



Department of Energy
Office of Legacy Management

November 5, 2009

Mr. Johnny Reising
Fernald Natural Resource Trustee
U.S. Department of Energy
EM Consolidated Business Center
250 East Fifth Street, Suite 500
Cincinnati, Ohio 45202

Mr. Thomas Schneider
Fernald Natural Resource Trustee
Ohio Environmental Protection Agency
Southwest District Office
401 East Fifth Street
Dayton, Ohio 45402-2911

Mr. David Devault
Fernald Natural Resource Trustee
United States Fish and Wildlife Services
Regional Office – Federal Building
Fort Snelling, Minnesota 55111

Dear Mr. Reising, Mr. Schneider, and Mr. Devault:

Subject: Transmittal of the Final Fernald Preserve Wetland Mitigation Monitoring Plan

Reference: 1) Letter, T. Schneider to J. Powell, "Re: Comments – Draft Fernald Preserve Wetland Mitigation Monitoring Plan," dated April 3, 2009

This letter transmits the revised Fernald Preserve Wetland Mitigation Monitoring Plan and responses to Ohio Environmental Protection Agency (OEPA) comments on the March 2009 Draft Fernald Preserve Wetland Mitigation Monitoring Plan (Reference 1). The Wetland Mitigation Monitoring Plan has been updated and finalized as a result of OEPA comments. There are two copies of the plan in each bound document. The first copy is the final plan. The second copy highlights the changes to the document (i.e., track changes). This plan is required by the Natural Resource Restoration Plan, Section 5.1.1, respectively. The Natural Resource Restoration Plan is Appendix B to the November 11, 2008 Consent Decree.

2597 B 3/4 Road, Grand Junction, CO 81503

1000 Independence Ave., S.W., Washington, DC 20585

10995 Hamilton-Cleves Highway, Harrison, OH 45030

232 Energy Way, N. Las Vegas, NV 89030

REPLY TO: Harrison Office

3600 Collins Ferry Road, Morgantown, WV 26505

11025 Dover St., Suite 1000, Westminster, CO 80021

955 Mound Road, Miamisburg, OH 45342

Mr. Johnny Reising
Mr. Thomas Schneider
Mr. David Devault
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If you have any questions regarding this matter, please call me at (513) 648-3148.

Sincerely,

A handwritten signature in black ink that reads "Jane Powell". The signature is written in a cursive, flowing style.

Jane Powell
Fernald Preserve Manager
DOE-LM-20.1

Enclosures

cc w/enclosures:
Project File (Thru W. Sumner)
Administrative Records (Thru W. Sumner)

cc w/o enclosures:
T. Pauling, DOE-LM
J. Homer, Stoller
F. Johnston, Stoller
G. Lupton, Stoller

Fernald Preserve Wetland Mitigation Monitoring Plan

October 2009

Final



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Acronyms and Abbreviations

A1PI	Area 1, Phase I
A6PI	Area 6, Phase I
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
cm	centimeters
DOE	U.S. Department of Energy
DOI	U.S. Department of Interior
EPA	U.S. Environmental Protection Agency
HGM	Hydrogeomorphic
NRRP	Natural Resource Restoration Plan
NRTs	Fernald Natural Resource Trustees
OEPA	Ohio Environmental Protection Agency
OU	Operable Unit
USACE	U.S. Army Corps of Engineers

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Executive Summary

The U.S. Department of Energy (DOE) and the Ohio Environmental Protection Agency (OEPA) have signed a Consent Decree that settles a long-standing natural resource damage claim under Section 107 of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). As a result, the Fernald Natural Resource Trustees (DOE, OEPA, and the U.S. Department of Interior) have finalized the Fernald Natural Resource Restoration Plan (NRRP), which is Appendix B of the *Partial Consent Decree Resolving Ohio's Natural Resource Damage Claim against DOE* (State of Ohio 2008). The NRRP provides a conceptual ecological restoration plan for the Fernald Preserve and specifies monitoring and maintenance requirements for restored areas. The NRRP requires the National Resource Trustees to develop a process for resolution of outstanding wetland mitigation obligations at the Fernald Preserve. This *Wetland Mitigation Monitoring Plan* sets forth the process for evaluation and acceptance of wetland restoration projects at the Fernald Preserve that are intended to satisfy wetland mitigation requirements.

The Fernald Preserve is situated on a 1,050-acre tract of land, approximately 18 miles northwest of Cincinnati, Ohio. The site is located near the unincorporated communities of Ross, Fernald, Shandon, and New Haven in Hamilton County. It is a former uranium-processing facility that was shut down in 1991. Since then, the site has undergone extensive remediation pursuant to CERCLA. Remedial activities and subsequent ecological restoration have converted the site from an industrial production facility to an undeveloped park, encompassing wetlands, prairies, and forest. When the large-scale soil remediation and waste disposal was completed in the fall of 2006, the site was successfully transitioned to the DOE Office of Legacy Management. The Fernald Closure Project was then renamed the Fernald Preserve.

In 1993, approximately 36 acres of jurisdictional wetlands were delineated at the Fernald site. According to the Operable Unit 5 Record of Decision, an estimated 10 acres of wetlands would be impacted from remediation activities. Compensatory mitigation pursuant to Section 404 of the Clean Water Act was subsequently negotiated with regulators. In 1995, DOE agreed to on-site mitigation at a 1.5 to 1 ratio. DOE committed to compensating for 11.9 acres of wetlands, based on the original 10-acre estimate as well as an additional 1.9 acres of wetlands delineated during remediation. Wetland mitigation plans were incorporated into sitewide ecological restoration planning through the NRRP. The NRRP established three projects specific for wetland mitigation, and also included wetland creation components within several additional restoration projects. In addition, a 26-acre jurisdictional forested/wet meadow wetland complex has been preserved in the northern portions of the site.

DOE completed the NRRP wetland mitigation projects from 1999 through 2006. An agreement on monitoring of these wetlands remained unresolved until final settlement of the natural resource damage claim. This plan provides a path forward for evaluating mitigation projects using recently established OEPA performance standards and monitoring protocols. In addition, the plan addresses standards and monitoring for newly constructed mitigation projects at the Fernald Preserve.

The size, type, and quality of site-impacted wetlands were estimated from historical information, which provided a basis for using OEPA wetland mitigation performance standards. Performance standards were then established to serve as monitoring objectives for the on-site created

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wetlands. Standards have been established for wetland acreage, basin morphology, hydrology, vegetation, wildlife, and soil biogeochemistry.

Published OEPA monitoring protocols will be used to evaluate the extent to which the performance standards are met. A 3-year monitoring period has been established, which takes into consideration past monitoring that has been conducted by DOE. Reporting requirements are also outlined. The annual Site Environmental Report will be used to report findings to the regulators and the public.

1.0 Introduction

The U.S. Department of Energy (DOE) and the Ohio Environmental Protection Agency (OEPA) have signed a Consent Decree that settles a long-standing natural resource damage claim under Section 107 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). As a result, the Fernald Natural Resource Trustees (NRTs) (DOE, OEPA, and the U.S. Department of Interior [DOI]) have finalized the Fernald Preserve Natural Resource Restoration Plan (NRRP), which is Appendix B of the *Partial Consent Decree Resolving Ohio's Natural Resource Damage Claim against DOE* (State of Ohio 2008). The NRRP provides a conceptual Ecological Restoration Plan for the Fernald Preserve and specifies monitoring and maintenance requirements for restored areas. The NRRP requires the NRTs to develop a process for resolution of outstanding wetland mitigation obligations at the Fernald Preserve. A combination of mitigation projects implemented under the NRRP achieved the negotiated compensatory acreage. This *Wetland Mitigation Monitoring Plan* meets the requirements of the NRRP by setting forth the process for evaluation and acceptance of wetland mitigation projects at the Fernald Preserve.

1.1 Site Description

The Fernald Preserve is situated on a 1,050 acre tract of land, approximately 18 miles northwest of Cincinnati, Ohio. The site is located near the unincorporated communities of Ross, Fernald, Shandon, and New Haven in Hamilton County. It is a former uranium-processing facility that was shut down in 1991. Since then, the site has undergone extensive remediation pursuant to CERCLA. Remedial activities and subsequent ecological restoration have converted the site from an industrial production facility to an undeveloped park, encompassing wetlands, prairies, and forest. The Fernald site is now known as the Fernald Preserve. Several trails and the Fernald Preserve Visitors Center have been constructed on site for public use.

1.2 Background

In June 1993, approximately 35.9 acres of jurisdictional wetlands and 8.9 acres of Waters of the United States were identified and documented in the *Wetlands Delineation Report of the Fernald Environmental Management Project Butler and Hamilton Counties, Ohio* (Ebasco 1993). The U.S. Army Corps of Engineers (USACE) approved this delineation in August 1993.

Section 9.1.6 of the Operable Unit 5 (OU5) Record of Decision identified approximately 10 acres of wetlands that would be impacted as a result of implementing OU5 remedial actions (DOE 1996). Mitigation for wetland impacts was not specifically defined but did indicate that mitigation would be consistent with Section 404(b)(1) of the Clean Water Act. Compensatory mitigation was also not specifically defined. The need for compensatory mitigation was to be determined after all practicable steps to avoid or minimize adverse impacts were applied.

In June 1995, DOE met with U.S. Environmental Protection Agency (EPA), OEPA, U.S. Fish and Wildlife Service, and the Ohio Department of Natural Resources to discuss mitigation of impacted wetlands. DOE agreed to conduct on-property (if possible) mitigation and to replace 1.5 acres of wetlands for every acre of wetland dredged or filled. Section 3.2.4 of the NRRP recognizes this agreement.

DOE committed to compensating for 11.9 acres of wetlands, which consist of the original 1993 delineation of 10 acres that were originally anticipated to be impacted as well as an additional 1.9 acres of wetlands delineated during remediation. Based on the agreed acreage and the agreed mitigation ratio, DOE is responsible for installing 17.85 acres of new wetlands. Wetland compensation was incorporated into sitewide ecological restoration planning for the site through the NRRP. The NRRP established three separate ecological restoration projects to meet this requirement. These projects are described in the NRRP and summarized in Section 2.0 below. Several other ecological restoration projects included a wetland restoration or creation component. While not specifically identified as compensatory wetlands, they nevertheless are worth evaluating for potential additional compensatory acreage. Also, approximately 26 acres of forested jurisdictional wetlands in the northern woodlot have been preserved on site.

An agreement on monitoring of mitigation wetlands remained unresolved until final settlement of the NRT's natural resource damage claim. Over the past several years, DOE has undertaken a variety of monitoring efforts pursuant to project-specific Natural Resource Restoration Design Plans. However, no resolution of compensation was reached, as the NRTs were involved in settlement negotiations. The final NRRP includes a path forward for DOE to meet its mitigation requirements through evaluation of existing projects using recently established OEPA monitoring protocols. In summary, the NRTs will use the monitoring approach set forth in this plan to evaluate the three specific wetland mitigation projects. In addition, several restoration projects included a component of wetland creation, but these newer wetlands were not monitored as part of the compensatory mitigation acreage. This revision of the monitoring approach provides an opportunity to add these areas into the wetlands mitigation program. A combination of these areas should meet DOE's compensatory mitigation requirement.

1.3 Scope

The scope of the *Fernald Preserve Wetland Mitigation Monitoring Plan* entails the establishment of performance standards and remaining monitoring requirements for completed wetland mitigation projects. In addition, this plan identifies additional on-site wetlands that may contribute to compensatory wetland acreage. Performance standards and monitoring requirements are set forth for these areas as well.

2.0 Wetland Mitigation Projects and Areas

The NRRP provides a summary of existing wetland mitigation projects. These projects include the Area 1, Phase I (A1PI) project (Wetland Mitigation Phase I), the North Woodlot (Wetland Mitigation Phase II), and the Borrow Area (Wetland Mitigation Phase III). Figure 2-1 shows the location of these projects.

2.1 A1PI Wetland Mitigation

The A1PI Wetland Mitigation Project is a series of 8 basins across approximately 12 acres in the northeast corner of the site. The project includes a variety of emergent, wet meadow, scrub/shrub, and open water areas, as well as a number of upland prairie and forest patches. Section 4.2 of the NRRP describes this project in more detail. It was designed to create about 6 acres of mitigation wetlands. The project was completed in 2000.

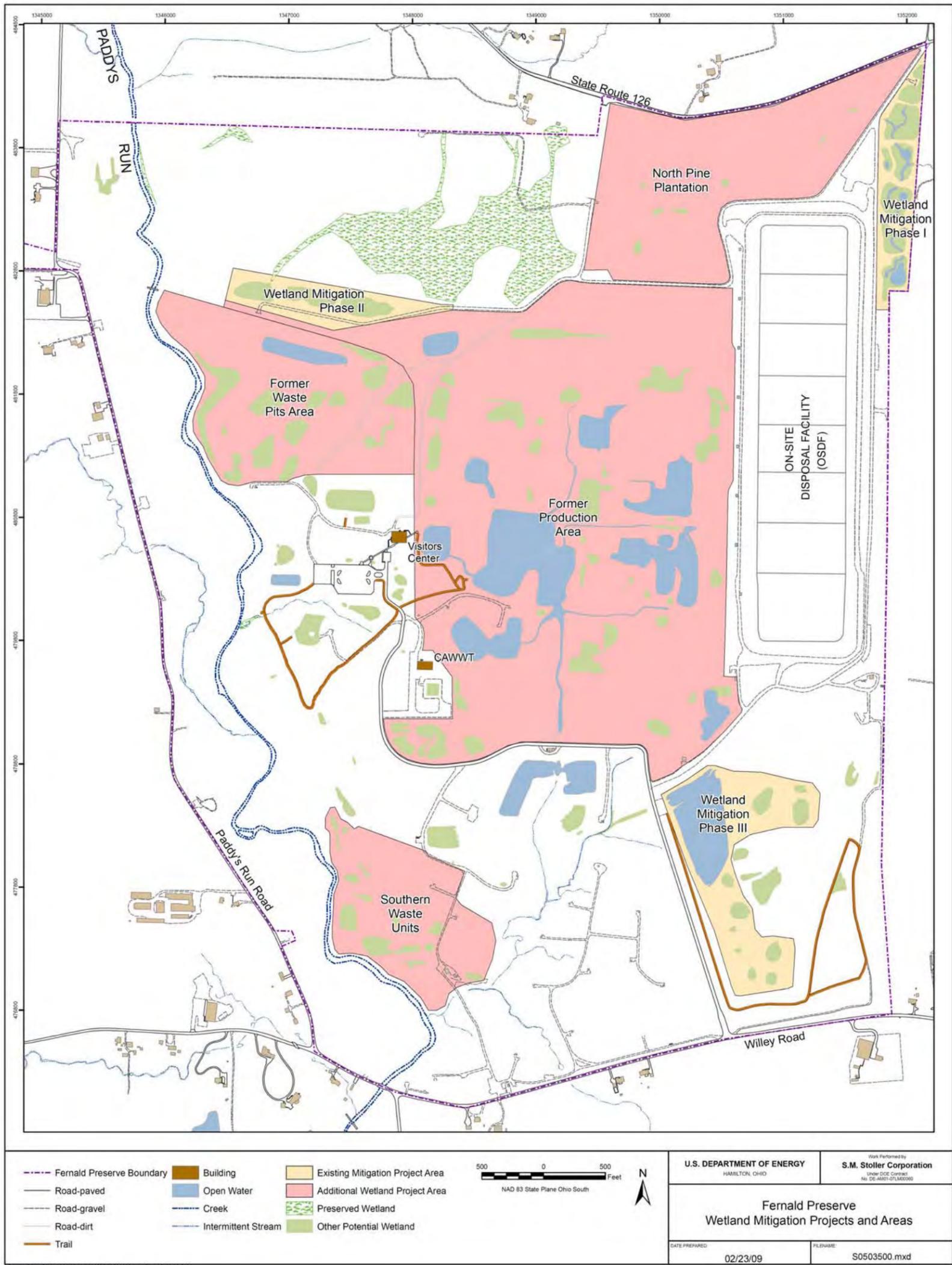


Figure 2-1. Fernald Preserve Wetland Mitigation Projects and Areas

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Monitoring of the A1PI Wetland Mitigation Project took place from 2000 to 2004. A wetland delineation was conducted in 2004 that showed 5.34 acres of compensatory wetlands were created.

2.2 A6PI Wetland Mitigation

The Area 6, Phase I (A6PI) Wetland Mitigation Project consists of three basins that are located on 8 acres along the south side of the northern woodlot. The basins are fed by surface water that drains from the existing 26-acre wetland system. These basins include a mix of open water and emergent and forested wetland communities. This wetland project was designed to create approximately 4 acres of mitigation wetlands. Section 4.5.3 of the NRRP describes this project in more detail.

The project was completed in spring 2005, and monitoring began the following summer. A wetland delineation has not yet been conducted on this system. Several species of salamander larvae and adults have been observed in each of the A6PI basins.

2.3 Borrow Area Wetland Mitigation

The Borrow Area Wetland Mitigation Project involves a series of shallow open water and emergent basins surrounded by marsh and wet prairie. It is located within the 48-acre footprint of the On-site Disposal Facility borrow area. The wetland features were constructed in stages from 2002 to 2006, as borrow activities were completed and areas became available for restoration. Section 4.7 of the NRRP describes this project in more detail.

Monitoring for the borrow area began in 2006. A wetland delineation has not been completed. While the system was designed to be fed by precipitation only, since 2006, groundwater has been pumped into a portion of the area. The addition of groundwater is an effort to provide passive groundwater recharge through downgradient site drainages. The altered average water levels have inundated portions of the wetland mitigation area. Also, upon allowing public access to the site in the summer of 2008, the area was renamed the Lodge Pond. This is in reference to the beavers that have taken up residence within the basin. A walking trail and overlook has been constructed around the perimeter of the project area.

2.4 Preserved Wetlands

In addition to the mitigation projects listed above, construction activities were adjusted during remediation to avoid impacts as much as possible. A 26-acre forested/wet meadow wetland complex is located on site in the northern woodlot (Figure 2-1). Additional isolated wetlands can be found along the Paddys Run riparian corridor. Several of these areas have been enhanced through seeding and invasive species control.

2.5 Other Wetland Areas

As stated in Section 1.2, several ecological restoration projects have included wetland creation. In fact, some of the most diverse wetland communities established on site can be found within these projects. While not originally envisioned as a component of the compensatory mitigation

program, these areas are worth evaluation. The primary areas to be evaluated are summarized below.

2.5.1 Northern Pine Plantation

Ecological restoration of the Northern Pine Plantation was undertaken in 2003. It consisted primarily of replacing a monoculture evergreen woodlot with deciduous forest. The surface water hydrology of the project area and the discovery of old agricultural drain tiles led to the creation of several wet prairie and emergent wetlands. Section 4.5.1 of the NRRP describes this project in more detail.

2.5.2 Former Production Area/Waste Pits Area

The Former Production and Waste Pits areas represent the bulk of ecological restoration activities that took place within remediated areas. Work was conducted in stages from 2004 through 2006, following remediation and soil certification. Numerous depressions were left across these areas following building demolition and soil excavation. As described in Section 4.10 of the NRRP, restoration involved maximizing open water and wetland establishment where possible, and surrounding these depressions with tallgrass prairie communities.

2.5.3 Southern Waste Units

The Southern Waste Units involved the first restoration effort within a significantly altered topography. This project was constructed in 2001 and 2002. The project was designed primarily as an expansion of the existing Paddys Run riparian corridor, with several wetland and open water areas incorporated into the landscape. The location of this project allowed for an expansion of the Paddys Run floodplain as well. Section 4.4 of the NRRP describes this project in more detail. A portion of the post-excitation topography included an unstable cutbank of sand and gravel. In 2006, this area was regraded using clean concrete from other on-site projects to create additional amphibian and reptile habitats.

3.0 Performance Standards

As stated in Section 1.3, the NRTs have agreed to a path forward for resolving compensatory wetland mitigation requirements at the Fernald Preserve. Section 5.1.1 of the NRRP sets forth the process for accomplishing this. The NRTs will use performance standards and monitoring protocols that were published by OEPA in 2004 (Mack et al. 2004) as the basis for evaluating on-site mitigation wetlands. This section and the following sections on monitoring describe how the OEPA standards apply to the Fernald Preserve.

The OEPA mitigation performance standards are designed to ensure that both the processes (functions) and ecological services (values) that an impacted wetland provided are sufficiently restored through the mitigation process. To do this, a multistep process has been developed to efficiently estimate the size, type, and quality of impacted wetlands. This evaluation results in a set of performance standards that subsequent mitigation wetlands must meet to ensure that similar size, type, and quality wetlands are replaced.

For the Fernald Preserve, wetland impacts occurred years ago as part of remedial activities. The size and type of impacted wetlands can be approximated from the 1993 wetland delineation, but the quality of the wetlands must be inferred from the original jurisdictional delineation and subsequent discussions with regulators. In Section 3.1 below, existing information was used to estimate the size and type and of wetlands impacted, as well as an approximation of impacted wetland quality at the site.

As with the impacts to on-site wetlands, mitigation efforts have already taken place as well. It is important to distinguish between mitigation projects that are already constructed and additional projects that may be needed in the future. The OEPA mitigation performance standards and monitoring protocols were published in 2004. Each of the primary wetland mitigation projects set forth in the NRRP was at least partially designed prior to finalization of these standards. Retroactively applying these standards to established mitigation wetlands is not feasible. Instead, the published performance standards can be used as a tool to evaluate existing projects and identify opportunities for improvement of functions and values through adaptive management.

For new projects that may be agreed to, the OEPA performance standards and monitoring protocols would be fully applicable. There are two scenarios in which new mitigation projects would be undertaken. First, new mitigation projects could be considered by the NRTs if it is determined that existing created and preserved on-site wetlands do not adequately compensate for past wetland impacts. Second, additional wetland impacts could occur as a result of possible future site construction or some unanticipated dredge or fill.

3.1 Description of Impacted Wetlands

3.1.1 Size of Impacted Wetlands

The 1993 wetland delineation was conducted using the Routine On-Site Determination methodology established by the 1987 Corp of Engineers Wetland Delineation Manual (USACE 1987). Figure 3–1 shows the results of this delineation. Jurisdictional wetlands included 26.58 acres of palustrine forested wetland, 6.95 acres of drainage ditches/swales, and 2.37 acres of isolated persistent emergent wetlands (Ebasco 1993). Since the 1993 delineation, several additional isolated persistent emergent wetlands have been identified, totaling 1.9 acres. Figure 3–1 confirms that no more than 11.9 acres of wetlands have been impacted (i.e., dredged or filled) at the Fernald Preserve as a result of remedial activities. The actual acreage of wetlands that were dredged or filled due to remediation is less than the 10 acres originally estimated in the OU5 Record of Decision. Based on Figure 3–1 and Table 3–1, about 9 acres have been impacted. In addition, while considered “Impacted” pursuant to Figure 3–1 and Table 3–1, a good portion of Wetlands WG (0.52 acre), WH (0.53 acre), WI (1.77 acres), WK (0.63 acre), and WHH (0.13 acre) have remained intact.

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Table 3-1. Summary of Jurisdictional Wetlands at the Fernald Preserve and Crosswalk of Ohio EPA Hydrogeomorphic (HGM) Wetland Classification

Wetland Boundary Designation	Wetland Classification	Acreage	Impacted?	HGM Class	Class Modifier	Plant Community Modifier	Dominant Plant Community	Comments
1993 Wetland Delineation								
WA-WB-WC-WD-WF	Palustrine Deciduous Forested	26.15	No	Depression	(A) Surface water	(1a) Swamp forest	(vi) mixed forest	Includes some areas of persistent emergent wetlands
WL	Palustrine Deciduous Forested	0.13	No	Depression	(A) Surface water	(1a) Swamp forest	(ix) cottonwood	
WN	Palustrine Deciduous Forested	0.10	Yes	Depression	(A) Surface water	(1a) Swamp forest	(ix) cottonwood	
WQ	Palustrine Deciduous Forested (Riparian)	0.20	No	Depression	(A) Surface water	(1a) Swamp forest	(iii) maple-ash	
WG	Persistent Emergent (Drainage Ditch)	0.52	Yes	Impoundment	(B) Human	(2a) Emergent marsh	(iv) cattail marsh	
WH (1-12)	Persistent Emergent (Drainage Ditch)	0.53	Yes	Impoundment	(B) Human	(2a) Emergent marsh	(iv) cattail marsh	
WH-WJ-WT-WGG	Persistent Emergent (Drainage Ditch)	2.07	Yes	Impoundment	(B) Human	(2a) Emergent marsh	(iv) cattail marsh	
WK	Persistent Emergent (Drainage Ditch)	0.63	Yes	Impoundment	(B) Human	(2a) Emergent marsh	(iv) cattail marsh	
WO	Persistent Emergent (Swale)	0.57	Yes	Depression	(A) Surface water	(2a) Emergent marsh	(iv) cattail marsh	
WR	Persistent Emergent (Drainage Ditch)	0.67	Yes	Impoundment	(B) Human	(2a) Emergent marsh	(iv) cattail marsh	
WU	Persistent Emergent (Drainage Ditch)	0.13	Yes	Impoundment	(B) Human	(2a) Emergent marsh	(iv) cattail marsh	
WV1-WW	Persistent Emergent (Drainage Ditch)	0.37	Yes	Impoundment	(B) Human	(2a) Emergent marsh	(iv) cattail marsh	
WV2	Persistent Emergent (Swale)	0.24	Yes	Depression	(A) Surface water	(2a) Emergent marsh	(iv) cattail marsh	
WX	Persistent Emergent (Drainage Ditch)	0.06	Yes	Impoundment	(B) Human	(2a) Emergent marsh	(iv) cattail marsh	
WY	Persistent Emergent (Drainage Ditch)	0.21	Yes	Impoundment	(B) Human	(2a) Emergent marsh	(iv) cattail marsh	
WZ1	Persistent Emergent (Drainage Ditch)	0.04	Yes	Impoundment	(B) Human	(2a) Emergent marsh	(iv) cattail marsh	
WZ2	Persistent Emergent (Drainage Ditch)	0.06	Yes	Impoundment	(B) Human	(2a) Emergent marsh	(iv) cattail marsh	
WZ3	Persistent Emergent (Drainage Ditch)	0.05	Yes	Impoundment	(B) Human	(2a) Emergent marsh	(iv) cattail marsh	
WAA	Persistent Emergent (Drainage Ditch)	0.02	Yes	Impoundment	(B) Human	(2a) Emergent marsh	(iv) cattail marsh	
WBB	Persistent Emergent (Drainage Ditch)	0.02	Yes	Impoundment	(B) Human	(2a) Emergent marsh	(iv) cattail marsh	
WCC	Persistent Emergent (Drainage Ditch)	0.03	Yes	Impoundment	(B) Human	(2a) Emergent marsh	(iv) cattail marsh	
WDD	Persistent Emergent (Drainage Ditch)	0.07	Yes	Impoundment	(B) Human	(2a) Emergent marsh	(iv) cattail marsh	
WEE	Persistent Emergent (Drainage Ditch)	0.45	Yes	Impoundment	(B) Human	(2a) Emergent marsh	(iv) cattail marsh	
WFF	Persistent Emergent (Swale)	0.08	Yes	Depression	(A) Surface water	(2a) Emergent marsh	(iv) cattail marsh	
WHH	Persistent Emergent (Drainage Ditch/Swale)	0.13	Yes	Impoundment	(B) Human	(2a) Emergent marsh	(iv) cattail marsh	
WE	Persistent Emergent	0.43	No	Depression	(A) Surface water	(2a) Emergent marsh	(iii) mixed emergent marsh	
WM	Persistent Emergent	0.02	Yes	Depression	(A) Surface water	(2a) Emergent marsh	(iii) mixed emergent marsh	
WI	Scrub-Shrub/Persistent Emergent	1.77	Yes	Impoundment	(B) Human	(2a) Emergent marsh	(iii) mixed emergent marsh	Former streambed of Paddys Run—disturbance evident
WS	Scrub-Shrub/Persistent Emergent	0.15	Yes	Impoundment	(B) Human	(3a) Shrub swamp	(iv) other - willow	
Wetlands Delineated During Remediation								
CU_WET1	Persistent Emergent (Swale)	0.04	Yes	Depression	(A) Surface water	(2a) Emergent marsh	(iv) cattail marsh	Similar to Wetland WO
CU_WET2	Persistent Emergent (Swale)	0.01	Yes	Depression	(A) Surface water	(2a) Emergent marsh	(iv) cattail marsh	Similar to Wetland WO
CU_WET3	Persistent Emergent (Drainage Ditch)	0.37	Yes	Impoundment	(B) Human	(2a) Emergent marsh	(iv) cattail marsh	
NWET_001	Persistent Emergent (Swale)	0.37	Yes	Depression	(A) Surface water	(2a) Emergent marsh	(iv) cattail marsh	Similar to Wetland WO
LEADRNGE	Persistent Emergent	1.07	Yes	Depression	(A) Surface water	(2a) Emergent marsh	(iii) mixed emergent marsh	Wetland boundary is approximate

3.1.2 Type of Impacted Wetlands

As Figure 3–1 shows, the majority of impacted wetlands consisted of drainage ditches/swales or isolated persistent emergent communities. Table 3–1 lists the impacted wetlands and compares them to the approximate hydrogeomorphic (HGM) class and dominant plant community in accordance with current OEPA methodology. As with other aspects of the impacted wetlands evaluation, the classifications are based on existing historical information instead of actual field walkdowns. As Table 3–1 shows, most of the impacted wetlands at the Fernald Preserve would have fallen into the impoundment HGM class, with an emergent marsh plant community modifier. The dominant plant community description for most of the impacted wetlands was a cattail marsh. As needed, this HGM class and associated plant community modifiers will be used for establishment of performance standards in Section 3.2 below.

3.1.3 Quality of Impacted Wetlands

In 1995, regulators and the NRTs discussed the quality of impacted wetlands and agreed upon the current mitigation ratio of 1.5 to 1. As described above, the majority of dredged or filled wetlands consisted of isolated drainage ditches and swales, with mostly monotypic stands of vegetation (i.e., cattails). Therefore, the determination of wetland quality had essentially already been made prior to the current approach for assessment. A brief evaluation of the OEPA assessment approach confirms that, if an assessment was conducted, on-site impacted wetlands would mostly fall within a Category 1 or 2 classification (Mack 2001). For the purposes of establishing present-day performance standards in Section 3.2, impacted wetlands will conservatively be assumed to have scored within Category 2.

3.2 Mitigation Performance Standards

A set of performance standards for on-site mitigation wetlands can be formulated using existing information to estimate the size, type, and quality of impacted wetlands at Fernald. Table 3–2 summarizes the representative impacted wetland estimate. With this “representative impacted wetland” established for the Fernald Preserve, the NRTs can set goals and objectives for existing wetland mitigation projects at the site. Future wetland mitigation requirements would depend on an evaluation of the impacted wetland, pursuant to existing OEPA protocols (Mack 2001, Mack et al. 2004).

Table 3–2. Representative Wetland Impact Estimate

Wetland Evaluation Parameter		Estimated Wetland Impact/Type
Size	Acres	11.9
Type	HGM Class	Impoundment
	Class Modifier	(B) Human
	Plant Community Modifier	(2a) Emergent Marsh
	Dominant Plant Community	(iv) Cattail Marsh
Quality	Category	2

3.2.1 Existing Wetland Areas

The discussion above establishes that compensatory wetland mitigation is required at the Fernald Preserve to replace the ecological functions and values of an emergent cattail marsh impoundment. Table 3–3 lists the applicable OEPA performance standards for this HGM class and plant community.

Table 3–3. Performance Standards for Existing Wetlands at the Fernald Preserve

Standard/Parameter	Value	OEPA Standard Section	Comments
Acreage	17.85 acres	2.1.1	Total mitigation acreage that is required based on past impact.
Basin morphology	less than or equal to 15:1 side slope	2.1.2	Not feasible in some areas given remediation footprint
Perimeter: Area ratio	Greater than or equal to 75% of impacted perimeter length	2.1.3	
Hydrologic regime		2.1.4	
water in root zone (<30 cm)	53% of time		
mean depth of water	29.4 cm		
flashiness index	2.0		
Unvegetated open water	<10%	2.2.1	Not feasible in some areas given remediation footprint
Native perennial hydrophytes	>75%	2.2.2	
Invasive species	<5%	2.2.3	
Vegetation IBI	48–63	2.2.4	
Amphibian IBI	NA	2.3	No standard for emergent marsh impoundments.
Other taxa groups	NA	2.4	Macroinvertebrates, wetland birds, and reptiles.
Soil biogeochemistry		2.5	
% solids	<46.6		
% total organic carbon	>3.9		
% total N	>0.5		

Adapted from Table 8 of the OEPA wetland mitigation performance standards (Mack et al. 2004)

cm = centimeters

IBI = Index of Biological Integrity

NA = not applicable

As Section 2.0 demonstrates, a wide variety of wetlands have been created or preserved at the Fernald Preserve. A mosaic of open water, emergent marsh, wet prairie, scrub/shrub, and wet forest communities have provided and will continue to provide a number of ecological values and functions, regardless of monitoring and performance standards. As stated previously, it is not practical to apply published performance standards to projects that were not necessarily designed and constructed with the standards in mind. Mitigation wetlands at the Fernald Preserve were driven by the goals of the NRRP and generally aimed to establish native plant communities and promote wildlife use. As a result, some of the wetlands created or preserved at the Fernald Preserve fall within a different (and potentially higher quality) HGM class and plant community than the impacted wetlands.

Instead of determining “pass/fail” compliance, the NRTs will use the OEPA performance standards in Table 3–3 as a set of reference points for evaluating existing on-site wetlands. The performance standards form the basis for additional monitoring, with results collectively evaluated by the NRTs. From this effort, the NRTs will determine the need for corrective action or the creation of additional wetlands. This process is conceptually similar to the functional monitoring approach for restored areas that is described in the NRRP. The performance standards serve as the reference community that monitored on-site wetland areas are compared to. For on-site wetlands, the monitoring parameters are expanded and more structured, as described in Sections 4.0 and 5.0.

3.2.2 New Projects

If the need for new wetland impacts is identified, the full compliment of OEPA guidance will be used to determine the extent and type of mitigation required. This includes the use of the Ohio Rapid Assessment Methodology for Wetlands (Mack 2001) and subsequent application of the OEPA performance standards (Mack et al. 2004).

4.0 Monitoring Period

Some form of monitoring has been ongoing within mitigation projects for a number of years. The project descriptions in Section 2.0 provide a brief summary of monitoring activities for each project. Monitoring on-site mitigation wetlands against the OEPA performance standards will require an increase in both the kind of data collected and the time frames for collection. As with other aspects of this plan, a distinction is made between existing projects and potential new projects.

4.1 Existing Wetland Areas

Existing wetland projects at the Fernald Preserve will be monitored for 3 years, from 2009 through 2011. This monitoring period is consistent with the schedule for functional monitoring as set forth in the NRRP. It is essentially similar to years 3, 4, and 5 of the conceptual schedule that is described in the OEPA performance standards. Table 4–1 lists the applicable monitoring activities and associated year of implementation. The 2009 monitoring activities coincide with the wetlands functional monitoring evaluation as described in the NRRP, so collected data can be used for several purposes.

UNCONTROLLED IF PRINTED

Following the 2011 effort, the NRTs will determine whether additional monitoring is needed. Again, this path forward is consistent with the monitoring approach established by the NRTs in Section 5 of the NRRP.

Table 4–1. Monitoring Schedule for Existing Wetlands at the Fernald Preserve

Monitoring Activity	OEPA Standard Section	2009	2010	2011
Delineation	4.1.1		X	
Basin morphology	4.1.2			X
Perimeter:area ratio	4.1.3			X
Hydrologic monitoring	4.1.4		X	X
Vegetation sampling	4.2	X		X
Amphibian sampling	4.3	X	X	X
Soil and water sampling	4.5		X	X
Other taxa group sampling	4.4	X	X	X

Adapted from Table 6a of the OEPA wetland mitigation performance standards (Mack et al. 2004)

4.2 New Projects

The monitoring period for any new wetland mitigation projects will be determined on a case-by-case basis. OEPA guidance requires at least 5 years of monitoring and states a preference for 10 years (Mack et al. 2004). If a forested mitigation project is required, then monitoring would be conducted for 10 years.

5.0 Monitoring Protocols

The OEPA performance standards provide detailed guidance with respect to monitoring and data analysis. This guidance will be the primary means for evaluation of wetlands at the Fernald Preserve. Table 4–1 provides a reference for the applicable OEPA monitoring protocols. Some modifications to these protocols may be needed due to unusual circumstances (e.g., access). Any changes to monitoring protocols will be agreed to by the NRTs prior to implementation.

The decision on which projects to evaluate was made by the NRTs as part of the field evaluation walkdowns conducted in 2009 pursuant to the NRRP. Figure 5–1 shows the location of all wetlands evaluated under this process. The total acreage for these projects is over 30 acres. This provides a substantial buffer for ensuring that the 17.85-acre compensatory mitigation requirement is met.

6.0 Reporting

Reporting will be conducted through annual Site Environmental Reports. All monitoring activities associated with ecological restoration at the Fernald Preserve will be summarized in the main text and documented in an appendix to the annual report. In addition to an annual report, the NRTs will be regularly updated on monitoring activities during periodic meetings.

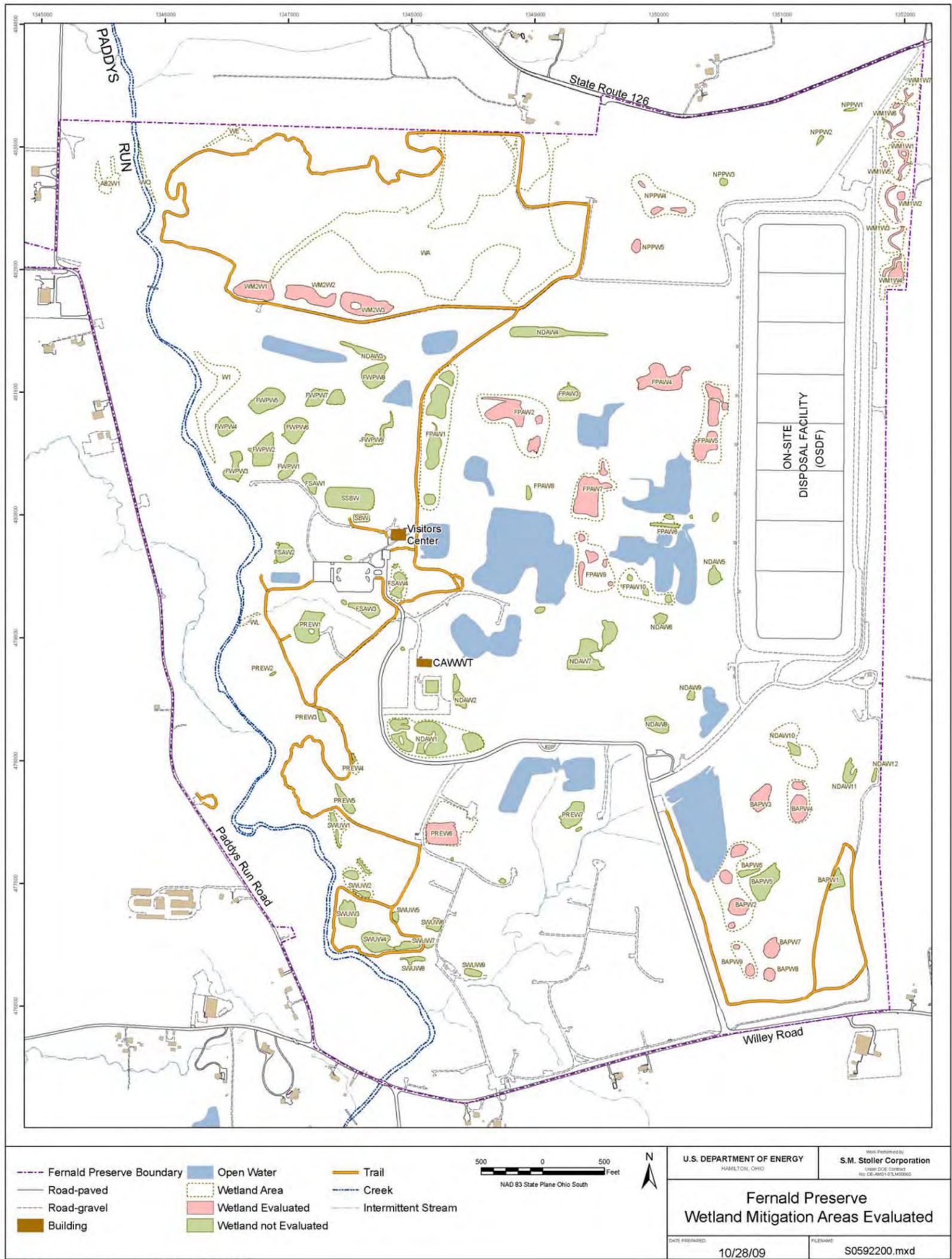


Figure 6-1. Wetland Mitigation Areas Evaluated

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7.0 References

DOE (U.S. Department of Energy), 1996. *Final Record of Decision for Remedial Actions at Operable Unit 5*, 7478 U-007-501.4, Final, Fernald Environmental Management Project, Fernald Area Office, Cincinnati, Ohio.

Ebasco Environmental, 1993. *Wetlands Delineation Report of the Fernald Environmental Management Project, Butler and Hamilton Counties, Ohio*, prepared for the Fernald Environmental Restoration Management Corporation under Contract DE-AC05-92OR21972, U.S. Department of Energy, Fernald Area Office.

Mack, John J., 2001. *Ohio Rapid Assessment Method for Wetlands v. 5.0, User's Manual and Scoring Forms*, Ohio EPA Technical Report WET/2001-1, Ohio Environmental Protection Agency, Division of Surface Water, 401/Wetland Ecology Unit, Columbus, Ohio.

Mack, John J., M.S. Fennessy, M. Micacchion, and D. Porej., 2004. *Standardized Monitoring Protocols, Data Analysis and Reporting Requirements for Mitigation Wetlands in Ohio*, v. 1.0. Ohio EPA Technical Report WET/2004-6, Ohio Environmental Protection Agency, Division of Surface Water, Wetland Ecology Group, Columbus, Ohio.

State of Ohio, 2008. *Partial Consent Decree Resolving Ohio's Natural Resource Damage Claim against DOE*, State of Ohio v. United States Department of Energy, et al., Civil Action No. C-1-86-0217, Judge Spiegel.

USACE (U.S. Army Corps of Engineers), 1987. *Corps of Engineers Wetlands Delineation Manual*, Technical Report Y-87-1, Final, Wetlands Research Program Environmental Laboratory, Vicksburg, MS, January.

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**RESPONSE TO OHIO EPA's COMMENTS ON THE MARCH 2009
DRAFT FERNALD PRESERVE WETLAND MITIGATION MONITORING PLAN**

GENERAL COMMENTS:

1. Commenting Organization: Ohio EPA
Section: Acronyms and Abbreviations Pg#: iii Line#: Code: E
Original Comment#:
Comment: The appropriate acronym/abbreviation for "United States Corps of Engineers" is actually "United States Army Corps of Engineers", abbreviated USACE.

Response: Agree

Action: The text will be revised to "United States Army Corps of Engineers (USACE)."

2. Commenting Organization: Ohio EPA
Section: Executive Summary Pg#: v Line#: Code: E
Original Comment#:
Comment: « a 26-acres jurisdictional » should read « a 26-acre jurisdictional ».

Response: Agree

Action: The text will be revised to "26-acre."

3. Commenting Organization: Ohio EPA
Section: Table 3-1 Pg#: Line#: Code: C
Original Comment#:
Comment: The Lead Range wetland was an ephemeral wetland dominated by polygonum spp. not typha spp. This is important in that, of all the actually destroyed wetlands, this was probably the highest quality one.

Response: Agree

Action: The dominant plant community for the Lead Range will be revised to a mixed emergent dominant plant community in Table 3-1.

4. Commenting Organization: Ohio EPA
Section: Table 3-3 Pg#: Line#: Code: C
Original Comment#:
Comment: Birds should be added to the "Other taxa group" as they would have been impacted by the loss of the particular wetlands being mitigated for and they are of significant importance to the public users of the site. Monitoring should be conducted using the protocol provided in Mack et al 2004 during one of the 3 years of monitoring.

Response: Agree. Additionally, subsequent discussions have led to reptile surveys in selected wetlands.

Action: Birds, macroinvertebrates, and reptiles will be added to Table 3-3.

5. Commenting Organization: Ohio EPA

Section: Table 3-3 Pg#: Line#: Code: C

Original Comment#:

Comment: The sign before the value for % total organic carbon is reversed, the table should read >3.9%.

Response: Agree

Action: Table 3-3 will be revised to >3.9%.

6. Commenting Organization: Ohio EPA

Section: Table 3-3 Pg#: Line#: Code: C

Original Comment#:

Comment: Note that our 2004 comments on the Borrow Area NRRDP mitigation wetlands stated that the % total organic carbon should be equal to or greater than 6% as well as specifying the slopes to not exceed 15:1.

Response: The performance standard for % total organic carbon is >3.9 as specified in Table 5 of the *Standardized Monitoring Protocols, Data Analysis and Reporting Requirements for Mitigation Wetlands in Ohio*. All of the wetlands under evaluation within the footprint of the Borrow Area have less than 15:1 side slopes.

Action: None

7. Commenting Organization: Ohio EPA

Section: 3.2.1 Pg#: 13 Line#: Code: C

Original Comment#:

Comment: Although we agree with the similarity in concept between the functional monitoring of restored areas presented in the NRRP and the integrated wetland assessment of the mitigation compliance program, differences exist between the monitoring and assessment protocols of the two programs. It is our position that where differences exist, generally the default should be to the compliance based integrated wetland assessment protocol for compensatory wetlands.

Response: Agree

Action: None

8. Commenting Organization: Ohio EPA

Section: 4.1 Pg#: 13 Line#: Code: C

Original Comment#:

Comment: Section 3.0 of the Integrated Wetland Assessment protocols (Mack et al, 2004) clearly states that, although at least five years of monitoring is specified, generally more time is needed, preferably 10 years. This was evident in the A1PI wetlands where a dramatic improvement in the vegetation occurred between years 5 and 10 post construction. Although it may be possible that monitoring through 2011 will be sufficient, it is unlikely particularly in the areas that are sparsely vegetated.

Response: Acknowledged. The need for additional monitoring will be determined following the initial planned monitoring period of three years.

Action: None

9. Commenting Organization: Ohio EPA

Section: Table 4-1 Pg#: Line#: Code: C

Original Comment#:

Comment: Based upon the document submittal date and delaying wetland selection until after the field walk down, it seems unlikely that some of the monitoring proposed for 2009 can actually be completed consistent with the monitoring protocols during this year. For example, the protocol for amphibian monitoring requires the first of 3 rounds to be conducted in Feb/March when the ambystomid salamanders are migrating to the wetlands. This monitoring round would have already been missed unless sampling has already been initiated. Additionally, the hydrological monitoring should have been initiated already.

Response: Agree

Action: Table 4-1 will be revised to reflect an updated monitoring schedule.

10. Commenting Organization: Ohio EPA

Section: Section 7.0 Pg#: Line#: Code: C

Original Comment#:

Comment: Add the NRRP and Consent Decree to the references section.

Response: Agree

Action: References to the NRRP and the Consent Decree will be added to the reference section.

Fernald Preserve Wetland Mitigation Monitoring Plan

October 2009



U.S. DEPARTMENT OF
ENERGY

Legacy
Management

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Fernald Preserve Wetland Mitigation Monitoring Plan

October 2009

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Acronyms and Abbreviations

A1PI	Area 1, Phase I
A6PI	Area 6, Phase I
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
cm	centimeters
DOE	U.S. Department of Energy
DOI	U.S. Department of Interior
EPA	U.S. Environmental Protection Agency
HGM	Hydrogeomorphic
NRRP	Natural Resource Restoration Plan
NRTs	Fernald Natural Resource Trustees
OEPA	Ohio Environmental Protection Agency
OU	Operable Unit
USACE	United States U.S. Army Corps of Engineers

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Executive Summary

The U.S. Department of Energy (DOE) and the Ohio Environmental Protection Agency (OEPA) have signed a Consent Decree that settles a long-standing natural resource damage claim under Section 107 of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). As a result, the Fernald Natural Resource Trustees (DOE, OEPA, and the U.S. Department of Interior) have finalized the Fernald Natural Resource Restoration Plan (NRRP), which is [Appendix B of the *Partial Consent Decree Resolving Ohio's Natural Resource Damage Claim against DOE \(State of Ohio 2008\)*](#). The NRRP provides a conceptual ecological restoration plan for the Fernald Preserve and specifies monitoring and maintenance requirements for restored areas. The NRRP requires the National Resource Trustees to develop a process for resolution of outstanding wetland mitigation obligations at the Fernald Preserve. This *Wetland Mitigation Monitoring Plan* sets forth the process for evaluation and acceptance of wetland restoration projects at the Fernald Preserve that are intended to satisfy wetland mitigation requirements.

The Fernald Preserve is situated on a 1,050-acre tract of land, approximately 18 miles northwest of Cincinnati, Ohio. The site is located near the unincorporated communities of Ross, Fernald, Shandon, and New Haven in Hamilton County. It is a former uranium-processing facility that was shut down in 1991. Since then, the site has undergone extensive remediation pursuant to CERCLA. Remedial activities and subsequent ecological restoration have converted the site from an industrial production facility to an undeveloped park, encompassing wetlands, prairies, and forest. When the large-scale soil remediation and waste disposal was completed in the fall of 2006, the site was successfully transitioned to the DOE Office of Legacy Management. The Fernald Closure Project was then renamed the Fernald Preserve.

In 1993, approximately 36 acres of jurisdictional wetlands were delineated at the Fernald site. According to the Operable Unit 5 Record of Decision, an estimated 10 acres of wetlands would be impacted from remediation activities. Compensatory mitigation pursuant to Section 404 of the Clean Water Act was subsequently negotiated with regulators. In 1995, DOE agreed to on-site mitigation at a 1.5 to 1 ratio. DOE committed to compensating for 11.9 acres of wetlands, based on the original 10-acre estimate as well as an additional 1.9 acres of wetlands delineated during remediation. Wetland mitigation plans were incorporated into sitewide ecological restoration planning through the NRRP. The NRRP established three projects specific for wetland mitigation, and also included wetland creation components within several additional restoration projects. In addition, a 26-acre jurisdictional forested/wet meadow wetland complex has been preserved in the northern portions of the site.

DOE completed the NRRP wetland mitigation projects from 1999 through 2006. An agreement on monitoring of these wetlands remained unresolved until final settlement of the natural resource damage claim. This plan provides a path forward for evaluating mitigation projects using recently established OEPA performance standards and monitoring protocols. In addition, the plan addresses standards and monitoring for newly constructed mitigation projects at the Fernald Preserve.

The size, type, and quality of site-impacted wetlands were estimated from historical information, which provided a basis for using OEPA wetland mitigation performance standards. Performance standards were then established to serve as monitoring objectives for the on-site created

wetlands. Standards have been established for wetland acreage, basin morphology, hydrology, vegetation, wildlife, and soil biogeochemistry.

Published OEPA monitoring protocols will be used to evaluate the extent to which the performance standards are met. A 3-year monitoring period has been established, which takes into consideration past monitoring that has been conducted by DOE. Reporting requirements are also outlined. [The annual Site Environmental Report will be used to report findings to the regulators and the public.](#)

1.0 Introduction

The U.S. Department of Energy (DOE) and the Ohio Environmental Protection Agency (OEPA) have signed a Consent Decree that settles a long-standing natural resource damage claim under Section 107 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). As a result, the Fernald Natural Resource Trustees (NRTs) (DOE, OEPA, and the U.S. Department of Interior [DOI]) have finalized the Fernald Preserve Natural Resource Restoration Plan (NRRP), which is [Appendix B of the *Partial Consent Decree Resolving Ohio's Natural Resource Damage Claim against DOE \(State of Ohio 2008\)*](#). The NRRP provides a conceptual Ecological Restoration Plan for the Fernald Preserve and specifies monitoring and maintenance requirements for restored areas. The NRRP requires the NRTs to develop a process for resolution of outstanding wetland mitigation obligations at the Fernald Preserve. This *Wetland Mitigation Monitoring Plan* sets forth the process for evaluation and acceptance of wetland mitigation projects at the Fernald Preserve that are intended to satisfy mitigation requirements.

1.1 Site Description

The Fernald Preserve is situated on a 1,050 acre tract of land, approximately 18 miles northwest of Cincinnati, Ohio. The site is located near the unincorporated communities of Ross, Fernald, Shandon, and New Haven in Hamilton County. It is a former uranium-processing facility that was shut down in 1991. Since then, the site has undergone extensive remediation pursuant to CERCLA. Remedial activities and subsequent ecological restoration have converted the site from an industrial production facility to an undeveloped park, encompassing wetlands, prairies, and forest. The Fernald site is now known as the Fernald Preserve. Several trails and the Fernald Preserve Visitors Center have been constructed on site for public use.

1.2 Background

In June 1993, approximately 35.9 acres of jurisdictional wetlands and 8.9 acres of Waters of the United States were identified and documented in the *Wetlands Delineation Report of the Fernald Environmental Management Project Butler and Hamilton Counties, Ohio* (Ebasco 1993). The U.S. Army Corps of Engineers (USACE) approved this delineation in August 1993.

Section 9.1.6 of the Operable Unit 5 (OU5) Record of Decision identified approximately 10 acres of wetlands that would be impacted as a result of implementing OU5 remedial actions (DOE 1996). Mitigation for wetland impacts was not specifically defined but did indicate that mitigation would be consistent with Section 404(b)(1) of the Clean Water Act. Compensatory mitigation was also not specifically defined. The need for compensatory mitigation was to be determined after all practicable steps to avoid or minimize adverse impacts were applied.

In June 1995, DOE met with U.S. Environmental Protection Agency (EPA), OEPA, U.S. Fish and Wildlife Service, and the Ohio Department of Natural Resources to discuss mitigation of impacted wetlands. DOE agreed to conduct on-property (if possible) mitigation and to replace 1.5 acres of wetlands for every acre of wetland dredged or filled. Section 3.2.4 of the NRRP recognizes this agreement.

DOE committed to compensating for 11.9 acres of wetlands, which consist of the original 1993 delineation of 10 acres that were originally anticipated to be impacted as well as an additional 1.9 acres of wetlands delineated during remediation. Based on the agreed acreage and the agreed mitigation ratio, DOE is responsible for installing 17.85 acres of new wetlands. Wetland compensation was incorporated into sitewide ecological restoration planning for the site through the NRRP. The NRRP established three separate ecological restoration projects to meet this requirement. These projects are described in the NRRP and summarized in Section 2.0 below. Several other ecological restoration projects included a wetland restoration or creation component. While not specifically identified as compensatory wetlands, they nevertheless are worth evaluating for potential additional compensatory acreage. Also, approximately 26 acres of forested jurisdictional wetlands in the northern woodlot have been preserved on site.

An agreement on monitoring of mitigation wetlands remained unresolved until final settlement of the NRT's natural resource damage claim. Over the past several years, DOE has undertaken a variety of monitoring efforts pursuant to project-specific Natural Resource Restoration Design Plans. However, no resolution of compensation was reached, as the NRTs were involved in settlement negotiations. The final NRRP includes a path forward for DOE to meet its mitigation requirements through evaluation of existing projects using recently established OEPA monitoring protocols. In summary, the NRTs will use the monitoring approach set forth in this plan to evaluate the three specific wetland mitigation projects. In addition, several restoration projects included a component of wetland creation, but these newer wetlands were not monitored as part of the compensatory mitigation acreage. This revision of the monitoring approach provides an opportunity to add these areas into the wetlands mitigation program. A combination of these areas should meet DOE's compensatory mitigation requirement.

1.3 Scope

The scope of the *Fernald Preserve Wetland Mitigation Monitoring Plan* entails the establishment of performance standards and remaining monitoring requirements for completed wetland mitigation projects. In addition, this plan identifies additional on-site wetlands that may contribute to compensatory wetland acreage. Performance standards and monitoring requirements are set forth for these areas as well.

2.0 Wetland Mitigation Projects and Areas

The NRRP provides a summary of existing wetland mitigation projects. These projects include the Area 1, Phase I (A1PI) project (Wetland Mitigation Phase I), the North Woodlot (Wetland Mitigation Phase II), and the Borrow Area (Wetland Mitigation Phase III). Figure 2-1 shows the location of these projects.

2.1 A1PI Wetland Mitigation

The A1PI Wetland Mitigation Project is a series of 8 basins across approximately 12 acres in the northeast corner of the site. The project includes a variety of emergent, wet meadow, scrub/shrub, and open water areas, as well as a number of upland prairie and forest patches. Section 4.2 of the NRRP describes this project in more detail. It was designed to create about 6 acres of mitigation wetlands. The project was completed in 2000.

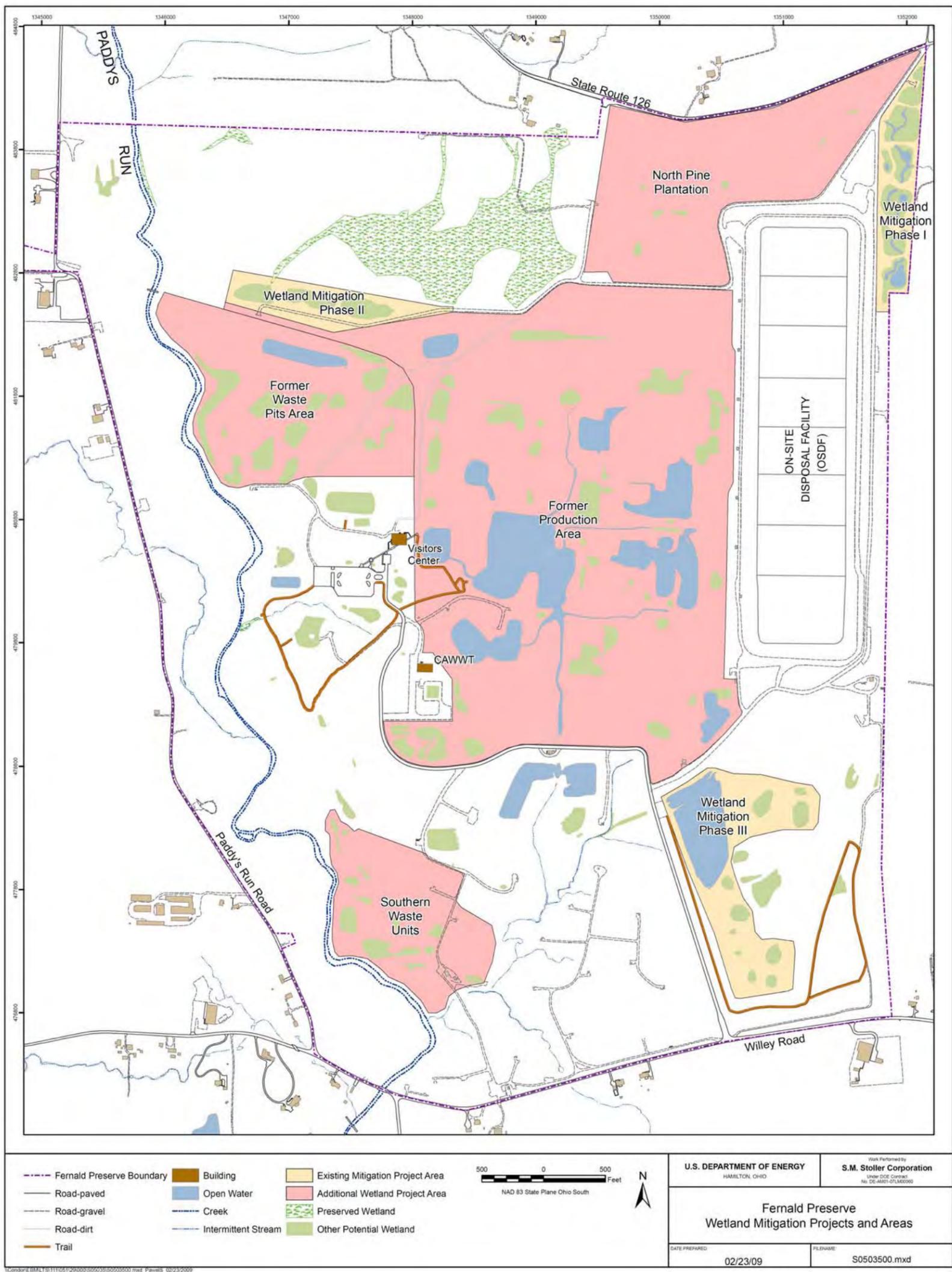


Figure 2-1. Fernald Preserve Wetland Mitigation Projects and Areas

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Monitoring of the A1PI Wetland Mitigation Project took place from 2000 to 2004. A wetland delineation was conducted in 2004 that showed 5.34 acres of compensatory wetlands were created.

2.2 A6PI Wetland Mitigation

The Area 6, Phase I (A6PI) Wetland Mitigation Project consists of three basins that are located on 8 acres along the south side of the northern woodlot. The basins are fed by surface water that drains from the existing 26-acre wetland system. These basins include a mix of open water and emergent and forested wetland communities. This wetland project was designed to create approximately 4 acres of mitigation wetlands. Section 4.5.3 of the NRRP describes this project in more detail.

The project was completed in spring 2005, and monitoring began the following summer. A wetland delineation has not yet been conducted on this system. Several species of salamander larvae and adults have been observed in each of the A6PI basins.

2.3 Borrow Area Wetland Mitigation

The Borrow Area Wetland Mitigation Project involves a series of shallow open water and emergent basins surrounded by marsh and wet prairie. It is located within the 48-acre footprint of the On-site Disposal Facility borrow area. The wetland features were constructed in stages from 2002 to 2006, as borrow activities were completed and areas became available for restoration. Section 4.7 of the NRRP describes this project in more detail.

Monitoring for the borrow area began in 2006. A wetland delineation has not been completed. While the system was designed to be fed by precipitation only, since 2006, groundwater has been pumped into a portion of the area. The addition of groundwater is an effort to provide passive groundwater recharge through downgradient site drainages. The altered average water levels have inundated portions of the wetland mitigation area. Also, upon allowing public access to the site in the summer of 2008, the area was renamed the Lodge Pond. This is in reference to the beavers that have taken up residence within the basin. A walking trail and overlook has been constructed around the perimeter of the project area.

2.4 Preserved Wetlands

In addition to the mitigation projects listed above, construction activities were adjusted during remediation to avoid impacts as much as possible. A 26-acre forested/wet meadow wetland complex is located on site in the northern woodlot (Figure 2-1). Additional isolated wetlands can be found along the Paddys Run riparian corridor. Several of these areas have been enhanced through seeding and invasive species control.

2.5 Other Wetland Areas

As stated in Section 1.2, several ecological restoration projects have included wetland creation. In fact, some of the most diverse wetland communities established on site can be found within these projects. While not originally envisioned as a component of the compensatory mitigation

program, these areas are worth evaluation. The primary areas to be evaluated are summarized below.

2.5.1 Northern Pine Plantation

Ecological restoration of the Northern Pine Plantation was undertaken in 2003. It consisted primarily of replacing a monoculture evergreen woodlot with deciduous forest. The surface water hydrology of the project area and the discovery of old agricultural drain tiles led to the creation of several wet prairie and emergent wetlands. Section 4.5.1 of the NRRP describes this project in more detail.

2.5.2 Former Production Area/Waste Pits Area

The Former Production and Waste Pits areas represent the bulk of ecological restoration activities that took place within remediated areas. Work was conducted in stages from 2004 through 2006, following remediation and soil certification. Numerous depressions were left across these areas following building demolition and soil excavation. As described in Section 4.10 of the NRRP, restoration involved maximizing open water and wetland establishment where possible, and surrounding these depressions with tallgrass prairie communities.

2.5.3 Southern Waste Units

The Southern Waste Units involved the first restoration effort within a significantly altered topography. This project was constructed in 2001 and 2002. The project was designed primarily as an expansion of the existing Paddys Run riparian corridor, with several wetland and open water areas incorporated into the landscape. The location of this project allowed for an expansion of the Paddys Run floodplain as well. Section 4.4 of the NRRP describes this project in more detail. A portion of the post-excitation topography included an unstable cutbank of sand and gravel. In 2006, this area was regraded using clean concrete from other on-site projects to create additional amphibian and reptile habitats.

3.0 Performance Standards

As stated in Section 1.3, the NRTs have agreed to a path forward for resolving compensatory wetland mitigation requirements at the Fernald Preserve. Section 5.1.1 of the NRRP sets forth the process for accomplishing this. The NRTs will use performance standards and monitoring protocols that were published by OEPA in 2004 (Mack et al. 2004) as the basis for evaluating on-site mitigation wetlands. This section and the following sections on monitoring describe how the OEPA standards apply to the Fernald Preserve.

The OEPA mitigation performance standards are designed to ensure that both the processes (functions) and ecological services (values) that an impacted wetland provided are sufficiently restored through the mitigation process. To do this, a multistep process has been developed to efficiently estimate the size, type, and quality of impacted wetlands. This evaluation results in a set of performance standards that subsequent mitigation wetlands must meet to ensure that similar size, type, and quality wetlands are replaced.

For the Fernald Preserve, wetland impacts occurred years ago as part of remedial activities. The size and type of impacted wetlands can be approximated from the 1993 wetland delineation, but the quality of the wetlands must be inferred from the original jurisdictional delineation and subsequent discussions with regulators. In Section 3.1 below, existing information was used to estimate the size and type and of wetlands impacted, as well as an approximation of impacted wetland quality at the site.

As with the impacts to on-site wetlands, mitigation efforts have already taken place as well. It is important to distinguish between mitigation projects that are already constructed and additional projects that may be needed in the future. The OEPA mitigation performance standards and monitoring protocols were published in 2004. Each of the primary wetland mitigation projects set forth in the NRRP was at least partially designed prior to finalization of these standards. Retroactively applying these standards to established mitigation wetlands is not feasible. Instead, the published performance standards can be used as a tool to evaluate existing projects and identify opportunities for improvement of functions and values through adaptive management.

For new projects that may be agreed to, the OEPA performance standards and monitoring protocols would be fully applicable. There are two scenarios in which new mitigation projects would be undertaken. First, new mitigation projects could be considered by the NRTs if it is determined that existing created and preserved on-site wetlands do not adequately compensate for past wetland impacts. Second, additional wetland impacts could occur as a result of possible future site construction or some unanticipated dredge or fill.

3.1 Description of Impacted Wetlands

3.1.1 Size of Impacted Wetlands

The 1993 wetland delineation was conducted using the Routine On Site Determination methodology established by the 1987 Corp of Engineers Wetland Delineation Manual (USACE 1987). Figure 3–1 shows the results of this delineation. Jurisdictional wetlands included 26.58 acres of palustrine forested wetland, 6.95 acres of drainage ditches/swales, and 2.37 acres of isolated persistent emergent wetlands (Ebasco 1993). Since the 1993 delineation, several additional isolated persistent emergent wetlands have been identified, totaling 1.9 acres. Figure 3–1 confirms that no more than 11.9 acres of wetlands have been impacted (i.e., dredged or filled) at the Fernald Preserve as a result of remedial activities. The actual acreage of wetlands that were dredged or filled due to remediation is less than the 10 acres originally estimated in the OU5 Record of Decision. Based on Figure 3–1 and Table 3–1, about 9 acres have been impacted. In addition, while considered “Impacted” pursuant to Figure 3–1 and Table 3–1, a good portion of Wetlands WG (0.52 acre), WH (0.53 acre), WI (1.77 acres), WK (0.63 acre), and WHH (0.13 acre) have remained intact.

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Table 3-1. Summary of Jurisdictional Wetlands at the Fernald Preserve and Crosswalk of Ohio EPA Hydrogeomorphic (HGM) Wetland Classification

Wetland Boundary Designation	Wetland Classification	Acreeage	Impacted?	HGM Class	Class Modifier	Plant Community Modifier	Dominant Plant Community	Comments
1993 Wetland Delineation								
WA-WB-WC-WD-WF	Palustrine Deciduous Forested	26.15	No	Depression	(A) Surface water	(1a) Swamp forest	(vi) mixed forest	Includes some areas of persistent emergent wetlands
WL	Palustrine Deciduous Forested	0.13	No	Depression	(A) Surface water	(1a) Swamp forest	(ix) cottonwood	
WN	Palustrine Deciduous Forested	0.10	Yes	Depression	(A) Surface water	(1a) Swamp forest	(ix) cottonwood	
WQ	Palustrine Deciduous Forested (Riparian)	0.20	No	Depression	(A) Surface water	(1a) Swamp forest	(iii) maple-ash	
WG	Persistent Emergent (Drainage Ditch)	0.52	Yes	Impoundment	(B) Human	(2a) Emergent marsh	(iv) cattail marsh	
WH (1-12)	Persistent Emergent (Drainage Ditch)	0.53	Yes	Impoundment	(B) Human	(2a) Emergent marsh	(iv) cattail marsh	
WH-WJ-WT-WGG	Persistent Emergent (Drainage Ditch)	2.07	Yes	Impoundment	(B) Human	(2a) Emergent marsh	(iv) cattail marsh	
WK	Persistent Emergent (Drainage Ditch)	0.63	Yes	Impoundment	(B) Human	(2a) Emergent marsh	(iv) cattail marsh	
WO	Persistent Emergent (Swale)	0.57	Yes	Depression	(A) Surface water	(2a) Emergent marsh	(iv) cattail marsh	
WR	Persistent Emergent (Drainage Ditch)	0.67	Yes	Impoundment	(B) Human	(2a) Emergent marsh	(iv) cattail marsh	
WU	Persistent Emergent (Drainage Ditch)	0.13	Yes	Impoundment	(B) Human	(2a) Emergent marsh	(iv) cattail marsh	
WV1-WVW	Persistent Emergent (Drainage Ditch)	0.37	Yes	Impoundment	(B) Human	(2a) Emergent marsh	(iv) cattail marsh	
WV2	Persistent Emergent (Swale)	0.24	Yes	Depression	(A) Surface water	(2a) Emergent marsh	(iv) cattail marsh	
WX	Persistent Emergent (Drainage Ditch)	0.06	Yes	Impoundment	(B) Human	(2a) Emergent marsh	(iv) cattail marsh	
WY	Persistent Emergent (Drainage Ditch)	0.21	Yes	Impoundment	(B) Human	(2a) Emergent marsh	(iv) cattail marsh	
WZ1	Persistent Emergent (Drainage Ditch)	0.04	Yes	Impoundment	(B) Human	(2a) Emergent marsh	(iv) cattail marsh	
WZ2	Persistent Emergent (Drainage Ditch)	0.06	Yes	Impoundment	(B) Human	(2a) Emergent marsh	(iv) cattail marsh	
WZ3	Persistent Emergent (Drainage Ditch)	0.05	Yes	Impoundment	(B) Human	(2a) Emergent marsh	(iv) cattail marsh	
WAA	Persistent Emergent (Drainage Ditch)	0.02	Yes	Impoundment	(B) Human	(2a) Emergent marsh	(iv) cattail marsh	
WBB	Persistent Emergent (Drainage Ditch)	0.02	Yes	Impoundment	(B) Human	(2a) Emergent marsh	(iv) cattail marsh	
WCC	Persistent Emergent (Drainage Ditch)	0.03	Yes	Impoundment	(B) Human	(2a) Emergent marsh	(iv) cattail marsh	
WDD	Persistent Emergent (Drainage Ditch)	0.07	Yes	Impoundment	(B) Human	(2a) Emergent marsh	(iv) cattail marsh	
WEE	Persistent Emergent (Drainage Ditch)	0.45	Yes	Impoundment	(B) Human	(2a) Emergent marsh	(iv) cattail marsh	
WFF	Persistent Emergent (Swale)	0.08	Yes	Depression	(A) Surface water	(2a) Emergent marsh	(iv) cattail marsh	
WHH	Persistent Emergent (Drainage Ditch/Swale)	0.13	Yes	Impoundment	(B) Human	(2a) Emergent marsh	(iv) cattail marsh	
WE	Persistent Emergent	0.43	No	Depression	(A) Surface water	(2a) Emergent marsh	(iii) mixed emergent marsh	
WM	Persistent Emergent	0.02	Yes	Depression	(A) Surface water	(2a) Emergent marsh	(iii) mixed emergent marsh	
WI	Scrub-Shrub/Persistent Emergent	1.77	Yes	Impoundment	(B) Human	(2a) Emergent marsh	(iii) mixed emergent marsh	Former streambed of Paddys Run—disturbance evident
WS	Scrub-Shrub/Persistent Emergent	0.15	Yes	Impoundment	(B) Human	(3a) Shrub swamp	(iv) other - willow	
Wetlands Delineated During Remediation								
CU_WET1	Persistent Emergent (Swale)	0.04	Yes	Depression	(A) Surface water	(2a) Emergent marsh	(iv) cattail marsh	Similar to Wetland WO
CU_WET2	Persistent Emergent (Swale)	0.01	Yes	Depression	(A) Surface water	(2a) Emergent marsh	(iv) cattail marsh	Similar to Wetland WO
CU_WET3	Persistent Emergent (Drainage Ditch)	0.37	Yes	Impoundment	(B) Human	(2a) Emergent marsh	(iv) cattail marsh	
NWET_001	Persistent Emergent (Swale)	0.37	Yes	Depression	(A) Surface water	(2a) Emergent marsh	(iv) cattail marsh	Similar to Wetland WO
LEADRNGE	Persistent Emergent	1.07	Yes	Depression	(A) Surface water	(2a) Emergent marsh	(iii) mixed emergent marsh (iv) cattail marsh	Wetland boundary is approximate

3.1.2 Type of Impacted Wetlands

As Figure 3–1 shows, the majority of impacted wetlands consisted of drainage ditches/swales or isolated persistent emergent communities. Table 3–1 lists the impacted wetlands and compares them to the approximate hydrogeomorphic (HGM) class and dominant plant community in accordance with current OEPA methodology. As with other aspects of the impacted wetlands evaluation, the classifications are based on existing historical information instead of actual field walkdowns. As Table 3–1 shows, most of the impacted wetlands at the Fernald Preserve would have fallen into the impoundment HGM class, with an emergent marsh plant community modifier. The dominant plant community description for most of the impacted wetlands was a cattail marsh. As needed, this HGM class and associated plant community modifiers will be used for establishment of performance standards in Section 3.2 below.

3.1.3 Quality of Impacted Wetlands

In 1995, regulators and the NRTs discussed the quality of impacted wetlands and agreed upon the current mitigation ratio of 1.5 to 1. As described above, the majority of dredged or filled wetlands consisted of isolated drainage ditches and swales, with mostly monotypic stands of vegetation (i.e., cattails). Therefore, the determination of wetland quality had essentially already been made prior to the current approach for assessment. A brief evaluation of the OEPA assessment approach confirms that, if an assessment was conducted, on-site impacted wetlands would mostly fall within a Category 1 or 2 classification (Mack 2001). For the purposes of establishing present-day performance standards in Section 3.2, impacted wetlands will conservatively be assumed to have scored within Category 2.

3.2 Mitigation Performance Standards

A set of performance standards for on-site mitigation wetlands can be formulated using existing information to estimate the size, type, and quality of impacted wetlands at Fernald. Table 3–2 summarizes the representative impacted wetland estimate. With this “representative impacted wetland” established for the Fernald Preserve, the NRTs can set goals and objectives for existing wetland mitigation projects at the site. Future wetland mitigation requirements would depend on an evaluation of the impacted wetland, pursuant to existing OEPA protocols (Mack 2001, Mack et al. 2004).

Table 3–2. Representative Wetland Impact Estimate

Wetland Evaluation Parameter		Estimated Wetland Impact/Type
Size	Acres	11.9
Type	HGM Class	Impoundment
	Class Modifier	(B) Human
	Plant Community Modifier	(2a) Emergent Marsh
	Dominant Plant Community	(iv) Cattail Marsh
Quality	Category	2

3.2.1 Existing Wetland Areas

The discussion above establishes that compensatory wetland mitigation is required at the Fernald Preserve to replace the ecological functions and values of an emergent cattail marsh impoundment. Table 3–3 lists the applicable OEPA performance standards for this HGM class and plant community.

Table 3–3. Performance Standards for Existing Wetlands at the Fernald Preserve

Standard/Parameter	Value	OEPA Standard Section	Comments
Acreage	17.85 acres	2.1.1	Total mitigation acreage that is required based on past impact.
Basin morphology	less than or equal to 15:1 side slope	2.1.2	Not feasible in some areas given remediation footprint
Perimeter: Area ratio	Greater than or equal to 75% of impacted perimeter length	2.1.3	
Hydrologic regime		2.1.4	
water in root zone (<30 cm)	53% of time		
mean depth of water	29.4 cm		
flashiness index	2.0		
Unvegetated open water	<10%	2.2.1	Not feasible in some areas given remediation footprint
Native perennial hydrophytes	>75%	2.2.2	
Invasive species	<5%	2.2.3	
Vegetation IBI	48–63	2.2.4	
Amphibian IBI	NA	2.3	No standard for emergent marsh impoundments.
Other taxa groups	TBDNA	2.4	Additional taxa groups may be identified by the NRTs Macroinvertebrates, wetland birds, and reptiles.
Soil biogeochemistry		2.5	
% solids	<46.6		
% total organic carbon	<=3.9		
% total N	>0.5		
Ecological services	TBD	2.6	Additional services may be identified by the NRTs

Adapted from Table 8 of the OEPA wetland mitigation performance standards (Mack et al. 2004)

cm = centimeters

IBI = Index of Biological Integrity

NA = not applicable

As Section 2.0 demonstrates, a wide variety of wetlands have been created or preserved at the Fernald Preserve. A mosaic of open water, emergent marsh, wet prairie, scrub/shrub, and wet forest communities have provided and will continue to provide a number of ecological values and functions, regardless of monitoring and performance standards. As stated previously, it is not practical to apply published performance standards to projects that were not necessarily designed and constructed with the standards in mind. Mitigation wetlands at the Fernald Preserve were driven by the goals of the NRRP and generally aimed to establish native plant communities and promote wildlife use. As a result, some of the wetlands created or preserved at the Fernald Preserve fall within a different (and potentially higher quality) HGM class and plant community than the impacted wetlands.

Instead of determining “pass/fail” compliance, the NRTs will use the OEPA performance standards in Table 3–3 as a set of reference points for evaluating existing on-site wetlands. The performance standards form the basis for additional monitoring, with results collectively evaluated by the NRTs. From this effort, the NRTs will determine the need for corrective action or the creation of additional wetlands. This process is conceptually similar to the functional monitoring approach for restored areas that is described in the NRRP. The performance standards serve as the reference community that monitored on-site wetland areas are compared to. For on-site wetlands, the monitoring parameters are expanded and more structured, as described in Sections 4.0 and 5.0.

3.2.2 New Projects

If the need for new wetland impacts is identified, the full compliment of OEPA guidance will be ~~utilized~~ used to determine the extent and type of mitigation required. This includes the use of the Ohio Rapid Assessment Methodology for Wetlands (Mack 2001) and subsequent application of the OEPA performance standards (Mack et al. 2004).

4.0 Monitoring Period

Some form of monitoring has been ongoing within mitigation projects for a number of years. The project descriptions in Section 2.0 provide a brief summary of monitoring activities for each project. Monitoring on-site mitigation wetlands against the OEPA performance standards will require an increase in both the kind of data collected and the time frames for collection. As with other aspects of this plan, a distinction is made between existing projects and potential new projects.

4.1 Existing Wetland Areas

Existing wetland projects at the Fernald Preserve will be monitored for 3 years, from 2009 through 2011. This monitoring period is consistent with the schedule for functional monitoring as set forth in the NRRP. It is essentially similar to years 3, 4, and 5 of the conceptual schedule that is described in the OEPA performance standards. Table 4–1 lists the applicable monitoring activities and associated year of implementation. [The 2009 monitoring activities coincide with the wetlands functional monitoring evaluation as described in the NRRP, so collected data can be used for several purposes.](#)

~~This approach involves quantitative monitoring in 2009 and 2011, with less intensive fieldwork in 2010. Some quantitative monitoring activities may need to be continued into 2010, depending on when field data collection is initiated in 2009. Note that the 2009 monitoring activities coincide with the wetlands functional monitoring evaluation as described in the NRRP, so collected data can be used for several purposes.~~

Following the 2011 effort, the NRTs will determine whether additional monitoring is needed. Again, this path forward is consistent with the monitoring approach established by the NRTs in Section 5 of the NRRP.

Table 4–1. Monitoring Schedule for Existing Wetlands at the Fernald Preserve

Monitoring Activity	OEPA Standard Section	2009	2010	2011	Comments
Delineation	4.1.1		X		
Basin morphology	4.1.2			X	
Perimeter:area ratio	4.1.3			X	
Hydrologic monitoring	4.1.4	X	X	X	
Vegetation sampling	4.2	X		X	
Amphibian sampling	4.3	X	X	X	
Soil and water sampling	4.54	X	X	X	
Other taxa group sampling	4.45	X	X	X	As determined by NRTs
Ecological services	4.6	X			As determined by NRTs

Adapted from Table 6a of the OEPA wetland mitigation performance standards (Mack et al. 2004)

4.2 New Projects

The monitoring period for any new wetland mitigation projects will be determined on a case-by-case basis. OEPA guidance requires at least 5 years of monitoring and states a preference for 10 years (Mack et al. 2004). If a forested mitigation project is required, then monitoring would be conducted for 10 years.

5.0 Monitoring Protocols

The OEPA performance standards provide detailed guidance with respect to monitoring and data analysis. This guidance will be the primary means for evaluation of wetlands at the Fernald Preserve. Table 4–1 provides a reference for the applicable OEPA monitoring protocols. Some modifications to these protocols may be needed due to unusual circumstances (e.g., access). Any changes to monitoring protocols will be agreed to by the NRTs prior to implementation.

The decision on which projects to evaluate was made by the NRTs as part of the field evaluation walkdowns conducted in 2009 pursuant to the NRRP. [Figure 5–1 shows the location of all wetlands evaluated under this process. The total acreage for these projects is over 30 acres. This provides a substantial buffer for ensuring that the 17.85-acre compensatory mitigation requirement is met.](#) ~~At a minimum, the three existing wetland mitigation projects will be included in the monitoring program. The potential additional wetland areas described in Section 2.5 may be evaluated as well.~~

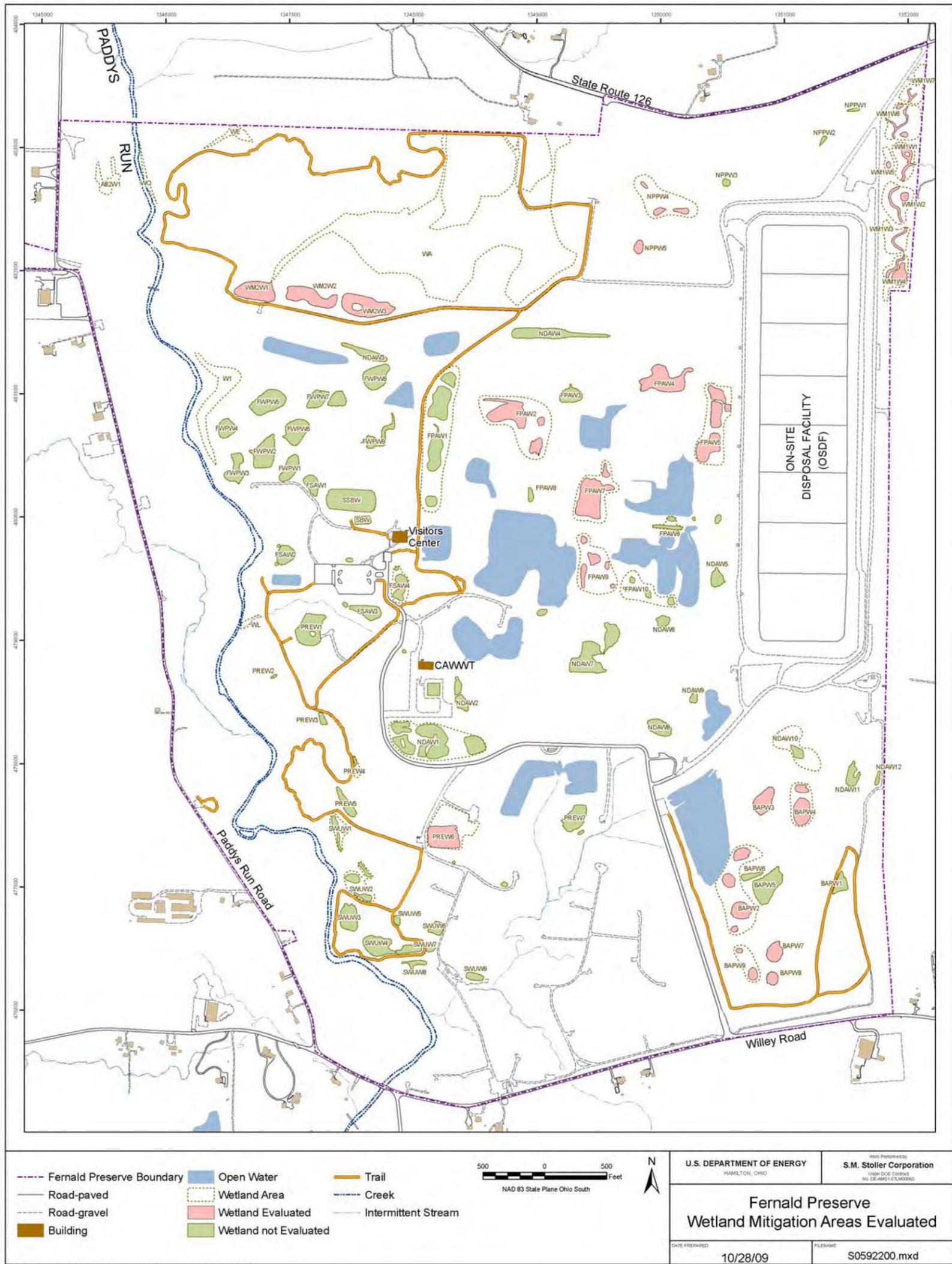


Figure 5-1. Wetland Mitigation Areas Evaluated

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6.0 Reporting

Reporting will be conducted through annual Site Environmental Reports. All monitoring activities associated with ecological restoration at the Fernald Preserve will be summarized in the main text and documented in an appendix to the annual report. In addition to an annual report, the NRTs will be regularly updated on monitoring activities during periodic meetings.

7.0 References

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