Raystown Lake USACE Project
Natural Resource Management
Level One Natural Resource Inventories

Written by
Devin DeCoeur
SCA Intern

Introduction

The following document addresses the completion of the Level One natural resource inventories at Raystown Lake. Level One natural resource inventory data is used in determining natural resource management needs. The Level One inventory is a general classification and quantification of resources present on the project site. The inventory will be based on four basic resource sets including vegetation cover types, soils capability, wetland, and special status species.   Standards in collecting these datasets have been implemented to maintain consistency and provide data that can be shared on the national level. Within vegetation cover types, a condition rating is assigned to designate the unit as sustainable, transitioning, degraded, or not assessed. This data will provide information to guide natural resource planning, development, restoration and environmental reviews.

The paper first discusses the history, objectives and extent of the level one inventories at the national scale, followed by site specific methodology, results and summaries of the specific data gathered for Raystown. The data gathered from this exercise, using a Student Conservation Association member has been inputted into OMBIL meeting national requirements.

Current Situation at the National Level

The Stewardship Advisory Team was established in accordance with Chapter 7 of ER 1130-2-540 to provide guidance on national programs and policy to improve Environmental Stewardship of Corps lands and waters. In accordance with ER 1130-2-540, section 2-2.c(1), natural resources inventories are to be conducted at Corps civil works projects to provide quantitative and qualitative data for use in determining resource management needs. Level one natural resource inventories are of a general nature and are to be conducted to provide baseline information for Master Plan and initial Operational Management Plan development purposes. Level one inventory data will be used to support the resource objectives and land use classifications of the Master Plan.

Several issues have made the lack of Level One inventories at Corps projects a critical concern. First, if the Corps does not know what resources exist, it is impossible to manage them properly. Secondly, there has been no attempt to implement standard and consistent inventory methodology throughout the Corps. Finally, the Corps needs to be able to measure its success in sustaining or improving the environment with a standardized and consistent inventory. Improvements cannot be demonstrated without the baseline information which a Level One

inventory would provide. Completed and consistent inventories would assist in the programmatic identification of high priority items such as the decline of critical species and the spread of invasive species. A full implementation of a consistent inventory would also assist the Corps in conveying their story to the public and representing ourselves as a good environmental steward.

Work Completed at Raystown Lake

A Level One natural resource inventory was accomplished for the Raystown Lake project using ArcGIS software along with data collected in years prior. Vegetation cover was classified and quantified according to the National Vegetation Classification System and totaled at 20,902 acres of the complete 29,934 acres of land and water within Raystown Lake boundary.

Methodologies for Work at Raystown Lake

Level One Natural Resource Standards

Vegetation cover types are assessed and classified according to the National Vegetation Classification System (NVCS) to the sub-class component. Soils are classified based on the suitability of the land for use without permanent damage according to the Land (Soils) Capability Classes, as defined by the Natural Resources Conservation Service. Classifications of wetlands were completed using the USFWS National Wetland Inventory Classifications of Wetlands and Deep Water Habitats (Cowardin) to the class component. Special status species comprise the fourth and final component of the level one inventory. Because the inventory for special status species complete, it was not discussed in this document.

Vegetation Classification Methods

Level One inventories of vegetation classification for the Raystown Lake Project was accomplished by using ESRI ArcGIS 9.1 in conjunction with data collected by GPS. Layers displaying fields, roads, recreation areas, shrubs, pine stands, and hardwood stands that had been collected previously were utilized to determine the vegetation of the project lands. Where data was not clear or specific, driving to the site and making notes on a map of the area or on GPS hardware was completed to more accurately digitize vegetation of the Raystown Lake project lands. To digitize the project lands, polygons were made to enclose areas that were determined to have similar vegetation types as described by the NVCS. Areas and acres were then calculated for each polygon and acreage was summed in tabular form for each vegetation sub-class.

Wetland Classification Methods

Level One inventories of wetland classification of the Army Corps of Engineers Raystown Lake Project was accomplished by utilizing the Wetlands Mapper online at http://wetlandsfws.er.usgs.gov/wtlnds/launch.html. Data was downloaded from the site that

covered the land occupied by the Raystown Lake Corps project. Areas that were not represented on the map that were known wetland areas were then added. All wetland areas were assigned the appropriate classification and color coded in a GIS layer.

Land (Soils) Capabilities Classification Methods

Level One inventories of land capabilities classification of the Army Corps of Engineers Raystown Lake Project was accomplished by acquiring soil types for the land of the Raystown Lake project. The soils types were then assigned to their land (soils) capabilities class using the Web Soil Survey found at http://websoilsurvey.nrcs.usda.gov/app/. Acres were summarized by class and color coded in a GIS layer.

Methods for Assessing the Conditions of the Land and Waters

An additional phase of the level one inventory is to assess the condition of the vegetated and non-vegetative areas of the project into three categories: degraded, transitioning and sustainable. The following is the definition of these conditions.

SUSTAINABLE – Meeting desired state. The acreage is not significantly impacted by any factors that can be managed and does not require intensive management. The acreage also meets operational goals and objectives set out in project OMP or other applicable management document. These acres are considered healthy and sustainable for future generations. Only minor management practices may be required to maintain the health.

TRANSITIONING – Managed to meet desired goals. The acreage is impacted by human or other environmental factors that require management of the acreage to meet goals and objectives outlined in the project OMP or other applicable management document.

DEGRADED – Does not meet desired goals. The acreage is significantly impacted by human or other environmental factors that prevent the acreage from meeting desired goals outlined in the project OMP or other management documents. The acreage is not considered healthy. Intense management may be required to meet desired goals.

Existing data was utilized to determine the conditions of the lands and waters. As per the protocol, facility lands and landscaped or mowed lands are considered sustainable. Primarily, two other indicators were utilized to assess the remaining acreage. Regeneration data taken from over 400 forest sampling plots were used to determine condition of forest resources. These plots were collected during the summer of 2007 to assess the condition of forest after 4 years of intensive deer management. A second data set of invasive species data coverages was also used. Vegetative polygons where invasive species dominated the vegetation were considered degraded. Those with some incursions were considered transitioning and no invasive species were considered sustainable.

<div align="center">

Results

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Vegetation

The most common vegetation type is the closed tree canopy deciduous forest at 9,462 acres. It is closely followed by the closed tree canopy mixed evergreen-deciduous forest at 8,250 acres, followed by the closed tree canopy evergreen forest at 1,843 acres (Table 1). A vegetation map can be found on the next page in Figure 1.

Table 1.

Level One Inventory
Vegetation Classification (NVCS)

(CODE)	CLASS	TOTALS (ACRES)
Vegetated		
	Closed Tree Canopy (CLOSEDTREE)	
(EV_CL_TREE)	Evergreen Forest	1843.705
(DE_CL_TREE)	Deciduous Forest	9462.447
(MXEVDE_CL_TREE)	Mixed evergreen-deciduous	8250.988
	Open Tree Canopy (OPENTREE)	
(EV_OP_TREE)	Evergreen Forest	10.439
(DE_OP_TREE)	Deciduous Forest	▮
(MXEVDE_OP_TREE)	Mixed evergreen-deciduous	17.841
	Shrubland (SHRUBLAND)	
(EV_SH)	Evergreen Forest	17.139
(DE_SH)	Deciduous Forest	46.611
(MXEVDE_SH)	Mixed evergreen-deciduous	130.407
	Dwarf Shrubland (DWFSHRUBLAND)	
(EV_DWSH)	Evergreen Forest	▮
(DE_DWSH)	Deciduous Forest	▮
(MXEVDE_DWSH)	Mixed evergreen-deciduous	▮
	Herbaceous Vegetation (HERBACEOUS)	
(PE_GMVG)	Perennial graminoid vegetation	776.624
(PE_FOVG)	Perennial forb vegetation	▮
(HYRO_VG)	Hydromorphic rooted vegetation	▮
(AN_GMFOVG)	Annual graminoid/ forb vegetation	345.823
	Nonvascular Vegetation (NONVASCULAR)	
(BR_VG)	Bryophyte vegetation	▮
(LI_VG)	Lichen vegetation	▮
(AL_VG)	Alga vegetation	▮
	Sparse Vegetation (SPRVEGETATED)	
(SP_VEG_CONS)	Consolidated rock sparse vegetation	▮
(SP_VEG_BLDR)	Boulder, gravel, cobble/ talus sparse veg.	▮
(SP_VEG_UNCONS)	Unconsolidated material sparse veg.	▮
Non-vegetated	Recreation Areas	897.079
	TOTAL VEGETATION (ACRES)	20902.024

Level One Natural Resource Inventory
Army Corps of Engineers - Raystown Lake Project
Vegetation Classification (NVCS)
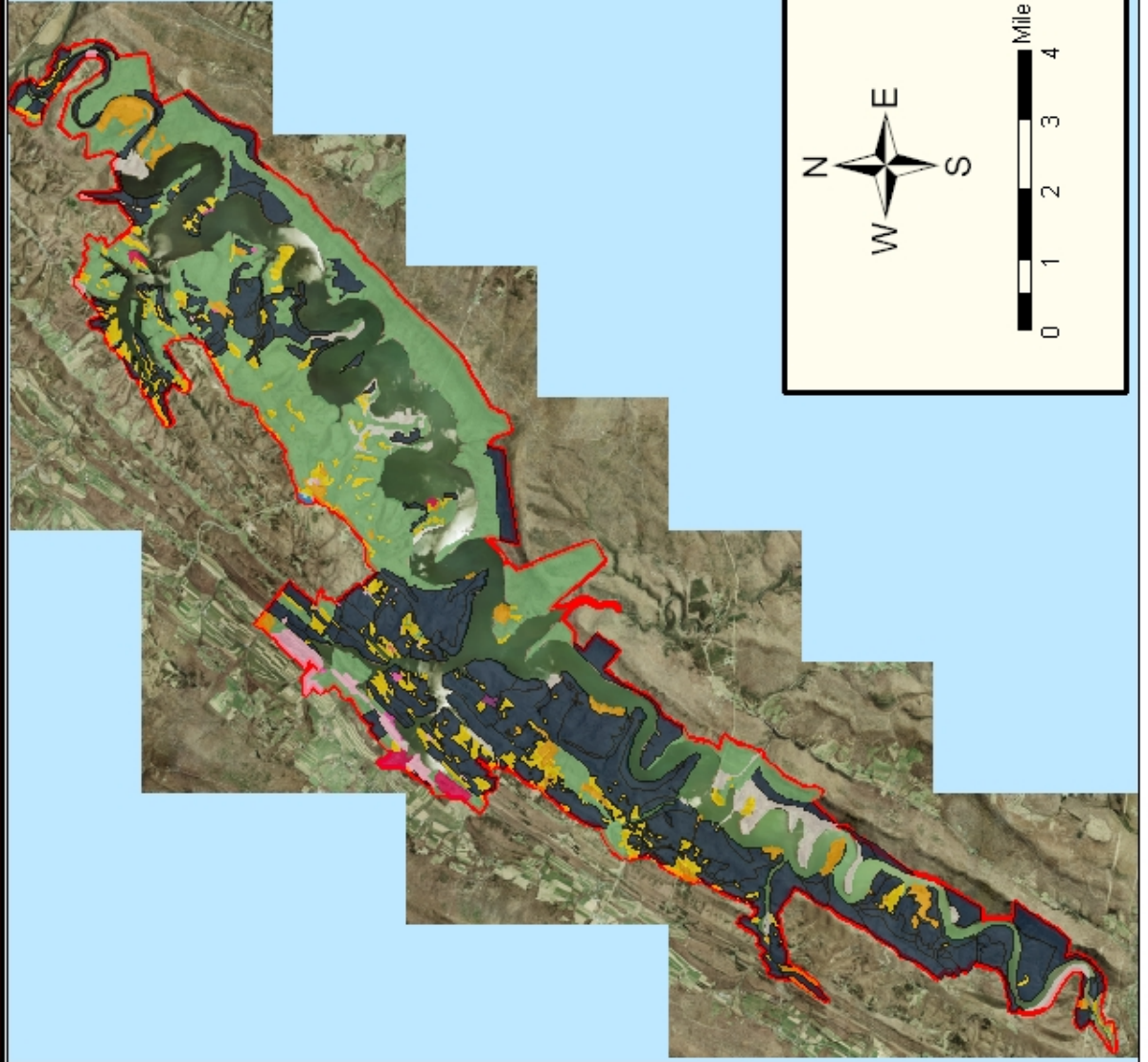
Legend

☐ Project Boundary

Vegetation

Closed Tree Canopy
- Deciduous
- Evergreen
- Mixed

Open Tree Canopy
- Evergreen
- Mixed

Shrubland
- Deciduous
- Evergreen
- Mixed

Herbaceous
- Annual Graminoid/ Forb
- Perennial Graminoid

Non Vegetated
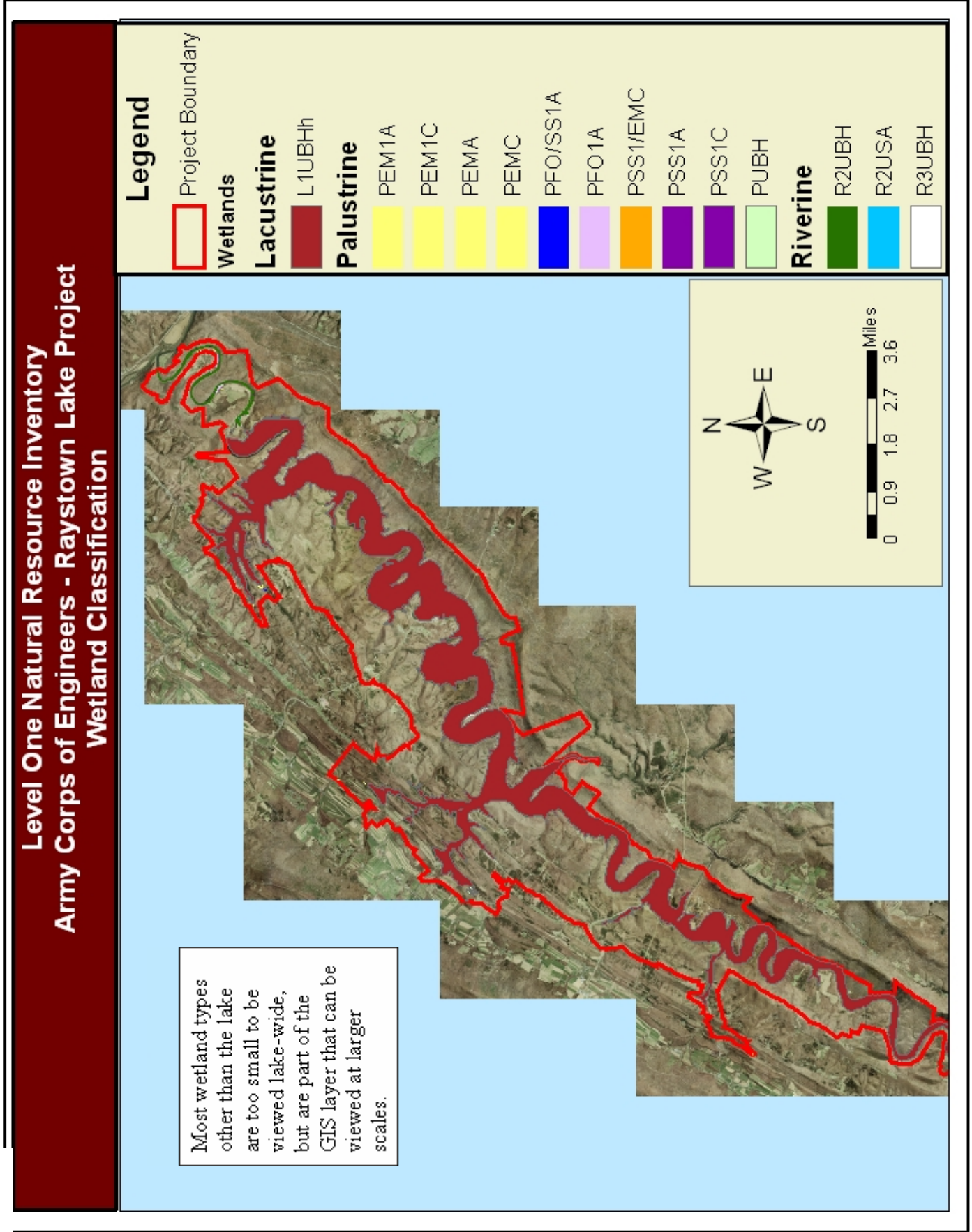- Non-vegetated

0 1 2 3 4 Miles

N W E S

Wetlands

The most common classification of the wetlands of Raystown Lake is the main portion of the lake as classified by L1UBHh at 8,337.5 acres, followed by the riverine system at 146.4 acres, and then the palustrine system at 36 acres (Table 2). A wetland map can be found on the next page in Figure 2.

Table 2.

Level One Inventory
Wetland Classification

CODE	SYSTEM	TOTALS (Acres)
	Lacustrine	
	Limnetic	
L1UBHh	Unconsolidated Bottom	8337.549
	Palustrine	
PEM1C/A	Emergent	11.962
PFO1A	Forested	9.066
PSS1A	Scrub-Shrub	1.378
PSS1/EMC	Scrub-Shrub/ Emergent	1.006
PUBH	Unconsolidated Bottom	10.678
PFO/SS1A	Forested/ Scrub-Shrub	1.924
	Riverine	
	Lower Perennial	
R2USA	Unconsolidated Shore	0.29
R2UBH	Unconsolidated Bottom	129.119
	Upper Perennial	
R3UBH	Unconsolidated Bottom	16.994
	TOTAL	8519.966

Figure 2.

Level One Natural Resource Inventory
Army Corps of Engineers - Raystown Lake Project
Wetland Classification

Most wetland types other than the lake are too small to be viewed lake-wide, but are part of the GIS layer that can be viewed at larger scales.

Legend

☐ Project Boundary

Wetlands

Lacustrine
- L1UBHh

Palustrine
- PEM1A
- PEM1C
- PEMA
- PEMC
- PFO/SS1A
- PFO1A
- PSS1/EMC
- PSS1A
- PSS1C
- PUBH

Riverine
- R2UBH
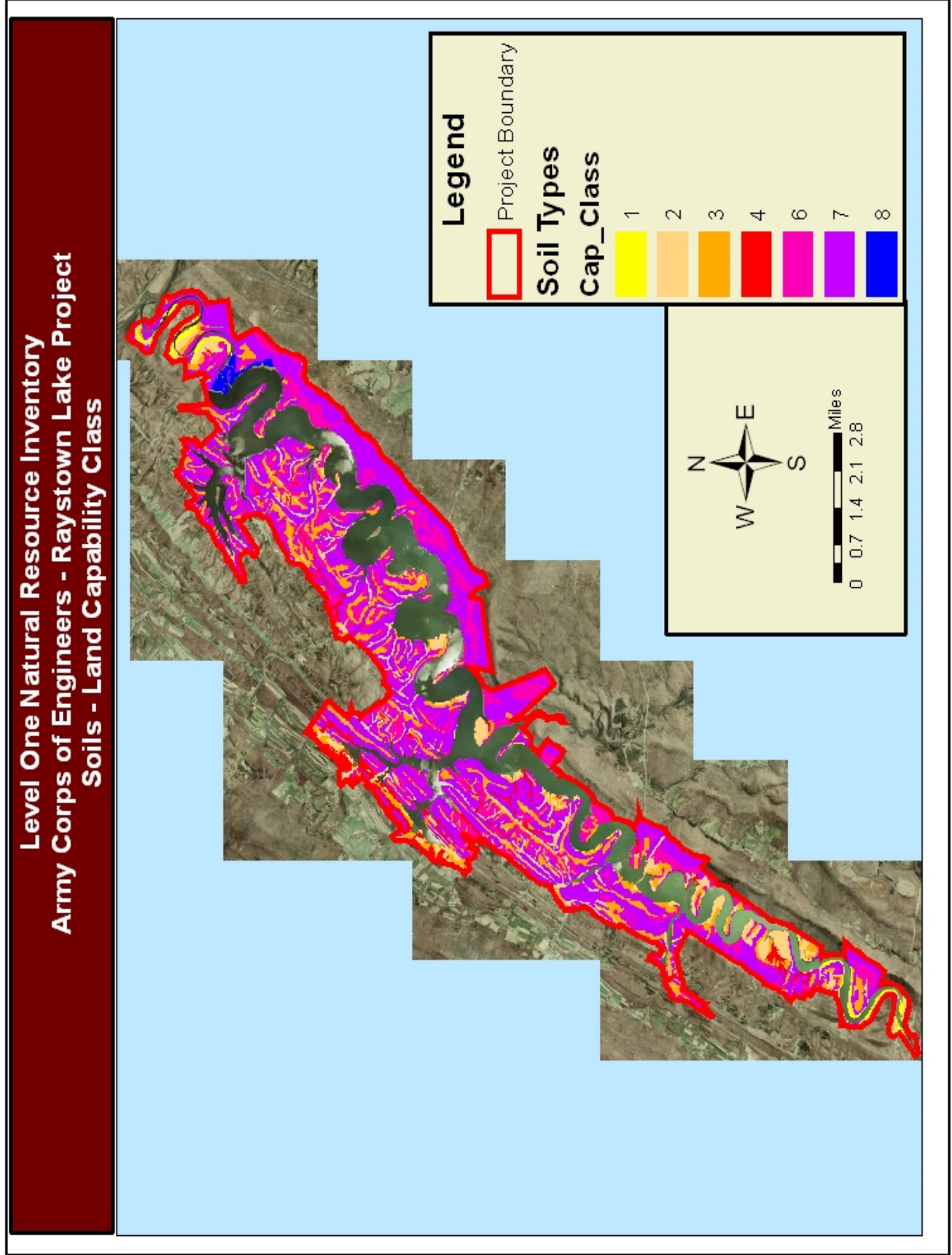- R2USA
- R3UBH

N
W E
S

Miles
0 0.9 1.8 2.7 3.6

Soils

The most common land capability class is class 7 at 9,781 acres. Class 7 soil has very severe limitations that make it unsuitable for cultivation. The next most common land capability class is class 6 which also has severe limitations but not as great as class 7. This is followed by class 3, which indicates that the soils have limitations that reduce the choice of plants or that require special conservation practices (Table 3.). A land capabilities class map can be found on the next page in figure 3.

Table 3.

Level One Inventory
Soils - Land Capability Class

LAND CAPABILITIES CLASS	TOTALS (ACRES)
1	346.524
2	2217.016
3	3241.324
4	743.967
5	0
6	4687.365
7	9871.546
8	146.977
TOTAL	21254.719

Figure 3.

Level One Natural Resource Inventory
Army Corps of Engineers - Raystown Lake Project
Soils - Land Capability Class

Legend

Project Boundary

Soil Types
Cap_Class
1
2
3
4
6
7
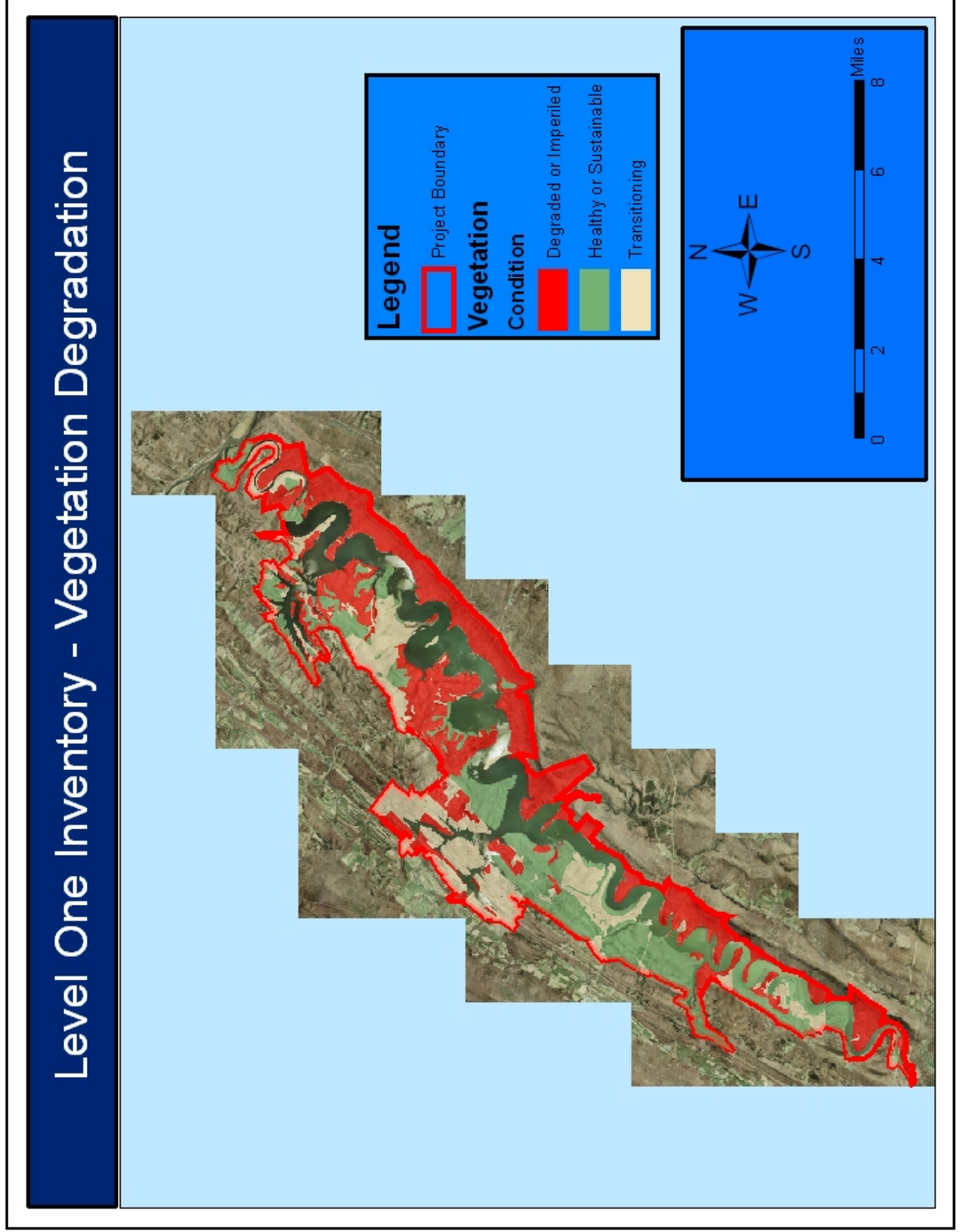8

W N E S

0 0.7 1.4 2.1 2.8 Miles

Vegetation Conditions

The condition of vegetation on Raystown Lake property was then assessed to the levels of healthy, transitioning, and degraded using data relating to regeneration, invasive plant species, and forest pest management including hemlock wooly adelgid and gypsy moths. The majority of the Corps vegetation has been assessed as degraded with 9,512 acres showing signs of severe degradation. About 6,000 acres of the vegetated land is assessed as healthy and sustainable. The 5,387 remaining vegetated acres are assessed as transitioning or needing improvement. This data can be view in Table 4 below. A map showing degradation information can be viewed on the following page in Figure 4.

Table 4.

Level One Inventory
Degradation Worksheet

CODE	TYPE	ACREAGE	HEALTHY OR SUSTAINABLE	NEEDS IMPROVEMENT (TRANSITIONING)	DEGRADED OR IMPERILED	NOT ASSESSED	% NOT ASSESSED
CLOSEDTREE							
EV_CL_TREE	Evergreen Closed Tree Canopy	1843.705	903.969	643.786	295.95	0	0.00
DE_CL_TREE	Deciduous Closed Tree Canopy	9462.447	3910.948	2645.343	2906.156	0	0.00
MXEVDE_CL_TREE	Mixed Closed Tree Canopy	8250.988	964.272	1441.823	5844.893	0	0.00
OPENTREE							
EV_OP_TREE	Evergreen Open Tree Canopy	10.439		10.439		0	0.00
DE_OP_TREE	Deciduous Open Tree Canopy					0	
MXEVDE_OP_TREE	Mixed Open Tree Canopy	17.841		17.841		0	0.00
SHRUBLAND							
EV_SH	Evergreen Shrubland	17.139			17.139	0	0.00
DE_SH	Deciduous Shrubland	46.611		27.105	19.506	0	0.00
MXEVDE_SH	Mixed Shrubland	130.407		63.873	66.534	0	0.00
DWFSHRUBLAND							
EV_DWSH	Evergreen Dwarf Shrubland					0	
DE_DWSH	Deciduous Dwarf Shrubland					0	
MXEVDE_DWSH	Mixed Dwarf Shrubland					0	
HERBACEOUS							
PE_GMVG	Perennial graminoid vegetation	776.624	220.585	346.558	209.481	0	0.00
PE_FOVG	Perennial forb vegetation					0	
HYRO_VG	Hydromorphic rooted vegetation					0	
AN_GMFOVG	Annual graminoid/ forb vegetation	345.823	2.248	191.022	152.553	0	0.00
NONVASCULAR							
BR_VG	Bryophyte vegetation					0	
LI_VG	Lichen vegetation					0	
AL_VG	Alga vegetation					0	
SPRVEGETATED							
SP_VEG_CONS	Consolidated rock sparse vegetation					0	
SP_VEG_BLDR	Boulder, gravel, cobble/ talus sparse vegetation					0	
SP_VEG_UNCONS	Unconsolidated material sparse vegetation					0	
TOTAL		20902.024	6002.022	5387.79	9512.212	0	0.00

Figure 4.

Level One Inventory - Vegetation Degradation

Legend

Project Boundary

Vegetation Condition

Degraded or Imperiled

Healthy or Sustainable

Transitioning

N
W E
S

0   2   4   6   8
Miles

Summary

The vegetation classification results will be utilized in the operational management plan to execute planning and implementation by vegetation type. The condition assessment of the vegetation illustrated the existence of a significant amount of lands that are degraded with 9,512 acres showing signs of severe degradation. About 6,000 acres of the vegetated land is assessed as healthy and sustainable. The 5,387 remaining vegetated acres are assessed as transitioning or needing improvement. Most of the degraded lands occur within the dominate vegetation class of deciduous and mixed deciduous closed tree canopy. Lack of historical forest management, deer browsing and invasive species primarily contribute to the degradation of these forest types. Nearly half of the open field and shrub habitat is degraded due to invasive species. Operational Management Plans will lead to forest management prescriptions and herbicide contracts to improve the sustainability of these habitats.

Important soils findings include a substantial acreage of nearly 9,000 acres of soils that are classified as class 7. This class is the second lowest in capabilities meaning that erosion and soil properties present restrictions on uses of the soils. These GIS soil layers should be reviewed prior to any development or land use change.

The wetlands classified under the National Wetland Inventory did not provide much new information. Other than the lake and river environments, total wetland acreage classified was only 36 acres. This illustrates the limited value of the NWI mapping. Additional surveying to determine jurisdictional or other important wet and moist soil environments will require site specific delineations.

In summary, the SCA position was an effective means to accomplishing the required Level One Inventory. The cost of the intern was approximately $ 12,000 for six months and estimated time worked on the inventory was approximately 3 months. Data from the project was entered into OMBIL to meet national requirements. The GIS files and data will be incorporated into the project GIS system. This document will be attached as an exhibit to Appendix 13 – Forest and Wildlife Management Plan.