

2.4 Ecology

The purpose of this section is to describe the terrestrial and aquatic environment and biota of the site and vicinity, transmission corridors, and offsite areas to provide a baseline from which to judge the construction and operational impacts on these areas. [Subsection 2.4.1](#) and [Subsection 2.4.2](#) identify and describe the terrestrial and aquatic species composition, spatial and temporal distribution, abundance, and other structural and functional attributes of biotic assemblages that could be impacted by Fermi 3. Important terrestrial and aquatic natural resources are identified, as well as wildlife sanctuaries, preserves, and other natural areas that are potentially affected.

2.4.1 Terrestrial Ecology

The Fermi 3 project is located on the shore of Lake Erie at the west end of the Lake Erie Basin in the Southern Lower Peninsula Ecoregion (SLPE) ([Reference 2.4-1](#)). West of the Fermi site is primarily agricultural land (row crops) with scattered rural residences. The general land use in the vicinity of the Fermi site is illustrated in [Figure 2.1-1](#). To the south the area is equally divided between residential properties and a narrow lagoon off Lake Erie that is surrounded by brushy forest. The general area of interest around the existing Fermi 2 is illustrated in [Figure 2.4-1](#).

The SLPE includes approximately the southern half of the Lower Peninsula of Michigan. The eastern portion of the region where the project is located has a prevalence of flat plains, the Lake Erie basin, that eventually give way to the main body of Lake Erie. The region is underlain by Paleozoic bedrock and was completely glaciated during the late Wisconsin Period, some 18,000 to 20,000 years ago ([Reference 2.4-2](#)). Today this type of broad lacustrine plain is found around most areas of the Great Lakes and typically extends several to many miles inland ([Reference 2.4-1](#)). Nearly all of Monroe County lies on this plain, making the landward extent of the plain in the project vicinity about 25 miles.

Reconnaissance surveys to the Fermi site and vicinity were made between November 2006 and May 2008. Detailed terrestrial surveys were conducted at the site from 2008 through 2009. The purpose of these investigations was to observe and assess existing conditions of the ecological resources, including vegetation and wildlife. Several previous wildlife and plant studies have been made on the property. NUS Corporation examined the site between 1973 and 1974 ([Reference 2.4-3](#)). In 2000 the Detroit Edison Fermi 2 Plant Wildlife Habitat Team in cooperation with the Wildlife Habitat Council prepared a Wildlife Management Plan, which included updated wildlife occurrence lists for the site. The Wildlife Management Plan was re-certified in 2002 and again updated the wildlife occurrence lists. Information from these studies is included and considered in the present study. As indicated above, Detroit Edison performed a confirmatory updated terrestrial ecological survey of the site that provides a year's worth of seasonal sampling data to reflect variations in terrestrial populations ([Reference 2.4-95](#) and [Reference 2.4-96](#)).

A topographic map of the Fermi area showing the property boundaries is provided in [Figure 2.4-2](#). [Figure 2.4-3](#) is an aerial photograph of the Fermi area taken in 1981 during the construction of Fermi 2. [Figure 2.4-4](#) is an aerial photograph taken in 2005 that is representative of current existing conditions. The most notable difference in the two photographs is the much higher water conditions

in the lagoons in 1981 compared to 2005 and the difference in cover types present due to Fermi 2 construction activities in 1981.

2.4.1.1 Terrestrial Communities

Following are brief discussions of the floral and faunal components found at the Fermi site. The vicinity surrounding Fermi consists of similar habitats but is dominated by Lake Erie (about 50 percent), urban areas, rural residences, and agricultural lands.

2.4.1.1.1 Vegetation on Site and Vicinity

The flora at the Fermi site was studied during site reconnaissance between 2006 and 2008 and again in a detailed survey between 2008 and 2009 ([Reference 2.4-95](#)). Using current aerial photography of the Fermi property, plant community boundaries were drawn on a provisional basis. The property was then divided into a gridwork of approximately 1,000 feet square parcels. Pedestrian surveys were then made of all areas of the site, using the grid system to effectively examine the habitats on and areas of the property. The surveys were conducted during the spring, summer and fall seasons to account for the variation in flowering time for different plant species. Field inspection of the structure and species composition of these areas was used to refine the boundaries of the plant communities present. Within each terrestrial community identified, point to point transects were examined to determine cover type and dominant species. At least two transects were examined in each habitat area of significant size. For example, if five separated areas of the property were identified as the same habitat, at least two transects were examined in each of these tracts, assuming each tract was large enough to accommodate a 100 meter or longer transect. Random sampling of plants was done within all communities identified to more thoroughly examine microhabitats and better understand the species diversity present. The outcome of the field studies was used to refine the boundaries of the plant communities present and provide an understanding of the character of these communities as they exist on the Fermi property. The discussion that follows is based on the findings of these studies.

The 1260 acre Fermi site is composed of approximately 16.8 percent developed areas and 5.1 percent cropland. Terrestrial habitats account for approximately 61 percent of the property. The remaining approximately 17 percent are water bodies, e.g. Quarry Lake and the main body of Lake Erie that lies east and north of the site. [Figure 2.4-5](#) illustrates the extent and location of the habitats identified and the developed areas on the Fermi site. [Table 2.4-1](#) provides an accounting of the acres present of each habitat. Plant community descriptions ([Table 2.4-1](#) and [Figure 2.4-5](#)) are defined biologically, which may differ from the regulatory definitions used in the wetlands delineation ([Figure 2.4-19](#)).

Studies of the flora at Fermi between 2006 and 2008 identified 216 plant species present. This should be considered a conservative number of species since in some instances specimens could not be identified beyond the genus. [Table 2.4-2](#) provides a list of plant species observed during reconnaissance visits or reported as occurring. Plant identifications and nomenclature primarily follow that used in the *Michigan Flora* ([Reference 2.4-4](#)). Common names primarily follow those found in the *National List of Plant Species that Occur in Wetlands: North Central (Region 3)* ([Reference 2.4-5](#) and [Reference 2.4-95](#)).

Early accounts of the Fermi site indicate that as recently as 1961, most of the site was in cultivation or had been otherwise disturbed. The NUS study ([Reference 2.4-3](#)) describes nearly all of the habitats on site as being in relatively early stages of succession. For example, most woodlots present in 1973 and 1974, which remain intact today, were nearly all once cleared land at one time. Over time these areas became revegetated by tree species representative of the area as well as some non-native species. But while the tree flora is mostly representative of other areas of southern Michigan, the ground cover remains diminished, presumably due to the lack of an adequate seed bank for ground cover species and probably alterations to soils conditions (fill material, mixing due to scrapping, shading, etc.). The terrestrial habitats present on the Fermi site today are described in the following paragraphs and the distribution of these is illustrated in [Figure 2.4-5](#). The communities are categorized according to the 2006 Michigan Department of Natural Resources Terrestrial Systems for the Lower Peninsula ([Reference 2.4-1](#)) with minor modifications.

Grassland: Row Crops (GRC) (brown areas in [Figure 2.4-5](#))

Grassland: Row Crop (GRC) areas are agricultural fields that are planted with a single species (usually corn or soybeans) and harvested annually. Approximately 64 acres or 5.1 percent of the property is completely GRC.

Grassland: Idle/Old Field/Planted (GOF) (orange areas in [Figure 2.4-5](#))

Grassland: Idle/old fields/planted (GOF) are communities of opportunistic plants that take over ground that had once been cleared for agriculture or other purposes. In some cases, these areas are initially planted with a cover grass, usually perennial brome or fescue when the area is to remain idle permanently or for the long term. The GOF communities at the Fermi site are dominated by smooth brome (*Bromus inermis*), but contain a good mix of opportunistic (weedy and invasive) native and introduced species, such as Canada thistle (*Cirsium arvense*), Canada goldenrod (*Solidago canadensis*), and flattop-fragrant goldenrod (*Euthamia graminifolia*). Invasive shrubs, such as multiflora rose (*Rosa multiflora*) and blackberry (*Rubus* spp.), may also be present but are not dominant. This is a disturbed community and offers limited value to wildlife, although it provides shelter to small mammals, birds, and reptiles and has some forage value. Approximately 75 acres or 6.0 percent of the site is GOF.

Grassland: Right-of-way (GRW) (yellow areas in [Figure 2.4-5](#))

Grassland: Rights-of-way (GRW) are linear features associated with roadways, railways, power lines, pipelines, etc. At Fermi approximately 29 acres or 2.3 percent of the property is right-of-way, including less than one percent along roadways. An existing power line right-of-way accounts for the majority of this classification. The power line right-of-way is periodically mowed to keep the area free of trees for reasons of safety in relation to line clearance issues. About one-half of the area is a prairie creation area while the remainder is unmanaged. The prairie was planted in 2003 by Detroit Edison with the assistance of a North American Wetland Conservation Act grant managed by Ducks Unlimited and the Natural Resources Conservation Service (NRCS). The area is dominated by big bluestem (*Andropogon gerardii*) and Indiangrass (*Sorghastrum avenaceum*). Broomsedge (*Andropogon virginicus*) is an undesirable and invasive grass that is relatively common in the area

and is even abundant in some localities. Other undesirable plants are also present, including purple loosestrife (*Lythrum salicaria*), common reed (*Phragmites australis*), teasel (*Dipsacus sylvestris*), and all non-native species. Surveys of the area between 2005 and 2008, including species identified prior to the preparation of this document, listed approximately 110 plant species as occurring in this area. To date, management has consisted of periodic mowing of most of the site to discourage the growth of woody species.

In the lowest portions of the GRW, large grasses like the bluestem and Indiangrass become less dominant. Where broomsedge has not overtaken the ground cover, composition tends to be somewhat representative of a perennial, herbaceous wetland. Grass-like bulrushes (*Scirpus* spp.), rushes (*Juncus* spp.), and sedges (*Carex* spp.) are present in some areas, as are broadleaf forbs, such as common boneset (*Eupatorium perfoliatum*) and southern blue flag (*Iris virginica*). An unmanaged portion of the right-of-way is dominated by broomsedge in the driest areas and with cattails (*Typha* spp.) in the lowest areas. The variation in hydrologic conditions across this area has encouraged the growth of a substantial variety of forbs representative of native and introduced species.

The GRW is a previously disturbed area that presently provides some limited value to wildlife in the form of diverse foraging and shelter for small mammals, birds, and reptiles and perhaps some grazing for larger mammals.

Shrubland (SHB) (red areas in [Figure 2.4-5](#))

Shrubland (SHB) communities at the Fermi site are upland areas with relatively dry soils that are dominated by deciduous shrubs. Approximately 113 acres or 9.0 percent of the site is SHB. On the Fermi property, all shrublands are located in areas that were filled or otherwise severely disturbed by construction activities for Fermi 1 and 2, with the possible exception of SHB in the extreme southeastern corner of the property. Shrub species, like dogwood (*Cornus* spp.), common buckthorn (*Rhamnus cathartica*), multiflora rose (*Rosa multiflora*), and blackberries (*Rubus* spp.), dominate the site. Saplings of trees in the area are also common, such as honey locust (*Gleditsia triacanthos*), cottonwood (*Populus deltoides*), and green ash (*Fraxinus pennsylvanica*). Despite the cover of shrubs and saplings there generally is substantial ground cover in the form of grasses and coarse forbs are common. Since these areas have been previously disturbed, it is not surprising to find that many of the species present are introduced or native increasers (i.e., plants native to the area but tending to be opportunistic in where they grow). Examples include smooth brome (*Bromus inermis*), prickly lettuce (*Lactuca serriola*), Canada goldenrod (*Solidago canadensis*), and Missouri ironweed (*Vernonia missurica*). Wildlife use in the SHB would include cover, nesting sites, and bedding areas but is expected to be limited for foraging due to lack of appropriate plant species.

Thicket (TKT) (light orange areas in [Figure 2.4-5](#))

Areas identified as Thicket (TKT) on the Fermi property are generally located in areas between wetlands and upland. Approximately 23 acres or 1.8 percent of the site is designated TKT. These areas are densely populated with small trees, such as hawthorn (*Crataegus* spp.), and box elder (*Acer negundo*). Shrubs are also common, including European privet (*Ligustrum vulgare*),

dogwoods (*Cornus* spp.). Saplings of eastern cottonwood (*Populus deltoides*), peach-leaved willow (*Salix amygdaloides*), and green ash are also prevalent and poison ivy (*Toxicodendron radicans*) is abundant. Ground cover is sparse to lacking except in a few open areas. The low quality species composition present suggests that the area was disturbed in the past. A comparison of the 1981 (Figure 2.4-3) and 2005 (Figure 2.4-4) aerial photographs of the site illustrates the change that has occurred from shrub/grassland habitat to thicket. Regarding wildlife, the TKT area is probably most beneficial to small mammals and birds for shelter and foraging, since large mammals would find it difficult to move through the dense brush.

Forest: Coastal Shoreline (FCS) (dark green hatched areas in [Figure 2.4-5](#))

The Forest: Coastal Shoreline (FCS) community occurs in a narrow, interrupted band along the east side of the property adjacent to the main body of Lake Erie. The area includes about 47 acres of land or 3.7 percent of the property. The area is dominated by large cottonwoods (*Populus deltoides*) and peach-leaved willow (*Salix amygdaloides*), some as much as two feet or more in diameter. Box elder (*Acer negundo*) and green ash (*Fraxinus pennsylvanica*) are also scattered in the area. Shrub growth varies from dense to sparse depending on lake exposure and the extent of high water ponding that occurs. Ground cover is sparse in heavily shaded areas and on the edges includes dense stands of reed canarygrass (*Phalaris arundinacea*). Forbs include primarily species capable of withstanding fluctuations in moisture availability and generally sandy soil conditions, such as stinging nettle (*Urtica dioica*). In this area it is also common to discover unexpected native and introduced species that have likely been dispersed here from other areas via the waters of Lake Erie. Examples include jimson-weed (*Datura stramonium*) and clammy-weed (*Polanisia dodecandra*). Overall, the FCS at Fermi is a dynamic community composed of opportunistic, early succession species. Wildlife value of the area is primarily limited to birds roosting or nesting in the trees.

Forest: Lowland Hardwood (FLH) (dark green areas in [Figure 2.4-5](#))

The Forest: Lowland Hardwood (FLH) community represents the most mature habitat on the Fermi property. The FLH accounts for about 92 acres or 7.3 percent of the site located in areas immediately northeast of Quarry Lake and the south-central portion of the site along the west side of the south lagoon. Like the FCS, cottonwood (*Populus deltoides*) and peach-leaved willow (*Salix amygdaloides*) are present but oaks (*Quercus* spp.), American basswood (*Tilia americana*), and hickory (*Carya* spp.) are well represented. Overall, the habitat is drier and more stable than that found in the FCS and the topsoil is organic to even clayey rather than sandy. The largest trees are found in the area northeast of Quarry Lake where numerous specimens can be found in the range of 18 to 26 inches in diameter. In the south-central area, scattered trees reach this size but most are less than 14 inches in diameter. Larger specimens appear to have been logged out of the area years ago, as evidenced by scattered old stumps. Shrubs are widely scattered in the FLH, so it is generally easy to move about the habitat. Ground cover is overall sparse, but consists of a variety of woodland species, such as woodland bluegrass (*Poa sylvestris*), scattered sedges (*Carex* spp.), enchanter's nightshade (*Circaea lutetiana*), false spikenard (*Smilacina racemosa*), and Virginia stickseed (*Hackelia virginiana*). Poison ivy (*Toxicodendron radicans*) is common as are grape vines

(*Vitis* spp.). The habitat provides substantial cover, shelter and foraging for a variety of wildlife in the area, as evidenced by tracks, nests, and scat observed in the area.

Forest: Woodlot (FWL) (light green areas in [Figure 2.4-5](#))

The Forest: Woodlot (FWL) community is found in the east-central and northwestern portions of the Fermi property and account for about 117 acres or 9.3 percent of the site. The FWL developed over fill material from Fermi 1 and 2 construction or on land otherwise heavily disturbed by Fermi 1 and 2 activities. The canopy is well developed and is composed of Cottonwood (*Populus deltoides*), box elder (*Acer negundo*), and green ash (*Fraxinus pennsylvanica*). Introduced species, such as the tree-of-heaven (*Ailanthus altissimus*) can also be observed. The understory is composed of saplings of the same species, dense in some areas and less dense in other places. Vines of poison ivy (*Toxicodendron radicans*), grape (*Vitis* spp.) and trumpet creeper sometimes form localized thickets. Introduced European privet (*Ligustrum vulgare*) and common buckthorn (*Rhamnus cathartica*) are relatively common. The ground cover is overall sparse and composed entirely of native and non-native invasive or otherwise undesirable species. Some of the more common herbaceous species include burdock (*Arctium minus*), heal-all (*Prunella vulgaris*), and garlic mustard (*Alliaria petiolata*). The value of FWL to wildlife is limited to nesting areas and den areas and sheltered resting areas. Few native species in the community are provided adequate foraging opportunities because of the dominance by non-native species.

Coastal Emergent Wetland (CEW) (light blue and blue hatched areas in [Figure 2.4-5](#))

The Coastal Emergent Wetland (CEW) is the largest plant community represented on site, covering about 273 acres or 21.7 percent of the site. The area is divided between a north and south lagoon and an unnamed drainage corridor entering the site from the west. From the most recent study, it is estimated that 238 acres is vegetated and 35 acres is open water. The extent of aquatic vegetation present fluctuates annually depending on water conditions in Lake Erie. High water years result in more open water and less in low water years. The 1981 aerial photograph in [Figure 2.4-3](#) illustrates relatively high water conditions, while the 2005 photograph in [Figure 2.4-4](#) shows a marked increase in vegetation in the lagoons during low water periods. At the present time the lagoon is dominated by dense and extensive stands of common reed (*Phragmites australis*) and cattail (*Typha* spp.). The introduced and undesirable purple loosestrife (*Lythrum salicaria*) is present throughout most of the area. The west-side drainage corridor has virtually no open water because of these plant communities. Because these stands are so dense, they provide minimal habitat for wildlife, especially waterfowl. In the south lagoon, and to a lesser extent in the north lagoon, are large stands of American lotus (*Nelumbo lutea*), which is a state listed threatened species. The status of the lotus is discussed in detail in [Subsection 2.4.1.2](#). Most of the lagoon is quite shallow. The south lagoon has fill deposits scattered throughout. Wading birds utilize the shallow water areas for foraging. A few songbirds use the cattails and reeds for nesting.

Developed Areas (DA) (white areas in [Figure 2.4-5](#))

Developed areas (DA) include buildings, parking areas, equipment storage areas, roadways, maintained lawns, and similar areas. Approximately 212 acres or 16.8 percent of the site is

developed. Plant species present are those planted for ornamental value or undesirable weeds. Wildlife value is very low because of poor plant species diversity, poor cover and exposure to frequent disturbance.

Lakes, Ponds and Rivers (LPR) (dark blue areas in [Figure 2.4-5](#))

Lakes, Ponds and Rivers (LPR) account for 44 acres or 3.5 percent of the site. These water bodies include an unnamed stream draining east across the central portion of the site and Quarry Lake, an abandoned rock quarry from Fermi 1 construction. No significant plant communities as discussed here are present, except for noting that cut-leaf water-milfoil (*Myriophyllum pinnatum*), a noxious plant native to Europe, has been observed in the waters. These waters are discussed further in [Subsection 2.4.2](#).

Lake Erie (main body)

The main body of Lake Erie lies north and east of the project. Lake Erie accounts for about 171 acres or 13.6 percent of the site. These aquatic areas are addressed in [Subsection 2.4.2](#).

2.4.1.1.2 Wildlife on the Site and Vicinity

Habitat diversity in an area generally contributes directly to the diversity of wildlife present in the same area. The more diverse the habitat, the greater the number of wildlife species that can be supported. The Fermi site and vicinity provide primarily a rural agricultural setting with small parcels of disturbed grassland, forest, and wetland habitats scattered throughout the area. The majority of the Fermi site proper is occupied by disturbed forest, lagoons, thickets, and developed areas. The site was extensively surveyed for wildlife in 1973 and 1974 by NUS Corporation ([Reference 2.4-3](#)). Wildlife observations were made during site reconnaissance between late 2006 and mid 2008 and during a detailed wildlife survey from mid-2008 until 2009 ([Reference 2.4-96](#)) to evaluate the diversity of species potentially present. The following discussions are based on the finding of these studies.

Mammals

The 1973-74 NUS study ([Reference 2.4-3](#)) listed 17 species of mammals directly or indirectly observed. The 2000 Wildlife Management Plan listed 41 species as potentially occurring on the property; 14 species were observed, 3 of which were newly observed. In 2002, Wildlife Habitat Program Re-certification document listed one additional newly observed mammal, bringing the total number of mammals observed on the property to 21. Field studies were made for the Fermi 3 work from late 2006 to mid 2008. Mammals were recorded on the basis of direct observation, tracks, and scat, anytime while on the property, but the most intense study periods occurred concurrently with the flora studies described in [Subsection 2.4.1.1.1](#). During the 2007-2008 studies, 13 of the 21 species listed for the site were observed. [Table 2.4-3](#) provides a composite list of mammals observed at the site.

The area surrounding the existing units is a mosaic of developed land, mowed grass, woodlots and second generation forest that do not appear to provide significant travel corridors as might be found along watercourses or entry/exit locations for desirable foraging or resting habitats. The Fermi

property is surrounded by high chain-link fence in terrestrial areas, which is expected to inhibit larger mammals from access to the site. Because the property is fenced, wildlife corridors in the truest sense are not present on the property. However, the Lake Erie waterfront and north lagoon areas may provide access via water. White-tailed deer, for instance, are frequently seen on the site. The varied habitats around the site, however, are well suited to small mammals, although the diminished quality of most of the communities discussed provides less than ideal foraging opportunities. None of the wildlife species observed or reported at the site is unusual for the region.

Birds

Birds in the Fermi region include year-round residents, seasonal residents and transients (birds stopping briefly during migration). A large percentage of the species occurring in Michigan are migratory, and because Fermi lies on the western shore of Lake Erie, it lies within the Atlantic flyway which is one of several major migratory flyways in North America. Avian surveys conducted at the Fermi site between 1973 and 1974 by NUS Corporation ([Reference 2.4-3](#)) listed about 150 species of birds occurring on the site. Although the 2000 Wildlife Management Plan provided a list of 287 species potentially occurring in the Fermi vicinity, only 150 were noted as observed on the Fermi property, the same 150 noted in the 1973-74 NUS study. The list of 287 species was derived from surveys conducted at the Ottawa National Wildlife Refuges located along Lake Erie about 30 miles southeast of Fermi near Oak Harbor, Ohio. In 2002, the Wildlife Habitat Program Re-certification added 6 new species to the list of species provided in the 2002 Wildlife Management Plan. According to the Michigan Natural Feature Inventory, the potential number of resident and transient birds in the region is much higher depending on the reporting resource group ([Reference 2.4-6](#)). In 2002, an April bird survey by the Detroit Edison Wildlife Habitat Team at Fermi counted 293 individuals and 31 species. Five (5) species accounted for 50% of the birds counted: common grackle, red-winged blackbird, herring gull, brown-headed cowbird, and northern pintail. The 2007 National Audubon Society Christmas Bird Count for Monroe, Michigan, covered a 15 mile diameter area centered on Monroe and was conducted between December 15, 2007 and January 4, 2008. The northeast edge of the study area lies less than 3.5 miles from the Fermi property. The count recorded 27,609 individuals and 71 species. 71% of the individuals recorded were one of 7 species: European starling (18%), ring-billed gull (15%), Canada goose (11%), common merganser (9%), rock pigeon (7%), herring gull (7%), and house sparrow (4%).

Fermi 3 avian studies were conducted between late-2006 and mid-2008. Point surveys were conducted early and late in the day in different areas across the Fermi property that were representative of the variety of habitats present. The sampling periods included seasonal variation, such as spring and fall migration periods. These surveys confirm that the avian fauna at Fermi, especially songbirds and certain water bird, remains diverse, but that a small number of common species make up a large percent of individuals present. The most common species observed were the European starling, Canada goose, gulls, and red-winged blackbirds. [Table 2.4-4](#) provides a list of the birds that have been recorded at Fermi and notes those species recently observed. The following are brief discussions of different bird guilds at Fermi.

Forest, Shrub and Grassland Community Birds

These birds nest in trees, shrubs or grasses and include year-round and seasonal residents. Examples include the American robin (*Turdus migratorius*), blue jay (*Cyanocitta cristata*), brown thrasher (*Toxostoma rufum*) and Eastern meadowlark (*Sturnella magna*). During the spring and fall, large flocks of European starlings pass through the area. Open areas, such as the transmission line prairie and grass/shrub habitats are used by many of the species present to forage for seeds, insects or other forms of food.

Water Dependent Birds

Approximately 38 percent of the observed bird species fall into this classification. These birds are mostly found in association with the shoreline area of Lake Erie and areas designated as Coastal Emergent Wetlands in [Figure 2.4-5](#), since they require surface water to complete at least part of their life cycle. Great blue herons (*Ardea herodias*), great egrets (*Casmerodius albus*), and American common mergansers (*Mergus merganser americanus*). American coots and mallards can be readily observed foraging in the shallow open water areas of the lagoons. Red-winged and yellow-headed blackbirds (*Agelaius phoeniceus* and *Xanthocephalus xanthocephalus*) nest in the tall cattail and reeds. The red-winged blackbird normally accounts for a large percentage of the birds observed on the Fermi property. Many more birds were typically observed in the lagoons than along the shore of Lake Erie, where the most common sighting is that of gulls.

Birds of Prey

Birds of prey were not frequently observed on the Fermi site but the most common sightings were that of the turkey vulture (*Cathartes aura*) and red-tailed hawk (*Buteo jamaicensis*). In 1973 a single peregrine falcon (*Falco peregrinus*) and a single osprey (*Pandion haliaetrus*) were observed over the lagoon ([Reference 2.4-3](#)). No peregrine falcons were observed in recent studies, but several ospreys were observed at the site. No evidence of nesting on the property was encountered.

The bald eagle (*Haliaeetus leucocephalus*) occurs in the area. In the fourth quarter of 2007 three nests were observed on the property, two are north and one is south of Fermi 2 in the large trees of the coastal shoreline forest (FCS) adjacent to Lake Erie. Eagles may be more common during the winter months around the plant where the warmer cooling water keeps some areas ice free. Additional discussion regarding legislated protection of this species is found in [Subsection 2.4.1.2.2.1](#). By May 2008, only the two nests north of Fermi 2 remained, as the southernmost nest had been destroyed by winter storms. Only one of the remaining nests was occupied.

Upland Game Birds

The mourning dove (*Zenaida macroura*) is the only upland game bird observed on the Fermi property. Wild turkey (*Meleagris gallopavo*) may be in the area but none were observed directly or indirectly (tracks, feathers, etc.) during site evaluations between 2006 and 2008.

Reptiles and Amphibians

The lagoons, other wetlands areas and adjacent habitats provide a significant amount of potential habitat for amphibians and reptiles on the Fermi property. Direct and indirect observations of a diversity of these species, however, have been infrequent both in recent studies and past studies. The 2000 Wildlife Management Plan listed 18 species of amphibians whose geographical ranges include the Fermi site, but only 3 species were observed. The same report did not list any reptiles. The 2002 wildlife habitat Re-certification document listed 3 additional amphibians and 3 reptiles. No intense surveys were made for the Fermi 3 project but observations were recorded during the course of other studies conducted for terrestrial resources. During the 2007-08 study period 2 amphibians were observed and 6 reptiles. [Table 2.4-5](#) provides a list of species observed and others that potentially occur in the area based on past studies ([Reference 2.4-3](#)).

2.4.1.2 Important Terrestrial Species and Habitats

NUREG-1555 defines “important species” as: 1) species listed or proposed for listing as threatened, endangered, candidate, or species of special concern in 50 CFR 17.11 and 50 CFR 17.12, by the USFWS, or the state in which the project is located; 2) commercially or recreationally valuable species; 3) species essential to the maintenance and survival of rare or commercially or recreationally valuable species; 4) species critical to the structural and function of local terrestrial ecosystems; or 5) species that could serve as biological indicators of effects on local terrestrial ecosystems. From the above definition, only element 1) is applicable to the species found on the Fermi site and vicinity. “Important habitat” is defined by the NRC in NUREG-1555 as wildlife sanctuaries, refuges, or preserves, wetland, floodplains and areas identified as critical habitat by the USFWS. The terrestrial species and habitats deemed important by these definitions are addressed in the sections that follow. [Subsection 4.3.1](#) describes the construction impacts on the terrestrial ecosystem and potential needs for preventative measures.

The following discussion reflects the results of the detailed wildlife survey conducted in 2008 and 2009 ([Reference 2.4-96](#)) and other information sources as cited.

2.4.1.2.1 Federal Protected Species

The USFWS was consulted concerning the occurrence or potential occurrence of species on or in the vicinity of the Fermi property that are protected under the Endangered Species Act of 1973 (ESA) ([Reference 2.4-7](#)). The USFWS stated that the project occurs within the potential range of some federally listed species, but that the USFWS had no records of occurrence nor was there any designated critical habitat in the area. The USFWS further stated that because of the types of habitat present at Fermi, no further action is required under ESA. The USFWS did state that if more than six months pass before the project is initiated, then the USFWS should again be contacted to ensure there have been no changes from the regulatory perspective. Detroit Edison will continue consultations with the USFWS per their recommendations.

A broad range of bird species, over 800 total, are protected by the Migratory Bird Treaty Act of 1918 (MBTA) ([Reference 2.4-8](#)). The statute makes it unlawful to pursue, hunt, take, capture, kill or sell birds listed and grants protection to any bird parts including feathers, eggs and nests. Detroit

Edison is remaining in contact with the USFWS to keep abreast of future changes in the regulatory environment regarding compliance with the MBTA. Based on avian surveys conducted during the 2006-2008 reconnaissance visits, the bald eagle appears to be the only migratory species of note that has been observed to date on the Fermi property, or in the site vicinity. The Indiana bat is also of interest, as it has been sited within the Fermi region.

Bald Eagle

The USFWS de-listed the bald eagle (*Haliaeetus leucocephalus*) as federally threatened under the Endangered Species Act, effective August 8, 2007 ([Reference 2.4-9](#)). However, the species continues to receive federal protection under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act ([Reference 2.4-10](#)), which prohibits the take, transport, sale, barter, trade, import and export, and possession of eagles, making it illegal for anyone to collect eagles and eagle parts, nests, or eggs without an USFWS permit.

Two nests were observed on the Fermi property in May 2008. Both nests are located north of Fermi 2 in the large trees of the forested coastline immediately adjacent to Lake Erie. Biologists from the USFWS usually check the nests in late winter for young. If present, the young are banded and blood samples taken. One of the nests was occupied in May 2008. As long as there is open water where they can forage, the bald eagle typically will remain in the region throughout the year ([Reference 2.4-6](#)). Protection of the bald eagle is discussed in more detail in [Subsection 2.4.1.2.2.1](#).

Bald eagles are found throughout the United States. Their breeding range extends from Alaska and Newfoundland south to Baja California and Florida, although many areas in the interior of the continent have few, if any nesting pairs. Nests are usually constructed near seacoasts, lakes or large rivers to be near their most common food supply: fish. Although they are quite capable of catching their own, sometimes even wading in shallow water to stalk fish like herons, they have often been seen stealing fish from other birds such as osprey. When fish are not available, such as in winter, eagles will also feed on waterfowl, small mammals (up to rabbit-size) and carrion (even road-kill). During Michigan winters, bald eagles are seen throughout the state. They nest mainly in the Upper Peninsula and the northern portion of the Lower Peninsula. Bald eagles reach maturity at four to five years of age. The beginning of the breeding season, from mid-February to mid-March, consists of the establishment of a territory, nest building and mating displays. The nest is usually located in the tallest tree in the area, often a white pine or dead snag. From late March to early April, one to four eggs are laid. Both male and female bald eagles participate in the incubation and the feeding of the chicks that hatch around seven weeks later. In about three months, by late summer, the fledglings are ready for flight. When it is time to move for the winter, the young birds are abandoned by their parents. A 1999 survey in Michigan found 343 nests that produced 321 young. The productivity was calculated as 96 percent, i.e., young per nest with known outcomes. ([Reference 2.4-82](#))

Indiana Bat

The Indiana bat (*Myotis sodalists*) is a federal endangered species. The species has not been observed on the Fermi property, nor has it been reported from Monroe County, Michigan, according

to the Michigan Natural Features Inventory (MNFI) ([Reference 2.4-46](#)). However, MNFI records do indicate that the Indiana bat has been observed in counties to the north and west of Monroe County. The bat is distributed from the Ozarks of Oklahoma east to Tennessee and northern Florida, and north to Vermont, northern Indiana and southern Michigan. The Indiana bat spends the winter hibernating in limestone caves (hibernacula) to the south of Michigan. From late spring to early fall, bats returning to Michigan typically roost in forested areas under the loose bark of large trees or in hollow snags. They leave their roosts to forage for insects from a half hour to one hour before dark in or near forested areas. ([Reference 2.4-81](#)). The Indiana bat is discussed further in [Subsection 2.4.1.2.2.1](#).

2.4.1.2.2 State-Listed Protected Species

The MDNR and the Michigan Natural Features Inventory ([Reference 2.4-6](#)) was consulted regarding the presence of known or potential occurrences of state-listed threatened and endangered animals and plants in and around the project area. Eight terrestrial species were identified by MDNR as occurring or potentially present. Organisms listed by MDNR as “species of special concern” are not protected under state endangered species legislation. Terrestrial species listed by MDNR are discussed below.

2.4.1.2.2.1 Animals

Bald Eagle

The bald eagle (*Haliaeetus leucocephalus*) is a state threatened species, although as of March 24, 2008, Michigan is moving toward removing the bald eagle from the state list of threatened and endangered species. As long as the bald eagle remains protected under Michigan law, MDNR offers the following recommendations:

To avoid disturbing nesting bald eagles, we recommend the following if an active bald eagle nest tree is within 400 meters (1/4 mile) of the project area: 1) avoid land altering activities during the critical nesting period from January 1 to June 1 in the Lower Peninsula and January 10 to June 10 in the Upper Peninsula, 2) retain the nest tree as long as the tree is healthy and not a safety concern, and 3) maintain a forested buffer (preferred) or natural buffer as wide as possible around the nest tree. Ideally, the buffer would protect the existing nest tree and provide for alternative or replacement nest trees. If the nest tree will be disturbed, an Endangered Species Permit may be needed from the Michigan Department of Natural Resources.

Each nest within a breeding area is protected by three zones that become less restrictive to human activity as the distance from the nest increases. The first zone, or Primary Zone, is defined as 330 feet (5 chains) around the nest. All land use activities, including human entry, motorized access, and low-level aircraft operations, should be prohibited during the most critical period described above. Exceptions are actions necessary to protect or improve the nest site, eagle researchers, or management by qualified individuals.

The Secondary Zone extends 660 feet (10 chains) from the nest (additional 330 feet from the Primary Zone). Land-use activities that result in significant changes in the landscape such as clear cutting, land clearing, or major construction should be prohibited during the most critical period described above. Actions such as thinning tree stands, maintenance of existing improvements, human entry, low-level aircraft operations, and construction of trails, are permitted but not during the most critical period. Exceptions are the same as above.

The Tertiary Zone extends 1/4 mile (or 20 chains) from the nest, but may extend up to 1/2 mile (40 chains) if topography and vegetation permit a direct line of sight from the nest to potential activities at that distance. The configuration of this zone therefore, may be variable. Many activities are permissible in this zone with some exceptions during the most critical period. Please contact the U.S. Fish and Wildlife Division, East Lansing Field Office at (517) 351-2555 for activities that are permissible in this zone, if your project is 1/4 to 1/2 mile from a known nest.

MDNR further noted that following Michigan de-listing, MDNR guidelines for bald eagle management would follow those provided by the USFWS *National Bald Eagle Management Guidelines* ([Reference 2.4-11](#)).

Indiana Bat

The Indiana bat (*Myotis sodalist*) is state endangered. The species is only found in Michigan during late spring to early fall when it would roost in forested areas beneath loose bark of large trees or in hollow snags. During the winter these bats migrate south to hibernate in caves in the Ohio Valley or more southern areas. Although portions of the Fermi site are forested, large trees with loose bark that would provide roosting habitat for the Indiana bat are not common. As such, suitable habitat for the Indiana bat at Fermi is scarce. MDNR expressed no concern for the species during consultations, and according to MNFI, there are no reported occurrences of the Indiana bat for Monroe County. Accordingly, this species is not being considered in [Chapter 4](#) and [Chapter 5](#) for Fermi 3 construction or operational impacts.

Barn Owl

The barn owl (*Tyto alba*) is state endangered. The barn owl is a distinctive species that uses a wide array of natural community types, including agricultural lands and buildings. These resident birds may be found year-round if prey species are abundant. Although reported in the region in the early 1980s ([Reference 2.4-6](#)), there appear to be no recent reports of occurrence and no observations were made during project related studies. The project would have no effect on the continued existence of the barn owl in the region, since neither prey species nor nesting/roosting habitat would be adversely affected. Accordingly, no further consideration is being given to this species as being potentially affected by Fermi 3.

Common Tern

The common tern (*Sterna hirundo*) is state threatened. The species prefers nesting on islands to avoid terrestrial predators but may be observed using gravelly shores and bars ([Reference 2.4-6](#)).

This small bird has been observed in Monroe County ([Reference 2.4-6](#)) but none were observed during site studies and there have been no recent observances reported. There is no known reason to believe that the project would adversely affect the continued existence of the common tern in the project region. Accordingly, no further consideration is being given to this species as being potentially affected by Fermi 3.

Eastern Fox Snake

The Eastern fox snake (*Pantherophis gloydi*) is state threatened. Primarily an open wetland species, this snake inhabits emergent wetlands along Great Lakes shorelines and associated drainages where cattails (*Typha* spp.) are common. Little is known about the life history of the Eastern fox snake. They are typically active from mid-April to late October, usually throughout the day except during periods of intense heat. Breeding probably occurs annually beginning at two to four years of age with mating occurring in June or early July. The eggs are deposited in rotten stumps, mammal burrows, soft soil or mats of decaying vegetation. Eastern fox snakes eat small rodents and amphibians, insects and earthworms. ([Reference 2.4-12](#))

In 2007, nine occurrences were reported in Monroe County ([Reference 2.4-8](#)). The snake was sighted two times on the Fermi property in June 2008.

2.4.1.2.2.2 Plants

American Lotus

The American lotus (*Nelumbo lutea*) is state threatened. Healthy populations of American lotus are found in scattered areas of southern Michigan. The species is distributed from New England to Florida and west to Michigan and Texas. It occurs in shallow water, usually in marshes, quiet backwaters, and near-shore areas of large rivers and lakes. The large perennial plant grows from thick tubers and flowers in mid summer. American lotus is abundant in the south and north lagoons on the project site.

Arrowhead

The arrowhead (*Sagittaria montevidensis*) is state threatened. The species is primarily distributed sporadically along the Mississippi River drainage, but is reported in other areas of the eastern United States. Southeastern Michigan populations represent a northern limit of distribution for the species ([Reference 2.4-4](#) and [Reference 2.4-6](#)). This perennial grows in wet to shallowly inundated mud flats and banks, lagoons, and estuaries. It flowers in mid to late summer and sets fruit by fall. This wetland species was not observed on the Fermi property during the recent field survey, but has been observed in Monroe County as recently as 2001 ([Reference 2.4-6](#)).

Franks Sedge

Frank's sedge (*Carex frankii*) was listed in the MDNR report as state threatened ([Reference 2.4-5](#)). Consultation with MDNR Endangered Species Permitting group revealed that the correct classification for Frank's sedge is 'special concern' species. Special concern species have no legislated state protection. It was delisted in 2009 because it is more common than originally

thought. The species was observed in the GRW transmission line prairie in 2005, but there is no specimen documentation by which the occurrence can be verified. It was not observed during a separate 2007 study, or in observations associated with this Environmental Report including the detailed terrestrial surveys from mid-2008 to 2009 ([Reference 2.4-95](#) and [Reference 2.4-96](#)). Accordingly, no further consideration is being given to this species as being potentially affected by Fermi 3.

2.4.1.2.3 Habitats

No areas of the Fermi property are designated as critical habitat for listed wildlife species. Other important habitats present on the property are discussed below.

Wetlands

In 1984, Michigan received authorization from the Federal government to administer Section 404 of the Federal Clean Water Act in most areas of the state. A state-administered 404 program must be consistent with the requirements of the Federal Clean Water Act and associated regulations set forth in the Section 404(b)(1) guidelines. Unlike other states where applicants must submit wetland permit applications to both the U.S. Army Corps of Engineers (USACE) and a state agency, applicants in Michigan generally submit only one wetland permit application to the MDEQ to obtain the necessary authorizations from both the MDEQ and the USACE.

In 1979, the Michigan legislature passed the Geomare-Anderson Wetlands Protection Act, 1979 PA 203, which is now Part 303, Wetlands Protection, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended. The MDEQ has adopted administrative rules which provide clarification and guidance on interpreting Part 303. Some wetlands in coastal areas are given further protection under Part 323, Shorelands Protection and Management, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended. This includes the Fermi site since the lagoons are connected to one of the Great Lakes, Lake Erie ([Reference 2.4-13](#)). Standard USACE guidelines with minor modifications are used for the delineation of wetlands in Michigan ([Reference 2.4-14](#)).

State and Federal authorities overlap in a coastal situation such as that at Fermi, according to Section 10 of the Federal Rivers and Harbors Act. Activities in these waters require a joint permit application, which minimizes time and effort for applicants. In accordance with the Clean Water Act, Section 404(g), USACE retains Federal jurisdiction over traditionally navigable waters. This jurisdiction includes the Great Lakes, connecting channels, other waters connected to the Great Lakes where navigational conditions are maintained, and wetlands directly adjacent to these waters.

In June 2008, a field delineation and assessment of wetlands on the Fermi property was completed. Flagging of wetland boundaries and data collection along the boundaries were performed between May 16, 2008 and June 13, 2008. The boundaries were delineated in accordance with procedures outlined in the USACE 1987 Wetland Delineation Manual ([Reference 2.4-14](#)). The boundaries between each type of wetland were identified and flagged to facilitate a functions and values assessment. The delineated wetlands were surveyed and acreage was calculated for each

wetland. Data was collected on wetland vegetation, and on primary and secondary indicators of hydrology and soils. Wetlands delineated on the Fermi property were evaluated using USACE–recommended methodology (Reference 2.4-93), supplemented with vegetation community measurements for species richness, diversity and cover and wildlife observations. Thirteen functions and values typically considered by regulatory and conservation agencies when evaluating wetlands are used as part of the New England Method. These include: groundwater recharge/discharge, floodflow alteration, fish habitat, sediment/toxicant retention, nutrient removal, production export, sediment/shoreline stabilization, wildlife habitat, recreation, educational/scientific value, uniqueness/heritage, visual quality/aesthetics and endangered species habitat.

The 2008 wetland investigation report was provided to MDEQ and USACE in the fall of 2008 with a request for review and a jurisdictional determination. Jurisdictional determination letters were provided by the now MDNRE in November 2008 (Reference 2.4-98) and March 2009 (Reference 2.4-99) and by USACE in November 2010 (Reference 2.4-100). The wetland delineation boundaries were updated in response to the jurisdictional determination letters. Additional updates to the wetland delineation were based on site visits and verbal and written feedback from MDNRE and USACE during 2010. Forty wetland units covering 509 acres of wetlands and 45 acres of open water were delineated on the Fermi property (Figure 2.4-19). Areas within the delineation boundary did not include open water areas in Lake Erie. The primary wetland type on the Fermi property is palustrine emergent marsh (PEM) comprising 324 acres followed by palustrine forested (PFO, 169 acres) and palustrine scrub-shrub (PSS, 16 acres).

Wetlands dominated by woody vegetation having a basal area larger than 3” diameter at breast height (dbh) were classified as PFO. Some herbaceous and woody vegetation with <3” dbh may be present, but contribute less than 50% combined of the basal area. Dominant vegetation in the PFO wetlands include silver maple (*Acer saccharinum*), shellbark hickory (*Carya laciniosa*), swamp white oak (*Quercus bicolor*), American elm (*Ulmus americana*), and eastern cottonwood (*Populus deltoides*). The shrub layer in PFO wetlands was dominated by American elm saplings, silky dogwood (*Cornus amomum*), and green ash (*Fraxinus pennsylvanica*) saplings. Herbaceous vegetation was sparse during delineation. Common species included black raspberry (*Rubus* spp.), mayapple (*Podophyllum peltatum*), reed canary grass (*Phalaris arundinacea*), poison ivy (*Toxicodendron radicans*), and Virginia creeper (*Parthenocissus quinquefolia*). Due to the intermittent hydrology of these PFO wetlands, a significant proportion of herbaceous species were plants that favor upland areas. Soils are hydric and saturated with pockets of standing water throughout the PFO wetlands. Approximately 169 acres of wetland were delineated as PFO including: B, D, F, G, I, L, O, P, S, T, V, X, Y, BB, GG, and KK (Figure 2.4-19).

Wetlands dominated by woody vegetation smaller than 3” dbh but greater than 3.2’ in height were classified as PSS. PSS wetlands may have some woody plants >3” dbh or some herbaceous vegetation that, combined, contribute less than 50% of ground cover. Common shrub species in PSS wetlands include silky dogwood, green ash, and Hawthorn (*Crataegus* spp.). PSS wetlands on the Site were largely early successional woody communities located on the fringes of PFO and upland or PFO and PEM wetland habitats. Approximately 16 acres of wetland were delineated as PSS including: E, K, Q, HH, and JJ (Figure 2.4-19).

PEM wetlands are characterized by greater than 50% of the ground surface covered by herbaceous vegetation, or woody vegetation less than 3.2' tall. PEM wetlands were dominated by reed canary grass, common reed (*Phragmites australis*), sedge species (*Carex* spp.), narrow-leaf cattail (*Typha angustifolia*), water lily (*Nymphaea* spp.), and coontail (*Ceratophyllum demersum*). Approximately 324 acres of wetlands were delineated as PEM and include: A, C, J, M, N, R, W, Z, AA, CC, DD, EE, FF, II, WW, XX, YY, ZZ, the south canal, and fringes around open waters H and U (Figure 2.4-19). Wetlands delineated as PEM span a range of periodically inundated wet meadows to deep water marsh systems. Due to the well-developed stands of invasive plants including common reed and reed canary grass, vegetation diversity was relatively low in PEM wetlands. There is significant build up of plant duff in PEM wetlands primarily from large, persistent stands of common reed.

Open water habitat is characterized by inundation to a depth greater than 4 feet with no emergent vegetation present. Several open water habitats are located within the delineation boundary. Some open water habitats were delineated with an aerial photograph. Most open water habitats are not flagged and do not have data points within their boundaries. There are approximately 45 acres of open water habitat (not including open water areas in Lake Erie) within the site property (Figure 2.4-19).

With the exception of a few wetlands isolated by berms or roads, the majority of wetland communities at the Fermi property are hydrologically connected and thus, for the purposes of the functions-values assessment, considered one wetland system. A functions-values assessment was completed for woody (PFO and PSS) and non-woody (PEM) wetland communities to provide distinctions in functions and values where necessary to complete an overall assessment for the wetland system at the Fermi property. The principal functions of the wetland system include floodflow alteration, sediment/toxicant retention, nutrient removal and fish and wildlife habitat. Additional functions and values this wetland system is suitable to provide, though not considered principal functions, are production export, sediment/shoreline stabilization, uniqueness/heritage and endangered species habitat. The wetland system was not considered well suited for groundwater recharge/discharge, recreation, educational/scientific value, or visual quality/aesthetics.

Floodflow alteration, sediment/toxicant retention and nutrient removal: The Fermi property's wetland complex is large relative to the watershed, relatively flat with storage potential and contains hydric soils and dense vegetation suitable to absorb and slow water flow. The wetland system is highly suitable to reduce flood damage by retaining and gradually releasing floodwater following precipitation events. Fermi 2, including cooling towers and control centers, is located downstream and in the floodplain of the wetland system. In the event of a large storm that results in floodflow from the watershed and excess water backing in from Lake Erie, the wetland system could slow and detain floodwaters for gradual release. The wetland system is highly suitable for trapping sediments, toxicants and pathogens as well as nutrient retention. There are potential sources of excess sediment, toxins, and nutrients upstream in the agriculturally dominated watershed. The Clean Water Act status for the Monroe County portion of the Ottawa-Stony watershed cites excessive nutrient levels as a documented impairment in waterbodies (Reference 2.4-94). There is

opportunity for sediment trapping and nutrient uptake in diffuse, slow moving and deepwater areas of the Fermi property wetlands that are edged or interspersed with dense herbaceous and woody vegetation.

Fish and wildlife habitat: The deepwater PEM of the Fermi wetland system is suitable to support fish habitat. There is an abundance of cover objects, the wetland is large and part of a larger, persistent, contiguous watercourse with slow velocity. The wetlands have sufficient size and depth to retain open water areas during the winter. Direct observation of fish species were observed in the wetland. The diverse wetland communities present across the entire wetland system provide suitable habitat for a significant number of wildlife species. While there has been notable direct and indirect disturbance in all wetlands observed, there remains significant abundance and diversity in habitat cover to support wildlife. With the exception of the buildings and roadways associated with the nuclear plant, the landscape is largely undeveloped with relatively large parcels of vegetated wetlands and uplands. The majority of the wetlands evaluated are connected hydrologically in spite of fragmentation by multiple roadways. The wetland system presents an interspersed of open water areas with dense emergent vegetation grading into shrub dominated and tree dominated communities. Some portions of the wetlands have a high degree of diversity in vegetation structure and species. The Clean Water Act Status Report for the Monroe County portion of the Ottawa-Stony watershed cites loss of aquatic life benefits as the most common impairment of waterbodies in the watershed ([Reference 2.4-94](#)).

Detroit River International Wildlife Refuge (DRIWR)

Detroit Edison entered into a cooperative agreement with the USFWS on September 25, 2003, placing portions of the Fermi property into the DRIWR ([Reference 2.4-15](#)). Lands on the Fermi property constitute the DRIWR Lagoon Beach Unit and the extent of these is illustrated in [Figure 2.4-6](#). The general public does not have access to this land without the permission of the USFWS and Detroit Edison, since all areas are within the outer fenced area of the facility. The agreement can be cancelled by either party at any time.

Transmission Line Corridor Prairie Planting

The USFWS, ITC *Transmission*, and Detroit Edison cooperatively funded the restoration and planting of a 29 acre prairie area in the on-site transmission corridor along the north side of the existing facility approach road. The restoration was begun in 2005 and completed in 2006. The area is described earlier in [Subsection 2.4.1.1](#) as Grassland: Right-of-Way community and illustrated in [Figure 2.4-5](#). Surveys of the restoration area were conducted in 2005 and 2007 to determine the plant species present in 2005 and 2007.

2.4.1.3 Habitat Importance

Forest, shrub, grass and wetland communities on the Fermi property provide habitat to a variety of wildlife. However, there are no unique attributes of the Fermi site and vicinity as habitats to the important species described in [Subsection 2.4.1.2](#), as compared with the habitats of these species across their entire range.

2.4.1.4 Disease Vectors and Pests

No unusual disease vectors or pest species were listed for the site and none were identified by federal or state agencies. Mosquitoes and ticks are in the area that could be carriers of West Nile disease and Lyme disease, respectively.

The emerald ash borer (EAB) (*Agrilus planipennis*), is an exotic beetle discovered in southeastern Michigan near Detroit in the summer of 2002. It probably arrived in the United States on solid wood packing material carried in cargo ships or airplanes originating in its native Asia. Because ash trees (*Fraxinus* spp.) in North America have no immunity to the insect, EAB has the potential to wipe out more than 700 million ash trees in Michigan. Since 2002, it has killed more than 10 million ash trees in southeastern Michigan alone. State and federal agencies in Michigan, and researchers in Michigan universities, are working to stop EAB from spreading. This includes the initiation of quarantines to stop the movement of infested ash wood and wood products, research to understand the pest's life cycle and what methods and strategies can control or eradicate it, and development of educational and informational materials to help communities detect and deal with EAB infestations. Michigan now requires that any re-forestation efforts exclude ash from species planted. ([Reference 2.4-16](#))

Dutch elm disease first entered Michigan about 1950. This disease probably accounts for the lack of large specimens on the site and the remains of old, fallen specimens ([Reference 2.4-3](#)).

2.4.1.5 Wildlife Travel Areas

The entire land portion of the study area is surrounded by an eight-foot tall chain-linked fence topped in most places with barbed wire. As such, wildlife movement to and from the site is severely restricted for larger mammals. Entry by way of water routes through the lagoons or from Lake Erie are the only available option for larger wildlife. Onsite wildlife can move freely around woodlots and shrub areas but roadways and transmission corridors fragment the area and may create barriers for some species.

The site lies within the Atlantic Flyway for migrating birds. Woodlots provide forested resting areas. For water birds, the lagoons, wetlands, and lakes provide resting and foraging areas.

2.4.1.6 Existing Natural and Man-Made Ecological Effects

While portions of the Fermi site consist of a mosaic of forest, shrub and grassland, the area is fragmented by roads and other development (e.g., the shooting range). Portions of the site, described in [Subsection 2.4.1.1](#), were once cleared and or covered by fill materials. Some of the forested areas, such as those along the southern edge of the property, have experienced logging in the past. The south lagoon contains large deposits of dredged and other fill materials. These activities have degraded the habitat value of essentially all the plant communities on the property. While there is no adequate quantitative data available with which to compare today's conditions, this disturbance suggests a diminished habitat for wildlife. With regard to certain wildlife, the area is completely fenced, which restricts movement and habitat use.

The existing hyperbolic cooling towers (approximately 400 feet tall) may have a small impact on avian wildlife in the area. Avian collisions are not monitored by Detroit Edison, but deceased birds are occasionally found around the towers. Typically only a few birds are observed at any one time, but on one occasion in September 1973, 15 dead birds were found (with as many as 50 potentially killed) at the Fermi 2 south cooling tower. More recently, 45 dead birds were found at the Fermi 2 south cooling tower; occurring during a one-week period during October 2007.

Noise can be a deterrent to wildlife when it is abrupt and irregular. However, most wildlife tends to adapt to constant noise and this appears to be the case at Fermi. For example, song birds, wading birds, and waterfowl were always observed in the north lagoon immediately west of the cooling towers, an area which has one of the highest outdoor noise levels on the site. In addition, it is not unusual to observe groups of turkey vultures soaring above the cooling towers.

2.4.1.7 Ongoing Ecological and Biological Studies

Other than the terrestrial site reconnaissance conducted in 2007 and 2008, and the detailed terrestrial surveys conducted in 2008 and 2009, no formal monitoring of the terrestrial environment has been conducted on the Fermi site since the construction of Fermi 2. The only recent study is that of the Detroit Edison/NAWCA transmission right-of-way prairie planting that was surveyed for plant species occurrences in 2005 and 2007.

2.4.1.8 Regulatory Consultation

The USFWS and MDNR were consulted for information on known occurrences of federal and state listed protected species and habitats. The identification and discussion of important species above was based in part on the information provided by these consultations.

2.4.1.9 Transmission Corridors and Offsite Areas

The offsite 345 kV transmission system and associated corridors are exclusively owned and operated by ITC *Transmission*. The Applicant has no control over the design of the transmission system. Accordingly, the terrestrial ecology that interfaces with the offsite transmission corridors is based on publicly available information, and reasonable expectations of the configurations that ITC *Transmission* would likely follow based on standard industry practice. However, the information described in this subsection does not imply commitments made by ITC *Transmission* or Detroit Edison, unless specifically noted. The discussion within this subsection pertains only to the offsite transmission corridor.

The offsite transmission system will consist of three 345 kV lines running from the Fermi site north, then west to the Milan Substation, located approximately 1.5 miles northwest of Milan, a distance of about 29.4 miles. The route is located in portions of Monroe, Wayne and Washtenaw counties and is illustrated in [Figure 2.2-3](#). The three 345 kV lines for Fermi 3 will run in a common corridor, with transmission lines for Fermi 2, to a point just east of I-75. From the intersection of this Fermi site corridor and I-75, the three Fermi-Milan lines will run west and north for approximately 12 miles in a corridor shared with other non-Fermi lines within an assumed 300-foot wide right-of way (ROW) in which the vegetation has been managed to exclude tall woody vegetation. In this section of the route, reconfiguration of existing conductors would allow for the use of existing transmission

infrastructure to create the new lines. In Wayne County, where Arkona Road and Haggerty Road intersect, all non-Fermi lines turn north and continue on to their respective destinations and the three Fermi-Milan lines will continue west for approximately 10.8 miles to the Milan Substation. To accommodate the new transmission lines, it is assumed the Milan Substation may be expanded from its current size of 350 by 500 feet to an area approximately 1,000 by 1,000 feet, utilizing maintained grassed areas and cropland.

2.4.1.9.1 **Vegetation**

Major vegetation types occurring in and adjacent to the transmission corridor are illustrated in [Figure 2.2-3](#). The plant communities found in and along the corridor are similar to those described in [Subsection 2.4.1.1.1](#). [Table 2.4-17](#) provides an accounting of the area of each land use/vegetation type found within the corridor, using a 300-foot width.

The eastern section of the corridor is dominated by cropland, including the areas beneath the existing transmission lines. Non-cropland areas are generally pasture, open developed space and emergent wetlands. No forested areas are present within the corridor in this section as normal maintenance includes the removal of large woody species. The corridor passes only a few small forested areas. Emergent wetlands and other waters crossed by the existing lines are generally narrow. None of the existing towers are located in wetlands, with the exception of one set of towers at Stony Creek (north of Stony Creek Road), where the crossing is in excess of 1,300 feet, one set of towers is located in the wetland. Further discussion of wetlands is found in [Subsection 2.4.1.9.4](#).

The western section of the transmission corridor is dominated by a mosaic of pastures, forest, shrubs or scrub, cultivated, and developed land. Corridor maintenance in this section is minimal, since no towers or lines are present. Wetlands are present and three are in excess of 900 feet in length, where it is expected a tower may need to be placed.

The Milan Substation site is located entirely in an area of cropland and planted grassland.

2.4.1.9.2 **Wildlife**

The diversity of wildlife found along the new transmission route is expected to be similar to that found on and in the vicinity of the Fermi property as described in [Subsection 2.4.1.1.2](#), since the habitats in and along the ROW are representative of the areas on the Fermi property. The exception is the lack of lake shore habitat along the ROW, that is present at Fermi. Certain birds in particular, such as the bald eagle, are less likely to be found along the new transmission route than they are on the Fermi property because of the proximity of Fermi to the coastline of Lake Erie.

2.4.1.9.3 **Important Species**

Important species potentially occurring along the new transmission route are the same as those described in [Subsection 2.4.1.2](#). Based on information obtained from the USFWS and MDNR, there are currently no reported occurrences of Michigan or Federal important species or designated critical habitat along the route.

2.4.1.9.4 Important Habitats

NUREG-1555 defines 'important habitats' as including wildlife sanctuaries, refuges or preserves, wetlands, floodplains, and areas identified as critical habitat for protected species identified by the USFWS. With the exception of wetlands, none of these features are known to occur within the assumed 300-foot ROW of the transmission corridor or immediately adjacent to the ROW.

The new transmission route crosses about 30 wetlands or other waters that may be regulated by the USACE and MDEQ, according to USFWS National Wetland Inventory mapping ([Reference 2.4-48](#)). The western 10.8-mile section of the route crosses 8 wetlands and 9 drains or narrow streams ([Figure 2.4-18](#)). The majority of the wetlands are 100 to 400 feet long but 3 wetlands are much longer at 1,302 feet, 903 feet, and 1,339 feet ([Figure 2.2-3](#)). Since the upper limit of spans between transmission structures is typically 900 feet, it is anticipated that construction of this undeveloped section of corridor will require the placement of one tower or pole within each of these wetlands. The wetlands present include woody and emergent herbaceous community types.

The 18.6-mile eastern section of the route crosses 2 wetlands and 12 narrow drains or small streams. The existing lines span all of these wetlands, with the exception of a 1,386 long wetland crossing at Stony Creek, where one set of towers is currently located.

2.4.1.9.5 Existing Stresses

The 18.6-mile eastern section of the ROW is located in a region dominated by crop and pasture land, or other land uses resulting from development. This coupled with ROW maintenance including the removal of undesirable vegetation by mechanical means and herbicides imposes a substantial level of existing stress on the existing terrestrial resources. In the western portion of the ROW, these stresses appear to be less intense. Although large woody vegetation is not allowed to grow in the ROW that is owned by *ITC Transmission*, privately held adjacent areas may be impacted by construction as these areas do support woody vegetation. Other areas of this ROW section support herbaceous plant communities, however, rural residences are common and cropland is scattered throughout the section.

Disease vectors and pests are the same as those discussed in [Subsection 2.4.1.4](#)

2.4.1.9.6 Regulatory Consultation

The USFWS and MDNR were consulted for information on known occurrences of federal and state listed protected species on the Fermi property and in the project vicinity for a radius of 7.5 miles around the facility. Although no regulatory contact has occurred for the more western portion of the transmission route, Federal and State web sites have been consulted. As the transmission system design is formalized, it is expected that agency contacts will be initiated by *ITC Transmission* to ensure the protection of terrestrial resources.

2.4.2 Aquatic Ecology

The Fermi site is located within a coastal wetland ecosystem near Newport (Frenchtown Township) in Monroe County, Michigan. The Fermi site consists of 1260 acres of developed and undeveloped

land on the shoreline of the western basin of Lake Erie between Swan Creek and Stony Creek (see [Figure 2.4-7](#) and [Figure 2.4-8](#)). Approximately 656 acres of this land is designated as a portion of the DRIWR. Coastal wetlands are common to areas surrounding the Great Lakes. Great Lakes coastal wetland systems contain morphological components of both riverine and lacustrine systems, and can be described as “freshwater estuaries.” Such freshwater estuaries are formed at river mouths drowned by the postglacial rise in lake level, and are influenced by both the lake level and riverine inflows ([Reference 2.4-17](#)).

Aquatic habitats onsite and in the vicinity of the Fermi site with the potential to be impacted by the construction and operation of Fermi 3 include:

- Man-made circulating water reservoir, canals, and drainage ditches,
- Quarry lakes and other waters and wetlands within the DRIWR,
- Lake Erie and its associated bays,
- Swan Creek, and
- Stony Creek.

Surface-water drainage at the Fermi site is influenced by Swan Creek, Lake Erie, and the waters associated with the surrounding DRIWR including the coastal wetlands and lowlands ([Reference 2.4-77](#) and [Reference 2.4-78](#)). [Section 2.3](#) provides a more detailed discussion of the hydrology, water use, and water quality of onsite water bodies.

The following provides a discussion of the primary aquatic habitats associated with the Fermi site. Information presented in the following sections is supported by current and historic site information, area specific literature, and both academic and industry-generated data summaries of the relative aquatic populations. In addition to using existing data sources, Detroit Edison performed a confirmatory updated aquatic ecological survey of the site that provides a year’s worth of seasonal sampling data to reflect variations in aquatic populations ([Reference 2.4-97](#)).

2.4.2.1 Key Data Source Review

A number of state agencies, federal agencies, and universities were contacted or otherwise utilized in the review of the data currently available for assessing the aquatic ecology of the area. Each entity and a brief description of its relevance to the proposed project are listed below:

- Michigan Department of Environmental Quality (MDEQ) – The MDEQ oversees implementation of environmental quality regulations. The MDEQ includes state and federal government resource managers as well as advisory boards in Michigan. The MDEQ issues annual environmental reports on water and air quality and pollution prevention ([Reference 2.4-26](#)).
- Michigan Department of Natural Resources (MDNR) – The MDNR is responsible for the stewardship of Michigan’s natural resources and management of outdoor recreational programs. The MDNR promotes diverse recreational outdoor opportunities, wildlife and

fisheries management, forest management, state lands and minerals, state parks and recreation areas, and conservation, and law enforcement ([Reference 2.4-27](#)).

- Ohio Department of Natural Resources (ODNR) – The ODNR Division of Wildlife contains two Lake Erie Fisheries Units that assess and manage fish populations and fisheries in Lake Erie’s Western and Central basins and their tributary streams. Using research vessels, these units monitor the food web and the spread of exotic species in the lake, as well as the abundance, growth, age, diet, and health of fish populations ([Reference 2.4-28](#)).
- United States Environmental Protection Agency (EPA) – The EPA manages implementation of federal laws to protect the environment. The EPA focuses on many aspects of the environment including air, water, soils, compliance, research, and control ([Reference 2.4-34](#)).
- United States Fish and Wildlife Service (USFWS) –The USFWS enforces federal wildlife laws, protects endangered species, restores significant fisheries, and helps foreign governments with international conservation efforts, while providing public education and promoting environmental stewardship ([Reference 2.4-75](#)).
- Universities in the area of western Lake Erie – The University of Michigan, Michigan State University and the University of Toledo employ many professors and research associates with intimate knowledge of the aquatic ecology of western Lake Erie and its tributary waters in Michigan and Ohio. Select faculty members of each university also serve as directors or members of other organizations such as Michigan Sea Grant, the Institute of Fisheries Research for MDNR, and the Lake Erie Center.

2.4.2.2 Aquatic Communities

The aquatic communities located on the Fermi site as well as in the vicinity contribute to a healthy ecosystem. These habitats include lakes, creeks, drainages, canals, as well as coastal wetlands. These aquatic habitats are discussed in greater detail in the following sections.

2.4.2.2.1 Onsite Principal Aquatic Habitats

The following are onsite aquatic habitats located within the Fermi site:

- Circulating water reservoir (heat dissipation system);
- Overflow and Discharge Canals;
- Drainage ditches;
- Quarry lakes; and
- Waters within the DRIWR

An important aquatic habitat is defined in NUREG-1555 as wildlife sanctuaries, refuges, or preserves; habitats identified by State and Federal agencies as unique, rare, or of priority for protection if they may be adversely affected by plant or transmission line construction or operation. Wetlands, floodplain, or other resources specifically protected by Federal regulations or Executive order, or by State regulations. Land areas identified as “critical habitat” for species listed as

threatened and endangered by the USFWS. The only important aquatic habitat identified is the DRIWR.

Circulating Water Reservoir (cooling water pond, circulation pond)

The circulating water reservoir, a component of the heat dissipation system associated with the operation of Fermi 2, provides the cooling water for the circulating water system. The circulating water reservoir is located east of the Fermi 2 cooling towers on the northern portion of the Fermi site. The man-made reservoir is approximately 20 feet in depth and is clay lined. The circulating water reservoir is chemically treated to inhibit excessive growth of vegetation and production of aquatic organisms; however, some benthic species and aquatic vegetation do occur in the reservoir.

Overflow and Discharge Canals

One clay-lined canal, approximately 5 to 10 feet in depth and 70 feet in width, originates in the central portion of the Fermi site and extends north where it flows into Swan Creek. This canal is termed the overflow canal. The overflow canal was previously utilized as a cooling water discharge/overflow canal for operation of Fermi 1, but was taken out of use when Fermi 1 was temporarily shut down in the mid-1960s. Currently, the Fermi site utilizes the canal as Outfall 009. The outfall and discharge points of the Fermi site are further discussed in [Subsection 2.3.3](#). A second canal (discharge canal), approximately 5 to 10 feet in depth and 70 feet in width, originates in the central portion of the Fermi site and extends south where it flows into the South Lagoon. This canal serves as a drain path for the western wetlands area. Between the two canals is a stagnant waterbody.

Drainage Ditches

Several ditches located throughout the Fermi site drain surface-water runoff to Swan Creek and the adjacent wetlands. The drainage ditches are regularly maintained and equipped with concrete culverts to divert runoff from the surface roads. The ditches are not ideal to support any significant aquatic species.

Quarry Lakes

The Quarry Lakes are located in the southwestern portion of the Fermi site. The two lakes are approximately 50 feet deep. The Quarry Lakes were created when water filled the abandoned rock quarries which were used for site development and construction of Fermi 2 ([Reference 2.4-79](#)). Although the Quarry Lakes are currently not utilized for any recreational or commercial use, they have been used in the past for scuba diving and recreational fishing by plant personnel.

Waters within the DRIWR

The DRIWR is a conservation area along the western basin of Lake Erie and along the Detroit River. The boundaries of the refuge are segmented into eleven units which include coastal wetlands, marshes, islands, shoals, and waterfront lands along approximately 48 miles of the western Lake Erie shoreline ([Figure 2.4-7](#)).

The Lagoon Beach Unit of the DRIWR surrounds the Fermi site on the northern, western, and southern borders of the Fermi site. Detroit Edison and the USFWS signed a cooperative agreement in 2003. The Lagoon Beach Unit includes approximately 656 acres of land and is divided into four sections, DRIWR-1 through DRIWR-4 shown on [Figure 2.4-7](#). DRIWR-1, located in the north-northeast portion of the Fermi site, contains approximately 162 acres of land and consists primarily of coastal wetlands and palustrine systems, including freshwater emergent wetlands and lake areas that are semi-permanently flooded. DRIWR-2, located in the northwest portion of the Fermi site, includes approximately 161 acres of coastal wetlands, upland forests, wet meadows, and coastal prairies, with palustrine scrub-shrub systems consisting of broad-leaved deciduous vegetation. The area is seasonally inundated. DRIWR-3, the southwest section, encompasses approximately 22 acres of upland forest and palustrine forested land with broad-leaved deciduous vegetation. The area is seasonally inundated and/or partially drained at various times during the year. DRIWR-4 is located in the south-southeast portion of the Fermi site. This section includes approximately 311 acres of coastal wetland and upland forest comprised of palustrine forested seasonally inundated areas, as well as seasonally flooded palustrine emergent areas ([Reference 2.4-48](#), [Reference 2.4-73](#), and [Reference 2.4-74](#)).

Wetland habitats along the shoreline of Lake Erie are essential to aquatic species because of the spawning and feeding grounds they can provide as well as the ideal habitat they provide for hydrophytic vegetation ([Reference 2.4-42](#)). Factors known to influence the distribution of aquatic species within the DRIWR on the Fermi site include water quality and plant operations. Water quality on the Fermi site is further discussed in [Subsection 2.3.3](#). Aquatic plant species observed during a September 2007 site visit included American lotus, floating duckweed, and the common reed. A fisheries survey of coastal marshes within the DRIWR documented species composition and richness comparable to other Lake Erie coastal habitats. Aquatic communities of the DRIWR are described in further detail in [Subsection 2.4.2.2.1.2](#).

American lotus was observed during the site visit in areas associated with the DRIWR and Swan Creek. American lotus is a hydrophilic plant listed as a threatened species in the State of Michigan. Because its roots require soil, the American lotus is being treated as a terrestrial species and addressed in detail in [Subsection 2.4.1](#).

2.4.2.2.1.1 Principal Aquatic Species in Circulating Water Reservoir, Overflow and Discharge Canals, and Drainage Ditches

Aquatic species that occur in the circulating water reservoir, overflow and discharge canals, and drainage ditches on the Fermi site are expected to be representative of typical Great Lakes coastal ecosystems and species. Aquatic vegetation including the common reed (*Phragmites australis*) were observed fringing the banks of the overflow and discharge canals during a September 2007 site visit. Despite the lack of other aquatic species observed in the overflow and discharge canals, the potential exists for aquatic species present in Swan Creek and the South Lagoon to also inhabit the canals due to the hydrological connectivity of the water bodies. The onsite drainage ditches are not expected to serve as habitat for aquatic species as they only carry surface runoff water during rainfall events and are routinely maintained.

An “important” aquatic species is defined in NUREG-1555 as listed threatened or endangered species or species of concern (State and/or Federal); proposed for listing as threatened or endangered species, or is a candidate for listing in the most current list of such species as published by the *Federal Register*; a commercially or recreationally valuable species; species that are essential to the maintenance and survival of species that are rare and commercially or recreationally valuable; species that are critical to the structure and function of the local aquatic ecosystem; and species that may serve as biological indicators to monitor the effects of the facilities on the aquatic environment. In summary, there are no known important aquatic species within the circulating water reservoir, overflow and discharge canals, and drainage ditches.

2.4.2.2.1.2 Principal Aquatic Species in Quarry Lakes and Waters of the Lagoon Beach Unit of the DRIWR

The Quarry Lakes support a small variety of aquatic species common to the Great Lakes coastal marsh. Historical recreational fishing catch was not recorded, but carp (*Cyprinidae* spp.) and sunfish (*Centrarchidae* spp.) species are known to occur within the lakes. In addition to fish, common reeds (*Phragmites australis*) and panic grasses (*Panicum* spp.) were among the species of aquatic vegetation observed along the banks during the September 2007 site visit. Both migratory and non-migratory birds are known to utilize the quarry lakes habitat as well.

A fisheries survey of coastal marshes within the DRIWR was conducted in September of 2005 as a joint venture by the MDNR and USFWS to document fish communities associated with Michigan waters of Lake Erie and to inventory the fisheries resources of the refuge. This survey utilized electrofishing and seining to sample four marsh complexes within the refuge, one of which was the Swan Creek Estuary/Lagoon Beach Unit located in the area of the Fermi site. A total of 38 species of fish from 13 families were collected at this sampling site. Species most well represented in the catch included gizzard shad (*Dorosoma cepedianum*), bluntnose minnow (*Pimephales notatus*), mimic shiner (*Notropis volucellus*), bluegill (*Lepomis macrochirus*), pumpkinseed (*Lepomis gibbosus*), goldfish (*Carassius auratus*), and largemouth bass (*Micropterus salmoides*).

A general habitat survey conducted by the Wildlife Habitat Council (WHC) in July of 2000 identified 21 species of wildlife and 28 species of plants (Table 2.4-6). No important aquatic species were identified during the habitat survey.

Aquatic plant species observed during the September 2007 site visit include duckweed (*Lemna* spp.) and common reed (*Phragmites australis*). These species provide a significant amount of spatial coverage for most of the DRIWR within the Fermi site.

In summary, there are no known important aquatic species in the Quarry Lakes and waters within the Lagoon Beach unit of the DRIWR.

2.4.2.2.2 Principal Aquatic Habitats in the Vicinity of the Fermi Site

The following provides a list and detail of aquatic habitats in the vicinity of the Fermi site:

- Lake Erie western basin

- Swan Creek
- Stony Creek

None of the above aquatic habitats are characterized as important aquatic habitats per the criteria of NUREG-1555.

Lake Erie

Lake Erie is one of the five lakes included in the Great Lakes system and is the smallest of the group in volume (116 cubic miles). Measuring 241 miles across and 57 miles from north to south, Lake Erie's surface area is nearly 10,000 square miles, with 871 miles of shoreline. The average depth of Lake Erie is approximately 62 feet (210 feet at its maximum depth) ([Reference 2.4-38](#)).

Lake Erie is divided into three basins; the eastern basin, the central basin, and the western basin. Because the Fermi site is located on the shoreline of the western basin, this portion of Lake Erie is of the greatest concern. The western basin receives 95 percent of the drainage water entering Lake Erie, including five major river drainages (Maumee River, River Raisin, Rouge River, Huron River, and Detroit River) as well as numerous streams that discharge directly into the western basin. Depth generally increases from west to east in Lake Erie. The western basin is the shallowest basin in the lake, averaging approximately 24 feet in depth. Soil deposits beneath the west end of the lake consist primarily of sand, with intermittent layers of gravel and clay ([Reference 2.4-77](#), [Reference 2.4-78](#), and [Reference 2.4-79](#)). While thermal stratification is a frequent and persistent problem during summer months for the central basin, stratification events occur less frequently in the western basin, although the waters have been shown to exhibit diel patterns of afternoon stratification followed by mixing at night.

Water levels in Lake Erie fluctuate in response to seasonal precipitation variations. The most significant lake level variations are observed at the western and eastern basins of the lake. During prolonged high southwesterly winds, Lake Erie is subject to surges when water from the western basin is pushed to the eastern basin resulting in surges greater than 7 feet. Lake Erie also experiences seiches in response to such surges. A seiche is a periodic oscillation of water level set in motion by an atmospheric disturbance passing over the lake. Major shifts in winds, a significant front, or high or low pressure weather systems can initiate a seiche event. Seiche events can cause flooding in low-lying areas of the eastern basin and cause already shallow bay areas of the western basin to become emergent sand flats ([Reference 2.4-24](#)).

The drainage basin of Lake Erie includes portions of Indiana, Michigan, Ohio, Pennsylvania, New York and Ontario and is the most densely populated of the five lake basins. The fertile soils associated with the Lake Erie watershed support intense agricultural production throughout the entire drainage basin. This greater urbanization and agricultural development, as well as its smaller volume, make the Lake Erie system more susceptible to external ecological stressors than the other Great Lakes. This became apparent in the latter half of last century after decades of cultural eutrophication and toxic contamination caused severe degradation of the system. By the 1980s, positive recovery of Lake Erie's water quality was observed due to implementation of remediation plans through the National Pollutant Discharge Elimination System (NPDES). In addition to

pollution abatement programs, colonization of Lake Erie by invasive zebra mussels (*Dreissena polymorpha*) has helped return the lake to more mesotrophic conditions.

The overall health of the Lake Erie western basin is determined by observing indicator organisms. The resurgence of the mayfly is discussed in [Subsection 2.4.2.5](#). The recent documentation of lake sturgeon and spawning lake whitefish in the Detroit River (located approximately ten miles northeast of the Fermi site) and the observation of birds of prey are also indicators that the overall health of Lake Erie is favorable, and has improved over the last 10 years. However, some sources state that the presence of toxic algal blooms, hypoxic zones, and contaminated sediments is going to prolong the recovery period of Lake Erie, especially in the central and eastern basins. Improvement measures currently being evaluated include remediating contaminated hot spots, reducing greenhouse gases, preventing the introduction of invasive aquatic species, and protecting high quality habitats ([Reference 2.4-68](#)).

Conditions in Lake Erie have been improving. *Hexagenia* spp. mayfly nymphs returned to sediments of western Lake Erie in 1992 to 1993 after an absence of 40 years. Their recovery was aided by pollution-abatement programs combined with the invasion of exotic zebra mussels in 1986 that changed the trophic status of nearshore waters of the Great Lakes ([Reference 2.4-32](#)). Further information discussing the mayfly is available in [Appendix 2A](#).

Swan Creek

Swan Creek is located approximately half a mile north of the Fermi site. It originates approximately 12 miles to the northwest of the Fermi site as small streams and then flows south and east where it enters Lake Erie. Land use adjacent to the Swan Creek drainage includes small residential communities and agricultural development.

The benthic habitat associated with Swan Creek consists of sandy sediment interspersed with small pockets of gravel and flat stone. Swan Creek is a shallow waterway (averaging three feet in depth) that is mainly used for recreation, with residential developments and recreational parks bordering the majority of its banks.

The shoreline of Swan Creek, near the Fermi site, is heavily vegetated with aquatic plants such as cattails (*Typha latifolia*) and common reed (*Phragmites australis*). The common reed is an invasive aquatic plant species, and is further discussed in [Subsection 2.4.2.6](#).

Stony Creek

Stony Creek is located approximately 2.6 miles southwest of the Fermi site, and drains directly into the western basin of Lake Erie. Stony Creek is approximately 35 miles long, and is supported by many more miles of smaller tributaries which comprise the Stony Creek Watershed and the larger Ottawa-Stony Creek Watershed. The creek bed is mostly comprised of rock, and the banks are heavily forested or adjacent to agricultural and residential development.

The Ottawa-Stony Creek Watershed includes a land area of approximately 114,000 acres, is approximately 32 miles long, and is approximately 8 miles wide at its widest point. The upper portion of the watershed is well developed and utilized by residential, commercial, and industrial

sectors. The lower portion of the watershed has been developed mainly for agricultural use, although some residential areas have been developed as well ([Reference 2.4-25](#) and [Reference 2.4-44](#)).

Some biological data have been collected from Stony Creek and its many tributaries. The Stony Creek Watershed Project has performed studies focusing on water quality, nutrients, and indicator species. The majority of the data from these studies were not collected near the Fermi site; however, these data were reviewed and are further discussed in [Subsection 2.4.2.2.3](#).

2.4.2.2.1 Principal Aquatic Species in Lake Erie

Plankton

Plankton are small plants or animals that float, drift, or weakly swim in the water column of any body of water. Studies of zooplankton and phytoplankton communities (the animal and plant components of plankton, respectively) of the western basin of Lake Erie extend back to the late nineteenth and early twentieth centuries.

Because they respond quickly to changes in nutrient input to Lake Erie, phytoplankton and zooplankton are important indicators of change in nutrient pollution ([Reference 2.4-32](#)). The Planktonic Index of Biotic Integrity (P-IBI) was developed to measure the biological health and diversity of Lake Erie. This indicator is based on the abundance of plankton, which in turn indicates the lake's productivity. Because of the importance of plankton to the Lake Erie ecosystem, recent studies have focused on the phytoplankton biomass abundance associated with seasonal variations, depth, and overall health of Lake Erie.

Phytoplankton studies conducted in the 1980s and the 1990s in nearshore waters of the western basin have demonstrated that plankton biomass fluctuates seasonally, with highest overall general phytoplankton densities occurring in the spring ([Figure 2.4-9](#)). The species documented in greatest abundance were diatoms (*Bacillariophyceae* spp.) and green algae (*Chlorophyceae* spp.). These species both exhibited peak abundance in the summer and fall months. A total of 53 taxa were identified ([Table 2.4-7](#)). Phytoplankton density varies spatially throughout the western basin, with increased phytoplankton abundance along the entire southern shore and decreased abundance offshore and throughout deeper waters ([Figure 2.4-10](#)). Phytoplankton tend to favor shallower water conditions due to increased light available in the shallow water column.

Seasonal zooplankton sampling has been conducted near the Davis Besse Power Station, located 25 miles south of the Fermi site on the western basin. Oblique tows identified 43 different species of zooplankton, with rotifers being the dominant species ([Table 2.4-8](#)). Vertical tow data collected in the mid- to late-1980s identified 118 zooplankton species and 53 genera, with rotifers dominating the biomass ([Figure 2.4-11](#)).

Two species of zooplankton, the spiny water flea (*Bythotrephes* spp.) and the fishhook water flea (*Cercopagis pengoi*), are considered invasive species throughout Lake Erie, and are further discussed in [Subsection 2.4.2.6](#).

Benthic Invertebrates

Benthic species inhabit the bottom of aquatic environments and serve as valuable indicators of the surrounding ecosystem. Benthic species include epifauna, which live on the surface, and infauna, which burrow into seafloor sediment. Benthic epifauna include species such as mussels, scallops, snails, crabs, and crayfish. Examples of infauna include clams and many species of worms ([Reference 2.4-17](#)).

Many studies have been conducted focusing on benthic organisms and communities. Benthic communities are important to the lake's ecosystem for several reasons. They serve as food sources for many aquatic species, are significant indicators of water quality, aid in protection of the shoreline, and provide spawning and nursery grounds for many aquatic species.

Populations of benthic invertebrates south of the mouth of the Detroit River are lowest in nearshore areas, likely due to lack of appropriate habitat. Benthic data collected in studies conducted in the late 1970s in the western basin of Lake Erie identified 25 taxa ([Table 2.4-9](#)), with annelids dominating the samples ([Figure 2.4-12](#)). Benthic trawl data collected in 2006, taken near the southern shore of the western basin, identified 11 taxa, with mussels (*Dreissena* spp.) comprising the largest portion of the sample ([Figure 2.4-13](#)).

A 1998 benthos survey was conducted by the EPA's Great Lakes National Program Office (GLNPO) for western Lake Erie. Sediment composition at the sampling sites was dominated by silt, with smaller components of clay and fine sand. Major benthic groups represented from sampling were aquatic worms (*Oligocheata* spp.), midges (*Chironomidae* spp.), and freshwater bivalves (*Sphaeriidae* spp.) ([Reference 2.4-33](#)).

Lake Erie was one of the first water bodies to be colonized by invasive zebra mussels (*Dreissena polymorpha*) and quagga mussels (*Dreissena rostriformis bugensis*) in the late 1980s. The zebra mussels have caused extensive economic and environmental impacts to Lake Erie as well as many other freshwater systems in the U.S. Many power plants, including Fermi 2, have implemented control programs specifically to address the zebra mussel. Native mussel species have also been affected by the decrease of natural habitat and food sources due to the introduction of the zebra mussel ([Reference 2.4-40](#) and [Reference 2.4-76](#)). These species are considered invasive nuisance species and are further discussed in [Subsection 2.4.2.6](#).

Fish

The improving overall health of Lake Erie has been contributing to a healthy fish population, including the presence of important sport and commercial fish species such as walleye and yellow perch, as well as an increased abundance of common species such as bluegill and white perch. Extensive research has been conducted on the Lake Erie fishery, focusing on seasonal abundance and distribution. Impingement rate data from Fermi 2 and Davis-Besse power stations have also been recorded.

Ichthyoplankton entrainment data collected from western Lake Erie identified 19 taxa, and 1 unidentified taxa, comprising 12 families of bony fish (*Osteoichthyes* spp.) ([Table 2.4-10](#)). Dominant

families identified in the ichthyoplankton entrainment samples included drums (*Sciaenidae* spp.), herrings (*Clupeidae* spp.), minnows (*Cyprinidae* spp.), and perch (*Percidae* spp.). Ichthyoplankton collection data identified the emerald shiner (*Notropis atherinoides*) as the most abundant species (during the spring and summer months) in southwestern Lake Erie followed by yellow perch (*Perca flavescens*) and gizzard shad (*Dorosoma cepedianum*). Larval abundance of walleye (*Sander vitreus*), an important recreational fish, increased during the late 1970s. This increase could be due to several factors including increase in adult fish population and improvement in water quality.

Impingement data collected from Davis Besse Power Plant south of the Fermi site indicated that the dominant species impinged was the goldfish (*Cassius auratus*), representing approximately 50 percent of fish documented in impingement samples. Additional impingement data collected from the Bayshore Power Station on Lake Erie, south of the Fermi site, identified 52 species ([Table 2.4-11](#)).

Impingement data collected in 1991-1992 from the Fermi 2 Power Plant indicated that the dominant species impinged was the gizzard shad at 71.5 percent of the estimated annual total abundance. White perch was the second most abundant species impinged at 6.8 percent of the annual total. Third, fourth, and fifth species ranked by abundance included the rock bass, freshwater drum, and emerald shiner ([Table 2.4-16](#)). The estimated annual impingement at the Fermi 2 Power Plant is 13,699 fish, with a total estimated biomass of 329.7 kgs.

Based on entrainment sampling conducted from October 1991 to September 1992 at the Fermi 2 Power Plant, the annual ichthyoplankton entrainment was estimated to be 2,955,693 (2,883,326 larvae and 72,367 eggs). The most abundant larval fish taxa were Cyprinidae (22.9 percent), *Morone* spp. (20.0 percent), gizzard shad (19.5 percent) Clupeidae (8.8 percent) and white perch (6.2 percent). The most abundant fish egg taxa were Cyprinidae (42.1 percent) and Percidae (22.4 percent).

More detailed species-specific information including spawning areas, nursery grounds, food habits, feeding areas, wintering areas, and migration routes is available in [Appendix 2A](#).

2.4.2.2.2 Principal Aquatic Species in Swan Creek

Extensive benthic research has not been conducted on Swan Creek; however, some general species surveys have been conducted to determine general fish species abundance. The most common species collected included sunfishes (*Centrarchidae* spp.) and carps and minnows (*Cyprinidae* spp.).

A fisheries survey of the Swan Creek estuary was conducted in September of 2005 as a joint venture by the MDNR and USFWS. This survey utilized electrofishing and seining to sample nine sites along Swan Creek ranging from approximately 0.5 to 2.5 miles from the Fermi site. A total of 38 species of fish from 13 families were collected at these sampling sites. Species most well represented in the catch included gizzard shad, bluntnose minnow, mimic shiner (*Notropis volucellus*), bluegill, pumpkinseed, goldfish, and largemouth bass. ([Reference 2.4-83](#))

Swan Creek is a popular recreational water body. Recreational fisheries data, further discussed in [Subsection 2.4.2.3](#), listed several species common to Michigan as frequent catches in Swan Creek, including the northern pike (*Esox lucius*), largemouth bass, and the bluegill.

2.4.2.2.3 Principal Aquatic Species in Stony Creek

Benthic Invertebrates

A macroinvertebrate survey was conducted in 2004 at several sampling sites along Stony Creek to assess the quality of the water body. The nearest sampling site was located approximately 2.5 miles south-southwest of the Fermi site. Various hydrological parameters were collected in addition to the macroinvertebrate samples. Results from the survey indicated an increase in the number of insect families with respect to previous studies of Stony Creek. There was also an observed increase in mayflies (*Ephemeroptera* spp.), stoneflies (*Plecoptera* spp.), and caddisflies (*Trichoptera* spp.), three sensitive orders of insects that comprise the “EPT index,” a measure of water quality. A higher number of taxa from each of these orders generally indicate higher water quality. The downstream sites (located nearest to the Fermi site) had a higher EPT index than the upstream survey sites. This may indicate a higher overall health of portions of Stony Creek nearest to the Fermi site ([Reference 2.4-70](#)).

In 1995 and 1997, species survey data were collected from six stations located along Stony Creek, approximately 10 miles southwest of the Fermi site ([Reference 2.4-90](#) and [Reference 2.4-91](#)). Survey data indicated that the most dominant species included isopods and chironomids. Nearly all sample sites lacked taxa diversity and density in groups including EPT species.

Fish

The native fish assemblage of the Ottawa-Stony Creek Watershed is documented to have been historically comprised of 72 species of fish. Only 63 of these species are currently noted in this watershed ([Table 2.4-13](#)). Additionally, the benthic invertebrate studies discussed above also collected quantitative fish samples, with twenty three species identified ([Table 2.4-12](#)).

2.4.2.3 Commercial and Recreational Fisheries

Lake Erie

Commercial Fisheries

Lake Erie supports one of the largest freshwater commercial fisheries in the world, with the majority of commercial fishing based on the Canadian border. Commercial landings are dominated by yellow perch and walleye, as well as the rainbow smelt (*Osmerus mordax*) and white bass (*Morone chrysops*).

Commercial harvest in the Michigan waters of Lake Erie for 2006 included 12 species of fish comprising a total of 664,870 pounds, with an estimated value of \$254,992 ([Figure 2.4-14](#)). Total catch was dominated by three species: the common carp (57 percent), buffalo (*Ictiobus* spp.) (13 percent), and goldfish (10 percent) accounting for about 80 percent of the total catch by weight.

Other species harvested include channel catfish (*Ictalurus punctatus*), gizzard shad, and lake whitefish (*Coregonus clupeaformis*). This commercial harvesting utilized shoreline seining and small-mesh trap net fishing gear. Michigan fishing harvest in 2006 was approximately 67 percent higher than the mean for the past ten years. However, harvests have been highly variable during this period, ranging from a high of 721,580 pounds to a low of 85,720 pounds ([Reference 2.4-72](#)).

Commercial harvest in the Ohio waters of Lake Erie for 2006 included more than 15 species of fish which comprised a total of 3.9 million pounds with an estimated market value of \$3.4 million ([Figure 2.4-15](#)). Ohio's catch is dominated by five species which comprise approximately 76 percent of the total catch by weight, including the yellow perch, white perch, white bass, freshwater drum (*Aplodinotus grunniens*), and channel catfish. Other important species include the common carp, buffalo, and quillback (*Carpoides cyprinus*). Gears utilized in Ohio's commercial fishery included trap nets, seines, and trotlines. Ohio's commercial fishing harvest in 2006 was slightly below the mean for the past ten years, and harvests have been fairly steady during this period ([Reference 2.4-84](#)).

Recreational Fisheries

Lake Erie is the warmest and most biologically productive of the Great Lakes, producing more fish each year for human consumption than the other four Great Lakes combined. The western basin of Lake Erie is known as the "Walleye Capital of the World," producing more walleye per acre than any other lake globally. Important recreational species include both native and non-native species such as the common carp and the white perch, as well as the rainbow trout (*Oncorhynchus mykiss*) and brown trout (*Salmo trutta*).

The non-charter sport harvest of the Michigan waters of Lake Erie for 2006 was estimated at 521,240 fish from onsite creel surveys. Walleye harvest rates were the highest recorded since 1998, while yellow perch harvest rates were their lowest since 1994. Charter-boat anglers harvested 45,701 fish from Lake Erie in 2006. Walleye (73 percent) and yellow perch (26 percent) accounted for 99 percent of the harvest. (See [Figure 2.4-16](#)) ([Reference 2.4-72](#)).

Non-charter sport boat harvest surveys of the Ohio waters of Lake Erie for 2006 was estimated at 7,262,541 fish. Ohio walleye harvest was the highest recorded since the late 1990s, increasing 255 percent from 2005 to 2006, while yellow perch harvest decreased slightly from 2005 to 2006. Shoreline creel surveys have not yet been tabulated for 2006 as of August 2007. Ohio charter-boat anglers harvested 587,580 fish from Lake Erie in 2006. Walleye (60 percent) and yellow perch (37 percent) accounted for nearly 98 percent of the harvest. The walleye harvest rate increased to the highest level since 1977, and the yellow perch harvest rate increased 19 percent from 2005.

Sport fish landings are managed utilizing state-implemented fishing regulations like the harvest quota system. In the 1990s, walleye fisheries throughout Lake Erie were affected by reduced spawning and resulted in a lower adult abundance. Harvest quotas and fishing regulations became more restrictive because of this reduced adult population. This resulted in a rebound of the adult walleye population and less restrictive current fishing regulations for the walleye.

Regulations such as the catch-and-immediate-release (CIR) season manage the entire state of Michigan bass fishing stocks.

Swan Creek

There are no recognized commercial fisheries operations in Swan Creek; however, this system does support a strong recreational fishery for common game fishes including northern pike, largemouth bass, and bluegill. Portions of the creek located near recreational areas such as public parks receive increased fishing pressure.

Other Waters

There are no recognized commercial or recreational fisheries within the boundaries of Stony Creek, the DRIWR, or other water bodies located at the Fermi site.

[Table 2.4-14](#) provides a list of species and the watershed within the vicinity of the Fermi site in which they are most likely to be encountered. Specific life history information on each of the species listed in the table can be found in [Appendix 2A](#). Life histories presented provide detailed information on any critical life-support requirements such as reproduction, spawning areas, nursery grounds, food habits, feeding areas, wintering areas, and migration routes.

Based on the experience of the effects of Fermi 2 on these species, no adverse effects are anticipated for Fermi 3.

2.4.2.4 Threatened and Endangered Aquatic Organisms

The following threatened and endangered (T&E) species discussion focuses on Federal or State listed species in Michigan, Ohio, and Ontario with the potential to be affected by construction and/or operational activities at the Fermi site. Threatened and endangered species lists prepared by the USFWS (federal level), the MDNR (state level), and the Government of Canada were reviewed and those species with potential to be adversely impacted are addressed below. Academic and industry-generated literature was also reviewed for documented and expected T&E species occurrences in the western basin of Lake Erie and other aquatic habitats within and near the Fermi site.

[Table 2.4-15](#) identifies the state and federally listed threatened and endangered species located within a 50-mile radius of the Fermi site. Detailed life history information on each of the species listed in this chart can be found in [Appendix 2B](#). Life histories presented provide detailed information on any critical life-support requirements such as spawning areas, nursery grounds, food habits, feeding areas, wintering areas and migration routes as well as abundance and distribution.

2.4.2.5 Aquatic Indicator Organisms

One of the best assessments of water body integrity is the examination of its biological inhabitants. Since biological communities incorporate and reflect the quality of their surroundings, the presence or absence of certain types of organisms can be utilized as an ecological indicator of fluctuating environmental conditions.

Mayflies

Mayflies are thought of as an ecological keystone species¹ and their presence is believed to be an important environmental indicator of mesotrophic (moderately productive) conditions which may have the potential to be affected by changes in the aquatic ecosystem.

Mayflies may be used to measure the restoration success of any adverse impacts that construction or operation may have on the onsite or area water bodies, and to get an idea of the overall water quality in Lake Erie's western basin, because enough data are being collected to establish a reliable set of biological reference points. In 2003, a three-year running average of mayfly nymphs per square meter was equal to a rating of "excellent" under the EPA biological reference point scoring system. The rating for the mayfly species between 1996 and 2004 in Lake Erie ranged from good to excellent, but the mayfly population in portions of the western basin exhibited large variation and appeared threatened in some years, possibly as a result of fluctuating dissolved oxygen concentrations.

Mayfly nymphs prefer to live in areas with softer sediments, which often harbor higher concentrations of pollutants in contaminated regions. These species do well in shallow, productive lakes with soft, organically rich sediment.

Burrowing mayfly populations (*Hexagenia* spp.) on western Lake Erie were extirpated during the 1940s and 1950s. Municipal and industrial pollution associated with urbanization greatly decreased the likelihood of mayfly reoccurrence. Absent for some 40 years, pollution-abatement programs, focusing on the lake's water quality, have facilitated the return of mayflies to western Lake Erie.

Mayfly nymph density in western Lake Erie has been designated by the State of the Lake Ecosystem Conference (SOLEC) as an important water quality indicator. Mayfly density will be used to report to the International Joint Commission and the public on progress made in restoring the chemical, physical, and biological integrity of the Great Lakes, as called for in the Canada-U.S. Great Lakes Water Quality Agreement. ([Reference 2.4-32](#)).

2.4.2.6 Nuisance and Invasive Species

Aquatic nuisance species have the capability to cause large scale ecological and economical problems when they have been introduced into a system that does not have the proper natural controls to keep them in check such as pathogens, predators and parasites. When such species are introduced into new habitats, the lack of natural controls may cause the populations to grow at or near maximum exponential rates. If a nuisance species becomes established, it may disrupt the existing ecosystem balance. As a nuisance species proliferates, it may prey upon, out-compete, or cause disease in the existing inhabitants. Nuisance species common near the Fermi site are discussed below.

1. Keystone Species - refers to species whose presence and role within an ecosystem has a disproportionate effect on other organisms within the system.

Zebra mussel-*Dreissena polymorpha*

Zebra mussels are considered a nuisance species throughout all of the Great Lakes Region and are known to inhabit the western basin of Lake Erie, near the Fermi site. Zebra mussels have been reported in Swan Creek, Stony Creek and the Detroit River as well. Originally found primarily in Russia, the mussel was transported to the Great Lakes Region by transatlantic freighter in 1988. Since that time, it has spread to over 100 lakes and several major river systems including the Mississippi River.

Zebra mussels are very successful invaders because they live and feed in many different aquatic habitats, breed prolifically, and have both a planktonic larval stage and an attached adult stage. Adult zebra mussels inhabit all types of living and non-living things from boats, docks, piers, water intake pipes, plants and even slow moving animals. They can also attach to each other, creating dense blankets of mussels up to one foot thick. In 1989, the town of Monroe lost its water supply for three days when large amounts of zebra mussels clogged the city's water intake pipeline. The USFWS estimates the economic impact of zebra mussels to be in the billions of dollars (over the next 10 years) in the Great Lakes Region alone ([Reference 2.4-76](#)).

Quagga mussel-*Dreissena bugensis*

The quagga mussel is a nuisance species native to the Ukraine, and is believed to have been introduced to the U.S. through the ballast water discharge of transatlantic shipping vessels. It is well-established in Lake Erie, has been reported in the Lake Erie mouths of Swan and Stony Creeks (near the Fermi site), and is most likely present in parts of the Detroit River as well. Very similar to the zebra mussel, the quagga mussel inhabits all types of living and non-living things including intake pipes and structures causing problems for operation and maintenance of these structures. Another threat posed by the quagga mussel lies in its filtration of the water. By filtering phytoplankton and suspended matter from the water column, the quagga mussel eliminates the biggest zooplankton food source; thus, impacting the entire food chain. By clarifying the water, the species augments the natural success of aquatic vegetation, and in turn, alters the entire lake ecosystem ([Reference 2.4-18](#)).

Other Species

Other nuisance species that may occur near the Fermi site include the spiny water flea, the fish hook flea, the round goby, the sea lamprey; and the aquatic plant species, common reed. These species are further discussed in [Appendix 2A](#). The biggest threat of the sea lamprey includes disruption of the food chain and aquatic ecosystem.

2.4.2.7 Important Habitats

Areas within the DRIWR have been allocated as important habitats due to the habitat available for aquatic wildlife or other species requiring an aquatic environment. The Lagoon Beach Unit of the DRIWR is located north, west, and south of the Fermi site (see [Figure 2.4-7](#)). Habitat associated with the refuge includes wetlands, coastal uplands and lowlands, and woodland forests. The refuge habitat is more thoroughly discussed in [Subsection 2.4.2.1](#).

2.4.2.8 Environmental Stresses

The onsite aquatic habitats are subject to a variety of historical and current environmental stresses, both man-induced and natural. Man-induced stresses can include many aspects of habitat conversion, consumptive biological resource use, pollution, and modification of natural processes including increased sediment deposits caused by deforestation and dredging of streambeds and drainages. Natural stresses include biological interactions and additional natural processes including drying out and inundation of onsite areas and scouring of the shoreline.

Man-induced stresses onsite have included farming and agricultural activities in the past, and operation of Fermi 1 and 2. Catastrophic natural environmental stresses may include massive infestations, epidemics, drought, or significant weather storms and/or climatic changes. Other natural stresses include the presence of invasive species including zebra mussels and Phragmites. Invasive species are further discussed in [Subsection 2.4.2.6](#). There have been no recorded environmental catastrophes on or near the Fermi site.

2.4.2.9 Transmission Corridors

The offsite 345 kV transmission system and associated corridors are exclusively owned and operated by ITC *Transmission*. The Applicant has no control over the design of the transmission system. Accordingly, the aquatic ecology that interfaces with the offsite transmission corridors is based on publicly available information, and reasonable expectations of the configurations that ITC *Transmission* would likely follow based on standard industry practice. However, the information described in this subsection does not imply commitments made by ITC *Transmission* or Detroit Edison, unless specifically noted. The discussion within this subsection pertains only to the offsite transmission corridor.

The offsite transmission system will consist of 345 kV lines running from Fermi west to the Milan Substation, located approximately 1.5 miles northwest of Milan, a distance of about 29.4 miles. The route is located in portions of Monroe, Wayne and Washtenaw counties and is illustrated in [Figure 2.2-3](#). The three 345 kV lines for Fermi 3 will run in a common corridor, with transmission lines for Fermi 2, to a point just east of I-75. From the intersection of this Fermi site corridor and I-75, the three Fermi-Milan lines will run west and north for approximately 12 miles in a corridor shared with other non-Fermi lines within an assumed 300-foot wide right-of way (ROW) in which the vegetation has been managed to exclude tall woody vegetation. In this section of the route, reconfiguration of existing conductors would allow for the use of existing infrastructure to create the new lines. In the area where Arkona Road and Haggerty Road intersect, the non-Fermi lines turn north and continue on to their respective destinations and the three Fermi-Milan lines will continue west for approximately 10.8 miles to the Milan substation. This western 10.8 miles of the corridor is undeveloped; no lines or towers are present, and where vegetation is present the maintenance has been minimal, except to keep tall woody vegetation removed. New transmission system infrastructure will be needed along this western section of the transmission corridor within the assumed 300-foot wide ROW. To accommodate the new transmission lines, it is assumed that the Milan Substation may also be expanded from its current size of 350 by 500 feet to an area approximately 1,000 by 1,000 feet, utilizing maintained grassed areas and cropland where there is no aquatic habitat.

2.4.2.9.1 Aquatic Communities and Principal Aquatic Species

Aquatic communities within or adjacent to the new transmission route include several small streams and numerous small drainage ditches. The route does not cross any lakes, ponds, or reservoirs. Stoney Creek, which is located in the developed eastern portion of the route, is the largest stream crossed by the transmission route and is discussed in [Subsection 2.4.2.2.2](#). Wetlands are associated with some of the drainages ([Figure 2.4-7](#)) and are discussed in [Subsection 2.3.1.1.4](#).

Due to the small size of the streams and ditches present along the transmission path, information regarding principal aquatic species is not readily available. It is presumed that species diversity is similar to that described for Stoney Creek in [Subsection 2.4.2.2.3](#), if not less diverse due to a lack of water in these smaller, and often intermittent, surface features. There are no commercial and recreational fisheries present within the assumed 300-foot ROW due to the small size of the drainages present.

2.4.2.9.2 Important Species

Important species, including threatened and endangered species, potentially occurring along the new transmission route are the same as those described in [Subsection 2.4.2.4](#). Based on information from the USFWS and MDNR, there are currently no reported occurrences of Michigan or Federal important species.

2.4.2.9.3 Important Habitats

Important habitats associated with the new transmission route include wetlands and small areas of lowland forest that are identified in [Figure 2.2-3](#). No wildlife areas or refuges are crossed by the route. There are no areas along the corridor that are designated as critical habitats, based on information obtained from the USFWS and MDNR. Wetlands associated with the transmission corridors are discussed in [Subsection 2.3.1.1.4](#).

2.4.2.9.4 Environmental Stresses

The aquatic habitats along the new transmission route are subject to a variety of historical and current environmental stresses, both man-induced and natural. Man-induced stresses can include many aspects of habitat conversion, consumptive biological resource use, pollution, and modification of natural processes. Agricultural and residential land use (described in [Subsection 2.2.2](#)) are the primary contributors to man-induced stresses along the corridor. Natural stresses include biological interactions and additional natural processes, such as habitats drying out or scouring from flooding. Environmental stresses are discussed further in [Subsection 4.3.2](#).

2.4.2.9.5 Regulatory Consultation

The USFWS and NDNR were consulted for information on known occurrences of Federal and State listed protected species on the Fermi property and in the project vicinity for a radius of 7.5 miles around the facility. Although no regulatory contact has occurred for the more western portion of the transmission route, Federal and State web sites have been consulted. As the transmission system

design is formalized, agency contacts are expected to be initiated by ITC *Transmission* to ensure the protection of aquatic resources in the region.

2.4.3 References

- 2.4-1 Michigan Department Natural Resources, Michigan's Wildlife Action Plan, "Southern Lower Peninsula," http://www.michigan.gov/dnr/0,1607,7-153-10370_30909_31053-153463--,00.html, accessed 4 October 2007.
- 2.4-2 Porter, S.C., Late-Quaternary Environments of the United States: *The Late Pleistocene*, Page xi, University of Minnesota Press, Minneapolis, MN, 1983.
- 2.4-3 Ecological Sciences Department, Cyrus Wm. Rice Division, *1973-74 Annual Report of the Terrestrial Ecological Studies at the Fermi Site*, NUS Corporation, 1974.
- 2.4-4 Voss, E.G. (1972-96), *Michigan Flora*, Part I Gymnosperms and Monocots (1972), Part II Dicots (Saururaceae-Cornaceae) (1985), Part III Dicots Concluded (1996). Cranbrook Institute of Science and University of Michigan Herbarium.
- 2.4-5 Reed, Jr., P.B., *National List of Plant Species That Occur in Wetlands: North Central (Region 3)*, U.S. Fish and Wildlife Service Biological Report 88(26.3), 108 pages, 1988.
- 2.4-6 Michigan Natural Features Inventory, Rare Species Explorer, <http://web4.msue.msu.edu/mnfi/explorer/index.cfm>, accessed 25 January 2008.
- 2.4-7 Endangered Species Act of 1973, 16 U.S.C. §§ 1531-1544.
- 2.4-8 Migratory Bird Treaty Act, 16 U.S.C. §§ 703-712 <http://laws.fws.gov/lawsdigest/migtrea.html>, accessed 24 March 2008.
- 2.4-9 50 CFR 17, "Endangered and Threatened Wildlife and Plants; Removing the Bald Eagle in the Lower 48 States From the List of Endangered and Threatened Wildlife," 9 July 2007, <http://www.fws.gov/migratorybirds/issues/BaldEagle/baldeaglefinaldelisting.pdf>, accessed 24 March 2008.
- 2.4-10 Bald and Golden Eagle Protection Act, 16 USC 668a-d, <http://www.animallaw.info/statutes/stus16usc668.htm>, accessed 24 March 2008.
- 2.4-11 U.S. Fish and Wildlife Service, *National Bald Eagle Management Guidelines*, May 2007, <http://www.fws.gov/migratorybirds/baldeagle.htm>, accessed 24 March 2008.
- 2.4-12 Michigan Natural Features Inventory 2004, *Elaphe vulpine gloydi* Conant, Eastern Fox Snake, Michigan State University Board of Trustees, Michigan State University Extension.
- 2.4-13 Michigan Department of Environmental Quality, *Michigan's Wetland Law - Complete Administrative Rules*, 1988, <http://michiganwetlands.org/citguide/AppendixE.pdf>, accessed 24 March 2008.

- 2.4-14 U.S. Army Corps of Engineer Waterways Experiment Station, Environmental Laboratory, *Corps of Engineers Wetlands Delineation Manual*, Technical Report Y-87-1, Vicksburg, MS, 1987.
- 2.4-15 Detroit Edison and U.S. Fish and Wildlife Service, *Detroit International Wildlife Refuge*, 2003
- 2.4-16 Michigan Department of Agriculture, "Emerald Ash Bore Information", http://www.michigan.gov/mda/0,1607,7-125-1568_2390_18298---,00.htm, accessed 24 January 2008.
- 2.4-17 Albert, D.A. Michigan Natural Features Inventory, Lansing, MI. Natural Community Abstract for Great Lakes Marsh. 11 pp., November 2004.
- 2.4-18 Benson, A.J., M.M. Richerson, and E. Maynard, USGS Nonindigenous Aquatic Species Database, Gainesville, FL. *Dreissena rostriformis bugensis*, 25 January 2007, <http://nas.er.usgs.gov/queries/FactSheet.asp?speciesID=95>, accessed 15 October 2007.
- 2.4-19 Carman, S.M., Michigan Natural Features Inventory, Lansing, MI. "Special Animal Abstract for *Opsopoeodus emiliae* (Pugnose minnow)," 2 pp., 2001, <http://web4.msue.msu.edu/mnfi/explorer/species.cfm?id=11343>, accessed 8 August 2007.
- 2.4-20 Carman, S.M., Michigan Natural Features Inventory, Lansing, MI. "Special Animal Abstract for *Percina shumardi* (River darter)," 3 pp., 2001, <http://web4.msue.msu.edu/mnfi/explorer/species.cfm?id=11410>, accessed 8 August 2007.
- 2.4-21 Carman, S.M., Michigan Natural Features Inventory, Lansing, MI. "Special Animal Abstract for *Notropis photogenis* (Silver shiner)," 3 pp., 2001, <http://web4.msue.msu.edu/mnfi/explorer/species.cfm?id=11323>, accessed 8 August 2007.
- 2.4-22 Carman, S.M., Michigan Natural Features Inventory, Lansing, MI. "Special Animal Abstract for *Erimyzon oblongus* (Creek chubsucker)," 2 pp., 2001, <http://web4.msue.msu.edu/mnfi/explorer/species.cfm?id=11349>, accessed 8 August 2007.
- 2.4-23 Carman, S.M. and R.R. Goforth, Michigan Natural Features Inventory, Lansing, MI. "Special Animal Abstract for *Percina copelandi* (Channel darter)," 2 pp., 2000, <http://web4.msue.msu.edu/mnfi/explorer/species.cfm?id=11408>, accessed 8 August 2007.
- 2.4-24 Clark, G., Coastal Natural Hazards University of Wisconsin Sea Grant Institute, Seiches and Storm Surges, 2004,

- www.seagrant.wisc.edu/coastalhazards/default.aspx?tabid=426, accessed 5 December 2007.
- 2.4-25 Clinton River Watershed Council, "Stony Creek Subwatershed Management," <http://www.crowc.org/programs/watershedmgmt/scnonpoint/scnonpointhome.html>, accessed 28 January 2008.
- 2.4-26 Michigan Department of Environmental Quality, "History of the DEQ," <http://www.michigan.gov/deq/0,1607,7-135-3306-13142--,00.html>, accessed 15 December 2007.
- 2.4-27 Michigan Department of Natural Resources, "The Department of Natural Resources..." <http://www.michigan.gov/dnr/0,1607,7-153-10366-30397--,00.html>, accessed 23 April 2008.
- 2.4-28 Ohio Department of Natural Resources, "About ODNR," www.dnr.state.oh.us/tabid/10748/default.aspx, accessed 28 January 2008
- 2.4-29 Derosier, A. L., Michigan Natural Features Inventory, Lansing, MI. "Special Animal Abstract for *Macrhybopsis storeriana* (Silver chub)," 2 pp., 2004, <http://web4.msue.msu.edu/mnfi/explorer/species.cfm?id=11341>, accessed 28 January 2008.
- 2.4-30 Derosier, A. L., Michigan Natural Features Inventory, Lansing, MI. "Special Animal Abstract for *Ammocrypta pellucida* (Eastern sand darter)," 3 pp., 2004, <http://web4.msue.msu.edu/mnfi/explorer/species.cfm?id=11397>, accessed 28 January 2008.
- 2.4-31 Derosier, A. L., Michigan Natural Features Inventory, Lansing, MI. "Special Animal Abstract for *Sander Canadensis* (Sauger)," 3 pp., 2004, <http://web4.msue.msu.edu/mnfi/explorer/species.cfm?id=11411>, accessed 28 January 2008.
- 2.4-32 U.S. Environmental Protection Agency, Large Lakes and Rivers Forecasting Research Branch, "Detroit River-Western Lake Erie Basin Indicator Project," http://www.epa.gov/med/grosseile_site/indicators/mayflies.html, accessed 15 October 2007.
- 2.4-33 U.S. Environmental Protection Agency, "Great Lakes National Program Office (GLNPO)," <http://www.epa.gov/glnpo/monitoring/indicators/benthic98/index.htm>, accessed 23 April 2008.
- 2.4-34 U. S. Environmental Protection Agency, About EPA, "Who We Are," www.epa.gov/epahome/aboutepa.htm#whoweare, accessed 5 December 2007.
- 2.4-35 Goforth, R.R. Michigan Natural Features Inventory, Lansing, MI. "Special Animal Abstract for *Acipenser fulvescens* (Lake sturgeon)," 4pp., 2000,

- <http://web4.msue.msu.edu/mnfi/explorer/species.cfm?id=11270>, accessed 28 January 2008.
- 2.4-36 Government of Canada-Fisheries and Oceans Canada, Aquatic Species at Risk, “Aurora Trout,” March 2004, http://www.dfo-mpo.gc.ca/species-especes/species/species_auroraTrout_e.asp, accessed 13 March 2008.
- 2.4-37 Government of Canada-Fisheries and Oceans Canada, Aquatic Species at Risk, “Eastern Pondmussel... a Species at Risk in Ontario,” http://www.dfo-mpo.gc.ca/species-especes/species/factsheet/factsheet_easternpondmussel_e.asp, accessed 13 March 2008.
- 2.4-38 Great Lakes Information Network, Lake Erie, “Overview,” <http://www.great-lakes.net/lakes/erie.html#overview>, accessed 28 January 2008.
- 2.4-39 Great Lakes Fishery Commission, Sea Lamprey Control, “Sea Lamprey: A Great Lakes Invader,” <http://www.glfc.org/lampcon.php>, accessed 28 January 2008.
- 2.4-40 Gulf of Maine Aquarium, “Zebra Mussels,” <http://www.gma.org/surfing/human/zebra.html>, accessed 28 January 2008.
- 2.4-41 Invasive Plants.net, “Phragmites: Common Reed, Basic Information,” www.invasiveplants.net/phragmites, accessed 15 October 2007.
- 2.4-42 Kellys Island Birds and Natural History, “Lake Erie Coastal Wetland Significant Features,” 31 July 2006, http://www.kellyslandnature.com/lake_erie_water_snake/wetlands.htm, accessed 28 January 2008.
- 2.4-43 Lindgren, J. and I. A. Grigorovich, I.A., Minnesota DNR, University of Windsor, *Aquatic Invasive Species: Spiny and Fishhook Water Fleas*, December 2005, http://www.in.gov/dnr/files/spiny_and_fishhook_water_flea.pdf, accessed 18 March 2008.
- 2.4-44 Clinton River Watershed Council, “Stony Creek Watershed Management Plan,” (23 September 2005), <http://www.crowc.org/programs/watershedmgmt/scnonpoint/scnonpointhome.html>, accessed 13 December 2007.
- 2.4-45 Michigan Department of Natural Resources, Michigan’s Wildlife Action Plan SGCN Status & Species-Specific Issues, “Mussels,” 27 June 2005, http://www.michigandnr.com/publications/pdfs/HuntingWildlifeHabitat/WCS/SGCN/Ligumina_recta.pdf, accessed 15 October 2007.
- 2.4-46 Michigan Natural Features Inventory, Rare Species Explorer, “Northern Madtom (*Noturus stigmosus*)”, <http://web4.msue.msu.edu/mnfi/explorer>, accessed 13 March 2008.

- 2.4-47 Mulcrone, R. S., "Obliquaria reflexa," University of Michigan Museum of Zoology, Animal Diversity Web, 2006,
http://animaldiversity.ummz.umich.edu/site/accounts/information/Obliquaria_reflexa.html,
accessed 12 March 2008.
- 2.4-48 U.S. Fish & Wildlife Service, Wetlands Online Mapper,
<http://wetlandsfws.er.usgs.gov/wtlnds/launch.html>, accessed 15 October 2007.
- 2.4-49 NatureServe Encyclopedia, NatureServe Explorer: An online encyclopedia of life [web application], Version 7.0. NatureServe, Arlington, Virginia,
<http://www.natureserve.org/explorer>, accessed 12 March 2008.
- 2.4-50 NatureServe Encyclopedia, "Blacknose shiner (*Notropis heterolepis*),"
<http://www.natureserve.org/explorer>, accessed 12 March 2008.
- 2.4-51 NatureServe Encyclopedia, "Black sandshell (*Ligumia recta*),"
<http://www.natureserve.org/explorer>, accessed 12 March 2008.
- 2.4-52 NatureServe Encyclopedia, "Fawns foot (*Truncilla donaciformis*),"
<http://www.natureserve.org/explorer>, accessed 12 March 2008.
- 2.4-53 NatureServe Encyclopedia, "Greater redhorse (*Moxostoma valenciennesi*),"
<http://www.natureserve.org/explorer>, accessed 12 March 2008.
- 2.4-54 NatureServe Encyclopedia, "Kidney shell (*Ptychobranthus fasciolaris*),"
<http://www.natureserve.org/explorer>, accessed 12 March 2008.
- 2.4-55 NatureServe Encyclopedia, "Lake chubsucker (*Erimyzon sucetta*),"
<http://www.natureserve.org/explorer>, accessed 12 March 2008.
- 2.4-56 NatureServe Encyclopedia, "Longnose sucker (*Catostomus catostomus*),"
<http://www.natureserve.org/explorer>, accessed 12 March 2008.
- 2.4-57 NatureServe Encyclopedia, "Mudpuppy mussel (*Simpsonaisa ambigua*),"
<http://www.natureserve.org/explorer>, accessed 12 March 2008.
- 2.4-58 NatureServe Encyclopedia, "Pocketbook (*Lampsilis ovata*),"
<http://www.natureserve.org/explorer>, accessed 12 March 2008.
- 2.4-59 NatureServe Encyclopedia, "Pondhorn (*Uniomerus tetralasmus*),"
<http://www.natureserve.org/explorer>, accessed 12 March 2008.
- 2.4-60 NatureServe Encyclopedia, "Pugnose shiner (*Notropis anogenus*),"
<http://www.natureserve.org/explorer>, accessed 12 March 2008.
- 2.4-61 NatureServe Encyclopedia, "Rayed bean (*Villosa fabalis*),"
<http://www.natureserve.org/explorer>, accessed 12 March 2008.

- 2.4-62 NatureServe Encyclopedia, "Round pigtoe (*Pleurobema sintoxia*)," <http://www.natureserve.org/explorer>, accessed 12 March 2008.
- 2.4-63 NatureServe Encyclopedia, "Shortnose cisco (*Ammocrypta pellucida*)," <http://www.natureserve.org/explorer>, accessed 12 March 2008.
- 2.4-64 NatureServe Encyclopedia, "Spotted gar (*Lepisosteus oculatus*)," <http://www.natureserve.org/explorer>, accessed 12 March 2008.
- 2.4-65 NatureServe Encyclopedia, "Threehorn wartyback (*Obliquaria reflexa*)," <http://www.natureserve.org/explorer>, accessed 12 March 2008.
- 2.4-66 NatureServe Encyclopedia, "Western banded killifish (*Fundulus diaphanous menoma*)," <http://www.natureserve.org/explorer>, accessed 12 March 2008.
- 2.4-67 National Oceanic and Atmospheric Administration, Coastal Services Center, Benthic Habitat Mapping, "What is Benthic Habitat?," 24 July 2007, www.csc.noaa.gov/benthic/start/what.htm, accessed 11 December 2007.
- 2.4-68 Michigan Sea Grant, Upwellings Online Edition, "Indicators Reflect Health of Detroit River, Western Lake Erie," December 2006, <http://www.miseagrant.umich.edu/upwellings/issues/06dec/health-detroit-river.html>, accessed 5 December 2007.
- 2.4-69 Stagliano, D.M., Natural Features Inventory, Lansing, MI, "Special Animal Abstract for *Phoxinus erythrogaster* (Southern redbelly dace)," 3pp., 2001, <http://web4.msue.msu.edu/mnfi/explorer/species.cfm?id=11330>, accessed 28 January 2008.
- 2.4-70 Stony Creek Watershed, Huron River Watershed Council, *Report on Stony Creek Watershed Sampling*, July 2004.
- 2.4-71 Swart, S.L., Michigan Natural Features Inventory, Lansing, MI, "Special Animal Abstract for *Noturus miurus* (Brindled Madtom)," 2pp., 2005, <http://web4.msue.msu.edu/mnfi/explorer/species.cfm?id=11366>, accessed 28 January 2008.
- 2.4-72 Thomas, Michael, Haas, Robert. Lake St. Clair Fisheries Research Station, "Status of the Fisheries in Michigan Waters of Lake Erie and Lake St. Clair, 2006," March 22, 2007.
- 2.4-73 U.S. Fish and Wildlife Service, Fish & Wildlife Journal, "Detroit River International Wildlife Refuge and International Wildlife Refuge Alliance Issue Annual Progress Report, 31 July 2006, <http://www.fws.gov/arsnew/regmap.cfm?arskey=19280>, accessed 15 October 2007.

- 2.4-74 U.S. Fish and Wildlife Service, Detroit River International Wildlife Refuge, "Background", <http://www.fws.gov/Midwest/DetroitRiver/documents/brochureAug23.pdf>, accessed 5 December 2007.
- 2.4-75 U.S. Fish and Wildlife Service, About the U.S. Fish and Wildlife Service, "History and Statutory Authority", 29 June 2007, www.fws.gov/help/about_us.html, accessed 5 December 2007.
- 2.4-76 U.S. Geological Survey, Great Lakes Science Center, "Zebra Mussel," http://www.glsc.usgs.gov/main.php?content=research_invasive_zebramussel&title=Invasive%20Invertebrates0&menu=research_invasive_invertebrates, accessed 15 October 2007.
- 2.4-77 Detroit Edison, "Fermi Power Plant No. 1 Study Report on Cooling Water Intake," Chapter 2-4, July 1976.
- 2.4-78 Detroit Edison, "Fermi Atomic Power Plant Unit 3-Applicants Environmental Report Construction Permit Stage," Vol. 1-3, Section 2.7, January 1967.
- 2.4-79 Detroit Edison, "Fermi Atomic Power Plant Unit 2-Applicants Environmental Report Operating License Stage," Vol. 1-3, August 1977.
- 2.4-80 Lawler, Matusky, & Skelly Engineers, Fish Entrainment and Impingement Study (October 1991-September 1992), February 1993, Fermi Power Plant.
- 2.4-81 Newell, T. L., "Myotis sodalist" University of Michigan Museum of Zoology, Animal Diversity Web, 2008, http://animaldiversity.ummz.umich.edu/site/accounts/information/Myotis_sodalis.html, accessed 6 June 2008.
- 2.4-82 Michigan Department of Natural Resources, Wildlife & Habitat, "Bald Eagle (*Haliaeetus leucocephalus*)," http://www.michigan.gov/dnr/0,1607,7-153-10370_12145_12202-32581--,00.html, accessed 1 May 2008.
- 2.4-83 Francis, J. and J. Boase. (2007), Michigan Department of Natural Resources and U.S. Fish and Wildlife Service, A Fisheries Survey of Selected Lake Erie Coastal Marshes in Michigan, 2005.
- 2.4-84 Ohio Department of Natural Resources Division of Wildlife and Lake Erie Fisheries Unit, *Ohio's Lake Erie Fisheries 2006*, March 2007, [http://www.dnr.state.oh.us/Portals/9/pdf/estatus2006\[1\].pdf](http://www.dnr.state.oh.us/Portals/9/pdf/estatus2006[1].pdf), accessed 19 June 2008.
- 2.4-85 Reutter, J.M. and J.W. Fletcher, *Phytoplankton and zooplankton densities from Lake Erie near the Davis-Besse nuclear power station during 1978*, Clear Technical Report No. 106, 25 pp., The Ohio State University, Columbus, OH, 1979.

- 2.4-86 Makarewicz, J. C., "A Lakewide Comparison of Zooplankton Biomass and Its Species Composition in Lake Erie, 1983-1987," *Journal of Great Lakes Research*, 19.2, 1993.
- 2.4-87 Reutter, J.M., *Benthic Macroinvertebrate populations in Lake Erie near the Davis-Besse nuclear power station during 1978*, Clear Technical Report No. 107, 9 pp., The Ohio State University, Columbus, OH, 1979
- 2.4-88 Reutter J.M., C.E. Herdendorf, and G.W. Sturm, *Impingement and Entrainment Studies at the Bay Shore Power Station, Toledo Edison Company*, Clear Technical Report No. 78b, The Ohio State University Center for Lake Erie Area Research, Columbus, OH, 1978.
- 2.4-89 Reutter, J.M., C.E. Herdendorf, G.W. Sturm. *Impingement and Entrainment Studies at the Acme Power Station, Toledo Edison Company*, Clear Technical Report No. 78A, The Ohio State University Center for Lake Erie Area Research, Columbus, OH, June 1978.
- 2.4-90 Michigan Department of Environmental Quality, Surface Water Quality Division, *A Biological Survey of Stony Creek and Amos Palmer Drain, Monroe County, Michigan*, Report Number 151, December 1996.
- 2.4-91 Michigan Department of Environmental Quality, Surface Water Quality Division, *A Biological Survey of Stony Creek and its Tributaries, Amos Palmer Drain and Ross Drain, Monroe County*, Report Number 087, February 1998.
- 2.4-92 Makaerwiczl, J.C. et al, "Phytoplankton composition and biomass in the offshore waters of Lake Erie: Pre- and post- Dreissena introduction, 1983-1993,". *Journal of Great Lakes Research* 25.1, 1999.
- 2.4-93 U.S. Army Corps of Engineers, *The Highway Methodology Workbook Supplement: Wetland Functions and Values: A Descriptive Approach*, 1999.
- 2.4-94 U.S. Environmental Protection Agency, "Ottawa-Stony Watershed," http://cfpub.epa.gov/surf/huc.cfm?huc_code=04100001, accessed 4 August 2008.
- 2.4-95 Black & Veatch Corporation, Fermi 3 Terrestrial Vegetation Survey Final Report, Prepared for The Detroit Edison, November 2009.
- 2.4-96 Black & Veatch Corporation, Fermi 3 Terrestrial Wildlife Survey Final Report, Prepared for The Detroit Edison, November 2009.
- 2.4-97 AECOM, "Aquatic Ecology Characterization Report, Detroit Edison Fermi 3 Project, Final Report," November 2009.
- 2.4-98 Michigan Department of Environmental Quality, Wetland Identification Report, Wetland Identification File Number 08-58-0003-W, November 7, 2008.
- 2.4-99 Michigan Department of Environmental Quality, Wetland Identification Report, Modified Wetland Identification File Number 08-58-0003-WA, March 30, 2009.

2.4-100 U.S. Army Corps of Engineers, Detroit District, Engineering & Technical Services,
Regulatory Office, File No. LRE-2008-00443-1, November 9, 2010.

Table 2.4-1 Approximate Acres per Plant Community Present on the Fermi Site

Habitat ¹	Acres	% of Site
Coastal Emergent Wetland (CEW) Open Water	35	2.8
Coastal Emergent Wetland (CEW) Vegetated	238	18.9
Grassland: Right-of-Way (GRW)	29	2.3
Grassland: Idle/Old Field/Planted (GOF)	75	6.0
Grassland: Row Crop (GRC)	64	5.1
Shrubland (SHB)	113	9.0
Thicket (TKT)	23	1.8
Forest: Coastal Shoreline (FCS)	47	3.7
Forest: Lowland Hardwood (FLH)	92	7.3
Forest: Woodlot (FWL)	117	9.3
Developed Areas (DA)	212	16.8
Lakes, Ponds, Rivers (LPR)	44	3.5
Lake Erie (main body)	171	13.6
Totals	1260	100

- Habitats are based on Michigan's Wildlife Action Plan, Michigan Department of Natural Resources ([Reference 2.4-1](#)).

Table 2.4-2 Plant Species Listed for the Fermi Site (Sheet 1 of 10)

Scientific Name ¹	Common Name ²	Wetland Status ²	Habitat ³											
			CEW	GRW	GOF	GRC	SHB	TKT	FCS	FLH	FWL	DA		
<i>Abutilon theophrasti</i>	Velvet Leaf	FACU-		x	x	x		x						
<i>Acalypha virginica</i>	Three-seeded Mercury	FACU		x								x		
<i>Acer negundo</i>	Box Elder	FACW-	x		x			x	x	x	x		x	
<i>Acer saccharinum</i>	Silver Maple	FACW			x			x		x	x			
<i>Acer saccharum</i>	Sugar Maple	FACU										x		
<i>Agrimonia pubescens</i>	Soft Agrimony	UPL		x										
<i>Agrimonia striata</i>	Woodland Groovebur	FAC-										x		
<i>Agropyron repens</i>	Quackgrass	FACU			x				x	x				
<i>Ailanthus altissimus</i>	Tree-of-Heaven	UPL						x	x				x	x
<i>Alisma plantago-aquatica</i>	Broad-leaf Water Plantain	OBL	x											
<i>Alliaria petiolata</i>	Garlic Mustard	FAC										x	x	
<i>Amaranthus albus</i>	White Pigweed	FACU			x	x	x	x						
<i>Ambrosia artemisiifolia</i>	Annual Ragweed	FACU		x	x	x	x			x				x
<i>Ambrosia psilostachya</i>	Naked-Spike Ragweed	FAC-			x									x
<i>Andropogon gerardii</i>	Big Bluestem	FACU-		x										x
<i>Andropogon virginicus</i>	Broomsedge	FAC-		x	x									
<i>Anemone canadensis</i>	Canada Anemone	FACW		x										
<i>Anemone cylindrica</i>	Thimbleweed	UPL		x										
<i>Apocynum cannabinum</i>	Prairie Dogbane	FAC		x	x	x	x							
<i>Arctium minus</i>	Burdock	UPL			x					x			x	
<i>Asclepias incarnata</i>	Swamp Milkweed	OBL	x	x										
<i>Asclepias syriaca</i>	Common Milkweed	UPL		x	x									
<i>Aster lateriflorus</i>	Side-flowering Aster	FACW-		x										
<i>Aster pilosus</i>	Heath Aster	FACU+		x	x					x				
<i>Barbarea vulgaris</i>	Yellow Mustard	FAC				x								

Table 2.4-2 Plant Species Listed for the Fermi Site (Sheet 2 of 10)

Scientific Name ¹	Common Name ²	Wetland Status ²	Habitat ³										
			CEW	GRW	GOF	GRC	SHB	TKT	FCS	FLH	FWL	DA	
<i>Bidens</i> sp.	Beggars-tick		x										
<i>Boehmeria cylindrica</i>	Bog Nettle	OBL		x							x		x
<i>Bromus inermis</i>	Smooth Brome	UPL		x	x			x		x			
<i>Bromus japonicus</i>	Japanese Brome	FACU		x	x	x							x
<i>Bromus tectorum</i>	Cheat	UPL				x							
<i>Campsis radicans</i>	Trumpet Creeper	FAC						x	x				
<i>Carex blanda</i>	Sedge	OBL		x									
<i>Carex cristatella</i>	Crested Sedge	FACW+		x									
<i>Carex frankii</i>	Frank's Sedge	OBL		x									
<i>Carex grayi</i>	Gray's Sedge	FACW-		x									
<i>Carex hirtifolia</i>	Sedge	UPL		x									
<i>Carex stipata</i>	Sedge	OBL		x									
<i>Carex vulpinoidea</i>	Fox Sedge	OBL	x	x									
<i>Carex</i> sp.	Sedge	unknown									x		
<i>Carya glabra</i>	Pignut Hickory	FACU											
<i>Carya ovata</i>	Shagbark Hickory	FACU									x		
<i>Celtis occidentalis</i>	Common Hackberry	FAC-											x
<i>Cenchrus longispinus</i>	Sandbur	UPL		x	x					x			
<i>Centaurea maculosa</i>	Knapweed	UPL			x								x
<i>Ceratophyllum demersum</i>	Common Hornwort	OBL	x										
<i>Chenopodium album</i>	Lamb's Quarters	FAC		x									
<i>Cichorium intybus</i>	Cichory	NL		x	x								
<i>Cinna arundinacea</i>	Wood Reedgrass	FACW	x								x		
<i>Circaea lutetiana</i>	Enchanter's Nightshade	FACU	x	x						x	x		x
<i>Cirsium arvense</i>	Canada Thistle	FACU	x	x	x	x	x	x	x	x			

Table 2.4-2 Plant Species Listed for the Fermi Site (Sheet 3 of 10)

Scientific Name ¹	Common Name ²	Wetland Status ²	Habitat ³											
			CEW	GRW	GOF	GRC	SHB	TKT	FCS	FLH	FWL	DA		
<i>Cirsium discolor</i>	Thistle	NL												
<i>Cirsium muticum</i>	Swamp Thistle	OBL	x	x							x			
<i>Cirsium vulgare</i>	Bull Thistle	FACU-		x	x			x						x
<i>Conyza canadensis</i>	Canada Horseweed	FAC-		x	x	x		x			x			x
<i>Coreopsis lanceolata</i>	Sand Coreopsis	FACU		x										
<i>Cornus amomum</i>	Silky Dogwood	FACW+	x								x	x		
<i>Cornus drummondii</i>	Rough-leaf Dogwood	FAC		x	x			x						
<i>Cornus foemina</i>	Stiff Dogwood	FACW-						x						
<i>Crataegus cf. mollis</i>	Downy Hawthorne	FACW-								x				
<i>Cyperus esculentus</i>	Chufa	FACW	x								x			
<i>Cyperus rivularis</i>	Shining Flatsedge	FACW+	x								x			
<i>Dactylis glomerata</i>	Orchard Grass	FACU	x		x			x			x		x	
<i>Datura stramonium</i>	Jimson-weed	UPL									x			
<i>Daucus carota</i>	Queen Ann's Lace	UPL		x	x	x					x			
<i>Dianthus armeria</i>	Deptford Pink	UPL		x										
<i>Digitaria ischaemum</i>	Smooth Crabgrass	FACU			x									x
<i>Digitaria sanguinalis</i>	Hairy Crabgrass	FACU												x
<i>Dipsacus fullonum</i>	Teasel	UPL		x	x			x						
<i>Diervilla lonicera</i>	Bush Honeysuckle	NL										x		
<i>Echinacea purpurea</i>	Purple Coneflower	UPL		x										
<i>Echinochloa crusgalli</i>	Barnyard Grass	FACW	x	x							x			
<i>Echinochloa muricata</i>	Rough Barnyard Grass	OBL	x											
<i>Elaeagnus umbellata</i>	Autumn Olive	FACU		x				x	x				x	
<i>Elymus canadensis</i>	Canada Wild Rye	FAC-	x	x	x			x	x					
<i>Elymus virginicus</i>	Virginia Wild Rye	FACW-	x	x	x				x					

Table 2.4-2 Plant Species Listed for the Fermi Site (Sheet 4 of 10)

Scientific Name ¹	Common Name ²	Wetland Status ²	Habitat ³											
			CEW	GRW	GOF	GRC	SHB	TKT	FCS	FLH	FWL	DA		
<i>Equisetum arvense</i>	Field Horsetail	FAC	x							x				
<i>Eragrostis pectinata</i>	Purple Lovegrass	FAC				x								
<i>Eragrostis spectabilis</i>	Purple Lovegrass	UPL		x										
<i>Erechtites hieracifolia</i>	American Burn	FACU	x											
<i>Erigeron annuus</i>	Annual Fleabane	FAC-		x										
<i>Erigeron strigosus</i>	Prairie Fleabane	FAC-				x								
<i>Eupatorium perfoliatum</i>	Common Boneset	FACU		x										
<i>Eupatroidium serotinum</i>	Late-flowering Thorough-wort	FAC+									x		x	
<i>Euphorbia nutans</i>	Eyebane Broomspurge	FACU					x							
<i>Euphorbia maculata</i>	Spotted Broomspurge	FACU-				x	x							
<i>Euthamia graminifolia</i>	Flattop-Fragrant Goldenrod	FACW-		x										
<i>Festuca arundinacea</i>	Kentucky Fescue	FACU+				x								
<i>Fragaria virginiana</i>	Wild Strawberry	FAC-		x	x									
<i>Fraxinus americana</i>	White Ash	FACU		x										
<i>Fraxinus pennsylvanica</i>	Green Ash	FACW		x	x			x	x	x	x		x	
<i>Galium aparine</i>	Catchweed Bedstraw	FACU						x	x	x				x
<i>Geranium maculatum</i>	Wild Geranium	FACU		x	x									
<i>Geum canadense</i>	White Avens	FAC		x				x	x					x
<i>Geum rivale</i>	Purple Avens	OBL		x										
<i>Gleditsia triacanthos</i>	Honey Locust	FAC				x		x	x					
<i>Glyceria striata</i>	Fowl Manna Grass	OBL	x	x										
<i>Hackelia virginiana</i>	Virginia Stickseed	FAC-										x		
<i>Helenium autumnale</i>	Sneezeweed	FACW+		x										
<i>Hibiscus moscheutos</i>	Swamp Mallow	OBL	x											
<i>Hordeum jubatum</i>	Foxtail	FAC+					x							x

Table 2.4-2 Plant Species Listed for the Fermi Site (Sheet 5 of 10)

Scientific Name ¹	Common Name ²	Wetland Status ²	Habitat ³											
			CEW	GRW	GOF	GRC	SHB	TKT	FCS	FLH	FWL	DA		
<i>Humulus lupulus</i>	Common Hops	FACU								x		x		
<i>Hydrocharis morus-ranae</i>	European frog-bit	OBL	x											
<i>Hypericum perforatum</i>	Common St. John's-wort	UPL		x	x									
<i>Hypericum punctatum</i>	Spotted St. John's-wort	FAC+	x											
<i>Impatiens capensis</i>	Spotted Touch-me-not	FACW										x	x	
<i>Iris virginica</i>	Southern Blue Flag	OBL		x										
<i>Juncus gerardii</i>	Black-grass	OBL	x											
<i>Juncus dudleyi</i>	Dudley's Rush	NL		x						x				
<i>Juncus marginatus</i>	Grass-leaf Rush	OBL	x											
<i>Juncus tenuis</i>	Path Rush	FAC	x											
<i>Kochia scoparia</i>	Mexican Summer-cypress	FACU-				x	x							x
<i>Kuhnia eupatorioides</i>	False Boneset	NL		x				x						
<i>Lactuca serriola</i>	Prickly Lettuce	FAC				x	x							
<i>Leersia oryzoides</i>	Cut Grass	FACW	x									x		
<i>Lemna sp.</i>	Duckweed	OBL	x											
<i>Lepidium perfoliatum</i>	Pepper-grass	NL				x	x							
<i>Lepidium virginicum</i>	Pepper-grass	NL					x			x				x
<i>Liatris spicata</i>	Marsh Blazing Star	FAC		x										
<i>Ligustrum vulgare</i>	European Privet	FAC-								x		x	x	
<i>Lobelia siphilitica</i>	Great Blue Lobelia	FACW+		x										
<i>Lotus corniculatus</i>	Bird's-foot Trefoil	FAC-		x										
<i>Lycopus americanus</i>	Common Water Horehound	OBL	x	x										
<i>Lysimachia ciliata</i>	Fringed Loosestrife	FACW		x										
<i>Lysimachia nummularia</i>	Creeping Jennie	FACW+	x	x								x		
<i>Lythrum alatum</i>	Winged Loosestrife	OBL	x	x										

Table 2.4-2 Plant Species Listed for the Fermi Site (Sheet 6 of 10)

Scientific Name ¹	Common Name ²	Wetland Status ²	Habitat ³											
			CEW	GRW	GOF	GRC	SHB	TKT	FCS	FLH	FWL	DA		
<i>Lythrum salicaria</i>	Purple Loosestrife	OBL	x	x							x			
<i>Malus coronaria</i>	Wild Crab	UPL					x	x	x					
<i>Medicago lupulina</i>	Black Medic	FAC-				x	x							
<i>Medicago sativa</i>	Alfalfa	NL		x										
<i>Melilotus alba</i>	White Sweet Clover	FACU		x	x	x								x
<i>Melilotus officinalis</i>	Yellow Sweet Clover	FACU				x	x				x			x
<i>Mentha arvensis</i>	Wild Mint	FACW		x							x			
<i>Mentha spicata</i>	Spearmint	FACW+		x							x			
<i>Monarda fistulosa</i>	Wild Bergamot	FACU		x										
<i>Muhlenbergia schreberi</i>	Nimble-will	FAC							x		x			x
<i>Myriophyllum pinnatum</i>	Cut-leaf Water-milfoil	OBL	x											
<i>Nelumbo lutea</i>	American Lotus	OBL	x											
<i>Nepeta cataria</i>	Catnip	FAC-		x	x			x						
<i>Nuphar variegata</i>	Cow-lily	OBL	x											
<i>Nymphaea odorata</i>	White Water-lily	OBL	x											
<i>Oenothera biennis</i>	Common Evening Primrose	FACU												
<i>Oxalis stricta</i>	Common Yellow Wood Sorrel	FACU		x			x							
<i>Panicum capillare</i>	Witchgrass	FAC		x			x							
<i>Panicum dichotomiflorum</i>	Fall Panic Grass	FACW-												
<i>Panicum virgatum</i>	Switchgrass	FAC+		x	x									
<i>Papavera sp.</i>	Poppy	NL												
<i>Parthenocissus quinquefolia</i>	Virginia Creeper	FAC-		x				x	x	x	x	x		
<i>Penstemon digitalis</i>	Foxglove Beard Tongue	FAC-		x				x						
<i>Phalaris arundinacea</i>	Reed Canary Grass	FACW+	x	x	x			x		x	x			
<i>Phleum pratense</i>	Timothy	FACU												

Table 2.4-2 Plant Species Listed for the Fermi Site (Sheet 7 of 10)

Scientific Name ¹	Common Name ²	Wetland Status ²	Habitat ³											
			CEW	GRW	GOF	GRC	SHB	TKT	FCS	FLH	FWL	DA		
<i>Phragmites australis</i>	Common Reed	FACW+	x	x	x			x	x	x				
<i>Phytolacca americana</i>	Common Pokeweed	FAC-						x	x	x	x		x	
<i>Plantago lanceolata</i>	English Plantain	FAC		x	x									
<i>Plantago major</i>	Common Plantain	FAC+		x	x									x
<i>Plantago rugellei</i>	Black-seed Plantain	FAC		x										
<i>Poa annua</i>	Annual Bluegrass	FAC-					x							x
<i>Poa compressa</i>	Swallen's Bluegrass	FACW	x											x
<i>Poa pratensis</i>	Kentucky Bluegrass	FAC-		x	x									x
<i>Poa sylvestris</i>	Woodland Bluegrass	FAC										x		
<i>Podophyllum peltatum</i>	May-apple	FACU		x										
<i>Polanisia dodecandra</i>	Clammy-weed	UPL								x		x		
<i>Polygonum amphibium</i>	Water Smartweed	OBL	x	x										
<i>Polygonum aviculare</i>	Prostrate Knotweed	FAC-				x	x			x			x	x
<i>Polygonum convolvulus</i>	Buckwheat	FAC-				x	x							
<i>Polygonum lapathifolium</i>	Willow-weed	FACW+	x							x				
<i>Polygonum pennsylvanicum</i>	Pennsylvania Smartweed	FACW+								x		x		
<i>Polygonum virginianum</i>	Virginia Smartweed	FAC								x		x		
<i>Populus deltoides</i>	Cottonwood	FAC+	x	x			x			x	x	x	x	
<i>Potamogeton</i> spp.	Pondweed	OBL	x											
<i>Potentilla simplex</i>	Old Field Cinquefoil	FACU-		x										
<i>Potentilla norvegica</i>	Norwegian Cinquefoil	FAC												
<i>Prunella vulgaris</i>	Heal-all	FAC		x						x				x
<i>Pycnanthemum virginianum</i>	Common Mountain Mint	FACU		x										
<i>Quercus rubra</i>	Red Oak	FACU										x		x
<i>Quercus macrocarpa</i>	Bur Oak	FAC-										x		x

Table 2.4-2 Plant Species Listed for the Fermi Site (Sheet 8 of 10)

Scientific Name ¹	Common Name ²	Wetland Status ²	Habitat ³											
			CEW	GRW	GOF	GRC	SHB	TKT	FCS	FLH	FWL	DA		
<i>Ratibida pinnata</i>	Yellow Coneflower	UPL		x										
<i>Rhamnus cathartica</i>	Common Buckthorn	FACU		x	x			x	x					
<i>Rhus glabra</i>	Smooth Sumac	UPL						x						
<i>Rhus typhina</i>	Staghorn Sumac	UPL		x				x	x					
<i>Ribes americanum</i>	Wild Black Current	FACW		x				x						
<i>Rosa carolina</i>	Pasture Rose	FACU		x	x									
<i>Rosa multiflora</i>	Multiflora Rose	FACU		x				x						
<i>Rubus allegheniensis</i>	Common Blackberry	FACU+		x	x				x					
<i>Rubus flagellaris</i>	Northern Dewberry	FACU-			x			x						
<i>Rubus occidentalis</i>	Black Raspberry	UPL		x				x					x	
<i>Rudbeckia hirta</i>	Black-eyed Susan	FACU		x										
<i>Rumex crispus</i>	Curly Dock	FAC+		x				x				x	x	
<i>Salix amygdaloides</i>	Peach-leaved Willow	FACW	x							x			x	
<i>Salix exigua</i>	Sandbar Willow	OBL	x	x					x	x			x	
<i>Sanicula marilandica</i>	Black Snakeroot	FACU		x										
<i>Scirpus americana</i>	Olney's Bulrush	OBL	x							x				
<i>Scirpus atrovirens</i>	Green Bullrush	OBL	x	x										
<i>Scirpus pendulus</i>	Nodding Bulrush	OBL	x	x										
<i>Scrophularia lanceolata</i>	Lance-leaf Figwort	FACU+										x		
<i>Setaria faberi</i>	Giant Foxtail	FACU+		x			x							
<i>Setaria glauca</i>	Yellow Foxtail	FAC		x	x									
<i>Setaria viridis</i>	Green Foxtail	UPL			x		x							
<i>Smilacina racemosa</i>	False Spikenard	FACU		x									x	
<i>Solanum nigrum</i>	Black Nightshade	FACU-			x		x	x						
<i>Solidago altissima</i>	Tall Goldenrod	FACU		x	x			x		x				

Table 2.4-2 Plant Species Listed for the Fermi Site (Sheet 9 of 10)

Scientific Name ¹	Common Name ²	Wetland Status ²	Habitat ³											
			CEW	GRW	GOF	GRC	SHB	TKT	FCS	FLH	FWL	DA		
<i>Solidago canadensis</i>	Canada Goldenrod	FACU			x									
<i>Sonchus arvensis</i>	Perennial Sow Thistle	FAC-	x	x	x	x				x				
<i>Sorghastrum avenaceum</i>	Indiangrass	FACU+		x										
<i>Spirodela polyrrhiza</i>	Greater Duckweed	OBL	x											
<i>Sporobolus aspera</i>	Dropseed	NL			x									
<i>Sporobolus vaginiflorus</i>	Dropseed	NL				x								
<i>Taraxacum officinale</i>	Dandelion	FACU		x	x	x								x
<i>Teucrium canadense</i>	American Germander	FACW-			x				x	x				
<i>Tilia americana</i>	American Basswood	FACU									x			
<i>Toxicodendron radicans</i>	Poison Ivy	FAC+		x	x		x	x	x	x	x	x	x	x
<i>Tridens flavus</i>	Purpletop	UPL			x									
<i>Trifolium pratense</i>	Red Clover	FACU+		x	x									
<i>Trifolium repens</i>	White Clover	FACU+			x	x								x
<i>Typha angustifolia</i>	Narrow-leaf Cattail	OBL	x											
<i>Typha x glauca</i>	Blue Cattail	OBL	x											
<i>Typha latifolia</i>	Broad-leaf Cattail	OBL	x	x						x				
<i>Ulmus americana</i>	American Elm	FACW-	x					x	x	x	x			
<i>Urtica dioica</i>	Stinging Nettle	FAC+							x	x				
<i>Verbascum thapsus</i>	Velvetleaf	UPL		x										
<i>Verbena hastata</i>	Blue Vervain	FACW+		x										
<i>Verbena urticifolia</i>	White Vervain	UPL						x	x		x			
<i>Verbena stricta</i>	Hoary Vervain	UPL		x	x									
<i>Vernonia missurica</i>	Missouri Ironweed	FAC+		x	x									
<i>Vitis aestivalis</i>	Summer Grape	FACU		x				x	x		x			
<i>Vitis riparia</i>	Riverbank Grape	FACW-		x				x	x	x	x			

Table 2.4-2 Plant Species Listed for the Fermi Site (Sheet 10 of 10)

Scientific Name ¹	Common Name ²	Wetland Status ²	Habitat ³										
			CEW	GRW	GOF	GRC	SHB	TKT	FCS	FLH	FWL	DA	
<i>Zanthoxylum americanum</i>	Prickly-ash	FACU		x				x	x				
<i>Zizia aurea</i>	Golden Alexander	FAC+		x									
Total Species = 217	Total Species Per Community		56	110	74	34	47	36	49	40	29	22	

Notes:

- Scientific names are primarily taken from Michigan Flora ([Reference 2.4-4](#)).
- Common names and wetland status are primarily taken from the National List of Plant Species that Occur in Wetlands: North Central (Region 3) ([Reference 2.4-5](#)).
 OBL = Obligate Wetland, plants occurring almost always (estimated probability >99%) under natural conditions in wetlands.
 FACW = Facultative Wetland; plants usually occurring in wetlands (estimated probability 67-99%, but occasionally found in non wetlands).
 FAC = Facultative; plants equally likely to occur in wetlands or non wetlands (estimated probability 34-66%).
 FACU = Facultative Upland; plants usually occurring in non wetlands (estimated probability 67-99%), but occasionally found in wetlands (estimated probability 1-33%).
 UPL = Upland; plants occur almost always under natural conditions in non wetlands areas (estimated probability >99%)
 NL = Not listed
- Acronyms for habitats derived from Michigan's Wildlife Action Plan, Terrestrial Systems: Southern Lower Peninsula (Reference 1).
 CEW = Coastal Emergent Wetland (Vegetated) GRW = Grassland Right-of-way GOF = Grassland Idle/Old Field/Planted
 GRC = Grassland Row Crop SHB = Shrubland TKT = Thicket FCS = Forest Coastal Shoreline
 FLH = Forest Low Hardwood FWL = Forest Woodlot DA = Disturbed Areas

Table 2.4-3 Common Mammals Directly or Indirectly Observed on the Fermi Site Between 1973 and 2008

Common Name	Scientific Name
Woodchuck*	<i>Marmota monax</i>
Red Fox*	<i>Vulpes vulpes</i>
Badger*	<i>Taxidea taxus</i>
Opossum*	<i>Didelphis virginiana</i>
Coyote*	<i>Canus latrans</i>
Eastern Cottontail Rabbit*	<i>Sylvilagus floridanus</i>
Raccoon*	<i>Procyon lotor</i>
Striped Skunk*	<i>Mephitis mephitis</i>
Eastern Fox Squirrel*	<i>Sciurus niger</i>
Red Squirrel*	<i>Tamiasciurus hudsonicus</i>
Gray Squirrel*	<i>Sciurus carolinensis</i>
White-tailed Deer*	<i>Odocoileus virginianus</i>
Muskrat*	<i>Ondatra zibethica</i>
Feral Cat	<i>Felis catus</i>
Norway Rat	<i>Rattus norvegicus</i>
House Mouse	<i>Mus musculus</i>
Masked Shrew	<i>Sorex cinereus</i>
Short-tailed Shrew	<i>Blarina brevicauda</i>
Prairie Deer Mouse	<i>Peromyscus maniculatus</i>
White-footed Mouse	<i>Peromyscus leucopus</i>
Meadow Vole	<i>Microtus pennsylvanicus</i>

* Observed 2007-2008

Table 2.4-4 Birds Potentially Occurring in the Monroe, Michigan Region and Seasonal Abundance¹ (Sheet 1 of 14)

(Asterisks in the left column indicated species observed on the Fermi property since 2000²)

Common Name	Scientific Name	Season ³				Nest Locally
		Spring	Summer	Fall	Winter	
Common Loon	<i>Gavia immer</i>	o ⁴		o	r	
Horned Grebe	<i>Podiceps auritus cornutus</i>	u		u	o	
Eared Grebe	<i>Colymbus nigricollis californicus</i>	r		r		
Pied-billed Grebe	<i>Podilymbus p. podiceps</i>	c	c	c	r	+
***White Pelican	<i>Pelecanus erythrorhynchos</i>	r	r	r		
***Double-crested Cormorant	<i>Phalacrocorax a. auritus</i>	o	o	o	r	
***Great Blue Heron	<i>Ardea h. herodias</i>	c	c	c	u	+
***Green Heron	<i>Butorides v. virescens</i>	c	c	c		+
Little Blue Heron	<i>Florida caerulea</i>	r	o	o		
Cattle Egret	<i>Bubulcus i. ibis</i>	u	u			
***Great Egret	<i>Casmerodius albus egretta</i>	c	c	c	x	+
***Snowy Egret	<i>Leucophoyx t. thula</i>	x	r	r	u	
***Black-capped Chickadee	<i>Parus a. atricapillus</i>	u		u	u	+
**Tufted Titmouse	<i>Parus bicolor</i>	u	u	u	o	+
White-breasted Nuthatch	<i>Sitta carolinensis cookie</i>	o	o	o	u	
Red-breasted Nuthatch	<i>Sitta canadensis</i>	u		u	u	
*Brown Creeper	<i>Certhia familiaris americana</i>	u		u	x	+
***House Wren	<i>Troglodytes troglodytes hiemalis</i>	c	c	c	u	
Winter Wren	<i>Troglodytes troglodytes hiemalis</i>	u		u	x	
Bewick's Wren	<i>Thryomanes bewickii</i>	x	x	x	r	+
**Carolina Wren	<i>Thryothorus l. ludovicianus</i>	r	r	r	r	+

Table 2.4-4 Birds Potentially Occurring in the Monroe, Michigan Region and Seasonal Abundance¹ (Sheet 2 of 14)

(Asterisks in the left column indicated species observed on the Fermi property since 2000²)

Common Name	Scientific Name	Season ³				Nest Locally
		Spring	Summer	Fall	Winter	
***Mockingbird	<i>Mimus p. polyglottos</i>	r	r	r	r	+
*Gray Catbird	<i>Dumetella carolinensis</i>	c	c	c	r	+
***Brown Thrasher	<i>Toxostoma r. rufum</i>	c	c	c	r	+
***American Robin	<i>Turdus m. migratorius</i>	c	a	c	u	+
*Wood Thrush	<i>Hylocichla mustellina</i>	u	u	o		+
*Hermit Thrush	<i>Catharus guttata faxoni</i>	c		c	r	
*Swainson's Thrush	<i>Catharus ustulata swainsoni</i>	c		c		
*Gray-Cheeked Thrush	<i>Catharus m. minima</i>	u		u		
*Veery	<i>Catharus fuscescena</i>	u	u	o		+
***Eastern Bluebird	<i>Siala s. sialis</i>	u	u	u	r	+
Blue-gray Gnatcatcher	<i>Poliptiala c. caerulea</i>	c	u	c		+
*Golden-crowned Kinglet	<i>Regulus s. satrapa</i>	c		c	u	
**Ruby-crowned Kinglet	<i>Regulus c. calendula</i>	c		c	r	
*Water Pipit	<i>Anthus spinoletta rubescens</i>	u		u	r	
Bohemian Waxwing	<i>Bombycilla garrulous pallidiceps</i>				x	
*Cedar Waxwing	<i>Bombycilla cedrorum</i>	c	u	c	u	+
Northern Shrike	<i>Lanius excubitor</i>	r		r	r	
Loggerhead Shrike	<i>Lanius ludovicianus</i>	o	o	o	r	+
***European Starling	<i>Sturnus v. vulgaris</i>	a	a	a	a	+
White-eyed Vireo	<i>Vireo griseus noveboracensis</i>	o		o		
Yellow-throated Vireo	<i>Vireo flavifrons</i>	u	u	u		+

Table 2.4-4 Birds Potentially Occurring in the Monroe, Michigan Region and Seasonal Abundance¹ (Sheet 3 of 14)

(Asterisks in the left column indicated species observed on the Fermi property since 2000²)

Common Name	Scientific Name	Season ³				Nest Locally
		Spring	Summer	Fall	Winter	
*Oldsquaw	<i>Clangula hyemalis</i>	r		r	r	
King Elder	<i>Somaterai spectabilis</i>			x		
White-winged Scoter	<i>Scoter melanitta d. deglandi</i>	o		o	o	
*Surf Scoter	<i>Melanitta perspicillata</i>	o		o	o	
Black Scoter	<i>Melanitta nigra</i>			o	r	
Ruddy Duck	<i>Oxyura jamaicensis rubida</i>	a	u	c	u	+
Hooded Merganser	<i>Lophodytes cucullatus</i>	c	u	c	u	+
*Long-billed Marsh Wren	<i>Telmatodytes palustris dissaptus</i>	c	c	c	x	+
Short-billed Marsh Wren	<i>Cistothorus platensis stellaris</i>	r	r	r	r	+
***Common Merganser	<i>Mergus merganser americanus</i>	a	r	a	a	
*Red-breasted Merganser	<i>Mergus s. serrator</i>	u		u	r	
***Turkey Vulture	<i>Cathartes aura septentrionalis</i>	c	u	u		+
Goshawk	<i>Accipiter gentilis atricapillus</i>	r		r	r	
*Sharp-shinned Hawk	<i>Accipiter striatus velox</i>	c		u	r	
*Coopers Hawk	<i>Accipiter cooperii</i>	u	u	u	u	+
***Red-tailed Hawk	<i>Buteo jamaicensis borealis</i>	c	c	c	c	+
Red-shouldered Hawk	<i>Buteo lineatus</i>	u	u	u	o	+
Broad-winged Hawk	<i>Buteo p. platypterus</i>	c		c		
Rough-legged Hawk	<i>Buteo lagopus</i>	u		u	c	
Golden Eagle	<i>Aquila chrysaetos canadensis</i>	r		r	r	
***Bald Eagle	<i>Haliaeetus leucocephalus</i>	u	u	u	u	+

Table 2.4-4 Birds Potentially Occurring in the Monroe, Michigan Region and Seasonal Abundance¹ (Sheet 4 of 14)

(Asterisks in the left column indicated species observed on the Fermi property since 2000²)

Common Name	Scientific Name	Season ³				Nest Locally
		Spring	Summer	Fall	Winter	
***Marsh Hawk	<i>Circus cyaneus hudsonius</i>	u	u	u	u	+
***Osprey	<i>Pandion haliaetus carolinensis</i>	u	r	u		
Gyrfalcon	<i>Falco rusticolus obsoletus</i>	x		x	x	
*Peregrine Falcon	<i>Falco peregrinus anatum</i>	r		r	r	
Pigeon Hawk	<i>Falco c. columbarus</i>	r		r	r	
***American Kestrel	<i>Falco s. sparverius</i>	c	c	c	c	+
Bobwhite	<i>Colinus v. virginianus</i>	u	u	u	u	+
*Ring-necked Pheasant	<i>Phasianus colchicus</i>	c	c	c	c	+
Sandhill Crane	<i>Grus canadensis tabida</i>	r		x		
King Rail	<i>Rallus e. elegans</i>	o	o	o	r	+
Virginia Rail	<i>Rallus l. limicola</i>	o	o	o	r	+
*Sora	<i>Porzana carolina</i>	c	u	c	r	+
Yellow Rail	<i>Coturnicops n. noveboracensis</i>	x		x		
Black Rail	<i>Laterallus j. jamaicensis</i>	x		x		
*Common Gallinule	<i>Gallinula chloropus cachinnana</i>	c	c	c	x	+
***American Coot	<i>Fulica americana</i>	a	c	a	u	+
*Semipalmated Plover	<i>Charadrius semipalmatus</i>	c	x	c		
Piping Plover	<i>Charadrius m. melodus</i>	r	r	r		+
Wilson's Plover	<i>Charadrius w. wilsonia</i>		x			
***Killdeer	<i>Charadrius v. vociferous</i>	c	c	c	r	+
*American Golden Plover	<i>Pluvialis d. dominica</i>	c	u	u		
*Black-bellied Plover	<i>Pluvialis squatarola</i>	c	u	u		
*Ruddy Turnstone	<i>Arenaris interpres morinells</i>	c	u	c		

Table 2.4-4 Birds Potentially Occurring in the Monroe, Michigan Region and Seasonal Abundance¹ (Sheet 5 of 14)

(Asterisks in the left column indicated species observed on the Fermi property since 2000²)

Common Name	Scientific Name	Season ³				Nest Locally
		Spring	Summer	Fall	Winter	
*American Woodcock	<i>Philohela minor</i>	u	u	u		+
*Common Snipe	<i>Capella gallingo delicate</i>	c	c	c	r	+
Whimbrel	<i>Numenius p. phaeopus</i>	r	r	r		
Upland Sandpiper	<i>Bartrima longicauda</i>	u	u	u		+
**Spotted Sandpiper	<i>Actitis macularia</i>	c	c	c		+
*Solitary Sandpiper	<i>Tringa s. solitaria</i>	c	c	c		
Willet	<i>Catoptrophoirus semipalmatus</i>	r	x	r		
*Greater Yellowlegs	<i>Tringa melanoleucus</i>	c	c	c		
*Lesser Yellowlegs	<i>Tringa flavipes</i>	c	c	c		
*Red Knot	<i>Calidris canutus rufa</i>	u	o	o		
*Pectoral Sandpiper	<i>Calidris melanotos</i>	c	c	c		
White-rumped Sandpiper	<i>Calidris fuscicollis</i>	r	r	r		
Baird's Sandpiper	<i>Calidris bairdii</i>	r	r	r	x	
*Least Sandpiper	<i>Calidris minutilla</i>	c	c	c		
*Dunlin	<i>Calidris alpine pacifica</i>	a	c	a	r	
*Short-billed Dowitcher	<i>Limnodromus griseus hendersoni</i>	c	c	c		
Long-billed Dowitcher	<i>Limnodromus scopaceus</i>	u	u	u		
Stilt Sandpiper	<i>Micropalama himantopus</i>	x	u	u		
*Semipalmated Sandpiper	<i>Calidris pusillus</i>	a	c	c		
Western Sandpiper	<i>Calidris mauri</i>	r	r	r		
Buff-breasted Sandpiper	<i>Tryngites subruficollis</i>	r	r	r		
Marbled Godwit	<i>Limosa fedoa</i>	r	r	r		

Table 2.4-4 Birds Potentially Occurring in the Monroe, Michigan Region and Seasonal Abundance¹ (Sheet 6 of 14)

(Asterisks in the left column indicated species observed on the Fermi property since 2000²)

Common Name	Scientific Name	Season ³				Nest Locally
		Spring	Summer	Fall	Winter	
Hudsonian Godwit	<i>Limosa haemastica</i>	x	r	r		
Sanderling	<i>Crocethia alba</i>	o	c	c	x	
American Avocet	<i>Recurvirostra americana</i>	r		r		
Red Phalarope	<i>Phalaropus fulicarius</i>			r	x	
Wilson's Phalarope	<i>Stegenopus tricolor</i>	o	o	o		
Northern Phalarope	<i>Lobipes lobatus</i>	o	o	o	x	
Parasitic Jaeger	<i>Stercorarius parasiticus</i>		x	r		
Skua	<i>Catharacta s. skua</i>			x		
Glaucous Gull	<i>Larus h. hyperboreus</i>	r	x	r	r	
Iceland Gull	<i>Larus g. glaucoides</i>			r	r	
**Great Black-backed Gull	<i>Larus marinus</i>	c	u	c	c	
***Herring Gull	<i>Larus argentatus smithsonianus</i>	a	c	a	a	+
***Ring-billed Gull	<i>Larus delewarensis</i>	a	c	a	a	+
Franklin's Gull	<i>Larus pipixcan</i>	x	r	r	x	
***Bonaparte's Gull	<i>Larus philadelphia</i>	c	o	a	a	
Forster's Tern	<i>Sterna forsteri</i>	r	o	u		
***Common Tern	<i>Sterna h. hirundo</i>	c	c	c	x	+
Least Tern	<i>Sterna albifrons</i>		x	x		
*Caspian Tern	<i>Hydroprogne caspia</i>	u	c	c		
Black Tern	<i>Chlidonias niger surinamensis</i>	c	c	c		+
***Mourning Dove	<i>Zenaida macroura carolinensis</i>	c	c	c	c	+
Rock Dove (Pigeon)	<i>Colomba livia</i>	c	c	c	c	+
*Yellow-billed Cuckoo	<i>Coccyzus a. americanus</i>	u	u	u		+

Table 2.4-4 Birds Potentially Occurring in the Monroe, Michigan Region and Seasonal Abundance¹ (Sheet 7 of 14)

(Asterisks in the left column indicated species observed on the Fermi property since 2000²)

Common Name	Scientific Name	Season ³				Nest Locally
		Spring	Summer	Fall	Winter	
*Black-billed Cuckoo	<i>Coccyzus erythrophthalmus</i>	o	o	o		+
Groove-billed Ani	<i>Crotophaga s. sulcirostris</i>			x		
Barn Owl	<i>Tyto alba pratincola</i>	u	u	u	u	+
**Screech Owl	<i>Otus osio naevius</i>	c	c	c	c	+
*Great Horned Owl	<i>Bubo v. virginianus</i>	c	c	c	c	+
Snowy Owl	<i>Nyctea scandiaca</i>	o		o	o	
Barred Owl	<i>Strix v. varia</i>	r	r	r	r	+
Long-eared Owl	<i>Asio otus wilsonianus</i>	o	o	o	o	+
Short-eared Owl	<i>Asio f. flammeus</i>	o		o	o	
Saw-whet Owl	<i>Aegolius a. acadicus</i>	o	x	o	r	+
Whip-poor-will	<i>Caprimulgus v. vociferous</i>	u		r		
***Common Nighthawk	<i>Chordeiles m. minor</i>	c	a	c		+
*Chimney Swift	<i>Chaetura pelagica</i>	c	u	a		+
*Ruby-throated Hummingbird	<i>Ardchilochus colubris</i>	u	u	u		+
***Belted Kingfisher	<i>Megaceryle a. alcyon</i>	c	c	c	o	+
***Yellow-shafted Flicker	<i>Colaptes a. auratus</i>	c	c	c	u	+
Red-bellied Woodpecker	<i>Centurus carolinus zebra</i>	u	u	u	u	+
***Red-headed Woodpecker	<i>Melanerpes e. erythrocephalus</i>	c	c	c	u	+
*Yellow-bellied Sapsucker	<i>Sphyrapicus v. varius</i>	c		c	r	
*Hairy Woodpecker	<i>Dendrocopos villosus</i>	u	u	u	u	+
***Downy Woodpecker	<i>Dendrocopos p. pubescens</i>	c	c	c	c	+
***Eastern Kingbird	<i>Tyrannus tyrannus</i>	c	c	c		+

Table 2.4-4 Birds Potentially Occurring in the Monroe, Michigan Region and Seasonal Abundance¹ (Sheet 8 of 14)

(Asterisks in the left column indicated species observed on the Fermi property since 2000²)

Common Name	Scientific Name	Season ³				Nest Locally
		Spring	Summer	Fall	Winter	
Western Kingbird	<i>Tyrannus verticalis</i>		x	x		
*Great Crested Flycatcher	<i>Myiarchus crinitus boreus</i>	c	c	c		+
*Eastern Phoebe	<i>Sayornis phoebe</i>	u	u	u		+
Yellow-bellied Flycatcher	<i>Empidonax flaviventria</i>	u		u		
Acadian Flycatcher	<i>Empidonax virescens</i>	r	r	r		+
*Traill's Flycatcher	<i>Empidonax trailli</i>	c	c	c		+
*Least Flycatcher	<i>Empidonax minimus</i>	c	c	c		+
*Eastern Wood Pewee	<i>Contopus virens</i>	c	c	c		+
Olive-sided Flycatcher	<i>Nuttallornis borealis</i>	u	u	u		
***Horned Lark	<i>Ermophila alpestris</i>	c	u	c	c	+
**Tree Swallow	<i>IradoPROCNE bicolor</i>	c	a	a	x	+
*Bank Swallow	<i>Riparia r. riparia</i>	c	a	c		+
*Rough-winged Swallow	<i>Stelgidopteryx ruficollis serripennis</i>	c	c	c		+
***Barn Swallow	<i>Hirundo rustica erythrogaster</i>	c	c	c		+
*Cliff Swallow	<i>Petrachelidon pyrrhonata</i>	u	r	u		+
***Purple Martin	<i>Progne s. subis</i>	c	c	c		+
***Blue Jay	<i>Cyanocitta cristata bromia</i>	a	c	c	c	+
Black-billed Magpie	<i>Pica pica</i>	x			x	
***Common Crow	<i>Corvus b. brachrhyngchos</i>	c	u	c	u	+
*Black-crowned Night Heron	<i>Nycticorax nycticorax hoactli</i>	c	c	c	o	+
Yellow-crowned Night Heron	<i>Nyctanassa v. violacea</i>	r	r			

Table 2.4-4 Birds Potentially Occurring in the Monroe, Michigan Region and Seasonal Abundance¹ (Sheet 9 of 14)

(Asterisks in the left column indicated species observed on the Fermi property since 2000²)

Common Name	Scientific Name	Season ³				Nest Locally
		Spring	Summer	Fall	Winter	
Least Bittern	<i>Ixobrychus e. exilis</i>	u	u	u	x	+
American Bittern	<i>Botaurus lentiginosus</i>	u	u	u	r	+
Glossy Ibis	<i>Plegadis f. falcinellus</i>	o	o			
**Mute Swan	<i>Cygnus olor</i>	r	r	r	r	
Whistling Swan	<i>Olor columbianus</i>	a	x	c	o	
***Canada Goose	<i>Branta canadensis</i>	a	c	a	a	
Brant	<i>Branta bernicla</i>	x		r		
Barnacle Goose	<i>Branta leucopsis</i>		x	x	x	
White-fronted Goose	<i>Anser albifrons frontalis</i>			x	x	
***Snow Goose	<i>Chen c. caerulescens</i>	o		c	u	
Blue Goose	<i>Chen c. caerulescens</i>	o		c	u	
Fulvous Tree Duck	<i>Dendrocygna bicolor helva</i>			x		
***Mallard	<i>Anas p. platyrhynchos</i>	a	a	a	a	+
**Black Duck	<i>Anas rubripes</i>	a	c	a	a	+
*Gadwall	<i>Ana strepera</i>	c	u	c	r	+
***Pintail	<i>Anas acuta</i>	a	u	a	c	+
***American Green-winged Teal	<i>Anas crecca carolinensis</i>	c	u	c	o	+
**Blue-winged Teal	<i>Anas d. discors</i>	c	c	a	x	+
European Wigeon	<i>Anas penelope</i>	r		r	x	
*American Wigeon	<i>Anas americana</i>	a	u	a	o	+
Northern Shoveler	<i>Anas clypeata</i>	c	u	c	r	+
***Wood Duck	<i>Aix sponsa</i>	c	c	a	r	+
*Redhead	<i>Aythya americana</i>	c	u	c	o	+
Ring-necked Duck	<i>Aythya collaris</i>	c	x	c	r	
Canvasback	<i>Aythya valisineria</i>	a	x	a	c	
Greater Scaup	<i>Aythya marilla</i>	u		u	r	

Table 2.4-4 Birds Potentially Occurring in the Monroe, Michigan Region and Seasonal Abundance¹ (Sheet 10 of 14)

(Asterisks in the left column indicated species observed on the Fermi property since 2000²)

Common Name	Scientific Name	Season ³				Nest Locally
		Spring	Summer	Fall	Winter	
**Lesser Scaup	<i>Aythya affinis</i>	a	u	c	u	+
*Common Goldeneye	<i>Bucephala clangula americana</i>	c		c	c	
***Bufflehead	<i>Bucephala albeola</i>	c		c	u	
Solitary Vireo	<i>Vireo s. solitarius</i>	u		u		
*Red-eyed Vireo	<i>Vireo olivaceus</i>	c	c	c		+
*Philadelphia Vireo	<i>Vireo philadelphicus</i>	u		u		
*Warbling Vireo	<i>Vireo g. gilvus</i>	c	c	c		+
Black and White Warbler	<i>Mniotilta varia</i>	c		c		
Prothonotary Warbler	<i>Protonotaria citrea</i>	u	u	u		+
Worm-eating Warbler	<i>Helminthos vermivorus</i>	r		x		
Golden-winged Warbler	<i>Vermivora chrysoptera</i>	u		u		
Blue-winged Warbler	<i>Vermivora pinus</i>	u	r	u		+
Tennessee Warbler	<i>Vermivora peregrina</i>	c		c		
*Orange-crowned Warbler	<i>Vermivora celata</i>	o		o	x	
*Nashville Warbler	<i>Vermivora r. ruficapilla</i>	c		c		
Northern Parula	<i>Parula americana</i>	o		o		
*Yellow Warbler	<i>Dendroica petechia aestiva</i>	c	c	c		+
*Magnolia Warbler	<i>Dendroica magnolia</i>	c	x	c		
*Cape May Warbler	<i>Dendroica tigrina</i>	c		c		
*Black-throated Blue Warbler	<i>Dendroica c. caerulescens</i>	c		c		
*Myrtle Warbler	<i>Dendroica c. coronata</i>	a		a	o	
*Black-throated Green Warbler	<i>Dendroica v. virens</i>	c		c		

Table 2.4-4 Birds Potentially Occurring in the Monroe, Michigan Region and Seasonal Abundance¹ (Sheet 11 of 14)

(Asterisks in the left column indicated species observed on the Fermi property since 2000²)

Common Name	Scientific Name	Season ³				Nest Locally
		Spring	Summer	Fall	Winter	
Cerulean Warbler	<i>Dendroica cerulea</i>	u	x	o		+
*Blackburnian Warbler	<i>Dendroica fusca</i>	c		c		
Yellow-throated Warbler	<i>Dendroica dominica albilora</i>	x				
*Chestnut-sided Warbler	<i>Dendroica pennsylvanica</i>	c	o	c		+
*Bay-breasted Warbler	<i>Dendroica castanea</i>	c		c		
*Blackpoll Warbler	<i>Dendroica striata</i>	c		c		
Pine Warbler	<i>Dendroica p. pinus</i>	o		o	x	
Prairie Warbler	<i>Dendroica d. discolor</i>	o		o		
*Palm Warbler	<i>Dendroica p. palmarum</i>	c		c		
*Ovenbird	<i>Seiurus a. aurocapillus</i>	c	c	c		+
*Northern Waterthrush	<i>Seiurus noveboracensis</i>	c		c		
Louisiana Waterthrush	<i>Seiurus motacilla</i>	r	x	x		
Kentucky Warbler	<i>Oporornis formosus</i>	r	r	r		+
Connecticut Warbler	<i>Oporornis agilis</i>	r		r		
*Mourning Warbler	<i>Oporornis philadelphia</i>	u		u		
*Common Yellowthroat	<i>Geothlypis trichas brachidactylus</i>	c	c	c	r	+
*Yellow-breasted Chat	<i>Icteria v. virens</i>	u	u	u		
Hooded Warbler	<i>Wilsonia citrina</i>	r	r	r		+
*Wilson's Warbler	<i>Wilsonia p. pusilla</i>	c		c		
*Canada Warbler	<i>Wilsonia canadensis</i>	c		c		
*American Redstart	<i>Setophaga ruticilla</i>	c	r	c		+

Table 2.4-4 Birds Potentially Occurring in the Monroe, Michigan Region and Seasonal Abundance¹ (Sheet 12 of 14)

(Asterisks in the left column indicated species observed on the Fermi property since 2000²)

Common Name	Scientific Name	Season ³				Nest Locally
		Spring	Summer	Fall	Winter	
*House Sparrow	<i>Passer domesticus</i>	a	a	a	a	+
*Bobolink	<i>Dolichonyx oryzivorus</i>	u	u	u		+
***Eastern Meadowlark	<i>Sturnella m. magna</i>	c	c	c	u	+
Western Meadowlark	<i>Sturnella neglecta</i>	u	u	u		+
Yellow-headed Blackbird	<i>Xanthocephalus xanthocephalus</i>	r	x	x		
***Red-winged Blackbird	<i>Agelaius phoeniceus</i>	a	a	a	a	+
Orchard Oriole	<i>Icterus spurius</i>	r	r	r		+
***Baltimore Oriole	<i>Icterus g. galbula</i>	c	u	u	x	+
Rusty Blackbird	<i>Euphagus c. carolinus</i>	c		c	u	
Brewer's Blackbird	<i>Euphagus cyanocephalus</i>	o		o	r	
***Common Grackle	<i>Quiscalus quiscula versicolor</i>	a	a	a	u	+
***Brown-headed Cowbird	<i>Molothrus a. ater</i>	c	c	c	u	+
*Scarlet Tanager	<i>Piranga olivacea</i>	c	u	c		+
Summer Tanager	<i>Piranga r. rubra</i>	r	x	x		
***Cardinal	<i>Cardinalis c. cardinalis</i>	c	c	c	c	+
Rose-breasted Grosbeak	<i>Pheucticus ludovicianus</i>	c	r	c		+
*Indigo Bunting	<i>Passerina cyanea</i>	c	c	c		+
***Dickcissel	<i>Spiza americana</i>	u	u	u		+
*Evening Grosbeak	<i>Hesperiphona v. vespertina</i>	o		o	o	
Purple Finch	<i>Carpodacus p. purpureus</i>	u	x	u	u	
Hoary Redpoll	<i>Acanthis hornemanni</i>	x		x		
Common Redpoll	<i>Acanthis flammea</i>	o		o	o	

Table 2.4-4 Birds Potentially Occurring in the Monroe, Michigan Region and Seasonal Abundance¹ (Sheet 13 of 14)

(Asterisks in the left column indicated species observed on the Fermi property since 2000²)

Common Name	Scientific Name	Season ³				Nest Locally
		Spring	Summer	Fall	Winter	
Pine siskin	<i>Spinus p. pinus</i>	u		u	o	
***American Goldfinch	<i>Spinus t. tristis</i>	c	c	c	c	+
*Rufous-sided Towhee	<i>Pipilo e. erythrophthalmus</i>	c	c	c	u	+
*Savannah Sparrow	<i>Passerculus sandwichensis</i>	c	c	c	x	+
Grasshopper Sparrow	<i>Ammodramus savannarum pratensis</i>	o	o	o		+
lienslow's Sparrow	<i>Ammodramus henslowii</i>	x	x			
Le Conte's Sparrow	<i>Ammospiza leconteii</i>	x		r		
Sharp-tailed Sparrow	<i>Ammospiza caudacuta</i>	r		r		
*Vesper Sparrow	<i>Pooecetes g. gramineus</i>	u	u	u	x	+
**Slate-colored Junco	<i>Junco h. hyemalis</i>	c		c	u	
Oregon Junco	<i>Junco hyemalis organus</i>	o		o	o	
*Tree Sparrow	<i>Spizella a. arborea</i>	c		c	c	
**Chipping Sparrow	<i>Spizella p. passerine</i>	u	u	u		+
*Field Sparrow	<i>Spizella p. pusilla</i>	u	u	u	r	+
Harris' Sparrow	<i>Zonotrichia guerula</i>	x		x		
*White-crowned Sparrow	<i>Zonotrichia leucophrys</i>	c	x	c	u	
*White-throated Sparrow	<i>Zonotrichia albicollis</i>	c	x	c	u	
Fox Sparrow	<i>Passerella i. iliaca</i>	c		c	r	
*Lincoln's Sparrow	<i>Melospiza lincolni</i>	u		u	x	
*Swamp Sparrow	<i>Melospiza Georgiana</i>	u	r	c	o	+
**Song Sparrow	<i>Melospiza melodia euphonis</i>	c	c	c	u	+
House Sparrow	<i>Passer domesticus</i>	c	c	c	c	+

Table 2.4-4 Birds Potentially Occurring in the Monroe, Michigan Region and Seasonal Abundance¹ (Sheet 14 of 14)

(Asterisks in the left column indicated species observed on the Fermi property since 2000²)

Common Name	Scientific Name	Season ³				Nest Locally
		Spring	Summer	Fall	Winter	
Lapland Longspur	<i>Calcarius l. lapponicus</i>	u		u	u	
*Snow Bunting	<i>Plectrophenax n. nivalis</i>	c		c	c	

Notes:

- 1 Potential species, season, and nesting is derived from surveys conducted on the Ottawa National Wildlife Refuge at Oak Harbor, OH, located about 30 miles southeast of Fermi.
- 2 Observed on the Fermi property
 - * Last observation reported in 2000 Detroit Edison Wildlife Management Plan
 - ** Last observation reported 2002 Detroit Edison Wildlife Habitat Program Re-certification
 - *** Last observation during 2006-08 Fermi 3 Terrestrial Studies
- 3 Spring = March – May; Summer = June – August; Fall = September – November; Winter = December – February
- 4 a = abundant – a common species which is very numerous
 c = common – certain to be seen in suitable habitat
 u = uncommon – present, but not certain to be seen
 o = occasional – seen only a few times during a season
 r = rare – seen at intervals of 2 to 5 years
 x = accidental – has been seen only once or twice
 + = species nest locally

Table 2.4-5 Amphibians and Reptiles Occurring on the Fermi Site

Common Name	Scientific Name
Reptiles	
Banded Water Snake*	<i>Natrix sipedon fasciata</i>
Eastern Garter Snake	<i>Thamnophis sirtalis sirtalis</i>
Eastern Milk Snake	<i>Lampropeltis doliata triangularis</i>
Eastern Spiny Softshell Turtle*	<i>Trionix spiniferus</i>
Eastern Fox Snake*	<i>Pantherophis gloydi</i>
Northern Water Snake	<i>Natrix sipedon sipedon</i>
Snapping Turtle*	<i>Chelydra serpentine serpentina</i>
Speckled Kingsnake*	<i>Lampropeltis getulus holbrooki</i>
Three-toed Box Turtle*	<i>Terrapene carolina triunquus</i>
Painted Turtle	<i>Chrysemys picta</i>
Map Turtle	<i>Graptemys geographica</i>
Amphibians	
American Toad*	<i>Bufo americanus</i>
Blanchard's Cricket Frog	<i>Acris crepitans blanchardi</i>
Bullfrog*	<i>Rana catesbiana</i>
Northern Leopard Frog	<i>Rana pipiens pipiens</i>
Chorus Frog	<i>Pseudacris triseriata</i>

*Observed 2007-08

Table 2.4-6 Flora and Fauna Noted on the Fermi Site during Wildlife Habitat Council (WHC) Site Visit, July 2000 (Sheet 1 of 2)

Species Type	Common Name	Scientific Name	
Birds	American robin	<i>Turdus migratorius</i>	
	Killdeer	<i>Charadrius vociferus</i>	
	Chimney swift	<i>Chaetura pelagica</i>	
	Great blue heron	<i>Ardea Herodias</i>	
	American goldfinch	<i>Carduelis tristis</i>	
	Indigo bunting	<i>Passerian cyanea</i>	
	Red-winged blackbird	<i>Agelaius phoeniceus</i>	
	Turkey vulture	<i>Cathartes aura</i>	
	Great egret	<i>Casmerodius albus</i>	
Trees, shrubs, & vines	Staghorn sumac	<i>Rhus typhina</i>	
	Cottonwood	<i>Populus deltoids</i>	
	Sandbar willow	<i>Salix exigua</i>	
	Willow sp.	<i>Salix</i> sp.	
	Grey dogwood	<i>Cornus racemosa</i>	
	Wild grape sp.	<i>Vitis</i> sp.	
	Bush honeysuckle	<i>Diervilla lonicera</i>	
	Trumpet creeper	<i>Campsis radicans</i>	
	Boxelder	<i>Acer negundo</i>	
	Sycamore	<i>Platanus occidentalis</i>	
	Multiflora rose	<i>Rosa multiflora</i>	
	Herbaceous plants	Purple loosestrife	<i>Lythrum salicaria</i>
		Giant reed grass	<i>Phragmites</i> sp.
Cattail sp.		<i>Thpha</i> sp.	
Softstem bulrush		<i>Scirpus</i> sp.	
Common milkweed		<i>Asclepias syracia</i>	
Goldenrod sp.		<i>Solidago</i> sp.	
Common mullein		<i>Verbascum thapsis</i>	
Daisy fleabane	<i>Erigeron annus</i>		
Black-eyed susan	<i>Rudbeckia hirta</i>		

Table 2.4-6 Flora and Fauna Noted on the Fermi Site during Wildlife Habitat Council (WHC) Site Visit, July 2000 (Sheet 2 of 2)

Species Type	Common Name	Scientific Name
	Poppy	<i>Papavera</i> sp.
	Coreopsis sp.	<i>Coriopsis</i> sp.
	Teasel	<i>Dipsacus</i> sp.
	Tiger lily	<i>Lilium lancifolium</i>
	Jewelweed	<i>Impatiens capensis</i>
	May apple	<i>Potophyllum peltatum</i>
	Raspberry sp.	<i>Rubus</i> sp.
	American lotus*	<i>Nelumbo lutea</i>
Reptiles & amphibians	Soft shell turtle*	<i>Trionix spiniferus</i>
	Blanding's turtle*	<i>Emydoidea blandingii</i>
	American toad	<i>Bufo americanus</i>
Insects	Spittle bug	<i>Philaenus spumarius</i>
	Fishfly	<i>Carydalidae</i>
	Monarch butterfly	<i>Danaus plexippus</i>
Mammals	Coyote*	<i>Canis latrans</i>
	White-tailed deer**	<i>Odocoileus virginiana</i>
	Red fox*	<i>Vulpes fulva</i>
	Raccoon*	<i>Procyon lotor</i>
	Eastern cottontail rabbit	<i>Sylvilagus floridana</i>
	Fox squirrel	<i>Sciurus niger</i>

Bold-type indicates aquatic species. Aquatic plants listed above are designated as Obligate (OBL) species by the U.S. Fish & Wildlife Service-National Wetlands Inventory. Occurrence of these species may indicate potential wetland habitat. This is further discussed in [Subsection 2.4.1](#).

* Reported by employees as occurring onsite

** Identified by tracks

Table 2.4-7 Individual Phytoplankton Taxa from Lake Erie Near the Davis Besse Power Plant (1978) (Sheet 1 of 2)

Bacillariophyceae

Asterionella formosa
Diatoma sp.
Fragilaria crotonensis
Gyrosigma sp.
Melosira sp.
Navicula sp.
Nitzschia sigmoidea
Nitzschia sp.
Skeletonema subsalsa
Stephanodiscus binderanus
Stephanodiscus sp.
Surirella sp.
Synedra actinastroides
Synedra sp.
Tabellaria sp.

Chlorophyceae

Actinastrum hantzchii
Actinastrum sp.
Ankistrodesmus falcatus
Binuclearia tatrana
Botryococcus sudeticus
Closteriopsis longissima
Closterium acerosum
Closterium sp.
Coelastrum sp.
Cosarium sp.
Dictyospahaerium sp.
Kirchneriella sp.
Oocystis sp.
Pediastrum duplex
Pediastrum simplex
Scenedesmus sp.
Selenastrum sp.
Spirogyra crassa
Spirogyra sp.

Table 2.4-7 Individual Phytoplankton Taxa from Lake Erie Near the Davis Besse Power Plant (1978) (Sheet 2 of 2)

Staurastrum paradoxum

Chlorophyceae

Tetraspora sp.

Trentepohlia sp.

Unidentified

Chrysophyceae

Dinobryon sp.

Dinophyceae

Ceratium hirudinella

Peridinium sp.

Euglenophyceae

Euglena sp.

Myxophyceae

Anabaena spiroides

Anabaena sp.

Myxophyceae

Aphanizomenon flos-aquae

Chroococcus sp.

Coelsphaerium sp.

Merismopedia sp.

Microcystis sp.

Oscillatoria sp.

Raphidiopsis sp.

Unidentified

Protozoa

Domatomonas sp.

Unidentified flagellate

Source: [Reference 2.4-85](#)

Table 2.4-8 Individual Zooplankton Taxa from Lake Erie Near the Davis Besse Power Plant (1978) (Sheet 1 of 2)

Rotifera

Asplanchna priodonta

Brachionus angularis

B. calyciflorus

B. diversicornus

Cephadella spp.

Chromogaster sp.

Filinia terminalis

Kellicottia longispina

Keratella cochlearis

K. quadrata

K. vulga

Lecane spp.

Lepadella sp.

Notholca spp.

Polyarthra vulgaris

Synchaeta spp.

Trichocerca spp.

T. multicornis

Unknown Rotifer A

Unknown Rotifer B

Copepoda

Calanoid Copepods

Diaptomus minutus

D. sicilis

D. siciloides

Eurytemora affinis

Copepodids, calanoid

Nauplii, calanoid

Table 2.4-8 Individual Zooplankton Taxa from Lake Erie Near the Davis Besse Power Plant (1978) (Sheet 2 of 2)

Copepoda

Cyclopoid Copepods

Cyclops bicuspidatus thomasi

C. vernalis

Mesocyclops edax

Tropocyclops pransnex

Copepodids, cyclopoid

Naupleii, cyclopoid

Cladocera

Bosmina longirostris

Chydorus sphaericus

Diaphanosoma

leuchtenbergianum

Daphnia galeata mendote

D. retrocurva

Eubosmina coregoni (mature)

E. coregoni (immature)

Leptodora kindtii

Protozoa

Diffugia sp.

Source: [Reference 2.4-86](#)

Table 2.4-9 Individual Benthic Macroinvertebrate Taxa in Lake Erie Near the Davis Besse Power Plant (1978)

Coelenterata

Hydra sp. (single polyp)

Hydra sp. (budding polyp)

Annelida

Helobdella elongata

H. stagnalis

Oligochaeta

Immatures (hair setae)

Immatures (no hair setae)

Branchiura sowerbyi

Limnodrilus cervix

L. claparedeanus

L. maumeensis

Ophidonais serpentina

Potamothrix moldaviensis

Arthropoda

Caenis sp.

Chironomus sp.

Cryptochironomus sp.

Ephemeridae

Gammarus fasciatus

Glyptotendipes sp.

Hyallela azteca

Leptodora kindtii

Polypedilum sp.

Procladius sp.

Tanytarsus pupae

Tanytarsus sp.

Mollusca

Amblema sp.

Source: [Reference 2.4-87](#)

Table 2.4-10 Fish Species Collected in Ichthyoplankton Studies in Western Lake Erie from 1974 to 1986

Common Name	Scientific Name	Family
Bluegill sunfish	<i>Lepomis macrochirus</i>	Centrarchidae
Channel catfish	<i>Ictalurus punctatus</i>	Ictaluridae
Common carp	<i>Cyprinus carpio</i>	Cyprinidae
Emerald shiner	<i>Notropis atherinoides</i>	Cyprinidae
Freshwater drum	<i>Aplodinotus grunniens</i>	Sciaenidae
Gizzard shad	<i>Dorosoma cepedianum</i>	Clupeidae
Lake whitefish	<i>Coregonus clupeaformis</i>	Salmonidae
Logperch darter	<i>Percina caprodes</i>	Percidae
Rainbow smelt	<i>Osmerus mordax</i>	Osmeridae
Spottail shiner	<i>Notropis hudsonius</i>	Cyprinidae
Troutperch	<i>Percopsis omiscomaycus</i>	Percopsidae
Unidentified		
Unidentified crappie	<i>Pomoxis</i> spp.	Centrarchidae
Unidentified shiner	<i>Notropis</i> spp.	Cyprinidae
Unidentified sucker		Catostomidae
Unidentified sunfish	<i>Lepomis</i> spp.	Centrarchidae
Walleye	<i>Sander vitreus</i>	Percidae
White bass	<i>Morone chrysops</i>	Moronidae
White sucker	<i>Catostomus commersoni</i>	
Yellow perch	<i>Perca flavescens</i>	Percidae

Source: [Reference 2.4-88](#) and [Reference 2.4-89](#)

Table 2.4-11 Fish Species Impinged at Bayshore Power Station in the Ohio Waters of Western Lake Erie 1976-1977, Michigan Waters, and Waters of the DRIWR, 2005 (Sheet 1 of 2)

Family	Common Name	Scientific Name
Bowfins	Bowfin	<i>Amia calva</i>
Bullhead catfishes	Brown bullhead	<i>Ameiurus nebulosus</i>
	Yellow bullhead	<i>Ameiurus natalis</i>
	Black bullhead	<i>Ameiurus melas</i>
	Stonecat madtom	<i>Noturus flavus</i>
	Tadpole madtom	<i>Noturus gyrinus</i>
	Brindled madtom	<i>Noturus miurus</i>
	Channel catfish	<i>Ictalurus punctatus</i>
Carp and Minnows	Common carp	<i>Cyprinus carpio</i>
	Goldfish	<i>Carassius auratus</i>
	Spotfin shiner	<i>Cyprinella spiloptera</i>
	Spottail shiner	<i>Notropis hudsonius</i>
	Emerald shiner	<i>Notropis atherinoides</i>
	Mimic shiner	<i>Notropis volucellus</i>
	Sand shiner	<i>Notropis stramineus</i>
	Common shiner	<i>Luxilus cornutus</i>
	Golden shiner	<i>Notemigonus crysoleucas</i>
	Bluntnose minnow	<i>Pimephales notatus</i>
	Silver chub	<i>Macrhybopsis storeriana</i>
Fathead minnow	<i>Pimephales promelas</i>	
Drums	Freshwater drum	<i>Aplodinotus grunniens</i>
Gars	Longnose gar	<i>Lepisosteus osseus</i>
Gobies	Round goby	<i>Neogobiusmelanostomus</i>
	Tubenose goby	<i>Proterorhinus marmoratus</i>
Herrings	Alewife	<i>Alosa pseudoharengus</i>
	Gizzard shad	<i>Dorosoma cepedianum</i>
Killifishes	Banded killifish	<i>Fundulus diaphanus</i>
Lampreys	Silver lamprey	<i>Ichthyomyzon unicuspis</i>
	Sea lamprey	<i>Petromyzon marinus</i>
Mooneyes	Mooneye	<i>Hiodon tergisus</i>
Perches	Yellow perch	<i>Perca falvescens</i>
	Walleye	<i>Sander vitreus</i>
	Johnny darter	<i>Etheostoma nigrum</i>
	Logperch	<i>Percina caprodes</i>
	Channel darter	<i>Percina copelandi</i>
	Sauger	<i>Sander canadensis</i>

Table 2.4-11 Fish Species Impinged at Bayshore Power Station in the Ohio Waters of Western Lake Erie 1976-1977, Michigan Waters, and Waters of the DRIWR, 2005 (Sheet 2 of 2)

Family	Common Name	Scientific Name
Pikes	Northern pike	<i>Esox lucius</i>
Salmons	Chinook salmon Coho salmon	<i>Oncorhynchus tshawytscha</i> <i>Oncorhynchus kisutch</i>
Sculpins	Mottled sculpin	<i>Cottus bairdii</i>
Silversides	Brook silverside	<i>Labidesthes sicculus</i>
Smelts	Rainbow smelt	<i>Osmerus mordax</i>
Sticklebacks	Threespine stickleback	<i>Gasterosteus aculeatus</i>
Striped basses	White perch White bass	<i>Morone americana</i> <i>Morone chrysops</i>
Suckers	Quillback Bigmouth buffalo Shorthead redhorse White sucker Northern hog sucker	<i>Carpionodes cyprinus</i> <i>Ictiobus cyprinellus</i> <i>Moxostoma macrolepidotum</i> <i>Catostomus commersonii</i> <i>Hypentelium nigricans</i>
Sunfishes	Orangespotted sunfish Green sunfish Longear sunfish Bluegill Pumpkinseed Rock bass Largemouth bass Smallmouth bass White crappie Black crappie	<i>Lepomis humilis</i> <i>Lepomis cyanellus</i> <i>Lepomis megalotis</i> <i>Lepomis macrochirus</i> <i>Lepomis gibbosus</i> <i>Ambloplites rupestris</i> <i>Micropterus salmoides</i> <i>Micropterus dolomieu</i> <i>Pomoxis annularis</i> <i>Pomoxis nigromaculatus</i>
Trout-perches	Trout-perch	<i>Percopsis omiscomaycus</i>

Source: [Reference 2.4-88](#)

Table 2.4-12 Fish Species Collected in Stony Creek

Common Name	Scientific Name
Blackside darter	<i>Percina Maculata</i>
Bluegill	<i>Lepomis macrochirus</i>
Bluntnose minnow	<i>Pimephales notatus</i>
Carp	<i>Cyprinus carpio</i>
Central mudminnow	<i>Umbridae limi</i>
Creek chub	<i>Semotilus atromaculatus</i>
Fathead minnow	<i>Pimephales promelus</i>
Golden redhorse	<i>Moxostoma erythrurum</i>
Grass pike	<i>Esox americanus</i>
Green sunfish	<i>Lepomis cyanellus</i>
Greenside	<i>Etheostoma blennioides</i>
Johnny darter	<i>Etheostoma nigrum</i>
Logperch	<i>Percina caprodes</i>
Northern hog sucker	<i>Hypentelium nigricans</i>
Northern pike	<i>Esox lucius</i>
Pumpkinseed	<i>Lepomis gibbosus</i>
Rainbow darter	<i>Etheostoma caruleum</i>
Rock bass	<i>Ambloplites rupestris</i>
Trout	<i>Salmonidae</i>
Western sucker	<i>Catostomus commersoni</i>
White bass	<i>Morone chrysops</i>
White sucker	<i>Catostomus commersoni</i>
Yellow perch	<i>Perca flavescens</i>

Source: [Reference 2.4-90](#) and [Reference 2.4-91](#)

**Table 2.4-13 Fish Species Known to Occur in the Ottawa-Stony Watershed
 HUC #4100001 (Sheet 1 of 3)**

Common Name	Scientific Name	Occurrence Status
Bigeye chub	<i>Hybopsis amblops</i>	Current
Bigmouth buffalo	<i>Ictiobus cyprinellus</i>	Current
Black bullhead	<i>Ameiurus melas</i>	Current
Blackchin shiner	<i>Notropis heterodon</i>	Current
Blacknose shiner	<i>Notropis heterolepis</i>	Current
Blackside darter	<i>Percina maculata</i>	Current
Bluegill	<i>Lepomis macrochirus</i>	Current
Bluntnose minnow	<i>Pimephales notatus</i>	Current
Brindled madtom	<i>Noturus miurus</i>	Current
Brook stickleback	<i>Culaea inconstans</i>	Current
Brown bullhead	<i>Ameiurus nebulosus</i>	Current
Central mudminnow	<i>Umbra limi</i>	Current
Central stoneroller	<i>Campostoma anomalum</i>	Current
Channel catfish	<i>Ictalurus punctatus</i>	Current
Channel darter	<i>Percina copelandi</i>	Current
Common shiner	<i>Luxilus cornutus</i>	Current
Creek chubsucker	<i>Erimyzon oblongus</i>	Current
Fantail darter	<i>Etheostoma flabellare</i>	Current
Fathead minnow	<i>Pimephales promelas</i>	Current
Flathead catfish	<i>Pylodictis olivaris</i>	Current
Freshwater drum	<i>Aplodinotus grunniens</i>	Current
Gizzard shad	<i>Dorosoma cepedianum</i>	Current
Golden redhorse	<i>Moxostoma erythrurum</i>	Current
Greenside darter	<i>Etheostoma blennioides</i>	Current
Hornyhead chub	<i>Nocomis biguttatus</i>	Current
Iowa darter	<i>Etheostoma exile</i>	Current
Johnny darter	<i>Etheostoma nigrum</i>	Current
Lake chubsucker	<i>Erimyzon sucetta</i>	Current
Largemouth bass	<i>Micropterus salmoides</i>	Current

**Table 2.4-13 Fish Species Known to Occur in the Ottawa-Stony Watershed
 HUC #4100001 (Sheet 2 of 3)**

Common Name	Scientific Name	Occurrence Status
Least darter	<i>Etheostoma microperca</i>	Current
Logperch	<i>Percina caprodes</i>	Current
Longear sunfish	<i>Lepomis megalotis</i>	Current
Mottled sculpin	<i>Cottus bairdi</i>	Current
Northern hog sucker	<i>Hypentelium nigricans</i>	Current
Northern pike	<i>Esox lucius</i>	Current
Orangespotted sunfish	<i>Lepomis humilis</i>	Current
Orangethroat darter	<i>Etheostoma spectabile</i>	Current
Pugnose minnow	<i>Opsopoeodus emiliae</i>	Current
Pumpkinseed	<i>Lepomis gibbosus</i>	Current
Quillback	<i>Carpoides cyprinus</i>	Current
Rainbow darter	<i>Etheostoma caeruleum</i>	Current
Redfin or Grass Pickerel	<i>Esox americanus</i>	Current
Redfin shiner	<i>Lythrurus umbratilis</i>	Current
River chub	<i>Nocomis micropogon</i>	Current
River darter	<i>Percina shumardi</i>	Current
Rosyface shiner	<i>Notropis rubellus</i>	Current
Sauger	<i>Sander canadensis</i>	Current
Shorthead redhorse	<i>Moxostoma macrolepidotum</i>	Current
Silver redhorse	<i>Moxostoma anisurum</i>	Current
Silverjaw minnow	<i>Ericymba buccata</i>	Current
Smallmouth bass	<i>Micropterus dolomieu</i>	Current
Spotfin shiner	<i>Cyprinella spiloptera</i>	Current
Spottail shiner	<i>Notropis hudsonius</i>	Current
Spotted gar	<i>Lepisosteus oculatus</i>	Current
Spotted sucker	<i>Minytrema melanops</i>	Current
Stonecat	<i>Noturus flavus</i>	Current
Striped shiner	<i>Luxilus chrysocephalus</i>	Current
Tadpole madtom	<i>Noturus gyrinus</i>	Current

**Table 2.4-13 Fish Species Known to Occur in the Ottawa-Stony Watershed
 HUC #4100001 (Sheet 3 of 3)**

Common Name	Scientific Name	Occurrence Status
Trout-perch	<i>Percopsis omiscomaycus</i>	Current
Walleye	<i>Sander vitreus</i>	Current
White bass	<i>Morone chrysops</i>	Current
Yellow bullhead	<i>Ameiurus natalis</i>	Current
Yellow perch	<i>Perca flavescens</i>	Current
Creek chub	<i>Semotilus atromaculatus</i>	Historical
Emerald shiner	<i>Notropis atherinoides</i>	Historical
Golden shiner	<i>Notemigonus crysoleucas</i>	Historical
Green sunfish	<i>Lepomis cyanellus</i>	Historical
Rock bass	<i>Ambloplites rupestris</i>	Historical

Source: [Reference 2.4-90](#) and [Reference 2.4-91](#)

Table 2.4-14 Commercial and Recreational Fish Species in the Vicinity of the Fermi Site (Sheet 1 of 2)

Common Name	Scientific Name	Watershed	Commercial Importance	Recreational Importance
Alewife	<i>Alosa pseudoharengus</i>	Lake Erie Stony Creek Swan Creek	Processed for animal food	Baitfish
Black crappie	<i>Pomoxis nigromaculatus</i>	Lake Erie Stony Creek Swan Creek	Food species	Sportfish
Bluegill	<i>Lepomis macrochirus</i>	Lake Erie Stony Creek Swan Creek	Food species	Sportfish
Bluntnose minnow	<i>Pimephales notatus</i>	Lake Erie Stony Creek Swan Creek	n/a	Baitfish
Channel catfish	<i>Ictalurus punctatus</i>	Lake Erie Stony Creek Swan Creek	Commercial fishery	Sportfish
Common shiner	<i>Luxilus cornutus</i>	Lake Erie Stony Creek Swan Creek	n/a	Baitfish
Emerald shiner	<i>Notropis atherinoides</i>	Lake Erie	n/a	Baitfish
Freshwater drum	<i>Applodinotus grunniens</i>	Lake Erie	Commercial Fishery	Sportfish
Gizzard shad	<i>Dorosoma cepedianum</i>	Lake Erie Stony Creek Swan Creek	n/a	Baitfish
Largemouth bass	<i>Micropterus salmoides</i>	Lake Erie Stony Creek Swan Creek	Food species	Sportfish

Table 2.4-14 Commercial and Recreational Fish Species in the Vicinity of the Fermi Site (Sheet 2 of 2)

Common Name	Scientific Name	Watershed	Commercial Importance	Recreational Importance
Pumpkinseed	<i>Lepomis gibbosus</i>	Lake Erie Stony Creek Swan Creek	n/a	Sportfish
Rainbow smelt	<i>Osmerus mordax</i>	Lake Erie	Processed for animal foods	Sportfish
Rock bass	<i>Ambloplites rupestris</i>	Lake Erie Stony Creek Swan Creek	Food species	Sportfish
Spottail shiner	<i>Notropis hudsonius</i>	Lake Erie Stony Creek Swan Creek	n/a	Baitfish
Walleye	<i>Sander vitreus</i>	Lake Erie Stony Creek Swan Creek	Food species	Sportfish
White bass	<i>Morone chrysops</i>	Lake Erie	Food species	Sportfish
White crappie	<i>Pomoxis annularis</i>	Lake Erie Stony Creek Swan Creek	Food species	Sportfish
White perch	<i>Morone Americana</i>	Lake Erie Stony Creek Swan Creek	n/a	Sportfish
Yellow perch	<i>Perca flavescens</i>	Lake Erie Stony Creek Swan Creek	Food species	Sportfish

Table 2.4-15 Threatened and Endangered Fish and Mollusk Species Within a 50-mi Radius of the Fermi Site (Sheet 1 of 4)

Location	Scientific Name	Common Name	Federal Status	State Status	
Monroe County	Fish				
		<i>Acipenser fulvescens</i>	Lake sturgeon		T
		<i>Ammocrypta pellucida</i>	Eastern sand darter		T
		<i>Erimyzon oblongus</i>	Creek chubsucker		E
		<i>Notropis photogenis</i>	Silver shiner		E
		<i>Opsopoeodus emiliae</i>	Pugnose minnow		E
		<i>Percina copelandi</i>	Channel darter		E
		<i>Percina shumardi</i>	River darter		E
		<i>Phoxinus erythrogaster</i>	Southern redbelly dace		E
		<i>Sander canadensis</i>	Sauger		T
		Mollusks			
		<i>Epioblasma obliquata perobliqua</i>	White catspaw		E
		<i>Epioblasma torulosa rangiana</i>	Northern riffelshell	E	E
		<i>Epioblasma triquetra</i>	Snuffbox		E
		<i>Lampsilis fasciola</i>	Wavy-rayed lampmussel		T
		<i>Obovaria subrotunda</i>	Round hickorynut		E
		<i>Simpsonaias ambigua</i>	Salamander mussel		E
	<i>Toxolasma lividus</i>	Purple lilliput		E	
Wayne County	Fish				
		<i>Acipenser fulvescens</i>	Lake Sturgeon		T
		<i>Opsopoeodus emiliae</i>	Pugnose minnow		E
		<i>Percina shumardi</i>	River darter		E
		<i>Sander canadensis</i>	Sauger		T
Livingston County	Fish				
		<i>Ammocrypta pellucida</i>	Eastern sand darter		T
		<i>Notropis photogenis</i>	Silver shiner		E
		<i>Phoxinus erythrogaster</i>	Souther redbelly dace		E

Table 2.4-15 Threatened and Endangered Fish and Mollusk Species Within a 50-mi Radius of the Fermi Site (Sheet 2 of 4)

Location	Scientific Name	Common Name	Federal Status	State Status
Washtenaw County	Fish			
	<i>Notropis photogenis</i>	Silver shiner		E
	<i>Phoxinus erythrogaster</i>	Souther redbelly dace		E
Lenawee County	Fish			
	<i>Ammocrypta pellucida</i>	Eastern sand darter		T
	<i>Erimyzon oblongus</i>	Creek chubsucker		E
	<i>Phoxinus erythrogaster</i>	Southern redbelly dace		E
Macomb County	Fish			
	<i>Ammocrypta pellucida</i>	Eastern sand darter		T
Oakland County	Fish			
	<i>Ammocrypta pellucida</i>	Eastern sand darter		T
Ohio Lucas County	Fish			
	<i>Acipenser fulvescens</i>	Lake sturgeon		E
	<i>Percina copelandi</i>	Channel darter		T
Ohio Lucas County	Mollusks			
	<i>Ligumia nasuta</i>	Eastern pondmussel		E
	<i>Ligumia recta</i>	Black sandshell		T
	<i>Obliquaria reflexa</i>	Threehorn wartyback		T
	<i>Truncilla donaciformis</i>	Fawnsfoot		T
	<i>Villosa fabalis</i>	Rayed bean		E
Ohio Fulton County	Fish			
	<i>Moxostoma valenciennesi</i>	Greater redhorse		T
Ohio Wood County	Fish			
	<i>Fundulus diaphanus menona</i>	Western banded killifish		E
	<i>Notropis heterolepis</i>	Blacknose shiner		E

Table 2.4-15 Threatened and Endangered Fish and Mollusk Species Within a 50-mi Radius of the Fermi Site (Sheet 3 of 4)

Location	Scientific Name	Common Name	Federal Status	State Status
Ohio Ottawa County	Fish			
	<i>Acipenser fulvescens</i>	Lake Sturgeon		E
	<i>Fundulus diaphanus menona</i>	Western banded killifish		E
	<i>Notropis heterolepis</i>	Blacknose shiner		E
	<i>Percina copelandi</i>	Channel darter		T
	<i>Truncilla donaciformis</i>	Fawnsfoot		T
	Mollusks			
	<i>Epioblasma torulosa rangiana</i>	Northern riffelshell	E	E
	<i>Epioblasma triquetra</i>	Snuffbox		E
	<i>Lampsilis ovata</i>	Pocketbook		E
	<i>Ligumia nasuta</i>	Eastern pondmussel		E
	<i>Ligumia recta</i>	Black sandshell		T
	<i>Obliquaria reflexa</i>	Threehorn wartyback		T
	<i>Unio merus tetralasmus</i>	Pondhorn		T
	<i>Villosa fabalis</i>	Rayed bean		E
Ohio Sandusky County	Fish			
	<i>Fundulus diaphanous menona</i>	Western banded killifish		E
Ohio Seneca County	Fish			
	<i>Moxostoma valenciennesi</i>	Greater redhorse		T
Ohio Erie County	Fish			
	<i>Acipenser fulvescens</i>	Lake Sturgeon		E
	<i>Catostomus catostomus</i>	Longnose sucker		E
	<i>Fundulus diaphanus menona</i>	Western banded killifish		E
	<i>Percina copelandi</i>	Channel darter		T
	<i>Truncilla donaciformis</i>	Fawnsfoot		T
Ohio Erie County	Mollusks			
	<i>Ligumia nasuta</i>	Eastern pondmussel		E
	<i>Ligumia recta</i>	Black sandshell		T

Table 2.4-15 Threatened and Endangered Fish and Mollusk Species Within a 50-mi Radius of the Fermi Site (Sheet 4 of 4)

Location	Scientific Name	Common Name	Federal Status	State Status
	<i>Obliquaria reflexa</i>	Threehorn wartyback		T
Canada Ontario Province	Fish			
	<i>Ammocrypta pellucida</i>	Eastern sand darter		T
	<i>Coregonus reighardi</i>	Shortnose cisco		E
	<i>Erimyzon sucetta</i>	Lake chubsucker		T
	<i>Lepisosteus oculatus</i>	Spotted gar		T
	<i>Noturus stigmosus</i>	Northern madtom		E
	<i>Notropis anogenus</i>	Pugnose shiner		E
	<i>Percina copelandi</i>	Channel darter		T
	<i>Salvelinus fontinalis timagamiensis</i>	Aurora trout		E
	Mollusks			
	<i>Villosa fabalis</i>	Rayed bean		E
	<i>Obovaria subrotunda</i>	Round hickorynut		E
	<i>Ptychobranthus fasciolaris</i>	Kidneyshell		E
	<i>Lampsilis fasciola</i>	Wavy-rayed lampmussel		E
	<i>Simpsonaias ambigua</i>	Mudpuppy mussel		E
	<i>Pleurobema sintoxia</i>	Round pigtoe		E
	<i>Epioblasma torulosa rangiana</i>	Northern riffleshell		E
	<i>Epioblasma triquetra</i>	Snuffbox		E

Table 2.4-16 Fish Species Impinged at Fermi 2 Plant (Oct 1991 – Sep 1992)

Family	Common Name	Scientific Name
Sunfishes	Rock Bass	<i>Ambloplites rupestris</i>
	Green sunfish	<i>Lepomis cyanellus</i>
	Pumpkinseed	<i>Lepomis gibbosus</i>
	Bluegill	<i>Lepomis macrochirus</i>
	Largemouth bass	<i>Micropterus salmoides</i>
	White crappie	<i>Pomoxis annularis</i>
	Black crappie	<i>Pomoxis nigromaculatus</i>
Herrings	Alewife	<i>Alosa pseudoharengus</i>
	Gizzard shad	<i>Dorosoma cepedianum</i>
Carp and Minnows	Common carp	<i>Cyprinus carpio</i>
	Goldfish	<i>Carassius auratus</i>
	Spottail shiner	<i>Notropis hudsonius</i>
	Emerald shiner	<i>Notropis atherinoides</i>
Catfish	Channel catfish	<i>Ictalurus punctatus</i>
	Stonecat	<i>Noturus flavus</i>
	Tadpole madtom	<i>Noturus gyrinus</i>
Smelts	Rainbow smelt	<i>Osmerus mordax</i>
Striped basses	White perch	<i>Morone americana</i>
	White bass	<i>Morone chrysops</i>
Perches	Yellow perch	<i>Perca falvenscens</i>
	Logperch	<i>Percina caprodes</i>
Trout-perches	Trout-perch	<i>Percopsis omiscomaycus</i>
Drums	Freshwater drum	<i>Aplodinotus grunniens</i>

Source: [Reference 2.4-80](#)

Table 2.4-17 Land Use and Vegetation Types Within the 300-ft Fermi to Milan Transmission Corridor

Vegetation/Land Use	Acres	
	Within 300-ft Corridor	Within 50-mile Region
Open Water	1.5	725,910
Developed, Open Space	77.7	346,966
Developed, Low Intensity	71.2	371,809
Developed Medium Intensity	9.2	264,167
Developed, High Intensity	0.8	106,853
Barren Land (Rock/Sand/Clay)	2.8	10,346
Deciduous Forest	151.5	282,046
Evergreen Forest	0.2	6,717
Mixed Forest	0.8	5,765
Shrub/Scrub	5.0	3,197
Grassland/Herbaceous	35.1	41,308
Pasture/Hay	152.2	219,241
Cultivated Crops	454.8	1,217,689
Woody Wetlands	93.4	128,090
Emergent Herbaceous Wetlands	13.0	56,711
Total	1069.1	3,786,795

Figure 2.4-2 Topographic Map Showing Fermi Property Boundary (Base map: USGS 1:24,000 7.5 Minute Topographic Series)

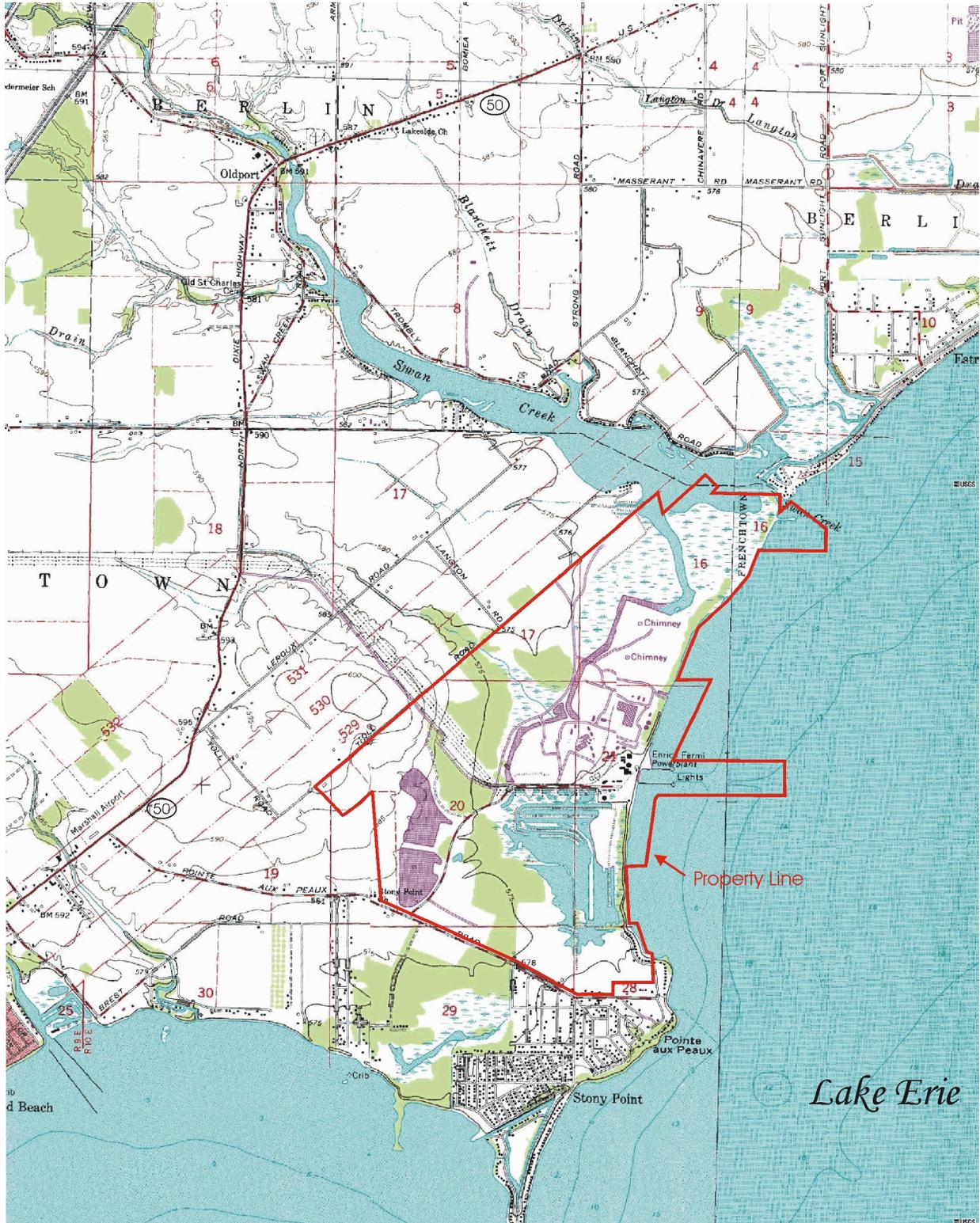


Figure 2.4-3 Aerial Photograph of the Fermi Site Taken in 1981



Figure 2.4-4 Aerial Photograph of the Fermi Site Taken in 2005



Figure 2.4-5 Terrestrial Habitats and Developed Areas at the Fermi Site

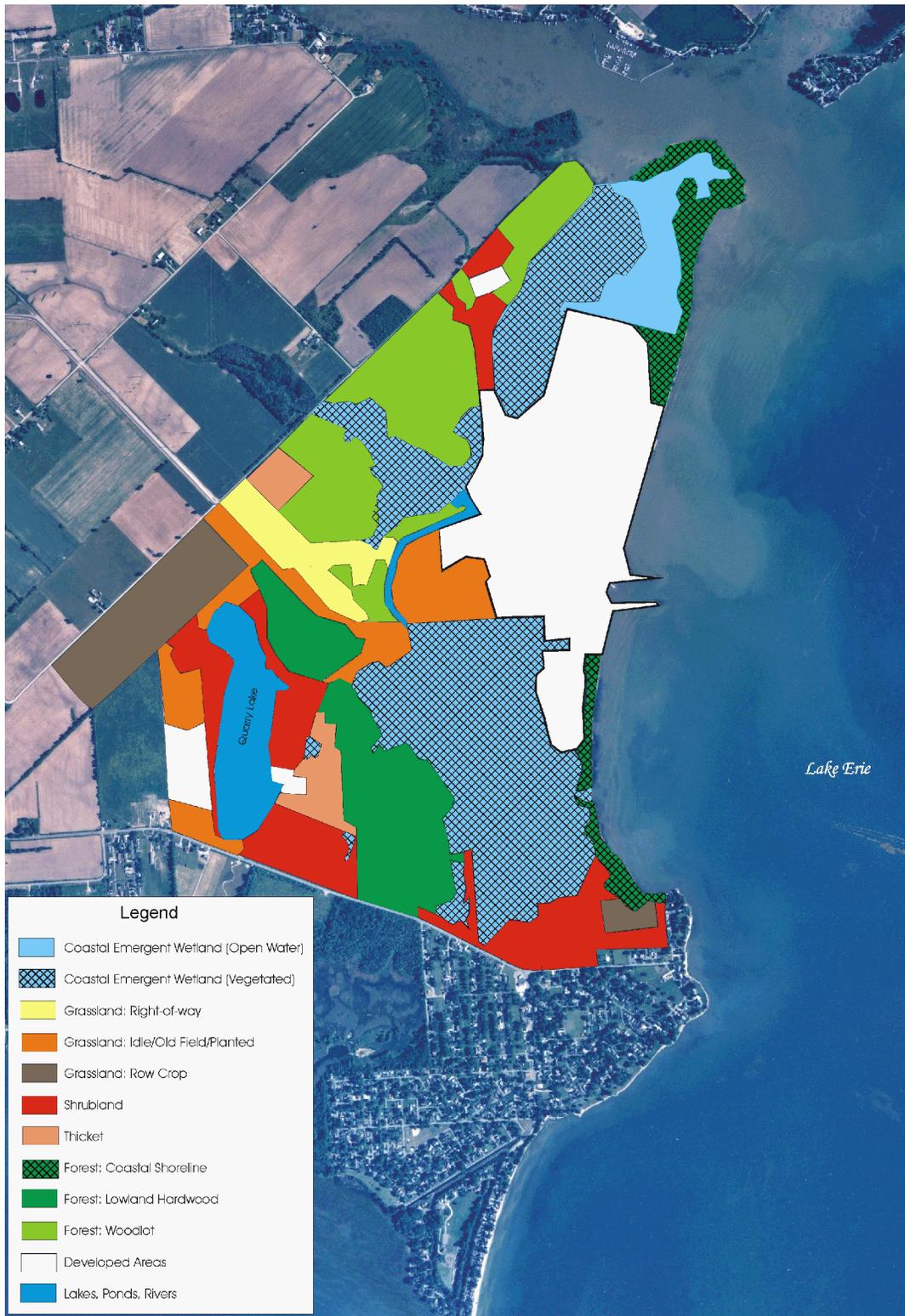


Figure 2.4-6 Boundaries of the Detroit River International Wildlife Refuge, Lagoon Beach Unit, Monroe County, MI



Figure 2.4-7 Fermi Site Map



Figure 2.4-8 Fermi Site Radius Map

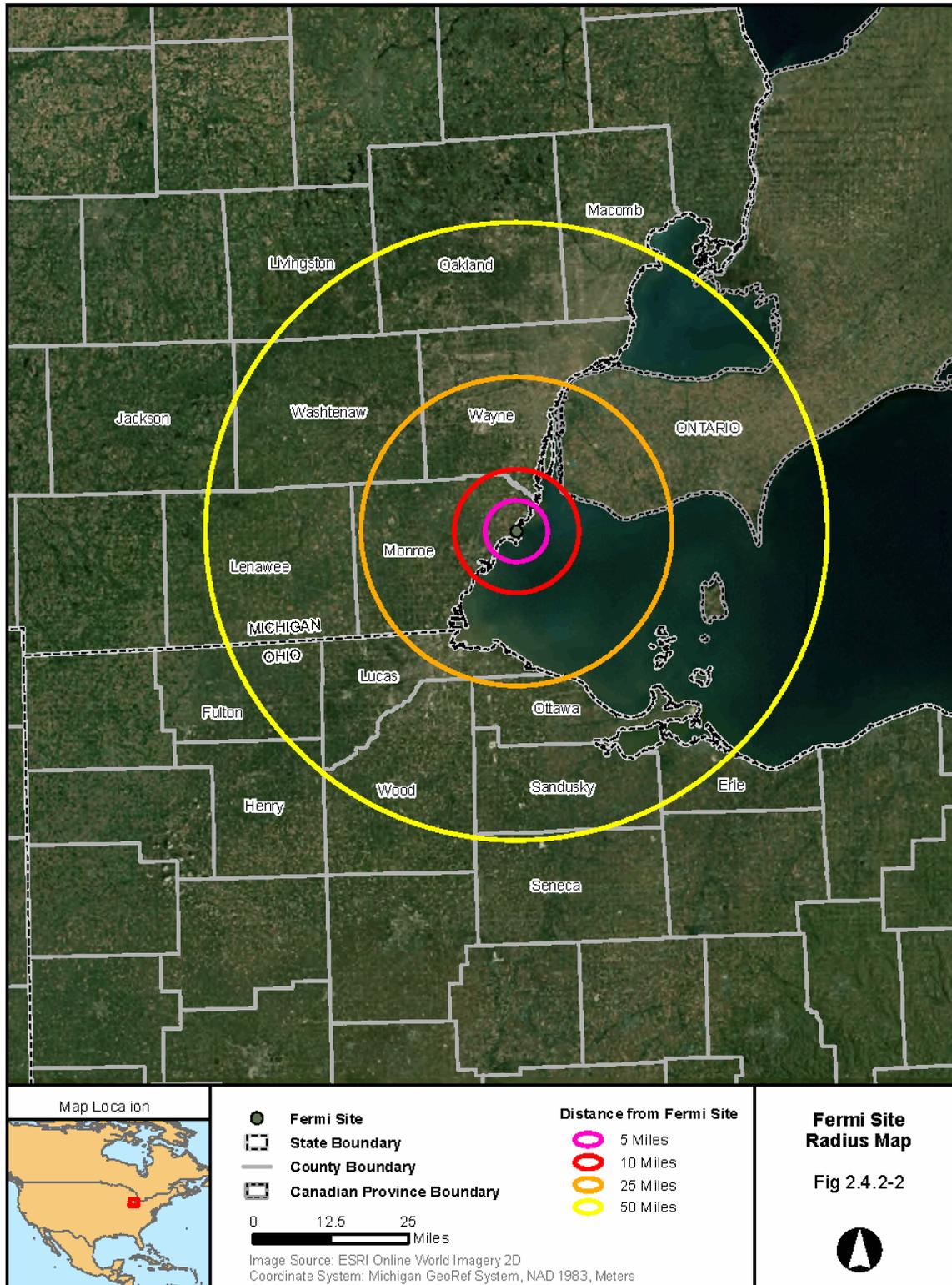
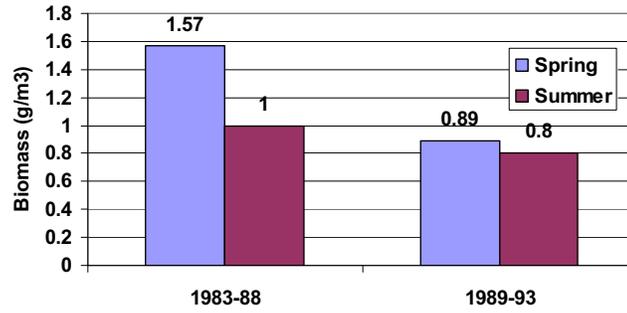
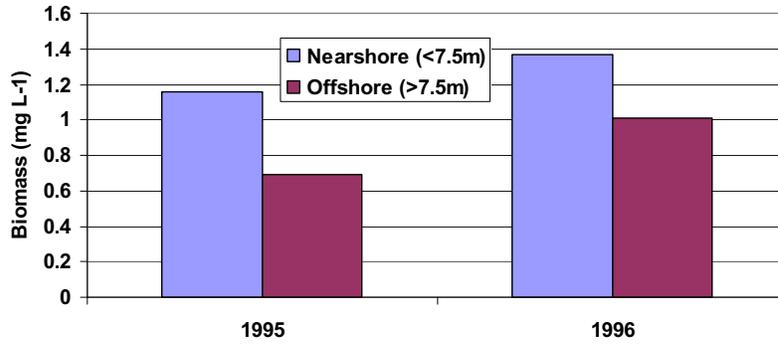


Figure 2.4-9 Average Phytoplankton Biomass in the Western Basin of Lake Erie



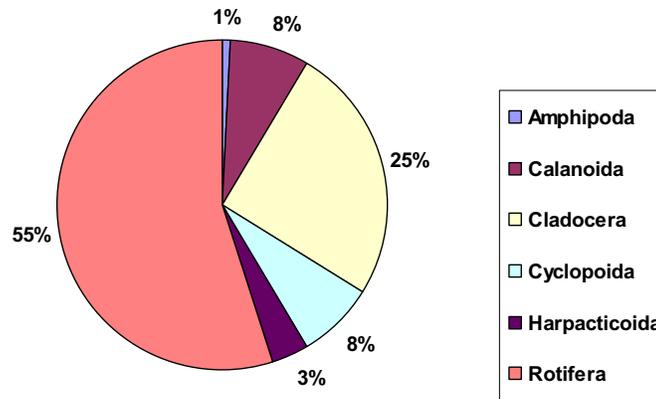
Source: [Reference 2.4-86](#)

Figure 2.4-10 Phytoplankton Biomass in Nearshore vs. Offshore Waters of Western Lake Erie



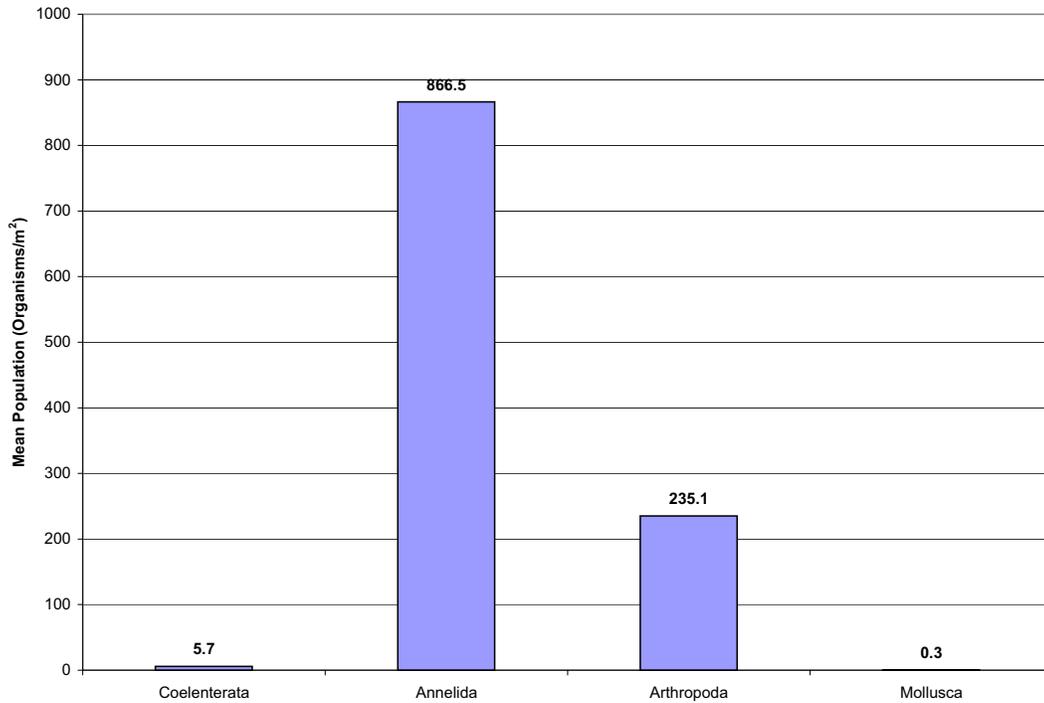
Source: [Reference 2.4-86](#)

Figure 2.4-11 Percent Composition of Zooplankton Species Observed in Lake Erie, 1983-1987



Source: [Reference 2.4-86](#) and [Reference 2.4-92](#)

Figure 2.4-12 Mean Population of Individual Macroinvertebrate Taxa at Locust Point, Lake Erie, 1978



Source: [Reference 2.4-87](#)

Figure 2.4-13 Percent Composition of Benthic Macroinvertebrates in Western Basin of Lake Erie, 2006

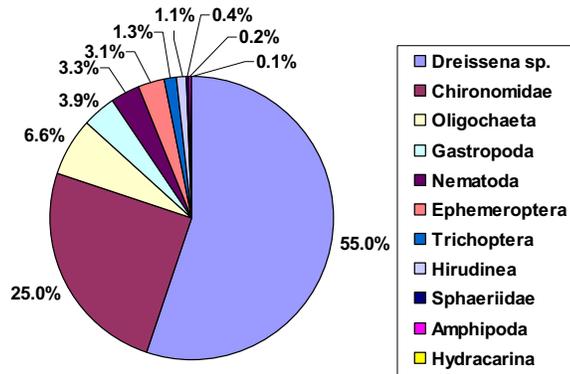
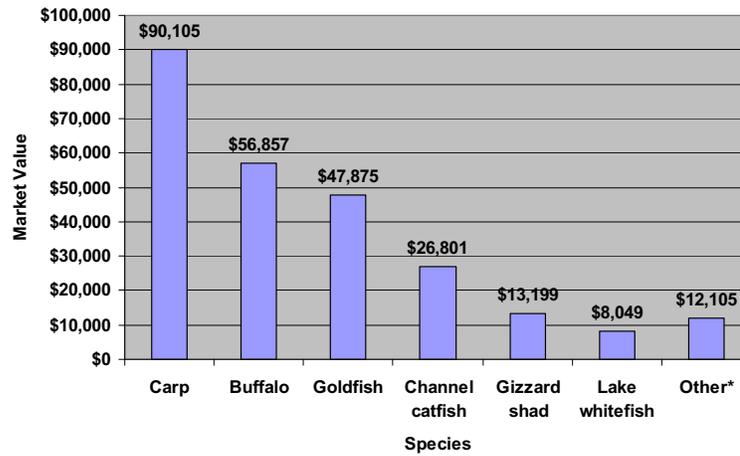
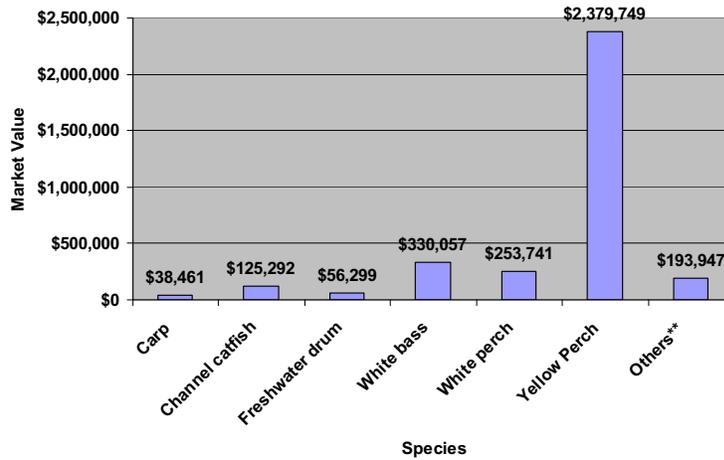


Figure 2.4-14 Michigan Market Value of Commercial Harvest Landings from Lake Erie



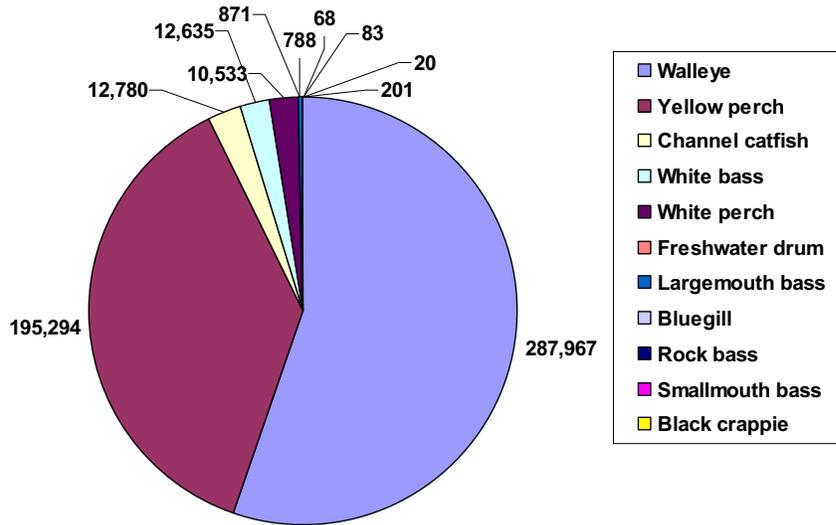
*Others include bullheads, suckers, quillback, white bass, white perch, and freshwater drum.

Figure 2.4-15 Ohio Market Value of Commercial Harvest Landings in Lake Erie (2006)



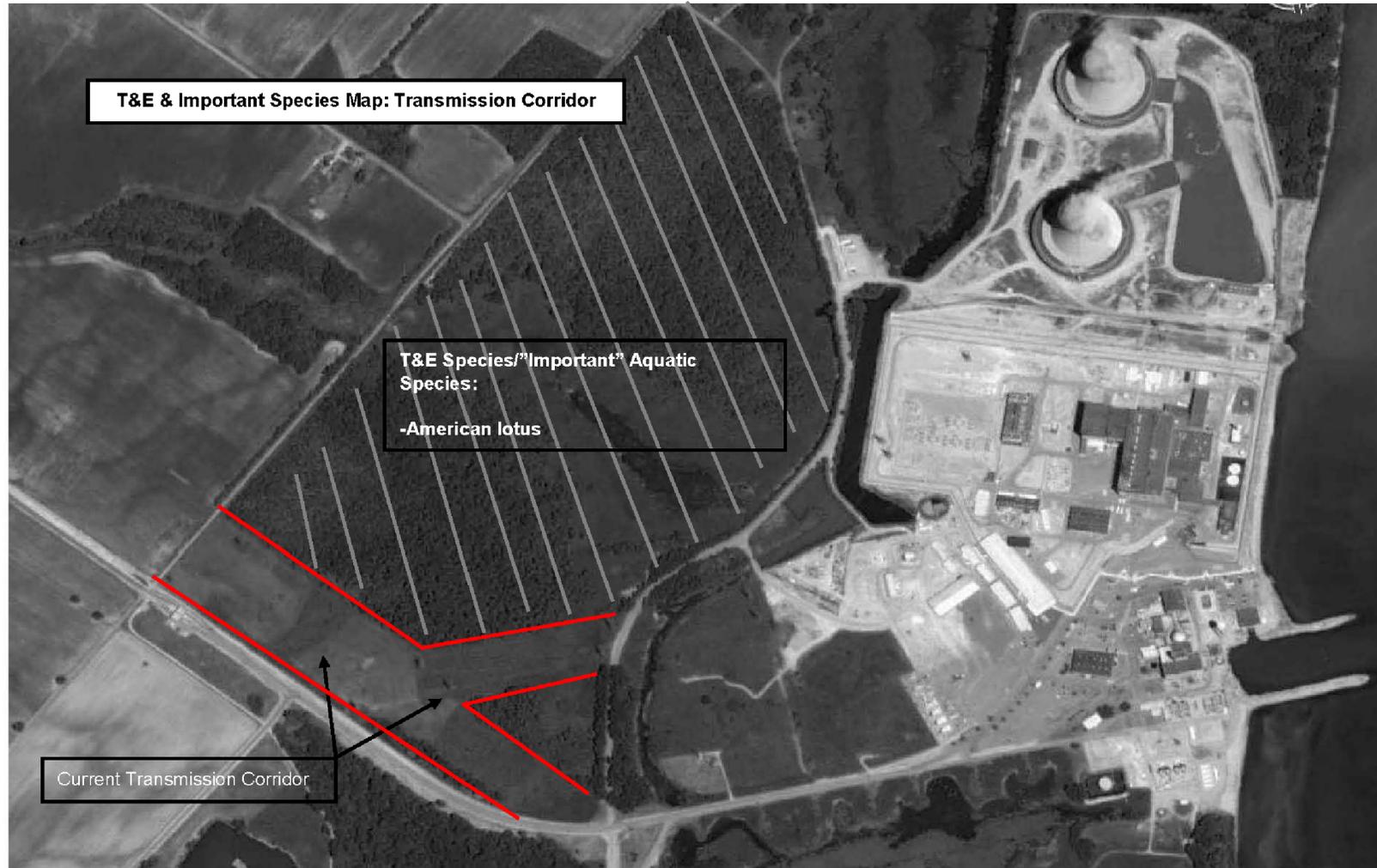
**Others include largemouth bass, rock bass, blue gill, rainbow smelt, bowfin, chinook salmon, black crappie, common carp, and goby.

Figure 2.4-16 Non-Charter Boat Fishery Season Totals*, Michigan, 2006



*Totals are number of specimens harvested
Source: [Reference 2.4-72](#)

Figure 2.4-17 T&E & Important Species Map: Current On-site Transmission Corridor



Hatched area indicates wetland habitat. The only T&E and/or important aquatic species identified in the current transmission corridor was the American lotus. More specific information is further discussed in [Appendix 2B](#).

Figure 2.4-18 Offsite transmission route from Fermi to Milan Substation showing location of wetlands and other potentially regulated waters

