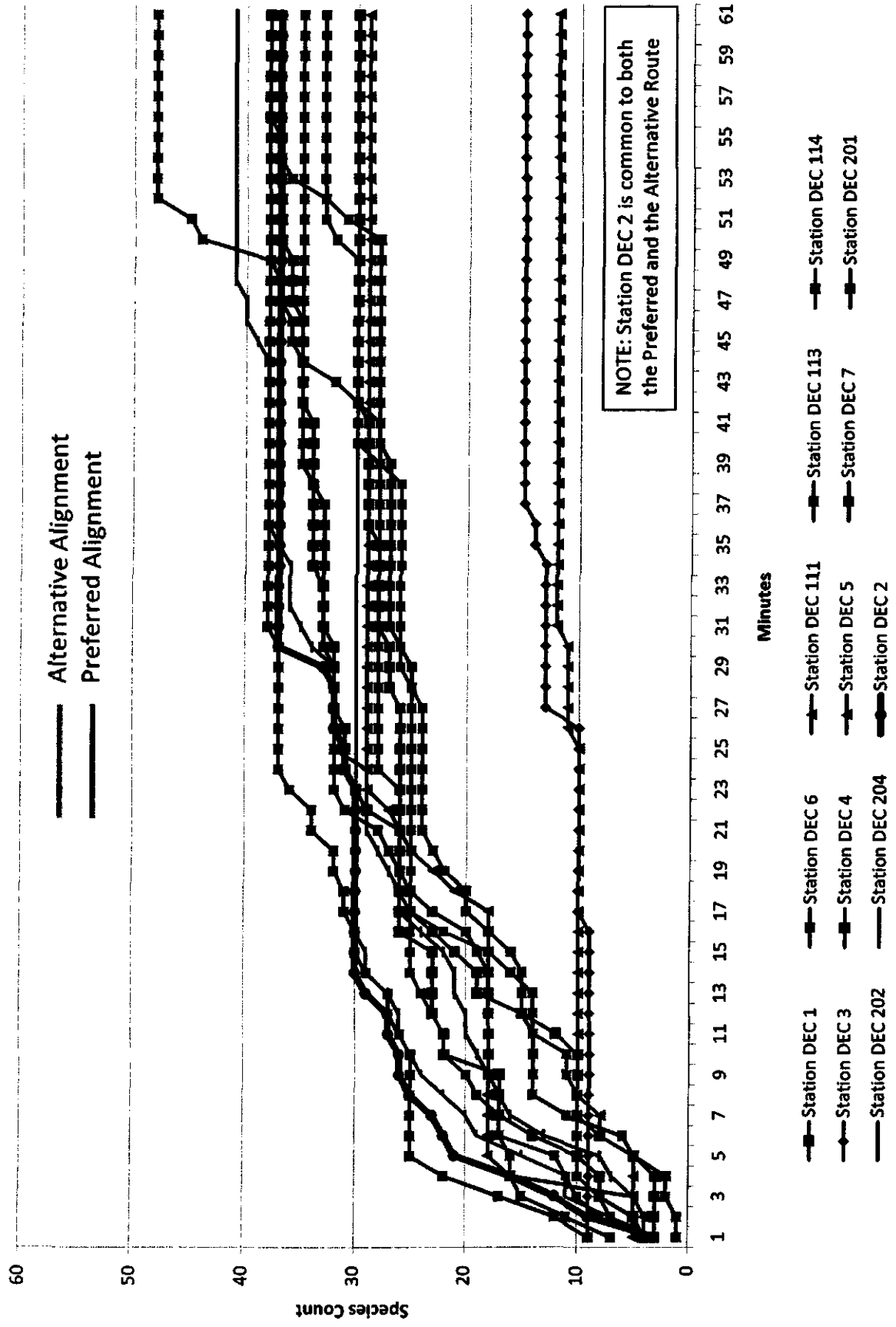
OLD 1

APPENDIX C
SPECIES EFFORT CURVES

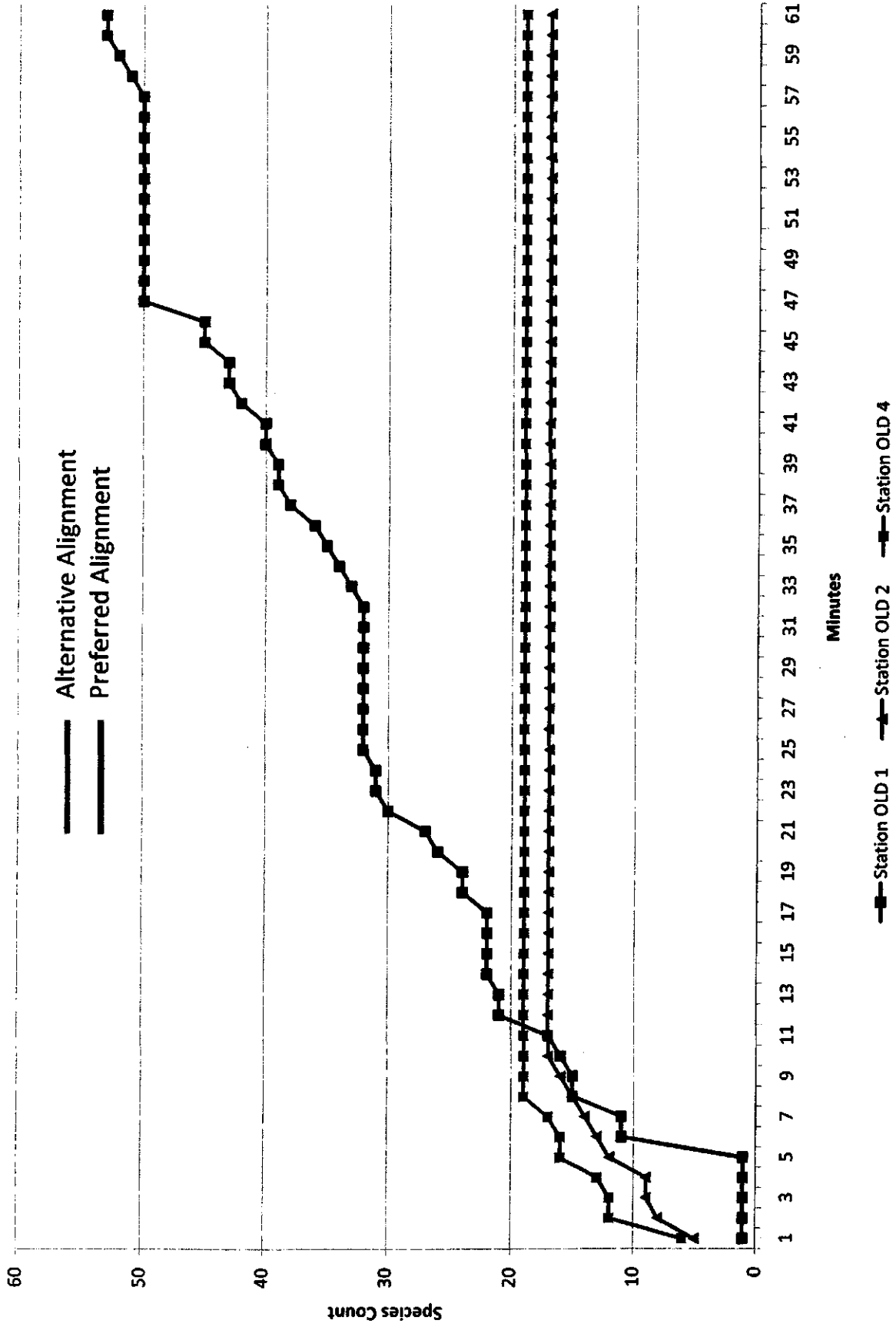
Habitat Species Effort: 2010 - 2011 Surveys - AGRICULTURAL FIELD



Habitat Species Effort: 2010 - 2011 Surveys - DECIDUOUS WOODLAND



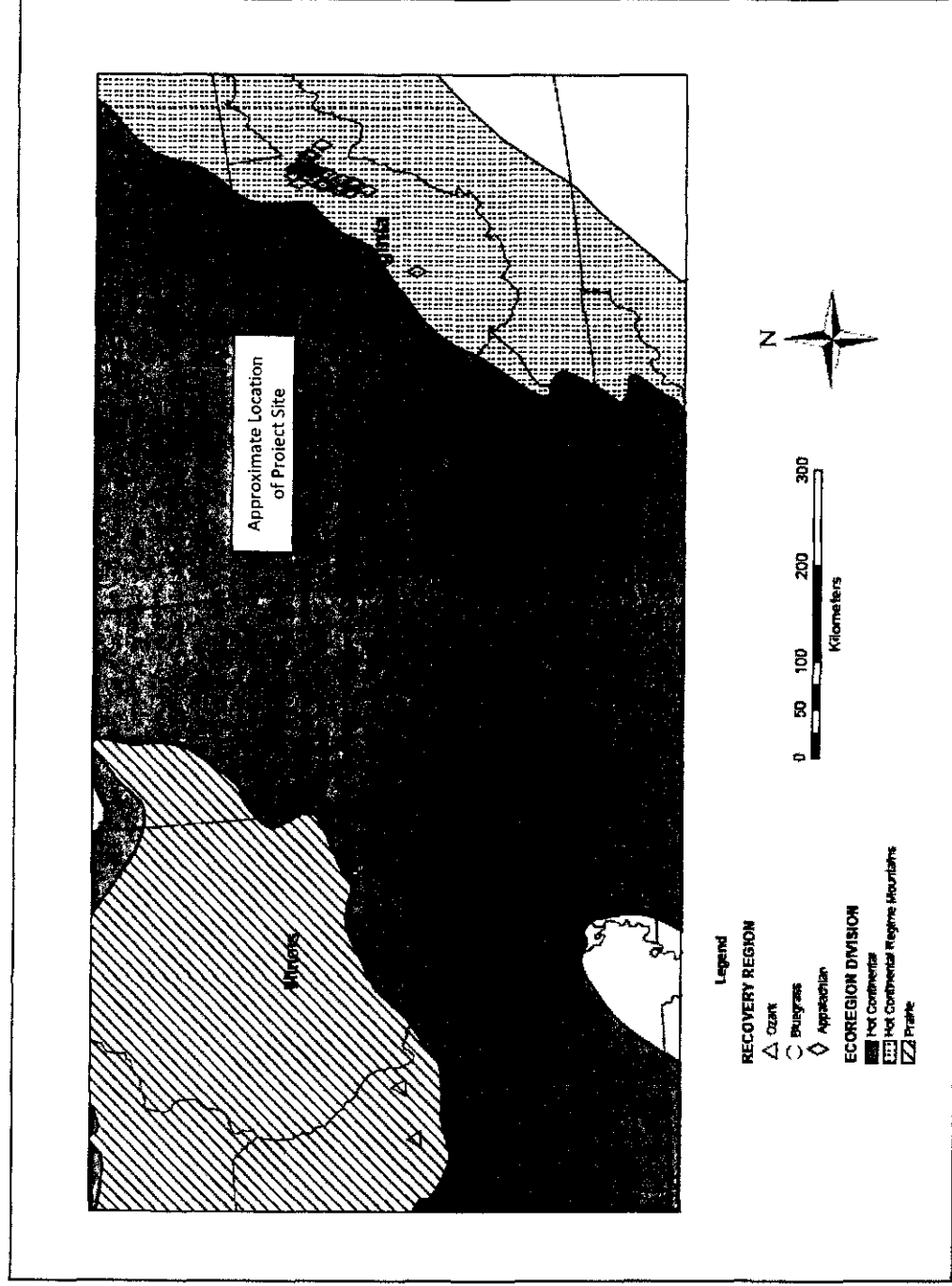
Habitat Species Effort: 2010 - 2011 Surveys - OLDFIELD/PIONEER



APPENDIX D

DOCUMENTED RUNNING BUFFALO CLOVER OCCURRENCES

Figure 2. Map of Running Buffalo Clover Occurrences



Source: U.S. Fish and Wildlife Service. 2007. Running Buffalo Clover (*Trifolium stoloniferum*) Recovery Plan: First Revision.