

7.0 Natural Resources

This chapter provides background information on the natural resources associated with the Fernald Preserve and summarizes the activities in 2007 relating to these resources. Included in this chapter is a discussion of the following:

- Ecological restoration activities.
- Fernald Preserve Site and on-site disposal facility inspections.
- Affected habitat areas.
- Threatened and endangered species.
- Cultural resources.

Much of the 1,050 acres (425 hectares) of the Fernald Preserve property is undeveloped land that provides habitat for a variety of animals and plants. Wetlands, deciduous and riparian (streamside) woodlands, old fields, grasslands, and aquatic habitats are among the site's natural resources. Some of these areas provide habitat for state and federal endangered species. Cultural resources, such as prehistoric archaeological sites, can also be found at the Fernald Preserve. Monitoring of these natural and cultural resources is addressed in the Natural Resource Monitoring Plan, which is included in the Legacy Management and Institutional Controls Plan, Attachment D (i.e., the IEMP). The Natural Resource Monitoring Plan presents an approach for monitoring and reporting the status of several priority natural resources to remain in compliance with pertinent regulations and agreements. The site and on-site disposal facility inspection process, which is defined in the Legacy Management and Institutional Controls Plan, also helps to evaluate the condition of natural resources at the Fernald Preserve.

7.1 Ecological Restoration Activities

The new site mission of long-term stewardship under DOE's Office of Legacy Management will focus on establishment, management, and improvement of ecologically restored areas across the Fernald Preserve. In 2007, work focused on erosion repair, control of noxious weeds and invasive plants, and limiting impacts due to nuisance animals (e.g., deer and geese).

Spot-spraying with a broad leaf herbicide, in conjunction with mowing and manual cutting, was used to control Canada thistle and other noxious weeds across the site. Herbicide was also used in portions of the north woodlot to remove bush honeysuckle from the understory. This species is a nonnative invasive shrub that crowds out more desirable native species. In some of the wooded areas, honeysuckle had been mechanically removed in the past, and the herbicide was applied in 2007 to resprouting shrubs. These wooded areas will be checked for regrowth in 2008.

The primary nuisance animals on site are white tailed deer and Canada geese. Existing deer enclosure fencing was maintained sitewide. A new area was fenced near Willey Road in 2007 to better protect the tree saplings and shrubs that were planted several years ago.

Canada geese are an ongoing concern at the Fernald Preserve. In the fall of 2007, control methods were initiated, using trained border collies to harass the geese. The dogs are trained to chase, not catch the geese. The dogs are brought onto the Fernald Preserve by their handlers and

are directed to chase the geese off the land and even out of the water. The goal is to keep the geese out of areas that have been seeded so that the seed has time to become established. Once that happens, and the grasses become tall, the geese will no longer be attracted to those areas. A second goal is to make the geese too uncomfortable to want to nest at the Fernald Preserve.

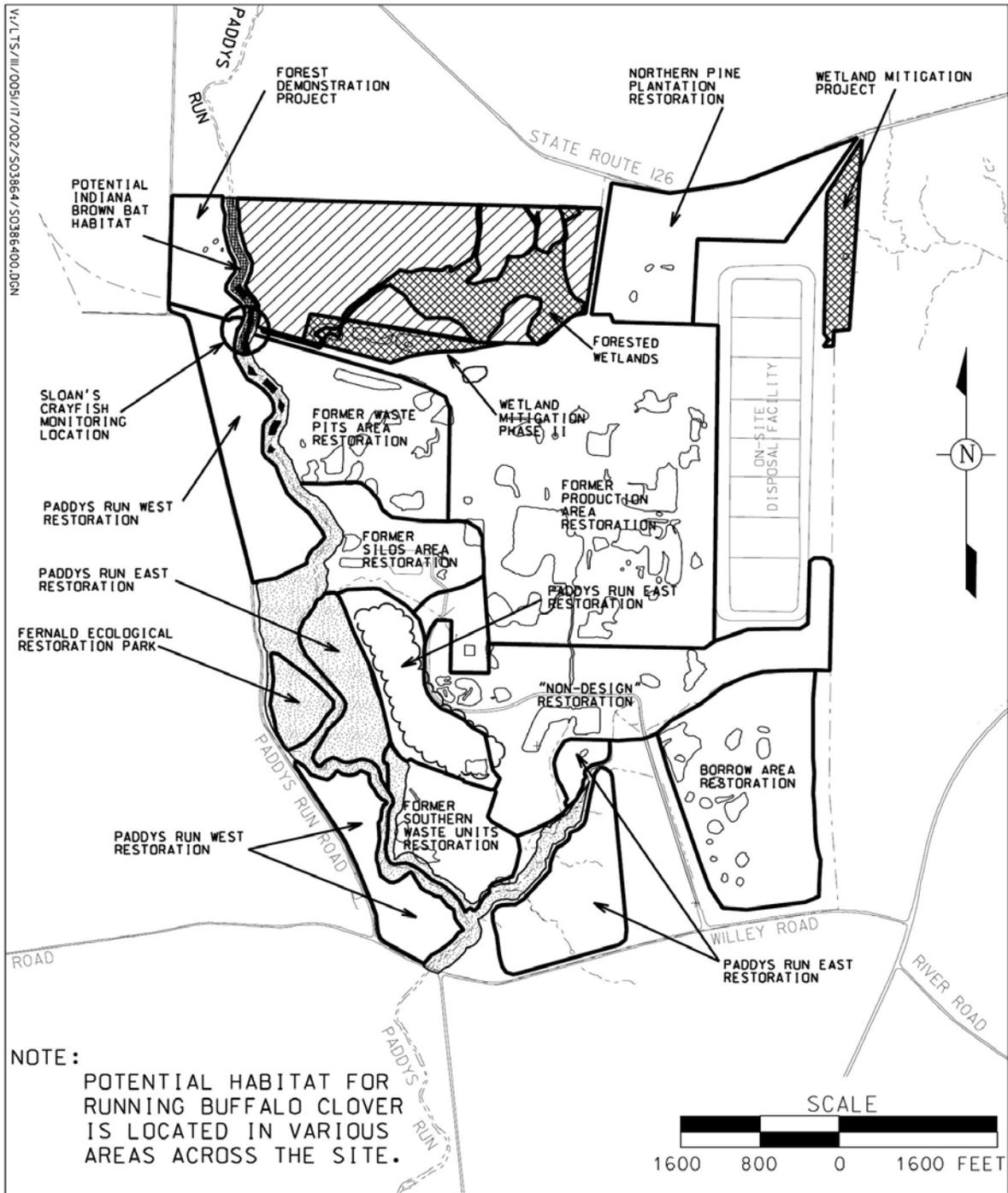
In 2007, implementation monitoring was conducted for all remaining restored areas. These projects include portions of the former production area, silos area, borrow area and “non-design” restoration areas (Figure 7-1). Mortality counts and herbaceous cover estimates were calculated across each of these projects. Overall plant survival was at or above 80 percent for most areas. Herbaceous cover estimates showed progress in some locations, but many of the areas seeded late in 2006 did not meet the goals established in the restoration designs. Soil and weather conditions at the time of seeding were often not ideal. In addition, the drought during the late summer and fall further hindered germination of the seed. These areas will continue to be evaluated in 2008. Reseeding of some areas may be necessary.

Ecological restoration monitoring has been divided into two phases: the implementation phase and the functional phase. Implementation phase monitoring is conducted to ensure that restoration projects are completed as intended in their designs. This effort involves the mortality counts and herbaceous cover estimates that are conducted after a project is completed. Functional phase monitoring is more general and considers projects in terms of their contribution to the ecological community as a whole. This is accomplished by comparing projects to pre-remediation baseline conditions and to ideal reference sites. Mortality and herbaceous cover thresholds are described in the *2002 Consolidated Monitoring Report for Restored Areas at the Fernald Closure Project* (DOE 2003b).

Water levels were also measured to monitor the performance of the newly constructed wetlands in the Phase II Wetland Mitigation Project and the Borrow Area. Pursuant to the Natural Resource Restoration Plan, functional monitoring efforts were completed in 2005, so no additional monitoring was conducted in 2007.



The Large, Showy Flower of the American White Water Lily (Nymphaea odorata) Can Be Seen in Several Wetlands Throughout the Summer.



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| ----- FERNALD PRESERVE BOUNDARY | ▨ NORTHERN WOODLOT AREA AND POTENTIAL AREA FOR SPRING CORAL ROOT |
| ▨ PADDY'S RUN AND TRIBUTARIES RIPARIAN CORRIDOR | ☁ PINES |
| ▨ SLOAN'S CRAYFISH AREA | ○ OPEN WATER |
| ▨ POTENTIAL INDIANA BROWN BAT HABITAT | |
| ▨ WETLANDS | |

Figure 7-1. Priority Natural Resource Areas

7.2 Fernald Preserve Site and On-Site Disposal Facility Inspections

As the site has transitioned to Legacy Management, DOE must ensure that institutional controls are in place. The Legacy Management and Institutional Controls Plan sets out a routine inspection process for both the site and the on-site disposal facility. Inspections are conducted quarterly with joint participation from DOE and the regulators. Inspections document evidence of unauthorized uses of the site, the effectiveness of institutional controls, and the need for repairs. Ecologically restored areas are evaluated for the presence of noxious weeds, erosion, the condition of vegetation, and signs of damage from nuisance animals. Findings in 2007 focused mainly on noxious weeds, debris, erosion, and areas of sparse vegetation. In some areas, trash associated with yard waste compost soil amendments is an issue. The material is not contaminated, nor does it impact ecological restoration. However, it is not aesthetically pleasing. Field personnel have worked to clear some of the affected areas and will continue with this effort in 2008.

For the on-site disposal facility, the vegetated cap is walked down and evaluated to ensure that the integrity of the cap is maintained. Erosion rills, holes from burrowing animals, noxious weeds, settlement cracks, and other indications that there may be an issue with the proper functioning of the cap are flagged and repaired. In 2007, there were no signs that the integrity of the cap had been compromised in any way. Findings consisted mainly of minor erosion repair, presence of noxious weeds, and animal burrows. Some concern was raised regarding the condition of cell 8. A series of ridges were observed along the south face. These depressions were caused by construction equipment during the final seed bed preparation steps when the cap was seeded in October 2006. Following an engineering evaluation, it was determined that the ridges should subside over time and that no further action is needed outside of continued monitoring and repair of erosion as necessary.

The cell 1 cap was reseeded in October 2007. An herbicide, Plateau, was applied on the cell 1 cap earlier in the year. This herbicide can be useful for prairie restoration projects because it protects warm season native grasses and wildflowers while killing cool season grasses and weeds. The application was successful in reducing the amount of weeds on the cap; however it also killed much of the cool season grasses that had volunteered on the cap (“volunteer” plants are those that are not seeded or planted, but rather move into an area on their own). This condition allowed for DOE to reseed the cap with the native cell cap mix. Results of this effort will be evaluated during quarterly on-site disposal facility inspections.

7.3 Affected Habitat and Inspection Findings

During remediation, DOE and the natural resource trustees tentatively agreed that it would not be necessary to quantitatively assess habitat affected by remediation because DOE would be conducting natural resource restoration on approximately 900 acres (364 hectares) of the Fernald Preserve. A summary of the year's habitat impacts is presented here.

With large-scale remediation complete, the potential for unanticipated habitat impacts is limited. Nevertheless, impacts may occur during construction or maintenance activities. In 2007 approximately two acres of wet meadow grassland was seeded to improve drainage and address the elevated uranium concentrations found in the water in the swale west of the former waste

pits, which is discussed in Chapter 4. This area was already factored into wetland mitigation requirements, so additional wetland mitigation is not required. Instead, the area was reseeded with native grasses and forbs. Excess soil from this effort was placed in the former waste pit area south of former Waste Pit 5 then seeded and mulched. An additional 2 acres of land was cleared as part of erosion repairs in the former waste pits. Impacts were limited because native grass had not yet become established. All areas were reseeded with native grasses and forbs following the repair work.

7.4 Threatened and Endangered Species

Sloan's Crayfish—The state-listed threatened Sloan's crayfish (*Orconectes sloanii*) is found in southwest Ohio and southeast Indiana. It prefers streams with constant (though not necessarily fast) current flowing over rocky bottoms. A large, well-established population of Sloan's crayfish is found at the Fernald Preserve in the northern reaches of Paddys Run.

Indiana Brown Bat—The federally listed endangered Indiana brown bat (*Myotis sodalis*) forms colonies in hollow trees and under loose tree bark along riparian (streamside) areas during the summer. Excellent habitat for the Indiana brown bat has been identified at the Fernald Preserve along the wooded banks of the northern reaches of Paddys Run. The habitat provides an extensive mature canopy of older trees and water throughout the year. One Indiana brown bat was captured and released on the property in August 1999.

Running Buffalo Clover—The federally listed endangered running buffalo clover (*Trifolium stoloniferum*) is a member of the clover family whose flower resembles that of the common white clover. Its leaves, however, differ from those of white clover in that they are heart-shaped and a lighter shade of green. Running buffalo clover has not been identified at the Fernald Preserve; however, because running buffalo clover is found nearby in the Miami Whitewater Forest, the potential exists for this species to become established at the site. The running buffalo clover prefers habitat with well-drained soil, filtered sunlight, limited competition from other plants, and periodic disturbances. Suitable habitat areas include partially shaded former grazed areas along Paddys Run and the storm sewer outfall ditch.

Spring Coral Root—The state-listed threatened spring coral root (*Corallorhiza wisteriana*) is a white and red orchid that blooms in April and May and grows in partially shaded areas of forested wetlands and wooded ravines. This plant has not been identified at the Fernald Preserve; however, suitable habitat exists in portions of the northern woodlot.

The Endangered Species Act requires the protection of any federally listed threatened or endangered species and any habitat critical for the species' existence. Several Ohio laws mandate the protection of state-listed endangered species as well. Since 1993 a number of surveys have been conducted to determine the presence of any threatened or endangered species at the Fernald Preserve. As a result of these surveys, the federally listed endangered Indiana brown bat and the state-listed threatened Sloan's crayfish have been found at the Fernald Preserve. In addition, suitable habitat exists at the Fernald Preserve for the federally listed endangered running buffalo clover and the state-listed threatened spring coral root. Neither of these species has been found on the property, but their habitat ranges encompass the Fernald Preserve. Figure 7-1 shows the habitats and potential habitats of these species. According to provisions in the IEMP, any threatened or endangered species habitat will be surveyed prior to any remediation or restoration activities. If threatened or endangered species are present, appropriate avoidance or mitigation efforts will be taken.

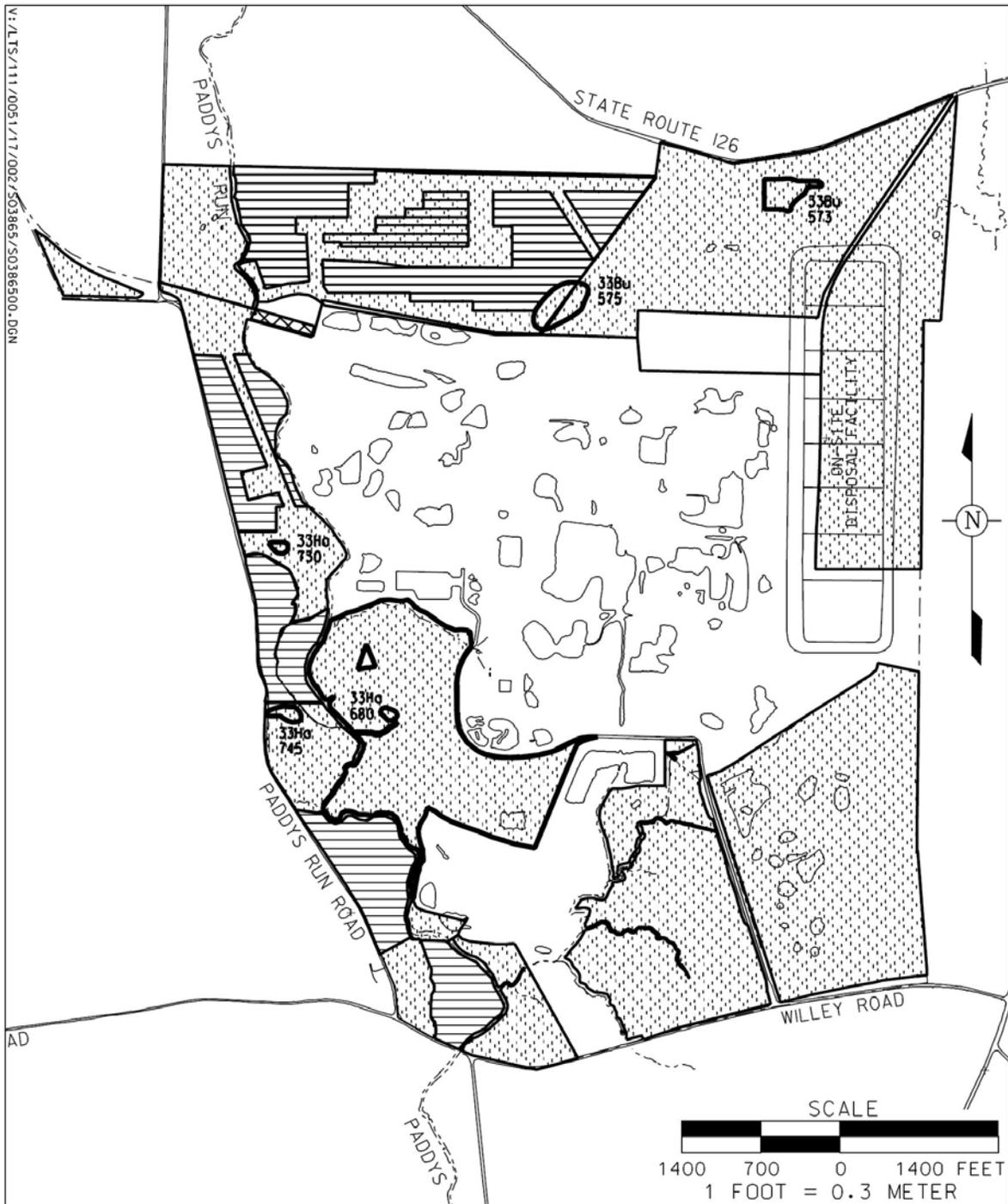
To avoid impacts to Indiana brown bat and Sloan's crayfish habitat, DOE and the regulatory agencies agreed to keep the former rail trestle that crosses Paddys Run in place. The Operable Unit 3 Fact Sheet (DOE 2006b) documents this decision. During the evaluation process it was determined that the train trestle may be used to enhance bat habitat at the Fernald Preserve. Several modifications to the trestle were made, including closing gaps between rail ties and installing specially designed bat houses. Bat activity was monitored through the breeding season, and mist netting was conducted at the trestle and several other suitable locations on July 31 and August 1, 2007. No Indiana brown bats were found, but several other species were netted, including the big brown bat, the eastern red bat, and one eastern pipistrelle. With site remediation complete, Indiana brown bat and Sloan's crayfish habitat will continue to be protected as part of legacy management activities.

7.5 Cultural Resources

The Fernald Preserve and surrounding area are located in a region of rich soil and many sources of water, such as the Great Miami River. Because of its advantageous location, the area was settled repeatedly throughout prehistoric and historical time, resulting in richly diverse cultural resources. In summary, 148 prehistoric and 40 historic sites have been identified within 1.24 miles (2 km) of the Fernald Preserve.

Several laws have been established to protect cultural resources during remedial activities at the Fernald Preserve. The National Historic Preservation Act requires DOE to consider the effects of its actions on sites that are listed or eligible for listing on the National Register of Historic Places. The Native American Graves Protection and Repatriation Act requires that prehistoric human remains and associated artifacts be identified and returned to the appropriate Native American tribe.

To comply with these laws, DOE conducted archeological surveys prior to remediation activities in undeveloped areas of the Fernald Preserve. Figure 7–2 shows the areas of the Fernald Preserve that have been surveyed. These surveys have resulted in the identification of six sites that may be eligible for listing on the National Register of Historic Places. None of these sites were affected by remediation activities, and no additional surveys were required in 2007.



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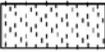
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|---------------------------|---|--|
| FERNALD PRESERVE BOUNDARY | ----- |  AREA SURVEYED |
| AREAS NOT SURVEYED |  | 33Ho 745  IDENTIFIED ARCHAEOLOGICAL SITE REQUIRING ADDITIONAL INVESTIGATION |
| OPEN WATER |  |  NOT SURVEYED DUE TO PREVIOUS CONTAMINATION/DISTURBANCE |

Figure 7-2. Cultural Resource Survey Areas

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