3520

AREA 8, PHASE II NATURAL RESOURCE RESTORATION PROJECT COMPLETION AND LESSONS LEARNED REPORT

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
FERNALD, OHIO

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U.S. DEPARTMENT OF ENERGY
FERNALD AREA OFFICE

21100-RP-0003
REVISION 0
FINAL

LIST OF ACRONYMS AND ABBREVIATIONS

3520

A8PII	Area 8, Phase II
DOE	U.S. Department of Energy
FEMP	Fernald Environmental Management Project
NRRDP	Natural Resource Restoration Design Plan
OEPA	Ohio Environmental Protection Agency

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3520

The Area 8, Phase II (A8PII) Forest Demonstration Project was constructed in Spring and Fall 2000. Field implementation was undertaken pursuant to the A8PII Natural Resource Restoration Design Plan (NRRDP; DOE 2000). The purpose of this report is to document the significant changes that were made during field implementation of the NRRDP. An attached figure shows final grade contours and the layout of habitat types.

Narrative change summaries are divided into two sections; grading/construction changes and planting/seeding changes. These descriptions are provided below. In addition, a discussion of lessons learned from this project is also included.

Grading/Construction Changes

1. The easternmost drainage swale through the materials handling area was eliminated. The U.S. Department of Energy (DOE) and Ohio Environmental Protection Agency (OEPA) agreed that the materials handling area could be reduced in size, thereby eliminating the need for this drainage feature. The added area available for planting also provided an opportunity to move the buffer habitat type, which is discussed as Item No. 3 under the Planting/Seeding Changes section.

2. Several field changes were made during the construction of the gravel access road. First, the pad location was cut back closer to the road. As a result, the geotextile liner was not installed on the southern half of the gravel pad. Also, larger No. 2 limestone was used as a foundation under the NRRDP-specified DGA limestone. These changes were initiated in order to avoid excavation into a poorly drained area to the east of the gravel pad. Road building within this area would have required a much greater amount of stone, as well as the removal of several trees. By moving the access back, less stone was used and the trees and wet area were not disturbed.

3. Perched water was discovered during excavation of the vernal pool. To utilize this unanticipated source of water, the northern half of the vernal pool was not lined with clay. Therefore, the vernal pool benefited from groundwater recharge and remained inundated with water for a longer period of time.

4. The wetland outfall was raised one foot in order to create an emergent wetland instead of the sedge-dominated filter wetland originally designed. This field change was initiated following a significant rain event that occurred before the outfall elevation was complete. Since the wetland held surface water so well, DOE and OEPA agreed that an emergent system would be most appropriate for this feature, and therefore kept the outfall height and adjusted the planting scheme accordingly. The planting revisions are discussed as Item No. 1 under the Planting/Seeding Changes section.

3

5. A secondary berm was constructed from the edge of the vernal pool south and west around a small area down gradient of the wetland outfall. This field change was also initiated following the significant rain event in the spring. By building this berm, surface water runoff was captured and used to expand a second wetland area from the first wetland outfall to the vernal pool. Approximately 1,500 square feet of wetland habitat was established. The berm was constructed with topsoil pulled from the vernal pool excavation.

6. Excess, clean railroad ties from the site were used to construct a bridge across the northern drainage to allow pedestrian and small vehicle (i.e., Dingo) equipment access into the Beech-Maple forest type.

Planting/Seeding Changes

1. Wetland plugs originally slated for the filter wetland were instead planted around the edges of the two ponds, the new emergent wetland (that replaced the filter wetland), and within the secondary wetland downgradient of the emergent wetland outfall. The new emergent wetland was vegetated through a combination of donor plants and wetland seed mixtures.

2. The Mesophytic and Beech-Maple forest types were not seeded with native grasses and forbs as specified in the NRRDP. It was realized in the field that management of the herbaceous layer within the forest types would be impossible after the seedlings were installed in the fall. Instead, the upland native grass and forb seed mixes were used to seed grading features where soil was disturbed, such as the new berm and a soil fill area west of the wetlands. Bare soil within the materials handling area and other access points was also seeded. Most of the Oak-Maple forest type was seeded as designed because disturbed soils were present. Topsoil from the gravel access was spread across the Oak-Maple planting area.

3. The buffer strip originally designed to shield adjacent residents from viewing the project was moved to a location east of the materials handling area. The residents requested that the buffer strip be moved.

4. Potted upland forbs supplied by OEPA were planted near Paddys Run Road at the edge of the savanna habitat type. The plants provided more immediate color to the area than the seeded forbs.

5. Prior to planting, herbicide was applied only once in certain portions of the project area, including the savanna. The NRRDP specified two applications prior to planting. However, the Fall 1999 application was only partially completed due to the availability of labor and equipment.

6. Several plant substitutions were required due to the unavailability of design-specified stock. A substitution summary table is provided on the following page.

Substitution Summary Table

Plant Type	Designed Species	Substitution	Habitat Type	Comments
Saplings	Bitternut hickory	Butternut	Oak-Maple	
	American elm	Green ash	Mesophytic, Beech-Maple	
		Hackberry	Mesophytic	
		Tulip poplar	Mesophytic, Buffer	
		Sycamore	Mesophytic	
	Shellbark hickory	Shagbark hickory	Existing riparian, Oak-Maple, Beech-Maple	1 gal. Container seedlings substituted 3:1 for saplings
		Shingle oak	Oak-Maple	1 gal. Container seedlings substituted 3:1 for saplings
		Bitternut hickory	Oak-Maple	1 gal. Container seedlings substituted 3:1 for saplings
	Bur oak	NA	Oak-Maple, Buffer	Some excess bur oaks from savanna patches were planted in the Oak-Maple and Buffer habitats
Shrubs	Pussy willow	Peach-leaf willow	Beech-Maple	Willows specified for Oak-Maple patches were moved to Beech-Maple because of the moisture requirements of the peach-leaf willow
	Greenbrier	Trumpet creeper	Oak-Maple	
	Maple-leaf viburnum	Arrow-wood	Oak-Maple, Beech-Maple	
	Prickly ash	NA	Oak-Maple, Riparian	Seedlings will be planted Spring 2001 since larger size plants were not available
Seedlings	American beech	NA	Mesophytic, Beech-Maple	Seedlings will be planted Spring 2001 since they were not available Fall 2000
	Basswood	NA	Mesophytic	Seedlings will be planted Spring 2001 since they were not available Fall 2000

5

Lessons Learned

1. Existing grasses and weeds need to be controlled more thoroughly prior to seeding. Herbicide was applied to the savanna habitat type once, but by the end of the growing season it appeared as though the existing turf grasses had reestablished. In areas where soil was disturbed, native grasses and forbs did very well in A8PII. Restoration literature suggests that multiple rounds of herbicide application and tilling be conducted for up to several growing seasons prior to seeding native grasses and forbs. Because of the timeframe established for restoration projects, extensive grass and weed control was not possible for the Forest Demonstration Project. Once the scope of work and schedule for future ecological restoration projects is finalized, grass and weed control of accessible areas could be scheduled into ongoing maintenance activities, thereby greatly increasing the chance of success for seeded prairies and savannas when restoration takes place.

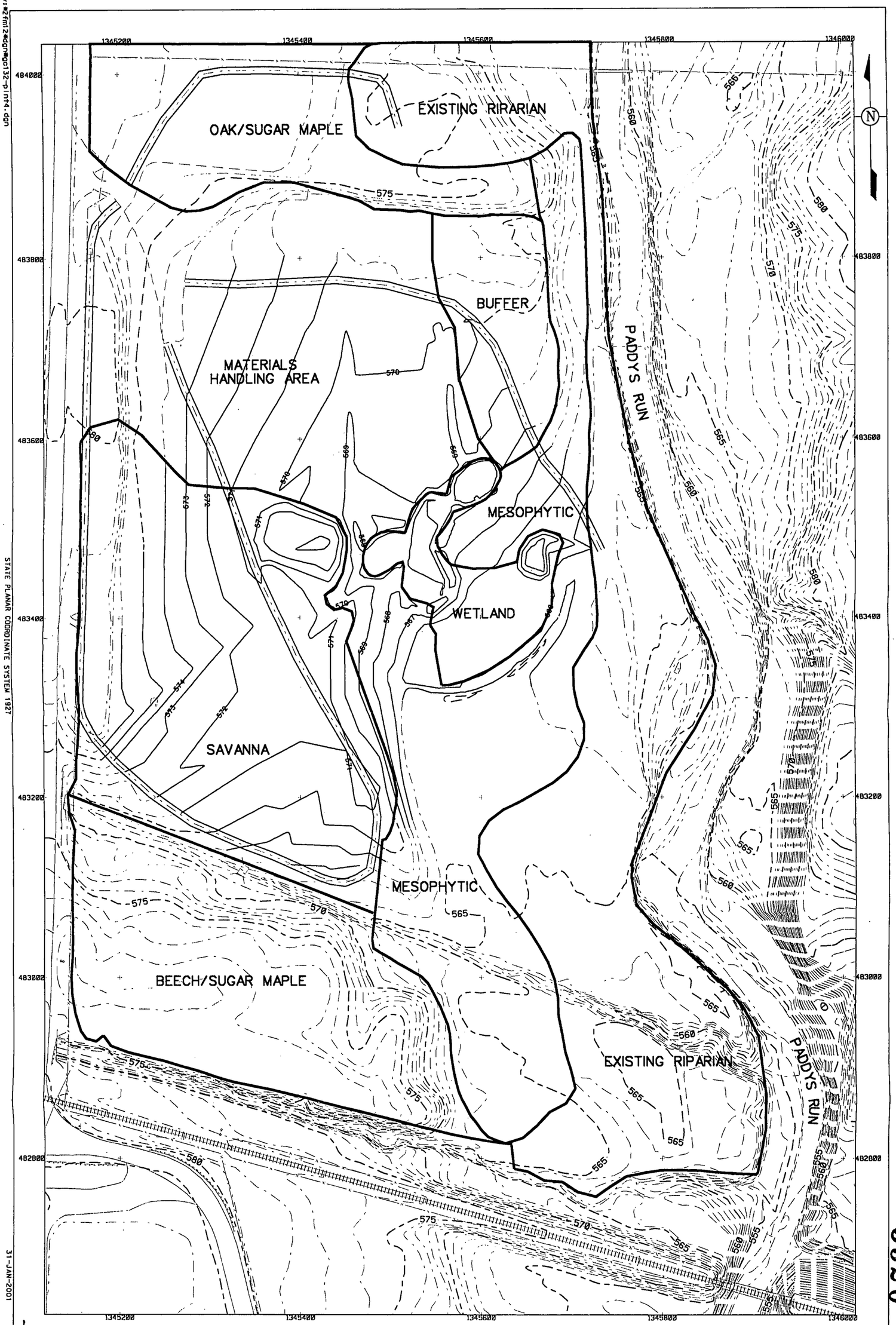
2. Donor soils and plants should be utilized in wetland projects whenever possible. The wetland soil and plants received from OEPA dramatically improved the wetland features within A8PII. Within a week of the first donor plant installation, damselflies and dragonflies were observed around the ponds. Bur reed plugs expanded to cover about two-thirds of the pond edges by the end of the growing season. Several healthy stands of arrowhead, bur marigold, and bladderwort were also established from existing seed in donor soils. Importing donor wetland soils and plants has proven very successful in A8PII, and should be pursued as an option for future wetland restoration and creation efforts.

3. Flexibility demonstrated by Fluor Fernald, DOE, and OEPA in the field decision making process proved to be very effective. Most of the field changes discussed above required on-the-spot decisions by DOE and OEPA. Without a good working relationship and open channels of communication, the project may have experienced delays or flawed field implementation. Also, the willingness to be flexible allowed for comprehensive pre-design investigations to be avoided. For instance, Fluor Fernald, DOE, and OEPA were able to delineate the optimal location for the vernal pool during a field visit following a weekend rain event. This "field-spot" was very effective, and conducted without surveying, hydrologic studies, etc. Future restoration projects should recognize the value in flexible field implementation and decision making.

4. A comprehensive deer management plan is required for the site. Planted stock in several portions of A8PII was severely impacted by deer rubbing in the fall of 2000. Deer tubing was installed on saplings, but some trees were missed when the tubes were installed. Also, the installed tubes did not prevent many trees from being rubbed. The impact to overall mortality in A8PII is yet to be determined, but it is expected to be severe in certain areas near the existing Paddys Run corridor. Because of this, DOE is planning to implement a comprehensive deer management plan for the site. This plan will establish a monitoring program, a process for implementing several control options (if necessary), and provide recommendations for adjusting restoration designs to minimize deer impacts. Restoration plans may be adjusted by avoiding the use of favorite deer plants, revising planting plans to avoid high-impact areas, and installing controls such as repellents and fencing.

REFERENCE

U.S. Department of Energy, 2000, "Area 8, Phase II Natural Resource Restoration Design Plan," Draft, Fernald Environmental Management Project, DOE, Fernald Area Office, Cincinnati, Ohio.



LEGEND:

HABITAT TYPE BOUNDARY

ACCESS PATH

SCALE

100 50 0 100 FEET

DRAFT

AREA 8, PHASE II, NATURAL RESOURCE RESTORATION FINAL GRADE CONTOURS AND HABITAT TYPES

STATE PLANAR COORDINATE SYSTEM 1927

31-JAN-2001

3520