

Porter Brickyard Trail
Environmental Assessment

SEPTEMBER 14, 2011

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CHAPTER 1. INTRODUCTION

The National Park Service (NPS) at Indiana Dunes National Lakeshore (national lakeshore) proposes to construct a portion of the Porter Brickyard Trail within the park. This environmental assessment (EA) analyzes the proposed action alternatives and their impacts on the environment. It has been prepared in accordance with the National Environmental Policy Act (NEPA) of 1969, the regulations of the Council on Environmental Quality (40 CFR 1508.9), and NPS Director’s Order #12 and Handbook: Conservation Planning, Environmental Impact Analysis, and Decision Making.

The proposed project would involve constructing a roughly one-mile multi-use trail on federal land within the national lakeshore boundary to connect with another Porter Brickyard Trail segment to the south on non-federal land. The result will be the construction of the roughly four-mile-long Porter Brickyard Trail that connects the Calumet Trail and the Prairie Duneland Trail. The one-mile trail on federal land, and addressed in this EA, will include an eight-foot-wide asphalt paved surface, with one-foot-wide gravel shoulders. Other parts of the trail, on non-federal lands, will use a combination of low-traffic roadways and eight-foot-wide asphalt paths.

1.1 DESCRIPTION OF THE NATIONAL LAKESHORE

The national lakeshore is located in northern Indiana along the south shore of Lake Michigan, between Gary and Michigan City, Indiana, approximately 50 miles southeast of Chicago (Map 1). It is loosely bounded by Lake Michigan to the north and U.S. 20 to the south (Map 2) and is divided into an East Unit and a West Unit, with several small noncontiguous satellite areas. A variety of residential, commercial, and industrial developments are adjacent to the boundaries, including several small communities that are completely surrounded by national lakeshore land (NPS 1997a).

The national lakeshore was established by the U.S. Congress as a unit of the National Park System on November 5, 1966, (Public Law 89-761) in order to “preserve for the educational, inspirational, and recreational use of the public certain portions of the Indiana Dunes and other areas of scenic, scientific, and historic interest and recreational value in the State of Indiana.”

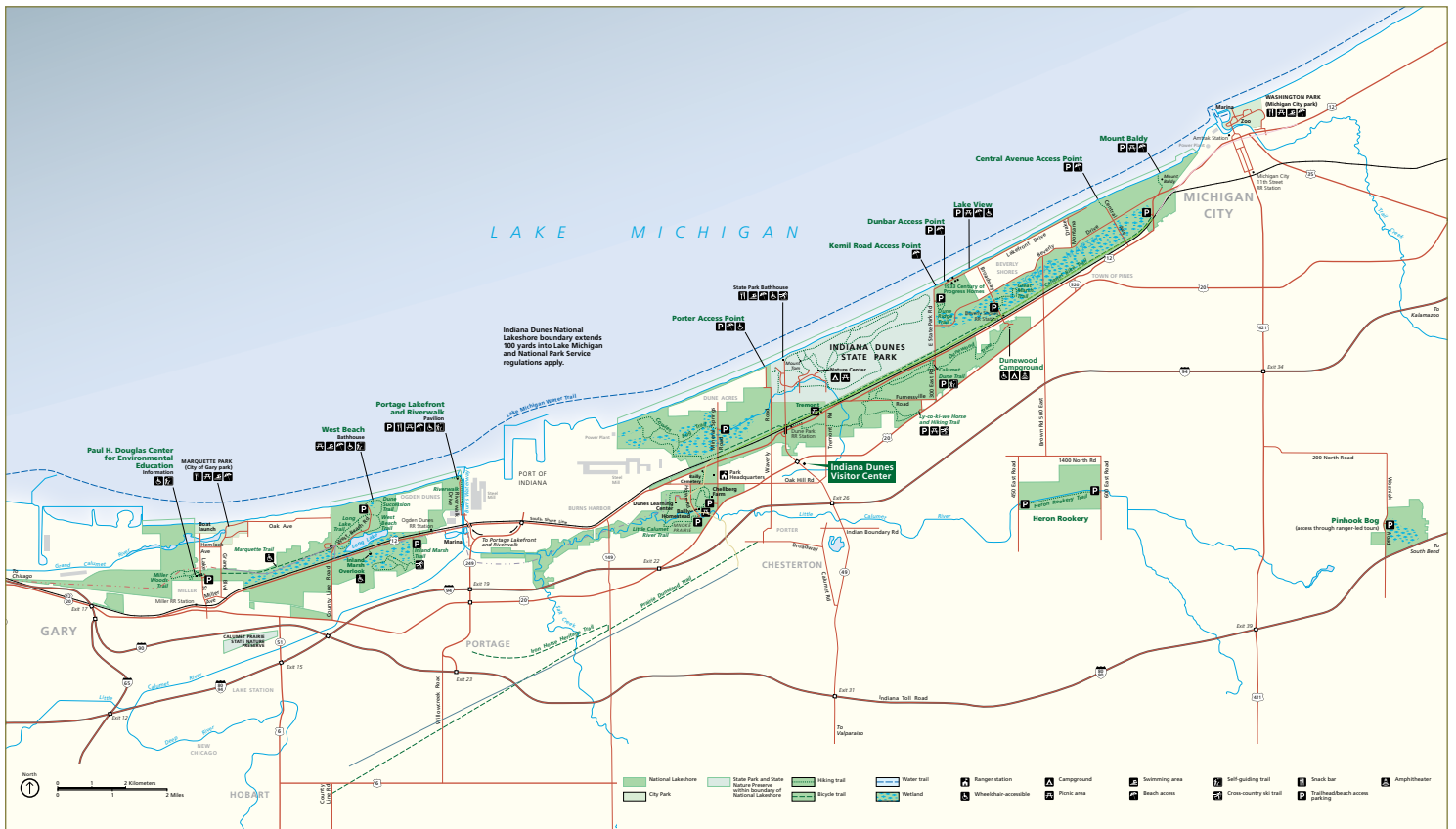
Today, the national lakeshore totals 15,067 acres and experiences nearly two million visitors each year. It offers many amenities, such as hiking, biking, and horseback riding trails; camping; beach access; visitor centers; picnic tables and shelters; and interpretive programs. In addition, the national lakeshore is home to four National Natural Landmarks and one National Historic Landmark.

The national lakeshore comprises dunes, oak savannas, swamps, bogs, marshes, prairies, rivers, and forests that support a great diversity of plant and animal species. Almost 1,200 native plant species are distributed throughout the national lakeshore, and over 300 bird species have been observed within its boundaries.

MAP 1 INDIANA DUNES NATIONAL LAKESHORE LOCATION



MAP 2 INDIANA DUNES NATIONAL LAKESHORE



1.2 DESCRIPTION OF THE PROJECT AREA

The roughly one-mile proposed trail segment within the national lakeshore boundary on federal lands is part of the proposed completion of the Porter Brickyard Trail, an approximately four-mile-long multi-use trail that will connect the existing Calumet Trail to the northeast with the existing Prairie Duneland Trail to the southwest (Map 3). At the south end, the Porter Brickyard Trail will traverse Town of Porter lands and cross over U.S. 20 on a new bridge to the Howe Road right-of-way. The trail will then proceed north within the national lakeshore, but on the



Howe Road right-of-way, which is owned by the Town of Porter. At the intersection with the Little Calumet River Trail, the new trail will proceed in a northeasterly direction on federal lands until its terminus at the Calumet Trail. The U.S. 12 crossing near the north terminus of the trail will also require a new bridge.

The roughly 75-acre project area addressed in this EA is generally bounded to the north by the Northern Indiana Commuter Transportation District (commuter train tracks), to the east by Mineral Springs Road, to the south by Oak Hill Road, and to the west by Bailly Drive. Additionally, all proposed alternatives addressed in this plan use the trail over an existing sewer line from Howe Road to Oak Hill Road and continue easterly on the south side of Oak Hill Road (Map 4).



Much of the project area is in mature forest, with the exception of the area along Mineral Springs Road which contains the national lakeshore's administrative headquarters and maintenance facilities and an open area just south of these facilities that contains herbaceous vegetation and scattered trees and shrubs. Other developments in the project area include the historic Bailly Cemetery, the Cemetery Trail, a trail that follows the sewer line south of Oak Hill Road then southwest to Howe Road, an informal trail that runs between the park headquarters and the Cemetery Trail, U.S. 12, and a wooden bridge used for trail access that spans a ravine on the south side of Oak Hill Road (Map 4).

The area is generally flat in the southern portion but contains some steep slopes in the northern areas associated with glacial ridges and wooded dunes. Elevations range from 619 to 690 feet above sea level. The area north of U.S.12 has some wetlands and is impacted by invasive non-native vegetation. Some wetland areas are also present just north of Oak Hill Road, in both the forested and open areas. There are no perennial streams on the site, but there are two drainages (intermittent streams) that would be crossed in two of the proposed alternatives.



The entire parcel, except for the U.S. 12 right-of-way, is federally owned and managed by the NPS. Private lands are located east of Mineral Springs Road and at the Northern Indiana Commuter Transportation District.

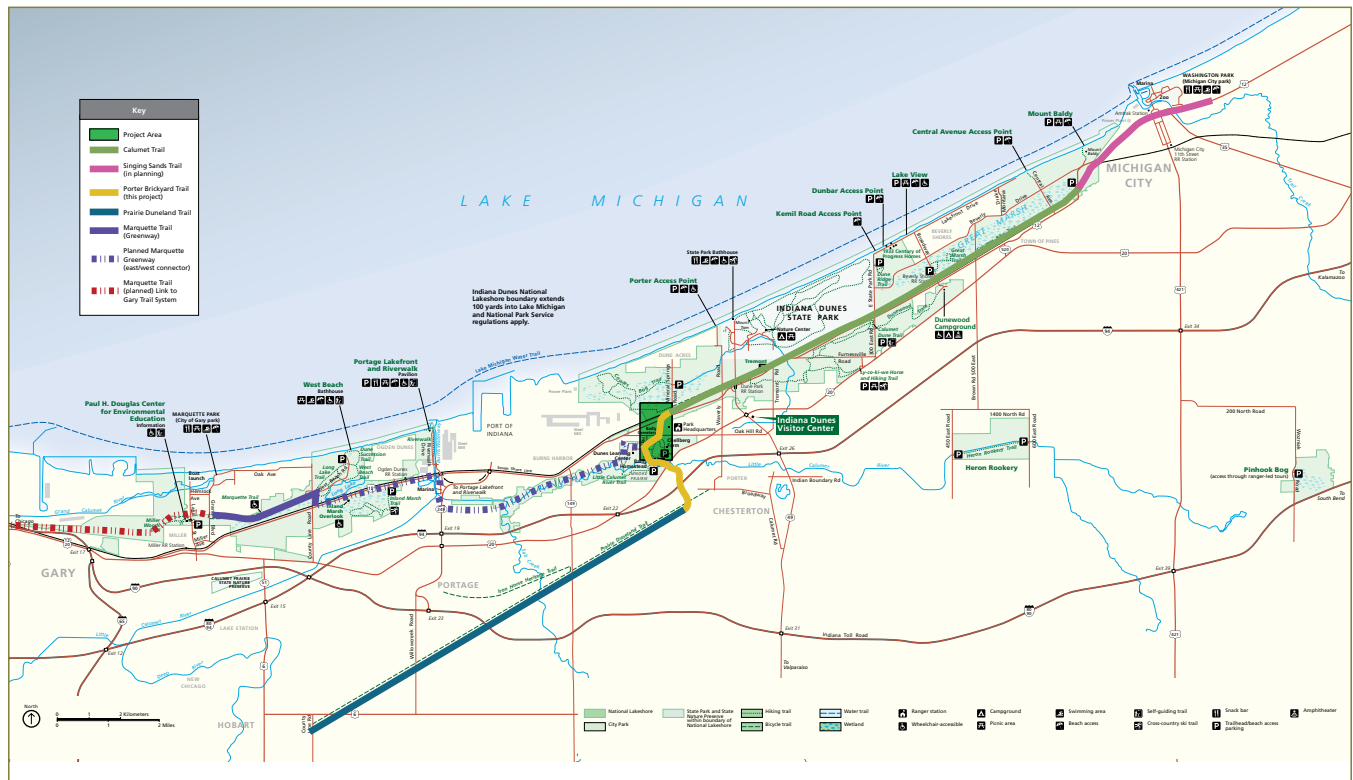
In addition to the utilities in the NPS administrative and maintenance facilities, utilities on the site include overhead power lines along the north side of U.S. 12 and along Oak Hill Road, the sewer line along the south edge of Oak Hill Road and running to the southwest to Howe Road, an underground gas line along U.S. 12, and underground phone lines along road corridors.

1.3 PLANNING CONTEXT

1.3.1 PROJECT BACKGROUND

This project is part of a much bigger trail concept that has been underway for many years to provide a greenway link between the East and West Units of the national lakeshore and, to an even greater extent, between Illinois and Michigan. Multiple studies have been prepared during the past 30-plus years, such as two plans developed by the Northwest Indiana Regional Planning Commission (NIRPC), the 1990 Trail Opportunity Plan for Northwest Indiana (NIRPC 1990) and the 1994 Regional Bikeway Plan for Northwest Indiana (NIRPC 1994). Another study prepared by NIRPC, the Marquette Plan (NIRPC 2005, 2008), developed in 2005 and amended in 2008, provided concepts and recommendations for a continuous trail network that would connect Illinois with Michigan.

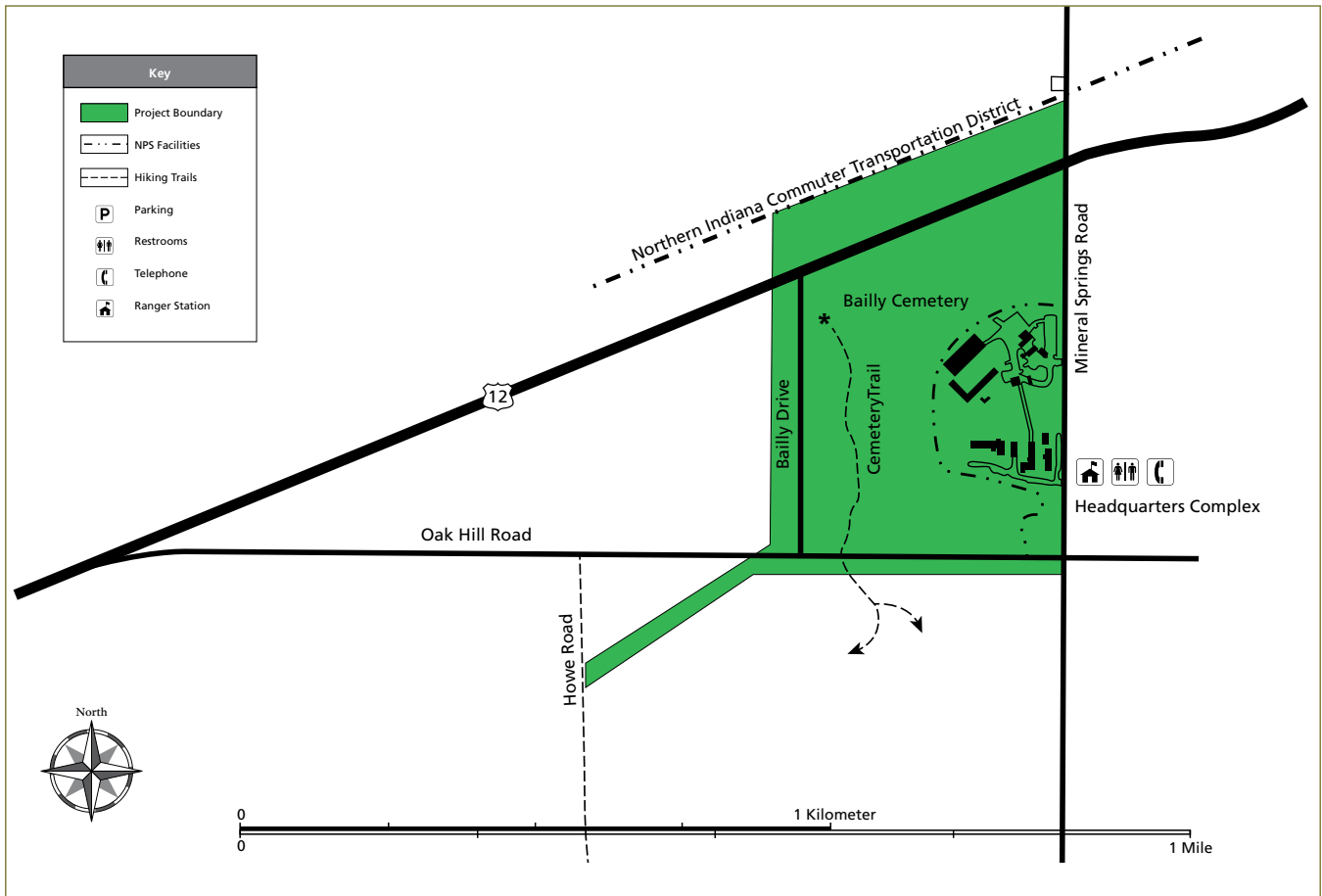
MAP 3 REGIONAL TRAILS SYSTEM



The Northwest Indiana Regional Development Authority (RDA), established by the state as a funding source partner, has a charge to implement the Marquette Plan. NIRPC brought trail and greenway visions to the forefront as a unified piece known as the Marquette Greenway, which included recommendations for connecting the 10-mile gap between the Calumet Trail in the east and the Marquette Trail in the west (Map 3). The Marquette Greenway is a trail route of about 50 miles that connects 15 communities and includes roughly 20 individual trail segments.

The Porter Brickyard Trail concept started in 2000 with an investigation into the possibility of a trail linking the Calumet Trail with the Prairie Duneland Trail. Numerous studies to determine the best route were considered, and in 2001 and 2002, the Town of Porter secured funding for trail construction. Between 2002 and 2008, the Porter Town Council worked with the public to develop a final route for the trail. In 2007, Indiana Department of Transportation (INDOT) prepared a Categorical Exclusion document to satisfy NEPA requirements (INDOT 2007). This document, however, did not include the roughly one-mile of trail within the national lakeshore boundary on federal land; instead it focused only on non-federal lands.

MAP 4 THE PROJECT AREA



1.3.2 RELATIONSHIP TO OTHER LAKESHORE PLANS AND PROJECTS

The 1980 General Management Plan (GMP) (NPS 1980a) was developed to define the management philosophy and goals for the national lakeshore, and it served as the framework for making decisions and solving problems related to the national lakeshore for almost 20 years. This document identified the need for a trail to connect the East and West Units of the national lakeshore.

The 1984 Trail Plan (NPS 1984) provided a guide for trail development in the national lakeshore, as described conceptually in the 1980 GMP. Some of the proposals in this plan have been implemented; others have not been achieved but are still desirable; and others are no longer being considered because of subsequent plans, such as the 1991 Little Calumet River Corridor Plan (NPS 1991a), having superseded them.

The 1991 U.S. 12 Scenic Road Feasibility Study (NPS 1991a) determined the feasibility of establishing an NPS–managed parkway or scenic roadway (“Dunes Highway”) along the U.S. 12 highway corridor and portions of other roads in the national lakeshore. Each of the three alternatives in this study would have established a bike lane or path along or near the Dunes Highway.

The 1991 Little Calumet River Corridor Plan (NPS 1991b) addressed methods to connect the West and East Units of the national lakeshore by developing a hiking/bicycle trail along U.S. 12. The plan also provided for river access, parking, and recreational opportunities (including trails) along the east branch of the Little Calumet River.

The 1993 West Unit General Management Plan Amendment (NPS 1993) updated the 1980 GMP for the West Unit of the national lakeshore. Among other things, this document addressed the development of hiking and biking trails to connect subunits in the West Unit.

The 1997 East Unit General Management Plan Amendment (NPS 1997a), when combined with the 1993 West Unit GMP Amendment and the 1991 Little Calumet River Corridor Plan, replaced the 1980 GMP. This document defined the national lakeshore management philosophy and goals for making decisions and solving problems for the next 20 years. It describes a hiking/bicycle trail along U.S. 12 to connect the East and West Units of the national lakeshore and states that the NPS will cooperate with other entities to link the national lakeshore trail system with regional trails and recreational facilities.

A Deer Management Plan/Environmental Impact Statement is currently underway. This document will address the impacts of high deer densities (currently about 98 deer per square mile) on vegetation and wildlife in the national lakeshore, including one federally–listed and 135 state–listed plant species and many of the 113 species of birds that are considered regular nesters. The plan will also identify a number of actions that the NPS can take, in concert with other entities, including federal, state, and local communities, in response to deer management in order to protect valuable resources, promote safety (especially involving vehicle accidents), and provide a high–quality visitor experience. Without management, deer populations are expected to increase in the future due to continued lack of predators and favorable habitat conditions that are a result of human alterations to the landscape.

A Shoreline Restoration and Management Plan/Environmental Impact Statement is currently underway for the national lakeshore’s 13 miles of the southern Lake Michigan Shoreline. Development and installation of navigational harbors and shoreline stabilization structures (jetties, breakwaters, revetments, and bulkheads) has altered southern Lake Michigan’s natural east to west littoral drift, resulting in significant accretion of sands east (up drift) of Michigan City and Burns International harbors and the subsequent sand starvation to the west (down drift) of these harbors. The lack of continued sand replenishment from natural littoral drift has further resulted in extensive beach and dune erosion, threatening both public and private resources. The project area includes areas off–shore, the shoreline, and the foredunes.

The Great Marsh–Dunes Creek Lakeplain Prairie Restoration: Phase I–Inventory project is currently underway to conduct inventories within the historic range of Great Marsh–Dunes Creek lake plain wet–mesic prairie. Three work zones have been defined: Pepoon, Kurz, and Peattie. Inventory work will include vegetation analyses, mapping of the existing ditch system, and data collection that will entail seed bank sampling, sampling for soil chemistry, and installation of shallow groundwater wells. Five phases of work will be required to restore the subject wetland: Phase I – inventory; Phase II – design; Phase III – landscape modification (hydrology restoration; removal of woody growth); Phase IV – establishment of native plant assemblages; and Phase V – follow–up management.

This project is consistent with the purpose and significance statements for the national lakeshore. Purpose statements convey the reason(s) for which the national park unit was set aside as part of the national park system. Grounded in an analysis of park legislation and legislative history, purpose statements also provide primary criteria against which the appropriateness of plan recommendations, operational decisions, and actions are tested. Significance statements capture the essence of the national park unit's importance to the nation's natural and cultural heritage. They describe the unit's distinctiveness and describe why an area is important within regional, national, and global contexts. This helps managers focus their efforts and limited funding on protection and enjoyment of attributes that directly relate to the purpose of the park unit.

The purpose of the national lakeshore is:

1. To preserve, restore, and protect outstanding ecological and biological diversity along with the geologic features that characterize the southern shore of Lake Michigan.
2. To provide access for a large diverse population to experience natural scenic open spaces and historic features and to participate in educational, scientific, inspirational, and recreational opportunities.

The significance of the national lakeshore:

1. The national lakeshore is the natural laboratory from which Dr. Henry Cowles described his theory of ecological succession and offers outstanding opportunities for scientific research due to the noteworthy plant diversity (over 1,100 native species) and complexity of its natural systems.
2. The wind-driven sand dunes at the national lakeshore are over 13,000 years old and have a rare east to west orientation. This mosaic of dunes and inter-dunal areas present a complex juxtaposition of eastern deciduous forests, prairies, savannas, wetlands, pannes, and boreal
3. forests on which dune successional stages and processes can be observed in close proximity to each other.
4. The national lakeshore, as one of the first parks specifically created to bring national parks close to urban areas, provides outstanding scenic beauty and varied outdoor recreational activities on the Lake Michigan shoreline.
5. The landscape of the national lakeshore tells the story of 10,000 years of settlement, urbanization, industrialization, and the rise of environmental conservation and restoration.

This project is consistent with, and helps satisfy, purpose statement 2 and significance statement 3.

1.4 IMPAIRMENT

NPS Management Policies 2006 (NPS 2006) require analysis of potential effects of park projects to determine if actions would impair park resources. The fundamental purpose of the national park system, established by the Organic Act and reaffirmed by the General Authorities Act as amended, begins with a mandate to conserve park resources and values. NPS managers must always seek ways to avoid or minimize, to the greatest degree practicable, adverse impacts to park resources and values.

However, the laws do give the NPS the management discretion to allow impacts to park resources and values when necessary and appropriate to fulfill the purposes of a park, as long as the impact does not constitute impairment of the affected resources and values. Although congress has given the NPS the

management discretion to allow certain impacts within a park, that discretion is limited by the statutory requirement that the NPS must leave park resources and values unimpaired unless a particular law directly and specifically provides otherwise. A prohibited impairment is an impact that, in the professional judgment of the responsible NPS manager, would harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of these resources or values. An impact to any park resource or value may, but does not necessarily, constitute an impairment, but an impact would be more likely to constitute an impairment when there is a major or severe adverse effect upon a resource or value whose conservation is:

- necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park;
- key to the natural or cultural integrity of the park; or
- identified as a goal in the park's general management plan or other relevant NPS planning documents.

An impact would be less likely to constitute an impairment if it is an unavoidable result of an action necessary to pursue or restore the integrity of park resources or values and it cannot be further mitigated.

An impairment analysis for the Preferred Alternative can be found in Appendix 1.

1.5 PURPOSE AND NEED FOR THE PROJECT

As a key link in the Porter Brickyard Trail, this segment will complete the connection between the Calumet Trail and the Prairie Duneland Trail, a distance of roughly four miles. The Porter Brickyard Trail will also connect with the planned Marquette Greenway and help close the gap between the East and West Units of the national lakeshore (Map 3). Enactment of this project will help satisfy the need to unify trail development and create the vision of a three-state, multi-use, off-road trail that connects both visitors and residents. The project will also encourage the use of non-motorized transportation, provide residents and visitors opportunities to safely enjoy outdoor-related activities along the corridor, and promote physical activity, which corresponds to a healthier population.

1.6 OBJECTIVES FOR THE PROJECT

In order for the project to be a success, the following objectives must be addressed:

1. Development of a trail route alternative that provides the safest and best possible visitor experience while protecting national lakeshore resources and values;
2. Provision of a key link in the Porter Brickyard Trail to connect the Calumet and Prairie Duneland trails; and
3. Encouragement of the use of non-motorized transportation and promotion of physical activity.

1.7 SCOPING AND ISSUES

Scoping is the effort to involve agencies and the public in determining the issues to be addressed in the environmental evaluation. Among other tasks, scoping determines important issues and eliminates issues that are ultimately unimportant; allocates assignments among the interdisciplinary team members and other participating agencies; identifies related projects and associated documents; identifies permits, surveys, or consultations required by other agencies; and creates a schedule that allows adequate time to prepare and distribute the environmental document for public review and comment before a final decision is made.

Internal and external scoping occurred prior to preparation of this environmental assessment. Internal scoping involved an interdisciplinary process to identify issues, alternatives, and data needs. Recent internal scoping meetings were held on June 10 and June 24, 2011, and were attended by members of the project planning team. On July 13, 2011, an agency scoping meeting was held with participation by the Town of Porter, the U.S. Fish and Wildlife Service, and the U.S. Army Corps of Engineers.

However, the project concept is not new, and internal scoping meetings were held as early as 2002, and a number of potential alternate trail locations were considered at this time. External scoping for this project has occurred since at least 2003, when the State Historic Preservation Office was contacted about archeological studies conducted as part of this project. In 2008, a public hearing was held in the Town of Porter to discuss the project. More details on scoping and public involvement are included in Chapter 5: Consultation and Coordination. The following issues were identified by the planning team, in part as a result of the scoping activities:

- Impacts to Bailly Cemetery
- Archeological concerns
- Drainage crossings
- Impacts to wetlands
- Conflicts with NPS administrative and maintenance duties
- Impacts to the mature forest
- U.S. 12 and U.S. 20 crossings
- Visitor experience and noise along U.S. 12 and U.S. 20
- Steep topography in the northern portion of the project area
- Impacts to sensitive plant and animal species

1.8 SUMMARY OF IMPACT TOPICS

Impact topics are the resources of concern that could be affected by the range of alternatives. Specific impact topics were developed to ensure that alternatives were compared on the basis of the most relevant topics. Impact topics were identified based on legislative requirements, topics specified in Director's Order #12 and Handbook (NPS 2001), and park-specific resource information, as well as input during scoping.

1.8.1 IMPACT TOPICS SELECTED FOR DETAILED ANALYSIS

GEOLOGY AND SOILS

According to NPS Management Policies 2006 (NPS 2006), the NPS actively seeks to understand and preserve the soil resources of parks and to prevent, to the extent possible, the unnatural erosion, physical removal, or contamination of the soil, or its contamination of other resources.

Excavation for construction of the trail would disturb soils. Therefore, impact to soil is retained as an impact topic to allow for evaluation of these impacts.

DRAINAGE CHARACTERISTICS

Some possible trail routes cross a small drainage (intermittent stream) north of the maintenance area and another drainage north of the maintenance area and adjacent to and parallel to Mineral Springs Road. Trail development has the potential to impact these drainages. Therefore, drainage characteristics are retained as an impact topic to allow for evaluation of these impacts.

WETLANDS

Executive Order 11990, Protection of Wetlands, requires federal agencies to avoid, where possible, adversely impacting wetlands. The goal of NPS wetlands management is to strive to achieve a “no net loss” of wetlands, as defined by both acreage and function. According to Director’s Order #77, Procedural Manual #77-1: Wetland Protection (NPS 2011a), for proposed new developments that have the potential for direct or indirect adverse impacts to wetlands, the NPS will employ a sequence of a) avoiding the adverse impacts to wetlands to the extent practicable, b) minimizing the impacts that could not be avoided, and c) compensating for remaining unavoidable adverse impacts to wetlands via restoration of degraded wetlands. Since there are two wetland areas in the project area that could be impacted by trail development—just north of Oak Hill Road and between U.S. 12 and the Northern Indiana Commuter Transportation District—impact to wetlands is retained as an impact topic.

VEGETATION

The NEPA (42 USC 4321 et seq.) calls for an examination of the impacts on all components of affected ecosystems. According to NPS Management Policies 2006 (NPS 2006), the NPS strives to maintain all components and processes of naturally evolving park unit ecosystems, including the natural abundance, diversity, and ecological integrity of plants.

Vegetation would be affected by construction of the trail; therefore, vegetation is retained as an impact topic.

WILDLIFE

The national lakeshore supports a variety of wildlife. The NPS Organic Act, which directs parks to conserve wildlife unimpaired for future generations, is interpreted by the agency to mean that native animal life should be protected and perpetuated as part of the national lakeshore’s natural ecosystem. Removal of vegetation and the construction of a trail could affect the national lakeshore’s wildlife; therefore, wildlife is retained as an impact topic.

RARE AND ENDANGERED SPECIES (PLANTS AND ANIMALS)

There are a number of rare and endangered plants and animals found in the project area that could be impacted by this project. Therefore, rare and endangered species will be retained as an impact topic.

VISITOR USE AND EXPERIENCE

Visitor use and experience would change as a result of implementing this project. Therefore, visitor use and experience has been retained as an impact topic.

PARK FACILITIES AND OPERATIONS

The national lakeshore has a Cooperative Management Agreement (CMA) with the Town of Porter to maintain the trail on park lands (NPS 2011b). The CMA includes provisions for routine maintenance, capital repairs, and general management. Routine maintenance activities include those involving tread, structures, drainage, signs, trash, and vegetation. However, at the time of trail construction, national lakeshore staff will be responsible for activities such as medical and law enforcement response and investigation, control of invasive species, supplementing Town of Porter maintenance activities (storm damage emergency removal and vandalism), and management of the CMA. Therefore, park facilities and operations has been retained as an impact topic.

1.8.2 IMPACT TOPICS DISMISSED

The alternatives being evaluated in this environmental assessment will not impact the following topics.

NATURAL SOUNDSCAPES

NPS Director's Order #47: Soundscape Preservation and Noise Management (NPS 2000) and NPS Management Policies 2006 (NPS 2006) direct NPS managers to protect, maintain, or restore natural soundscapes so that they are unimpaired by inappropriate or excessive noise. Under this directive, noise is defined as appropriate or inappropriate relative to the purpose of a park, the level of visitor services available, and activities pursued by visitors.

Neither the "No Action Alternative" nor any of the action alternatives addressed in this analysis would introduce long-term inappropriate noise levels to the national lakeshore. The temporary noise produced during construction would result in negligible short-term, localized adverse impacts. Therefore, natural soundscapes was dismissed as an impact topic.

NIGHT SKY/LIGHTSCAPES

The NPS Night Sky Initiative and NPS Management Policies 2006 (NPS 2006) direct the NPS to "preserve to the greatest extent possible the natural lightscapes of the parks, which are natural resources and values that exist in the absence of human-caused light." The NPS is currently developing the Night Sky Initiative to formulate a policy to protect views of the stars and planets in our national parks.

Since no artificial lighting is proposed in this project, night sky was dismissed as an impact topic for further consideration.

FLOODPLAINS

All of the project area lies outside the 100-year floodplain. Therefore, floodplains were dismissed as an impact topic for further consideration.

PRIME AND UNIQUE AGRICULTURAL LANDS

Prime farmland, as defined by the Council on Environmental Quality 1980 memorandum, has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oil-seed crops. Unique agricultural land is land other than prime farmland that is used for production of specific high-value food and fiber crops. These designations are established by the Natural Resource Conservation Service following soil and resource analyses. There are 16 soil units classed as prime or unique in Porter County, and five of those 16 occur in the East Unit of the national lakeshore. However, no soils within the project site are defined as prime or unique. Therefore, this impact topic was dismissed from further analysis.

LAND USE

The project area is located within the boundaries of the national lakeshore. The overall use and purpose of the site is consistent with planning documents and adjacent land use; therefore, land use was dismissed as an impact topic.

ENVIRONMENTAL JUSTICE

Presidential Executive Order 12898, General Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, requires all federal agencies to incorporate environmental justice into their missions by identifying and addressing the disproportionately high and/or adverse human health or environmental effects of their programs and policies on minorities and low-income populations and communities. According to the EPA, environmental justice is the

...fair treatment and meaningful involvement of all people, regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations and policies. Fair treatment means that no group of people, including a racial, ethnic, or socioeconomic group, should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of federal, state, local, and tribal programs and policies.

The goal of ‘fair treatment’ is not to shift risks among populations, but to identify potentially disproportionately high and adverse effects and identify alternatives that may mitigate these impacts.

The general vicinity of the national lakeshore contains both minority and low-income populations; however, environmental justice was dismissed as an impact topic for the following reasons:

- The national lakeshore staff and planning team solicited public participation as part of the planning process and gave equal consideration to all input from persons, regardless of age, race, income status, or other socioeconomic or demographic factors.
- Implementation of the preferred alternative would not result in any identifiable adverse human health effects. Therefore, there would be no direct or indirect adverse effects on any minority or low-income population.
- The impacts associated with implementation of the preferred alternative would not disproportionately affect any minority or low-income population or community.
- Implementation of the preferred alternative would not result in any identified effects that would be specific to any minority or low-income community.
- The national lakeshore staff and planning team do not anticipate any impacts on the socioeconomic environment to appreciably alter the physical and social structure of the nearby communities.

CULTURAL RESOURCES

The National Historic Preservation Act, as amended (16 USC 470 et seq.); the National Environmental Policy Act (42 USC 4321 et seq.); Director’s Order #28: Cultural Resource Management Guideline (NPS 1997b), Management Policies 2006 (NPS 2006); and Director’s Order #12: Conservation Planning, Environmental Impact Analysis, and Decision Making (NPS 2001) all require the consideration of potential impacts on archeological resources, Indian trust resources, historic structures, cultural landscapes, museum collections, and ethnographic resources listed in or eligible for listing in the National Register of Historic Places.

ARCHEOLOGICAL RESOURCES

Archeological resources are the material remains or physical evidence of past human life or activities. Archeological investigations have been conducted within the project area and evidence of historic and prehistoric sites have been discovered. However, the only identified route alternative that could impact these resources has been dismissed. Therefore, archeology was dismissed as an impact topic.

INDIAN TRUST RESOURCES

Indian trust assets are owned by American Indians, but are held in trust by the United States. Requirements are included in the Secretary of the Interior's Secretarial Order 3206, American Indian Tribal Rites, Federal – Tribal Trust Responsibilities, and the Endangered Species Act; and Secretarial Order 3175, Departmental Responsibilities for Indian Trust Resources. Secretarial Order 3175 requires that any anticipated impacts to Indian Trust Resources from a proposed project or action by Department of Interior agencies be explicitly addressed in environmental documents. The federal Indian Trust responsibility is a legally enforceable fiduciary obligation on the part of the United States to protect tribal lands, assets, resources, and treaty rights, and it represents a duty to carry out the mandates of federal law with respect to American Indian and Alaska Native tribes.

There are no Indian Trust Resources in the national lakeshore. The lands comprising the national lakeshore are not held in trust by the Secretary of the Interior for the benefit of Indians. Therefore, Indian Trust Resources was dismissed as an impact topic in this environmental assessment.

HISTORIC STRUCTURES

The National Historic Preservation Act, as amended (16 USC 470 et seq.); the National Environmental Policy Act (42 USC 4321 et seq.); Director's Order #28: Cultural Resource Management Guideline (NPS 1997b), Management Policies 2006 (NPS 2006); and Director's Order #12: Conservation Planning, Environmental Impact Analysis, and Decision Making (NPS 2001) all require the consideration of potential impacts on archeological resources, historic structures, and cultural landscapes listed in or eligible for listing in the National Register of Historic Places.

The Bailly Cemetery is listed on the National Register of Historic Places as a component of the Bailly Homestead. None of proposed trail route alternatives are within an area that could potentially affect the Bailly Cemetery, so no impacts to the cemetery would occur. Therefore, historic structures were dismissed from further analysis.

CULTURAL LANDSCAPES

According to Director's Order #28: Cultural Resource Management Guideline (NPS 1997b), a cultural landscape is:

...a reflection of human adaptation and use of natural resources and is often expressed in the way land is organized and divided, patterns of settlement, land use, systems of circulation, and the types of structures that are built. The character of a cultural landscape is defined both by physical materials, such as roads, buildings, walls, and vegetation, and by use reflecting cultural values and traditions.

Thus, cultural landscapes are the result of the long interaction between people and the land and the influence of human beliefs and actions over time upon the natural landscape. Shaped through time by historical land-use and management practices, politics and property laws, levels of technology, and economic conditions, cultural landscapes provide a living record of an area's past and a visual chronicle of its history. The dynamic nature of modern human life, however, contributes to the continual reshaping of cultural landscapes, making them a good source of information about specific times and places, but at the same time rendering their long-term preservation a challenge.

There are no formal or informal cultural landscapes in the project area; therefore, cultural landscapes were dismissed as an impact topic.

ETHNOGRAPHIC RESOURCES

Ethnographic resources are defined by the NPS as any "site, structure, object, landscape, or natural resource feature assigned traditional legendary, religious, subsistence, or other significance in the cultural system of a group traditionally associated with it" (Director's Order #28: Cultural Resource Management Guideline, 181) (NPS 1997b). There are no known ethnographic resources or traditional cultural properties in the vicinity of the project area. Copies of the environmental assessment will be forwarded to each tribe traditionally associated with park lands for review and comment. Because there are no known ethnographic resources within the area of potential effects, ethnographic resources were dismissed as an impact topic. If the tribes subsequently identify the presence of ethnographic resources, appropriate mitigation measures would be undertaken in consultation with the tribes. The location of ethnographic sites would not be made public. In the unlikely event that human remains, funerary objects, sacred objects, or objects of cultural patrimony are discovered during construction, provisions outlined in the Native American Graves Protection and Repatriation Act (25 USC 3001) of 1990 would be followed.

AIR QUALITY

Section 118 of the 1963 Clean Air Act (42 U.S.C. 7401 et seq.) requires a national park system unit to meet all federal, state, and local air pollution standards. The Lakeshore is a Class II air quality area under the Clean Air Act, as amended. A Class II designation indicates the maximum allowable increase in concentrations of pollutants over baseline concentrations of sulfur dioxide and particulate matter as specified in Section 163 of the Clean Air Act. Further, the Clean Air Act provides that the federal land manager has an affirmative responsibility to protect air-quality-related values (including visibility, plants, animals, soils, water quality, cultural resources, and visitor health) from adverse pollution impacts.

Construction activities, including equipment operation and the hauling of material, could result in temporarily increased vehicle exhaust and emissions, as well as inhalable particulate matter. Construction dust associated with exposed soils would be controlled, if necessary, with the application of water or other approved dust palliatives. In addition, any hydrocarbons, nitrogen dioxide (NO₂), or sulfur dioxide (SO₂) emissions, as well as any airborne particulates created by fugitive dust plumes, would be rapidly dissipated because the location of the park and prevailing winds allows for good air circulation. Overall, there could be a short-term, negligible local degradation of local air quality during construction activities; however, no measurable effects outside of the immediate construction site would be anticipated. Any construction-related adverse effects to air quality would be temporary, lasting only as long as construction. Therefore, air quality was dismissed as an impact topic.

CHAPTER 2. ALTERNATIVES

A range of alternatives to provide a roughly one-mile multi-use trail on federal land within the national lakeshore boundary was developed and evaluated throughout the preparation of this environmental assessment. Several alternatives were considered and dismissed because they either did not meet project objectives or had the potential to produce unacceptable levels of adverse impacts. The alternatives dismissed from further consideration are described later in this chapter, under the heading “Alternatives Considered but Dismissed.”

2.1 ALTERNATIVE A – NO ACTION

Under Alternative A, no new multi-use trail would be developed on federal lands within the national lakeshore to connect with the proposed portion of the Porter Brickyard Trail located on non-federal lands. An alternative route on non-federal lands would need to be developed to complete the Porter Brickyard Trail, which will connect the Calumet Trail to the northeast and the Prairie Duneland Trail to the south (Map 3).

2.2 ALTERNATIVE B (THE PREFERRED ALTERNATIVE) – FIELD-FOREST ROUTE

This alternative route would enter federal land at the intersection of Howe Road and the trail over the sewer line, travel in a northeasterly direction to Oak Hill Road, and then follow the existing trail along the south side of Oak Hill Road until it ends at the junction with the Cemetery Trail. A bicycle rack and information kiosk would be constructed at this location to encourage trail users to leave their bicycles and hike north to the Bailly Cemetery or south to the Bailly Homestead, Chellberg Farm, and the Bailly/Chellberg Visitor Center. The trail would then follow the south side of Oak Hill Road, cross Oak Hill Road at a designated and signed crossing, travel north along an old driveway (now a park administrative trail), skirt the wetlands, and traverse the field west of the NPS administrative headquarters and maintenance facilities in a northerly direction until entering the wooded area in the northwest corner of the national lakeshore maintenance compound. Native vegetation (forest species) would be planted to screen the trail from the NPS administrative headquarters and maintenance complex (and vice versa). The trail would traverse the forest between the maintenance compound and the moraine hills to the north, cross two drainages, and cross U.S. 12 on a prefabricated bridge, just west of the U.S. 12–Mineral Springs Road intersection. The trail terminus would be at the intersection of Mineral Springs Road and the Northern Indiana Commuter Transportation District (Map 5).



MITIGATION

- Trail crossing signs and a painted crosswalk would be required at the Oak Hill Road crossing.
- Stop signs would be placed on the trail at the intersection with Oak Hill Road.
- Caution signs would be used as necessary.
- Standard trail construction practices would be applied, such as silt fencing, when needed.
- The construction zone would be limited to a width of 18 feet.
- A vegetative screening, using native materials common to a forested environment, would be planted to provide a buffer between the field portions of the trail and the NPS administrative headquarters and maintenance facilities.
- Well-maintained equipment and bio fuels and lubricants would be encouraged.
- Specific to wetlands (adapted from NPS Procedural Manual #77-1):
 - Provide measures for public education, interpretation, and enjoyment of wetland resources such as waysides and signage.
 - Avoid any rutting caused by vehicles or equipment.
 - Measures must be taken to prevent or control spills of fuels, lubricants, and other contaminants from entering the wetland.
 - Appropriate erosion and siltation controls must be maintained during construction, and all exposed soil or fill material must be stabilized at the earliest practicable date.
 - Structure or fill must be properly maintained so as to avoid adverse impacts on aquatic environments or public safety.
 - Heavy equipment use in wetlands must be avoided if at all possible. Heavy equipment used in wetlands must be placed on mats, or other measures must be taken to minimize soil and plant root disturbance and to preserve preconstruction elevations.
 - Whenever possible, excavated material must be placed on an upland site. However, when this is not feasible, temporary stockpiling of excavated material in wetlands must be placed on filter cloth, mats, or some other semipermeable surface, or comparable measures must be taken to ensure that underlying wetland habitat is protected. The material must be stabilized with straw bales, filter cloth, or other appropriate means to prevent reentry into the wetland.
 - Temporary stockpiles in wetlands must be removed in their entirety as soon as practicable. Wetland areas temporarily disturbed by stockpiling or other activities during construction must be returned to their preexisting elevations, and soil, hydrology, and native vegetative communities must be restored as soon as practicable.
 - Revegetation of disturbed soil areas should be facilitated by salvaging and storing existing topsoil and reusing it in restoration efforts in accordance with NPS policies and guidance. Topsoil storage must be for as short a time as possible to prevent loss of seed and root viability, loss of organic matter, and degradation of the soil microbial community.
 - Where plantings or seedlings are required, native plant material must be obtained and used in accordance with NPS policies and guidance. Management techniques must be implemented to foster rapid development of target native plant communities and to eliminate invasion by exotic or other undesirable species.

2.3 ALTERNATIVE C – ALONG OAK HILL ROAD AND MINERAL SPRINGS ROAD RIGHTS-OF-WAY

This alternative route would enter federal land at the intersection of Howe Road and the trail over the sewer line (as in the Preferred Alternative), travel in a northeasterly direction to Oak Hill Road, then follow the existing trail along the south side of Oak Hill Road until it ends at the junction with the Cemetery Trail. A bicycle rack and information kiosk would be constructed at this location to encourage trail users to leave their bicycles and hike north to the Bailly Cemetery or south to the Bailly Homestead, Chellberg Farm, and the Bailly/Chellberg Visitor Center. The trail would then follow the south side of Oak Hill Road to the intersection with Mineral Springs Road. The trail would turn north at this intersection, follow the west side of Mineral Springs Road, crossing two NPS entrance drives until entering the forest and joining the Preferred Alternative route just north of the maintenance compound (Map 5).

MITIGATION

- Trail crossing signs and a painted crosswalk would be required at the Oak Hill Road crossing.
- Stop signs would be placed on the trail at the intersection with Oak Hill Road and at driveway crossings. –Caution signs would be used as necessary.
- Standard trail construction practices would be applied, such as silt fencing, when needed.
- The construction zone would be limited to a width of 18 feet.
- Well-maintained equipment and bio fuels and lubricants would be encouraged.
- Specific to wetlands (adapted from NPS Procedural Manual #77-1):
 - The mitigation measures listed for the Preferred Alternative would apply.

2.4 ACTIONS COMMON TO BOTH ACTION ALTERNATIVES (B AND C)

Under both action alternatives, trail construction would be the same. Per INDOT and Federal Highway Administration (FHWA) requirements, the trail cross-section would include a compacted subgrade, eight inches of compacted aggregate base, four inches of asphalt base course, and 1.5 inches of asphalt surface course. The trail would be 8-foot-wide asphalt with 1-foot compacted aggregate shoulders (Figure 1). (Note: Current INDOT/FHWA standards are 10-foot trail surface with 2-foot shoulders. However, the Porter Brickyard Trail project was approved and funded by INDOT/FHWA when the standard was an 8-foot trail surface with 1-foot shoulders.) Culverts would be constructed at all drainage crossings. Additionally, both action alternatives use the trail over the sewer line from Howe Road to Oak Hill Road and continue easterly on the south side of Oak Hill Road (Map 5).

2.5 ALTERNATIVES CONSIDERED BUT DISMISSED

Four other route options were considered but dismissed for a variety of reasons. All dismissed routes used the sewer line right-of-way from Howe Road to the intersection with Oak Hill Road (Map 6):

- **DISMISSED OPTION 1:** This option crossed Oak Hill Road at the intersection with Bailly Drive and followed Bailly Drive to the intersection with U.S. 12. The route then traversed the north side of U.S. 12 to Mineral Springs Road. This option was dismissed due to steep slopes down the moraine (Bailly Drive) just south of U.S. 12, the U.S. 12 crossing location, and noise associated with U.S. 12.

- **DISMISSED OPTION 2:** This option crossed Oak Hill Road at the intersection with Bailly Drive and followed Bailly Drive until turning to the northeast at a point south of the moraine. This option would cross the Cemetery Trail and join the current Preferred Alternative and C routes near the maintenance complex. This option was dismissed due to crossing the Cemetery Trail and concerns that bicyclists may be enticed to ride on the hiking trail. There are also mature hardwoods in the area that would need to be removed.
- **DISMISSED OPTION 3:** This option crossed Oak Hill Road at the intersection with Bailly Drive and followed Bailly Drive until turning east at U.S. 12. The route would follow the south side of U.S. 12, crossing U.S. 12 by bridge near Mineral Springs Road. This option was dismissed due to steep slopes down the moraine just south of U.S. 12, noise associated with U.S. 12, and the recent discovery of historic and prehistoric sites along the route.
- **DISMISSED OPTION 4:** This option was the previous Preferred Alternative. It crossed Oak Hill Road between the Cemetery Trail crossing and the intersection of Oak Hill Road and Mineral Springs Road, and travelled north through mature forest about 1,000 feet until joining the current Preferred Alternative and C route near the maintenance complex. However, a number of potential impacts were identified that resulted in the NPS decision to dismiss this route from further consideration. Impacts included:
 - **Forested Wetland:** This wetland extends more than 400 feet north of Oak Hill Road. Its existence was unknown until soil sampling was conducted in March and July 2011, which revealed hydric soils. Additionally, wetland vegetation was observed, as was standing water, during a spring 2011 fieldtrip. This option, as proposed, would have impacted roughly 0.2 acres of this wetland.
 - **Mature Forest:** Along this 1,000-foot route from Oak Hill Road to the intersection with the current Preferred Alternative and C route, there are a number of mature trees (some 150 years old) that would be directly or indirectly killed by trail construction. Direct mortality results when the tree is removed during construction. Indirect mortality results when over fifty percent of the tree's route zone is impacted. Even route damage at less than fifty percent opens pathways for tree pathogens to infect and kill trees. Over 100 mature trees along this route would be impacted.
 - **Unique Fungi:** Ongoing studies in this area have found roughly 400 species of fungi above and below ground, making the area one of the best-known forest fungal communities in the national park system. Trail construction in this area would impact surface fungi, such as mushrooms, as well as the 5–10 species of mycorrhizal fungi, which form a symbiotic relationship with the roots and work together to provide nutrients to the tree.
 - **Sensitive Wildlife Species:** Research has identified 41 dead and downed logs across this route between Oak Hill Road and the intersection with current Preferred Alternative and C routes. These decaying logs provide excellent habitat for several species of salamanders, among them the blue-spotted salamander, which is a state-listed species of special concern. Other state-listed animal species of concern along or near this route include the northern leopard frog (special concern), eastern box turtle (special concern), red-shouldered hawk (special concern), common nighthawk (special concern), and whip-poor-will (special concern).

2.6 ENVIRONMENTALLY PREFERABLE ALTERNATIVE

As stated in Section 2.7D of the Director's Order #12 and Handbook: Conservation Planning, Environmental Impact Analysis, and Decision Making; the environmentally preferable alternative is the alternative that would promote the national environmental policy expressed in the National Environmental Policy Act (NEPA).

Section 101(b) of the NEPA identifies six criteria to help determine the environmentally preferable alternative. The act directs that federal plans should:

- Fulfill the responsibilities of each generation as trustees of the environment for succeeding generations;
- Ensure safe, healthful, productive, and aesthetically and culturally pleasing surroundings for all Americans;
- Attain the widest range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable or unintended consequences;
- Preserve important historic, cultural, and natural aspects of our national heritage and maintain, wherever possible, an environment that supports diversity and variety of individual choice;
- Achieve a balance between population and resource use that would permit high standards of living and a wide sharing of life's amenities; and
- Enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.

Generally, an environmentally preferable alternative is the alternative that causes the least damage to the biological and physical environment. It also means the alternative that "best protects, preserves, and enhances historic, cultural, and natural resources" (Council on Environmental Quality 1981).

The Preferred Alternative would meet all the objectives of this plan with limited impact on the environment. It would provide variety by mixing field and forest environments, would be located far enough away from roadways to provide a less noisy and congested experience, and would provide for the health and safety of park visitors. Sensitive resources, such as unique wildlife habitats, would be avoided. Where wetlands cannot be avoided north of U.S. 12, mitigation measures would be included to reduce impacts.

Therefore, the Preferred Alternative, Alternative B, is the environmentally preferable alternative.

2.7 COMPARISON OF ALTERNATIVES

The following table summarizes the impacts under each alternative.

TABLE 1: Comparison of Alternatives

IMPACT TOPIC	ALTERNATIVE A (NO ACTION)	ALTERNATIVE B (PREFERRED ALTERNATIVE)	ALTERNATIVE C
GEOLOGY AND SOILS	No impact	Much of the route is on disturbed soils. Trail construction in forest would alter surface soil profiles by compaction, removal, ruts, and tree stump removal. Possibility exists for soil contamination from spills. Impacts to geology and soils would be long-term, minor, and adverse.	Much of the route is on disturbed soils. Trail construction in forest would alter surface soil profiles by compaction, removal, ruts, and tree stump removal. Possibility exists for soil contamination from spills. Impacts to geology and soils would be long-term, minor, and adverse.
DRAINAGE CHARACTERISTICS	No impact	Trail construction would alter their soils and topography, but there would be little change in water flow due to culverting. Impacts to drainage characteristics would be long-term, minor, and adverse.	Trail construction would alter their soils and topography, but there would be little change in water flow due to culverting. Impacts to drainage characteristics would be long-term, minor, and adverse.
WETLANDS	No impact	Trail construction would avoid wetland in field. Impacts to this wetland would be short-term, negligible, indirect, and adverse. Trail construction would impact about 0.02 acres of wetlands north of U.S. 12. Impacts would be long-term, minor, and adverse.	Trail construction would avoid wetland in field. There are no direct or indirect impacts to this wetland. Trail construction would impact about 0.02 acres of wetlands north of U.S. 12 (same route as Alternative B). Impacts would be long-term, minor, and adverse.
VEGETATION	No impact	Much of the route is on disturbed lands (sewer line corridor, abandoned driveway, field). Potential exists for direct and indirect tree mortality in forested areas. Impacts to vegetation would be long-term, minor, and adverse.	Much of the route is on disturbed lands (sewer line corridor, abandoned driveway, along roadways). Potential exists for direct and indirect tree mortality in forested areas. Impacts to vegetation would be long-term, minor, and adverse.

IMPACT TOPIC	ALTERNATIVE A (NO ACTION)	ALTERNATIVE B (PREFERRED ALTERNATIVE)	ALTERNATIVE C
WILDLIFE	No impact	Much of the route is on disturbed lands with little high-quality wildlife habitat. Habitat would be reduced in forested area due to tree removal and soil alteration. Small animal migration would be impeded, and some mortality from wheeled vehicles could occur. Impacts to wildlife would be long-term, minor, and adverse.	Much of the route is on disturbed lands with little high-quality wildlife habitat. Habitat would be reduced in forested area due to tree removal and soil alteration. Small animal migration would be impeded, and some mortality from wheeled vehicles could occur. Impacts to wildlife would be long-term, minor, and adverse.
RARE AND ENDANGERED SPECIES	No impact	There are no federally-listed species in the area. State-listed reptiles and amphibians are in wetter areas to the southwest. State-listed birds are in more mature woods to the southwest. Impacts to rare and endangered species would be long-term, negligible, and adverse.	There are no federally-listed species in the area. State-listed reptiles and amphibians are in wetter areas to the southwest. State-listed birds are in more mature woods to the southwest. Impacts to rare and endangered species would be long-term, negligible, and adverse.

2.8 PROJECT OBJECTIVES BY ALTERNATIVE

The following table illustrates how well each alternative addresses the objectives defined in Chapter 1.

TABLE 2: Project Objectives By Alternative

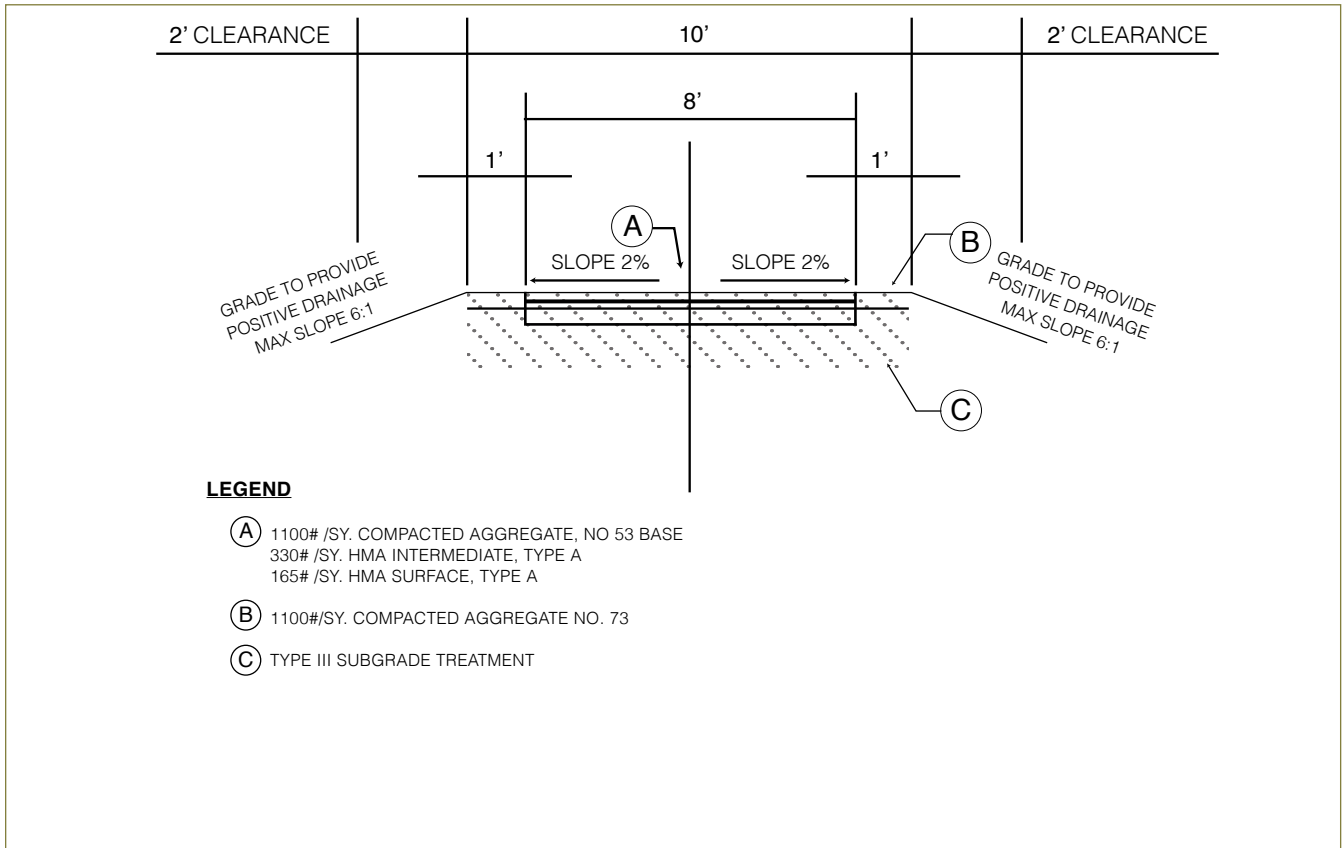
OBJECTIVE	ALTERNATIVE A (NO ACTION)	ALTERNATIVE B (PREFERRED ALTERNATIVE)	ALTERNATIVE C
Development of a trail route alternative that provides the safest and best possible visitor experience, while protecting national lakeshore resources and values.	Does not address this objective	Fully addresses this objective	Partially addresses this objective: protects national lakeshore resources and values; does not offer the visitor experience of the Preferred Alternative; introduces some safety issues along Mineral Springs Road.

OBJECTIVE	ALTERNATIVE A (NO ACTION)	ALTERNATIVE B (PREFERRED ALTERNATIVE)	ALTERNATIVE C
Provision of a key link in the Porter Brickyard Trail to connect the Calumet and Prairie Duneland trails.	Does not address this objective	Fully addresses this objective	Fully addresses this objective
Encouragement of the use of non-motorized transportation and promotion of physical activity.	Does not address this objective	Fully addresses this objective	Fully addresses this objective
Development of a trail route alternative that provides the safest and best possible visitor experience, while protecting national lakeshore resources and values.	Does not address this objective	Fully addresses this objective	Partially addresses this objective: protects national lakeshore resources and values; does not offer the visitor experience of the Preferred Alternative; introduces some safety issues along Mineral Springs Road

MAP 5 ALTERNATIVE TRAIL LOCATIONS



FIGURE 1 TRAIL CROSS SECTION



MAP 6 ALTERNATIVE TRAIL ROUTES CONSIDERED BUT DISMISSED



CHAPTER 3. AFFECTED ENVIRONMENT

This chapter provides brief descriptions of the resources (defined as “impact topics” in Chapter 1), that may potentially be affected by the proposed trail development.

3.1 GEOLOGY AND SOILS

Soils in the national lakeshore vary from clay-rich soils in the southern portion to sand with little clay in the dune ridges. These soils were derived from glacial deposition originating from the underlying bedrock layer, which consists of limestone, dolomite, sandstone, and shale.

The East Unit of the national lakeshore is a sand plain with many dunes interspersed with areas of wetlands. Topographical relief varies almost 200 feet from the Lake Michigan shore to dune tops. The lowest elevation is at the Lake Michigan shoreline, which is about 585 feet above sea level, whereas Mt. Baldy, in the far eastern part of the national lakeshore, is 706 feet above sea level.

Water, wind, plant and animal communities, and human activities are all elements in the geomorphology of the dunes area, but glaciation is responsible for most of the current landform and drainage patterns. Glaciers alternately retreated and advanced until about 11,000 years ago, when moraines of glacial till and outwash materials were deposited.

The silt, sand, and clay sediments found in the national lakeshore are of the Pleistocene and Holocene ages, and the sediments overlie Antrim shale of Devonian age. The underlying bedrock consists of limestone, dolomite, sandstone, and shale of the Paleozoic age.

Many fluctuations and a general lowering of the water level of Lake Michigan have created as many as seven successive lake shorelines, including beach, dune, and wetland areas.

According to the 1976 Soil Survey of Porter County, Indiana (Porter 1976), there are seven soil types in the project area (Map 7). They include Blount silt loam (0–3% slopes) and Morley silt loam (2–6% slopes) in the lower half; Oakville fine sand (18–40% slopes) and Morley silt loam (18–30% slopes) in the moraine ridge in the upper (northern) part; Oakville fine sand (4–12% slopes) on either side of U.S. 12; and Maumee loamy sand near the railroad tracks. The soils under the sewer line running southwest from Oak Hill Road to Howe Road include Blount silt loam, Pewamo silty clay loam, and Morley silt loam, but these soils have been greatly disturbed by placement of the sewer line. No soils within the project site are defined as prime or unique.

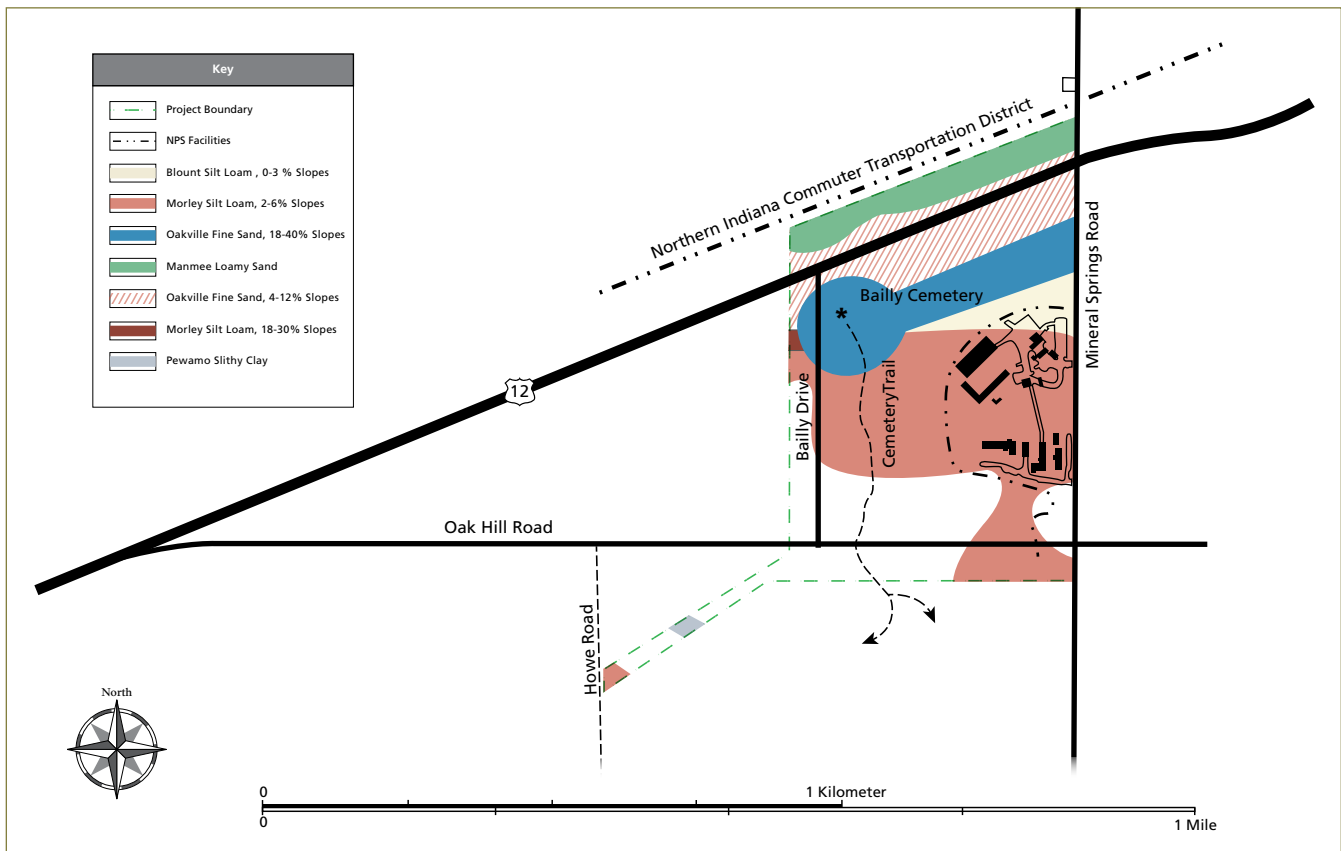
The Morley–Blount–Pewamo soils found generally in the southern half of the project area are nearly level-to-steep, well-to-poorly drained silty soils found on till plains and moraines. These soils are suited to a variety of uses when nearly level. They are unsuitable for access and road development, sanitary facilities, and building developments, mainly due to low permeability, but also due to slope, wetness, and



ponding problems (NPS 1997c).

Oakville–Maumee–Brems soils are the most common in the East Unit. Oakville and Maumee soils are found in the northern half of the project area and are nearly level–to–very steep. They are excessively–to–poorly drained soils on outwash plains, lake plains, beach ridges, and sand dunes. These sandy soils are highly permeable and do not filter well, making them generally unsuited for sanitary facilities and building site development (NPS 1997c).

MAP 7 SOILS IN THE PROJECT AREA



In March 2011, the NPS retained the services of a soils specialist to evaluate the soils within a suspected wetland area just north of Oak Hill Road. One trail alternative was in this location, and the national lake-shore was interested in any possible development constraints that might be present. In July 2011, additional soil borings were taken in order to better determine the extent of hydric soils in the area. The soils survey determined that many soils at this site are Condit (i.e., very poorly drained and hydric soils that formed under a forested environment (NPS 2011c)). The Condit series consists of very deep, very poorly drained soils formed in loamy till on ground moraines, with slopes ranging from 0 to 2 percent.

Topography on the site ranges from nearly flat in the south to up to 40% slopes on the moraine ridge to the north (Map 8). Elevations at the site range from almost 690 feet at the Baily Cemetery to 619 feet at the intersection of Mineral Springs Road and the Northern Indiana Commuter Transportation District at the northeast end.

3.2 DRAINAGE CHARACTERISTICS

Alternatives B and C (same routes in this area) cross a small drainage (intermittent stream) north of the maintenance area, and three proposed trail routes cross a drainage (intermittent stream) north of the maintenance area adjacent to and parallel Mineral Springs Road (Map 8). The small drainage north of the maintenance area is approximately five feet deep in Morley silt loam soils. The other drainage near Mineral Springs Road is quite narrow and pinches between the escarpment to the west and the Mineral Springs roadbed to the east (Map 8). Soils in this area are Oakville fine sand (18–40% slopes). Both drainages are down gradient from the national lakeshore maintenance area and headquarters complex.

MAP 8 TOPOGRAPHY IN THE PROJECT AREA



3.3 WETLANDS

Wetlands have been identified throughout the East Unit by the National Wetland Inventory (NWI). They include ponds, marshes, swamps, peatlands, and bogs. Seasonal and annual variations in water levels may affect wetlands. Major wetland systems delineated for the national lakeshore are palustrine, riverine, and lacustrine (NPS 1997a).

Historically, wetlands in the national lakeshore were more prominent. Surface ditching, stream channelization, and road development have claimed or altered many wetlands. The alteration of natural drainage and hydrological regimes through human action could change the distribution of wildlife and plants in the national lakeshore or compromise threatened and endangered species (NPS 1997a).

According to the NWI maps for the national lakeshore, no wetlands were identified in the project area (FWS 1981). However, as mentioned previously, there are two areas within the project boundary in which

wetlands are present: between U.S. 12 and the Northern Indiana Commuter Transportation District and north of Oak Hill Road.

Park staff have described some areas between U.S. 12 and the Northern Indiana Commuter Transportation District as having wetland characteristics, but no formal delineation has been performed. A U.S. Army Corps of Engineers representative visited the site on August 23, 2011, and determined that both action alternatives B and C would have minor impacts on wetlands in the area (about 0.02 acres). The representative mentioned that a Section 404 permit would be required, but more likely, either a Section 404 nationwide or regional permit would be required due to the type of project and the minimal impact expected. As described previously in the “Geology and Soils” section, the soils in the area north of Oak Hill Road were sampled in March 2011, and the survey determined that soils at this site are very poorly drained, hydric soils that formed under a forested environment (NPS 2011c). Additionally, sedges and swamp white oaks were present at the site in a June 2011 field trip, both indicative of hydric soils.

On July 21, 2011, a representative from the U.S. Army Corps of Engineers conducted a wetland evaluation (not a formal delineation) of areas that might be impacted by two possible alternative routes. The results of that evaluation determined that along the general location of the original preferred alternative (since dismissed), the forested wetland extends 451 feet from the ditch along Oak Hill Road in a northerly direction. During the same wetland evaluation, it was determined that construction through wetlands in the field near the Preferred Alternative, could be avoided by skirting them to the east and north. Map 9 illustrates the general boundary of the wetland north of Oak Hill Road, based on the soil borings taken in July 2011. The wetlands shown north of U.S. 12 are based on the vegetation classification (“Midwest Cattail Deep Marsh”). No formal wetland delineations have been conducted at either location.

MAP 9 WETLANDS IN THE PROJECT AREA

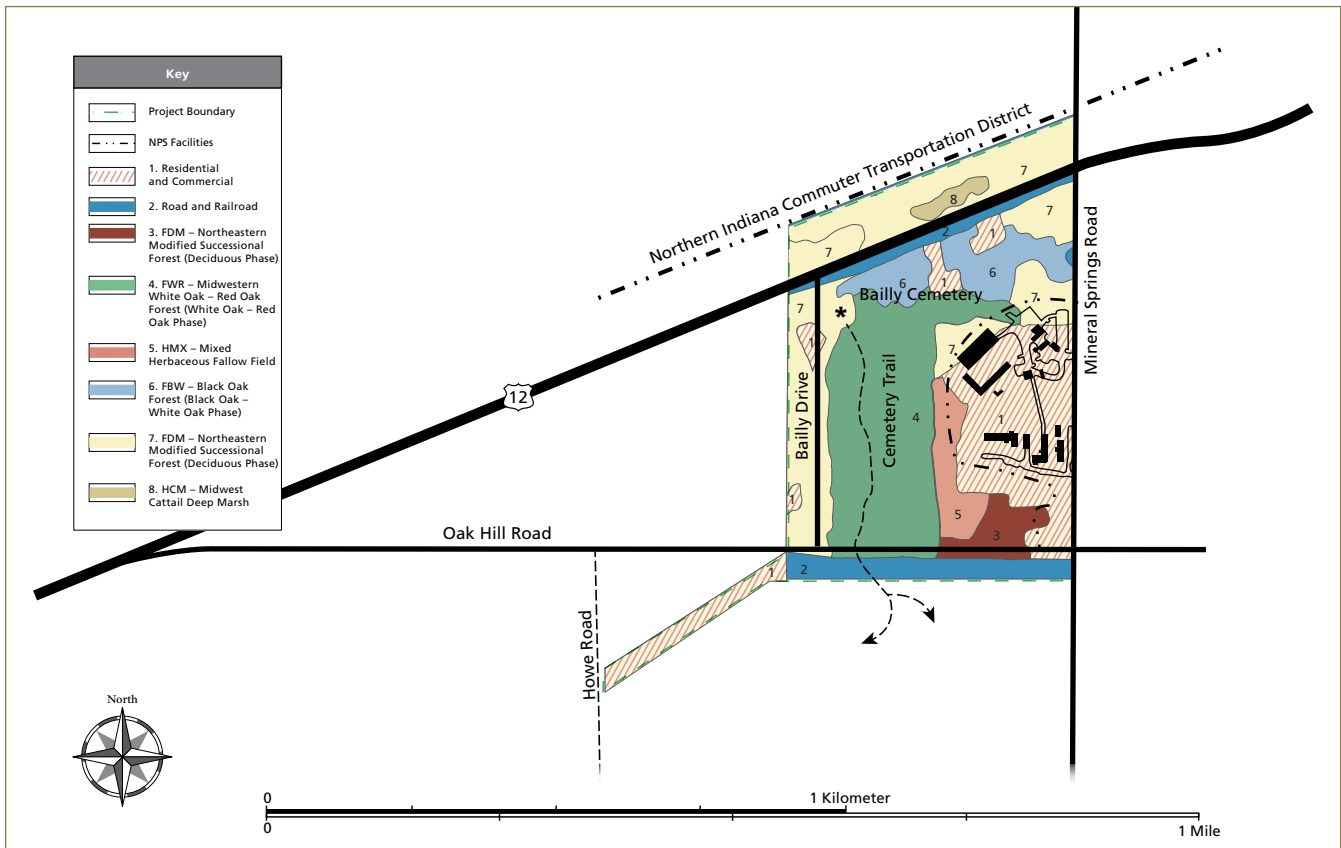


3.4 VEGETATION

Because the national lakeshore is located in several ecological transition zones, the diversity of vegetation is many times greater than most areas of similar size. Remnant species from past climatic changes have survived in sheltered habitats. The moderating effect of Lake Michigan along with the great variety of habitats within a small area explains much of the plant diversity (NPS 2007). The national lakeshore has a remarkably rich flora population. NPSpecies data indicate 1,501 species of vascular plants have been identified (NPS 2011d). There are 1,196 species of native plants and 304 non-native plant species within the national lakeshore’s boundaries. Many of these non-natives are invasive species and, once established, can severely alter natural succession (NPS 1997a). The national lakeshore is home to populations of thirty percent of Indiana’s listed rare, threatened, endangered, and special concern plant species. Shaped by glacial events and changing climates, the dunes landscape contains disjunct flora representative of eastern deciduous forests, boreal forest remnants, and species with Atlantic coast affinities. In addition, the national lakeshore is part of the upper- and eastern-most limits of the tallgrass prairie peninsula and supports high quality remnants of this ever-diminishing vegetation type. The presence of many unique dune and wetland plant community types has led to a long history of botanical exploration and research.

A number of studies and reports have been conducted on the vegetation of the national lakeshore. However, the vegetative classifications differ among the studies, making comparisons difficult.

MAP 10 VEGETATION IN THE PROJECT AREA



According to the Ecosystem Study of the Indiana Dunes National Lakeshore, Volume One (NPS 1981), the Bailly Unit, of which the project area is a part, has been compromised by past uses. However, there are remnants in the Bailly Unit that have not been significantly compromised, such as floodplains of the Little Calumet River, older forest areas on the slopes along the Little Calumet River, and much of the wooded project area. In this study, the project area included the following zones: Transportation line, Woodland–continuous crown, Woodland–open crown, Grass–continuous cover, and Abandoned agriculture–grass.

According to the Environmental Assessment, East Unit General Management Plan Amendment (NPS 1997c), dune communities, moraine communities, and wetlands compose the major vegetation classifications.

The 2010 vegetation mapping project for the national lakeshore used the National Vegetation Classification (NVC) System, which standardizes vegetation categories for all units of the national park system. This project determined the following NVC System classifications for the project area (Map 10):

- Residential and Commercial
- Road and Railroad
- Northeastern Modified Successional Forest (Deciduous Phase)
- Midwestern White Oak – Red Oak Forest (White Oak – Red Oak Phase)
- Mixed Herbaceous Fallow Field
- Black Oak Forest (Black Oak – White Oak Phase)
- Northeastern Modified Successional Forest (Deciduous Phase)
- Midwest Cattail Deep Marsh

A list of vegetation in or near the project area is included as Appendix 2. This information has been retrieved from the draft database for the Special Vegetation and Flora of the Indiana Dunes National Lakeshore by Noel B. Pavlovic and Barbara Plampin. A total of 167 plant species are recorded from the Bailly A Unit around park headquarters, including the woods to the west and disturbed areas further west (USGS 2011).

In addition to vegetation, fungi are an important component of the ecosystem of the project area. Although fungi are no longer classified as plants, they are often studied in botany since fungi are often associated with plants in the role of decomposer and pathogen. Ongoing studies in the large tree area within the project, west of park headquarters, have found roughly 400 species of fungi above and below ground, making the area one of the best-known forest fungal communities in the national park system (Avis et al 2008).

3.5 WILDLIFE

The national lakeshore is home to not only a diverse population of plants, but also a diverse wildlife population. Forty-six species of mammals, 15 species of amphibians, 22 species of reptiles, 71 species of fish, 60 species of butterflies, and 60 species of dragonflies and damselflies are present. This biological diversity is one of the most significant features of the national lakeshore and a primary reason for its establishment. Because the national lakeshore is located in several ecological transition zones, the wildlife diversity is many times greater than most areas of similar size. Remnant vegetative species from past cli-

matic changes have survived in sheltered habitats. The moderating effect of Lake Michigan, along with the great variety of habitats within a small area, explains much of the plant and animal diversity (NPS 2007).

More than 350 species of birds have been identified in the area along the entire southern shore of Lake Michigan (Brock 1997), with 113 of these being regular nesters. The national lakeshore also provides habitat for many feeding great blue herons as well as an ideal nesting habitat. The pileated woodpecker is making a comeback in the national lakeshore due to maturing forests; the red-shouldered hawk, though a state species of concern, is nesting in good numbers also due to maturing forests; and sandhill cranes and great egrets have begun nesting in the area in the last three years due to wetland restoration efforts. Common resident species include mallard, blue jay, American crow, great horned owl, song sparrow, ring-billed gull, house finch, and northern cardinal. Summer breeding species include pied-billed grebe, red-shouldered hawk, sora, Acadian flycatcher, yellow-billed cuckoo, and chestnut-sided warbler.

The national lakeshore is a focal point for migrating avian species. Spring and fall migrants include numerous wildfowl species, olive-sided flycatcher, Swainson's thrush, solitary vireo, Cape May warbler, bay-breasted warbler, and many other species.

During spring, the Lake Michigan shoreline channels numerous migrating raptor species through the East Unit along the dune ridge tops. About a dozen raptor species, including red-tailed hawks, bald eagles, peregrine falcons, sharp-shinned hawks, American kestrels, and turkey vultures, all take advantage of uplifting south breezes on their northward journey. Thousands of migrating raptors and sandhill cranes have been identified and are counted annually by volunteer birdwatchers.

Appendix 3 lists the birds observed in the project area.

Most mammals have relatively stable populations. They include white-tailed deer, woodchuck, coyote, red fox, red squirrel, eastern gray squirrel, beaver, striped skunk, eastern chipmunk, muskrat, meadow vole, eastern cottontail, and white-footed mouse. High white-tailed deer populations are a concern, however, and the national lakeshore is currently preparing a Deer Management Plan/Environmental Impact Statement to address this issue.

In an area of older trees (approximately 120-150 years old), there are medium-to-large-sized decaying logs and leaf litter on the ground that provide excellent habitat for several species of salamanders, including the red-backed and blue-spotted salamanders. Seasonally wet areas (area with increased precipitation from February to May) in the forested wetland part of the woods may attract spring peepers and the northern leopard frog. The American toad, ringnecked snake, garter snake and DeKays snake may be found in the area. The open field portion of the Preferred Alternative route would still contain some garter snakes.

The Little Calumet River is a major stream near the project site. All major game fish in this stream are exotic, including rainbow trout (steelhead), brown trout, and coho and chinook salmon. Nongame fish species include white sucker, carp, creek chub, Johnny darter, blunt-nose minnow, and green sunfish (NPS 1997a).

No project-specific wildlife survey has been done.

3.6 RARE AND ENDANGERED SPECIES (PLANTS AND ANIMALS)

Both state and federally protected threatened and endangered plant and animal species are known to occur or could potentially occur in the national lakeshore. According to the U.S. Fish and Wildlife Service (FWS), the project area is within the range of the federally endangered Indiana bat (*Myotis sodalists*) and the candidate eastern massasauga rattlesnake (*Sistrurus catenatus catenatus*). The Little Calumet River corridor is considered by FWS to be a potential habitat for the Indiana bat, and there are historical records of the massasauga rattlesnake in Cowles Bog, just north of the project area. Several beaches within the national lakeshore are designated as critical habitats for the federally endangered piping plover (*Charadrius melodus*), but there are no beaches in the project area. There is also potential in the national lakeshore for the presence of the federally endangered Karner blue butterfly (*Lycaeides melissa samuelis*), which relies on populations of wild lupine (*Lupinus perennis*) for larval food. However, the habitat of the project area is not suitable for this species. The federally threatened Pitcher's thistle (*Cirsium pitcheri*) occurs in the national lakeshore, but only in the open dune environment, which is not present in the project area.

As mentioned in the previous section, in the area of older trees (approximately 120–150 years old), there are medium-to-large-sized decaying logs and leaf litter on the ground that provide excellent habitat for several species of salamanders, among them the blue-spotted salamander, which is a state-listed species of special concern.

Other state-listed animal species include the northern leopard frog (special concern), eastern box turtle (special concern), red-shouldered hawk (special concern), common nighthawk (special concern), and whip-poor-will (special concern).

The Report on the Special Vegetation of the Indiana Dunes National Lakeshore (NPS 1980) inventoried special vegetation (defined as locally important to the national lakeshore, including unique, exemplary, relic, threatened, or endangered vegetation). The report concluded that “most of the natural amenities of this unit had been permanently compromised.” The central portion of the project area was surveyed in this study (Bailly Survey Unit — Area A) and was described as a “mesophytic forest.” However, the report stated that “these forests are relatively low in quality in comparison with what they must have been at one time; though, sadly, they are nevertheless, significant in comparison with what remains in the Chicago Region today.” The report also included a species list for the area.

An updated list of vegetation, including rare species, in or near the project area has been retrieved from the draft database for the Special Vegetation and Flora of the Indiana Dunes National Lakeshore by Noel B. Pavlovic and Barbara Plampin, found in Appendix 2. A total of 167 plant species are recorded from the Bailly A unit around park headquarters, including the woods to the west and disturbed areas further west (USGS 2011).

3.7 VISITOR USE AND EXPERIENCE

Roughly two million visitors come to the national lakeshore annually, with the majority of the visitation in the summer months. A variety of recreational opportunities are offered, such as bird watching, picnicking, swimming, hiking, horseback riding, camping, fishing and boating, bicycling, special events, and win-

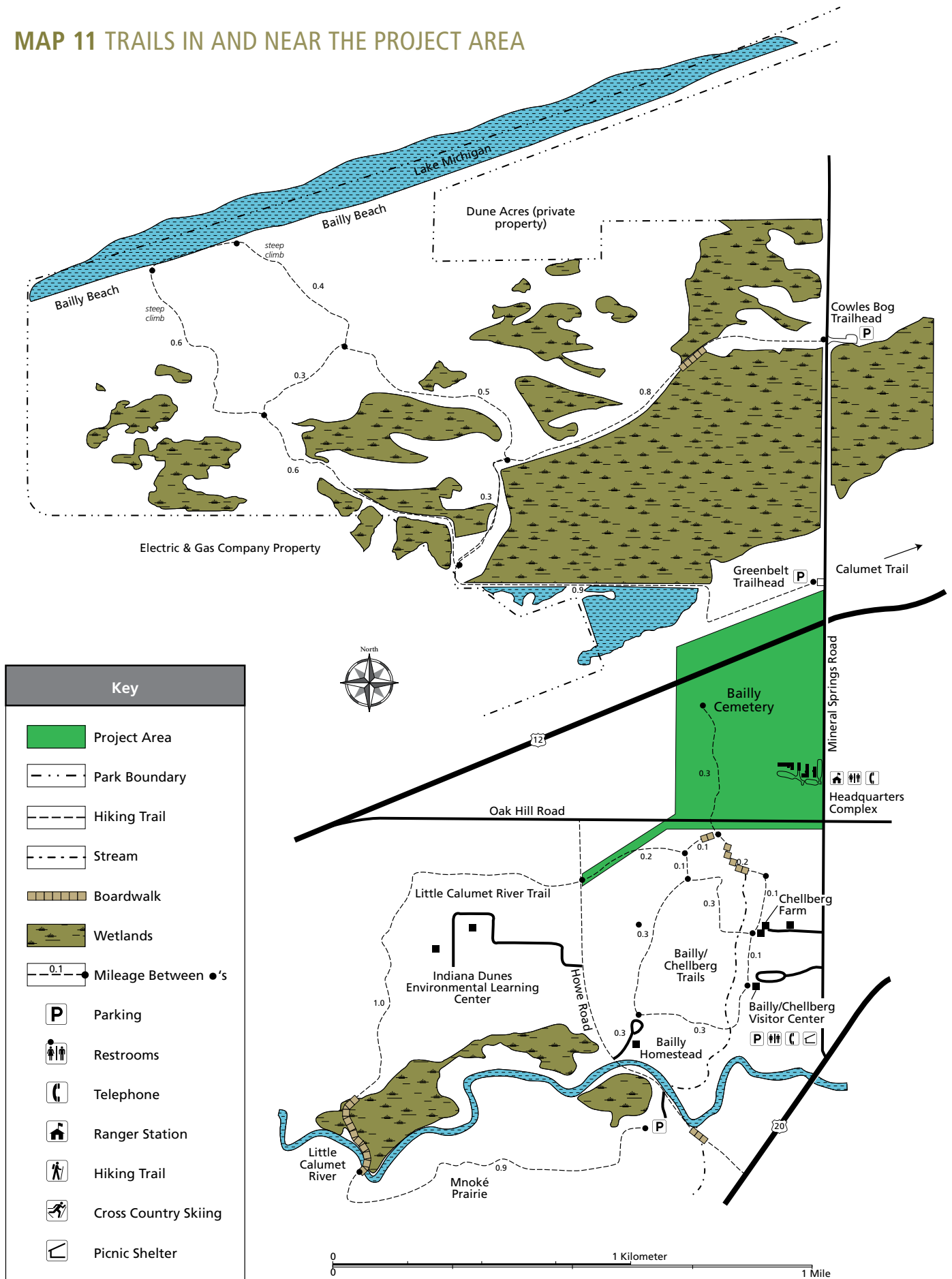
ter activities (hiking, cross-country skiing, and snowshoeing) (NPS 2011e). The Indiana Dunes National Lakeshore Visitor Study (NPS 2010) describes the results of a visitor survey conducted at the national lakeshore between August 1 and 14, 2009. According to the survey, the most common sites visited within the national lakeshore were Mt. Baldy (38%), followed by the beach in the central part of the park (37%). Beach activities were the most common visitor activity (79%), followed by walking/hiking (51%). United States visitors composed 98% of total visitation during the survey period, with 40% from Indiana, 40% from Illinois, and smaller proportions from 27 other states. International visitors represented seven countries and composed 2% of total visitation. Among visitors that visited other places in the surrounding area (from Gary, Indiana to Michigan City, Indiana), 42% of visitor groups visited Indiana Dunes State Park. Of those using trails during their visit, 55% used Mt. Baldy, with 17% using a variety of other trails.

No visitor use studies in the project area have been conducted. Some visitors hike to the Bailly Cemetery from the Bailly/Chellberg Visitor Center or from the Bailly Homestead via the Bailly Chelberg Trails and the Cemetery Trail, since they may be aware of the cemetery's significance as a component of the Bailly Homestead. The Cemetery Trail also has a connection with the Little Calumet River Trail, which is south of Oak Hill Road. One of two Cowles Bog Trail trailhead parking areas is directly across from the Calumet Trail at the north end of the project area (Map 11). The roads in the area are moderately-to-heavily used. Average daily two-way traffic (ADT) counts in the vicinity of the project area were 406 (eastbound) and 275 (westbound) for Oak Hill Road, and 415 (northbound) and 307 (southbound) for Mineral Springs Road. U.S. 12 has higher use, with an ADT of 5,790 at Mineral Springs Road in 2003.

3.8 PARK FACILITIES AND OPERATIONS

The national lakeshore has a Cooperative Management Agreement (CMA) with the Town of Porter to maintain the trail on park lands (NPS 2011b). The CMA includes provisions for routine maintenance, capital repairs, and general management. Routine maintenance activities include tread, structures, drainage, signs, trash, and vegetation. However, national lakeshore staff will be responsible for activities such as medical and law enforcement response and investigation, control of invasive species, supplementing Town of Porter maintenance activities (storm damage emergency removal and vandalism), and management of the CMA. Additionally, any potential vandalism to adjacent park properties and assets would have to be addressed.

MAP 11 TRAILS IN AND NEAR THE PROJECT AREA



CHAPTER 4. ENVIRONMENTAL CONSEQUENCES

A determination of the probable impacts of each alternative on park resources has been made in accordance with NEPA. The analysis for each impact topic includes the identification of impacts of the various actions associated with the alternative, characterization of the impacts, an assessment of cumulative impacts, and a conclusion.

4.1. METHODOLOGY

For each impact topic, the analysis includes an evaluation of potential effects resulting from the implementation of each alternative discussed in Chapter 2. The impact analyses were based on professional judgment using information provided by park staff and subject matter experts and compiled from relevant references and technical literature citations. Evaluation of alternatives takes into account whether the impacts would be negligible, minor, moderate, or major. These thresholds are defined for each impact topic.

Duration of impacts is evaluated based on the short-term or long-term nature of the changes on existing conditions associated with each alternative. Type of impact refers to the beneficial or adverse consequences of implementing a given alternative. More exact interpretations of intensity, duration, and type of impact are given for each impact topic examined.

4.2 CUMULATIVE IMPACTS

The Council on Environmental Quality regulations for implementing the National Environmental Policy Act (Council on Environmental Quality, 1978) and NPS Director's Order #12 Conservation Planning, Environmental Impact Analysis, and Decision Making (2001) require assessment of cumulative effects in the decision-making process for federal projects. Cumulative effects are considered for both the No Action and action alternatives.

- Cumulative impacts were determined by combining the effects of the alternative with other past, present, and reasonably foreseeable future actions at the national lakeshore and in the surrounding region. These other actions, in conjunction with this project are intended to preserve and restore cultural and natural resources and to improve visitor experience. These actions include the following.
- A Deer Management Plan/Environmental Impact Statement is currently underway. This document will address the impacts of high deer densities (currently about 98 deer per square mile) on vegetation and wildlife in the national lakeshore, including one federally-listed and 135 state-listed plant species and many of the 113 species of birds that are considered regular nesters. The plan will also identify a number of actions that the NPS can take, in concert with other entities, including federal, state and local communities, for deer management in order to protect valuable resources, promote safety (especially involving vehicle accidents), and provide a high-quality visitor experience. Without management, deer populations are expected to increase in the future due to continued lack of predators and favorable habitat conditions that are a result of human alterations to the landscape.

- A Shoreline Restoration and Management Plan/Environmental Impact Statement is currently underway for the national lakeshore's 13 miles of the southern Lake Michigan Shoreline. Development and installation of navigational harbors and shoreline stabilization structures (jetties, breakwaters, revetments, and bulkheads) has altered southern Lake Michigan's natural east-to-west littoral drift, resulting in significant accretion of sands east (up drift) of Michigan City and Burns International harbors and the subsequent sand starvation to the west (down drift) of these harbors. The lack of continued sand replenishment from natural littoral drift has further resulted in extensive beach and dune erosion, threatening both public and private resources.
- The Great Marsh-Dunes Creek Lakeplain Prairie Restoration: Phase I-Inventory project is currently underway to conduct inventories within the historic range of Great Marsh-Dunes Creek lakeplain wet-mesic prairie. Three work zones have been defined: Pepon, Kurz, and Peattie. Inventory work will include vegetation analyses, mapping of the existing ditch system, and data collection that will entail seedbank sampling, sampling for soil chemistry, and installation of shallow groundwater wells. Five phases of work will be required to restore the subject wetland: Phase I – inventory; Phase II – design; Phase III – landscape modification (hydrology restoration; removal of woody growth); Phase IV – establishment of native plant assemblages; and Phase V – follow-up management.

4.3 GEOLOGY AND SOILS

INTENSITY

Negligible: Soils would not be affected or the effects on soils would be below or at the lower levels of detection. Any effects on soil productivity or fertility would be slight.

Minor: The effects on soils would be detectable. Effects on soil productivity or fertility would be small, as would the area affected. If mitigation were needed to offset adverse effects, it would be relatively simple to implement and would likely be successful.

Moderate: The effect on soil productivity or fertility would be readily apparent and would result in a change to the soil character over a relatively wide area. Mitigation measures would probably be necessary to offset adverse effects and would likely be successful.

Major: The effect on soil productivity or fertility would be readily apparent and would substantially change the character of the soils over a large area in and out of the park. Mitigation measures to offset adverse effects would be necessary and extensive, and their success could not be guaranteed.

DURATION

Short-term: Following treatment, recovery would take less than three years.

Long-term: Following treatment, recovery would take more than three years.

IMPACTS TO GEOLOGY AND SOILS BY ALTERNATIVE A (NO ACTION)

Under the No Action Alternative, no new multi-use trail would be constructed on federal land within the national lakeshore boundary. Bicyclists and other users would continue to use the travel surface or shoulder of existing roads. There would be no impact to geology and soils.

Cumulative Impacts: There are no current plans or actions that would contribute to geology and soil impacts at the project site. The three studies currently underway, described in the “Cumulative Impacts” section, are management plans that focus on restoring natural resources in the national lakeshore.

Conclusions: Implementation of the No Action Alternative would result in no impact to geology and soils.

IMPACTS TO GEOLOGY AND SOILS BY THE PREFERRED ALTERNATIVE

Under the Preferred Alternative much of the trail route is located on previously disturbed soils. From Howe Road to Oak Hill Road, the route follows the existing trail over the sewer line, then runs along the buried sewer line on the south side of Oak Hill Road until it crosses the road. It then follows an NPS administrative trail (a former driveway) before traversing the open field near the NPS administrative headquarters and maintenance facilities (Map 9). The soils in the field have been disturbed by past uses (agricultural and military). When the trail enters the woods just west of the maintenance facility, minor impacts to soils would result during trail construction. However, in this wooded area the trees have been timbered at least 2–3 times, and the level of soil impact that occurred during these past activities is unknown. Trail construction activities would alter any surface soil profiles in the 18-foot-wide construction zone, including compaction, removal, ruts from heavy equipment, and tree stump removal. Surface contours would also be altered to meet engineering requirements. Soil contamination may result from chemical spills from heavy equipment or chainsaws. Impacts to geology and soils would be long-term, minor, and adverse.

Cumulative Impacts: There are no current plans or actions that would contribute to geology and soil impacts at the project site. The three studies currently underway, described in the “Cumulative Impacts” section, are management plans that focus on restoring natural resources in the national lakeshore. The Preferred Alternative, when combined with these other actions, would result in long-term, minor, and adverse impacts to geology and soils.

Conclusions: Implementation of the Preferred Alternative would result in long-term, minor, and adverse impacts to geology and soils.

IMPACTS TO GEOLOGY AND SOILS BY ALTERNATIVE C

Under Alternative C, much of the trail route is located on previously disturbed soils. From Howe Road to Oak Hill Road, the route follows the existing trail over the sewer line, then runs along the buried sewer line on the south side of Oak Hill Road until it crosses the road at the intersection with Mineral Springs Road. It then follows previously disturbed land along the west side of Mineral Springs Road until entering the forest north of the maintenance complex. At this point, minor impacts to soils would result during trail construction. However, in this wooded area the trees have been timbered at least 2–3 times, and the level of soil impact that occurred during these past activities is unknown. Trail construction activities would alter any surface soil profiles in the 18-foot-wide construction zone, compaction, removal, ruts from heavy equipment, and tree stump removal. Surface contours would also be altered to meet engineering requirements. Soil contamination may result from chemical spills from heavy equipment or chainsaws. Impacts to geology and soils would be long-term, minor, and adverse.

Cumulative Impacts: There are no current plans or actions that would contribute to geology and soil impacts at the project site. The three studies currently underway, described in the “Cumulative Impacts”

section, are management plans that focus on restoring natural resources in the national lakeshore. Alternative C, when combined with these other actions, would result in long-term, minor, and adverse impacts to soils.

Conclusions: Implementation of the Alternative C would result in long-term, minor, and adverse impacts to geology and soils.

4.4 DRAINAGE CHARACTERISTICS

INTENSITY

Negligible: Changes in drainage characteristics (including changes to water flow, soils, and topography) within the project area are not detectable using standard measurement techniques.

Minor: Changes in drainage characteristics within the project area are detectable but have a local and temporary impact. Mitigation may be required to offset adverse impacts but would be relatively simple to implement (e.g., increasing culvert size, configuration, or placement).

Moderate: Changes in drainage characteristics within the project area are detectable, impact a larger area, and may result in some localized flooding during rain events. Mitigation measures would be necessary to offset adverse impacts and would likely be successful.

Major: Changes in drainage characteristics within the project area are readily apparent, widespread, and could result in increased flooding during rain events. Mitigation measures to offset adverse impacts would be necessary and extensive, and their success could not be certain.

DURATION

Short-term: The impact occurs only during treatment actions or less than two years after the treatment option is completed.

Long-term: The impact would be semi-permanent to permanent.

IMPACTS TO DRAINAGE CHARACTERISTICS BY ALTERNATIVE A (NO ACTION)

Under the No Action Alternative, no new multi-use trail would be constructed on federal land within the national lakeshore boundary. Bicyclists and other users would continue to use the travel surface or shoulder of existing roads. There would be no impact on drainage characteristics.

Cumulative Impacts: There are no current plans or actions that would contribute to impacts to drainage characteristics at the project site. The three studies currently underway, described in the “Cumulative Impacts” section, are management plans that focus on restoring natural resources in the national lakeshore.

Conclusions: Implementation of the No Action Alternative would result in no impact to drainage characteristics.

IMPACTS TO DRAINAGE CHARACTERISTICS BY THE PREFERRED ALTERNATIVE

There are two small drainages that would be impacted by the Preferred Alternative, and both are located north of the maintenance complex in the forest (Map 8). These are intermittent watercourses with water flowing only during rain events or periods of snowmelt. Trail construction over these two drainages would alter their soils and topography, but placement of culverts would result in little change in water flow. Impacts to drainage characteristics would be long-term, minor, and adverse.

Cumulative Impacts: There are no current plans or actions that would contribute to impacts to drainage characteristics at the project site. The three studies currently underway, described in the “Cumulative Impacts” section, are management plans that focus on restoring natural resources in the national lakeshore. The Preferred Alternative, when combined with these other actions, would result in long-term, minor, and adverse impacts to drainage characteristics.

Conclusions: Implementation of the Preferred Alternative would result in long-term, minor, and adverse impacts to drainage characteristics.

IMPACTS TO DRAINAGE CHARACTERISTICS BY ALTERNATIVE C

Alternative C would only impact the drainage along Mineral Springs Road. This is an intermittent watercourse with water flowing only during rain events or periods of snowmelt. Trail construction over this drainage would alter its soils and topography, but placement of culverts would result in little change in water flow. Impacts to drainage characteristics would be long-term, minor, and adverse.

Cumulative Impacts: There are no current plans or actions that would contribute to impacts to drainage characteristics at the project site. The three studies currently underway, described in the “Cumulative Impacts” section, are management plans that focus on restoring natural resources in the national lakeshore. Alternative C, when combined with these other actions, would result in long-term, minor, and adverse impacts to drainage characteristics.

Conclusions: Implementation of Alternative C would result in long-term, minor, and adverse impacts to drainage characteristics.

4.5 WETLANDS

INTENSITY

Negligible: Water quality would not be affected, or changes would be either non-detectable or below water quality standards. Effects would be considered slight, site specific, and short-term. Any effects to wetlands would be below or at the lower levels of detection. There would be no long-term effects to wetlands, and any detectable effects would be slight. No Corps of Engineers 404 permit would be necessary.

Minor: Water quality would be measurable, although the changes would be below water quality standards, small, likely short-term, and effects would be site-specific or local. No water quality or hydrology mitigation measures would be necessary. The effects to wetlands would be detectable and relatively small and short-term in terms of individual plants. No effects would be detectable to populations of plants. The effect would be site-specific. A Corps of Engineers Section 404 permit may or may not be required. Minor long-term effects to wetlands could occur.

Moderate: Changes in water quality or hydrology would be measurable and long-term and may exceed water quality standards, but would remain relatively local. Necessary water quality or hydrology mitigation measures would likely succeed. The effects to wetlands would be detectable and readily apparent, including a long-term effect on individual plants and short- or long-term effect on populations of plants. A Corps of Engineers Section 404 permit would be required. The effect could be site-specific or local.

Major: Changes in water quality or hydrology would be readily measurable, would have substantial consequences, and would be noticed on a regional scale. Mitigation measures would be necessary, and their success would not be guaranteed. Effects to wetlands would be observable over a relatively large localized or regional area and would be long-term. A Corps of Engineers Section 404 permit would be required. The character of the wetland would substantially change its functions over the long-term.

DURATION

Short-term: Following treatment, recovery would take less than three years.

Long-term: Following treatment, recovery would take more than three years.

IMPACTS TO WETLANDS BY ALTERNATIVE A (NO ACTION)

Under the No Action Alternative, no new multi-use trail would be constructed on federal land within the national lakeshore boundary. Bicyclists and other users would continue to use the travel surface or shoulder of existing roads. There would be no impact on wetlands.

Cumulative Impacts: There are no current plans or actions that would contribute to wetlands impacts at the project site. The three studies currently underway, described in the “Cumulative Impacts” section, are management plans that focus on restoring natural resources in the national lakeshore.

Conclusions: Implementation of the No Action Alternative would result in no impact to wetlands.

IMPACTS TO WETLANDS BY THE PREFERRED ALTERNATIVE

The forested wetland north of Oak Hill Road extends to the east into the open field near the NPS administrative headquarters and maintenance facilities (Map 9). Although no formal wetland delineation has been performed, NPS wetlands guidance in Director’s Order #77, Procedural Manual #77-1: Wetland Protection (NPS 2011a) was closely reviewed. A U.S. Army Corps of Engineers representative was asked to visit the site to assist in determining what areas exhibited wetland characteristics under the Cowardin classification system (i.e. wetland vegetation, hydric soils, or saturated or covered by water at some time during the growing season each year). Although the representative was from the U.S. Army Corps of Engineers, the agency that administers the Section 404 permit program, no attempt was used to apply the narrower Section 404 wetland definition for this review. Based on this field review, the Preferred Alternative route was moved to the east to avoid impacting the wetland. Impacts to this wetland would be short-term, indirect, negligible, and adverse.

The wetland north of U.S. 12 would be directly impacted by this alternative. Although no formal wetland delineation has been performed, based on a field trip with a U.S. Army Corps of Engineers representative, again using the Cowardin classification system rather than the narrower Corps manual, it was determined that about 0.02 acres (870 square feet) of wetlands would be impacted in the 18-foot construction zone. Park staff and the Corps representative took measurements along the staked centerline of the proposed trail. A Section 404 permit would be required, but most likely, it would be of the nationwide or regional variety due to the type of the project and the minimal impact expected. The trail has been routed as closely as possible to existing roadways (U.S. 12 and Mineral Springs Road). Impacts to this wetland would be long-term, minor, and adverse.

A “Wetland Statement of Findings” is a document that explains why an alternative with adverse impacts on wetlands was chosen. Bicycle trails are a development that may be excepted from the “Statement of Findings” requirement where “primary purposes include public education, interpretation, or enjoyment of wetland resources and where total wetland impacts from fill placement are 0.1 acre or less” (NPS 2011a). However, excepted actions must comply with the conditions and best management practices referred to in Section 4.22 of Procedural Manual #77-1 and listed in Appendix 2 of the manual. These best management practices are included in the mitigation section for Alternative B (Chapter 2).

Cumulative Impacts: There are no current plans or actions that would contribute to wetland impacts at the project site. The three studies currently underway, described in the “Cumulative Impacts” section, are management plans that focus on restoring natural resources in the national lakeshore. The Preferred Alternative, when combined with these other actions, would result in short-term, negligible, and adverse impacts to the field wetland north of Oak Hill Road, and long-term, minor, adverse impacts to the wetland north of U.S. 12.

Conclusions: Implementation of the Preferred Alternative would result in short-term, negligible, and adverse impacts to the field wetland north of Oak Hill Road and long-term, minor, adverse impacts to the wetland north of U.S. 12.

IMPACTS TO WETLANDS BY ALTERNATIVE C

Alternative C would avoid the wetland north of Oak Hill Road by following the sewer line corridor on the south side of the road. There would be no impacts to the field wetland north of Oak Hill Road. North of U.S. 12, Alternative C follows the same route as the Preferred Alternative, and the wetland in this area would be impacted. Although no formal wetland delineation has been performed, based on a fieldtrip with a U.S. Army Corps of Engineers representative, using the Cowardin classification system rather than the narrower Corps manual, it was determined that about 0.02 acres (870 square feet) of wetlands would be impacted in the 18-foot construction zone. Park staff and the Corps representative took measurements along the staked centerline of the proposed trail. A Section 404 permit would be required, but most likely of the nationwide or regional variety due to the type of the project and the minimal impact expected. The trail has been routed as closely as possible to existing roadways (U.S. 12 and Mineral Springs Road). Impacts to this wetland would be long-term, minor, and adverse.

As in Alternative B, this excepted action must comply with the conditions and best management practices referred to in Section 4.22 of Procedural Manual #77-1 and listed in Appendix 2 of the manual. These best management practices are included in the mitigation section for Alternative C (Chapter 2).

Cumulative Impacts: There are no current plans or actions that would contribute to wetlands impacts at the project site. The three studies currently underway, described in the “Cumulative Impacts” section, are management plans that focus on restoring natural resources in the national lakeshore. Alternative C, when combined with these other actions, would result in no impacts to the field wetland north of Oak Hill Road, and long-term, minor, adverse impacts to the wetland north of U.S. 12.

Conclusions: Implementation of the Alternative C would result in no impacts to the field wetland north of Oak Hill Road, and long-term, minor, adverse impacts to the wetland north of U.S. 12.

4.6 VEGETATION

INTENSITY

Negligible: Either no native vegetation would be affected or some individual native plants could be affected as a result of the alternative, but there would be no effect on native species populations. The effects would be on a small-scale, and no species of special concern would be affected.

Minor: The alternative would temporarily affect some individual native plants and would also affect a relatively minor portion of that species' population. Mitigation to offset adverse effects, including special measures to avoid affecting species of special concern, could be required and would be effective.

Moderate: The alternative would affect individual native plants and would also affect a sizeable segment of the species' population over a relatively large area. Mitigation to offset adverse effects could be extensive, but would likely be successful. Some species of special concern could also be affected.

Major: The alternative would have a considerable long-term effect on native plant populations, including species of special concern, and would affect a relatively large area in and outside of the national lakeshore. Mitigation measures to offset the adverse effects would be required and extensive, and the success of the mitigation measures would not be guaranteed.

DURATION

Short-term: Following treatment, recovery would take less than two years.

Long-term: Following treatment, recovery would take more than two years.

IMPACTS TO VEGETATION BY ALTERNATIVE A (NO ACTION)

Under the No Action Alternative, no new multi-use trail would be constructed on federal land within the national lakeshore boundary. Bicyclists and other users would continue to use the travel surface or shoulder of existing roads. There would be no impact on vegetation.

Cumulative Impacts: There are no current plans or actions that would contribute to vegetation impacts at the project site. The three studies currently underway, described in the "Cumulative Impacts" section, are management plans that focus on restoring natural resources in the national lakeshore.

Conclusions: Implementation of the No Action Alternative would result in no impact to vegetation.

IMPACTS TO VEGETATION BY THE PREFERRED ALTERNATIVE

Under the Preferred Alternative, much of the trail route is located on previously disturbed lands, with vegetation consisting of herbaceous grasses and non-native vegetation. From Howe Road to Oak Hill Road, the route follows the existing trail over the sewer line, then runs along the buried sewer line on the south side of Oak Hill Road until it crosses the road. It then follows an NPS administrative trail (a former driveway) before traversing the open field near the administrative headquarters and maintenance facilities. The field has been disturbed by past uses (agricultural and military), and includes a mix of herbaceous grasses, non-native vegetation, and scrub-shrub vegetation. Native vegetation common to a forest environment will be planted to screen the trail from the NPS administrative headquarters and maintenance facility (and vice versa). When the trail enters the woods just west of the maintenance facility, some trees would be

removed during trail construction and some would ultimately die due to root zone disturbance. However, according to park staff, in this area the trees have been timbered at least 2–3 times and are not of a size or species composition quality when compared to the forest immediately to the southwest. Because of this, the forest habitat in this area is not as unique or significant as the more mature forest to the south. The trail will be routed to bypass any quality trees. Impacts to vegetation would be long-term, minor, and adverse. This impact would be offset somewhat from the planting of native vegetation in the open field to screen the trail.

Cumulative Impacts: There are no current plans or actions that would contribute to vegetation impacts at the project site. The three studies currently underway, described in the “Cumulative Impacts” section, are management plans that focus on restoring natural resources in the national lakeshore. The Preferred Alternative, when combined with these other actions, would result in long-term, minor, and adverse impacts to vegetation.

Conclusions: Implementation of the Preferred Alternative would result in long-term, minor, and adverse impacts to vegetation.

IMPACTS TO VEGETATION BY ALTERNATIVE C

As with the Preferred Alternative, much of the Alternative C trail route is located on previously disturbed lands, with vegetation consisting of herbaceous grasses and non-native vegetation. From Howe Road to Oak Hill Road, the route follows the existing trail over the sewer line and then runs along the buried sewer line on the south side of Oak Hill Road until it crosses the road at the intersection with Mineral Springs Road. It then follows previously disturbed land along the west side of Mineral Springs Road until entering the forest north of the maintenance complex. The trail enters the woods just north of the maintenance facility, along the same alignment as the Preferred Alternative. Some trees would be removed during trail construction and some would ultimately die due to root zone disturbance. However, according to park staff, in this area the trees have been timbered at least 2–3 times and are not of a size or species composition quality when compared to the forest immediately to the south. So, the forest habitat in this area is not unique or significant in comparison with the forest to the south. Impacts to vegetation would be long-term, minor, and adverse.

Cumulative Impacts: There are no current plans or actions that would contribute to vegetation impacts at the project site. The three studies currently underway, described in the “Cumulative Impacts” section, are management plans that focus on restoring natural resources in the national lakeshore. Alternative C, when combined with these other actions, would result in long-term, minor, and adverse impacts to vegetation.

Conclusions: Implementation of Alternative C would result in long-term, minor, and adverse impacts to vegetation.

4.7 WILDLIFE

INTENSITY

Negligible: Any effects to wildlife would be at or below the level of detection, short-term, site-specific, and so slight that they would not be of any measurable or perceptible consequence to the wildlife populations.

Minor: Effects to wildlife would be detectable, although short-term, site-specific, small, and of little consequence to the wildlife populations. Mitigation measures, if needed to offset adverse impacts, would be simple and successful.

Moderate: Effects to wildlife would be readily detectable, short- or long-term, and site-specific, with consequences at the population level. Mitigation measures, if needed to offset adverse impacts, would be extensive and likely successful.

Major: Effects to wildlife would be obvious, long-term, local or regional, and would have substantial consequences to wildlife populations in the region. Extensive mitigation measures would be needed to offset any adverse impacts, and their success would not be guaranteed.

DURATION

Short-term: Following treatment, recovery would take less than two years.

Long-term: Following treatment, recovery would take more than two years.

IMPACTS TO WILDLIFE BY ALTERNATIVE A (NO ACTION)

Under the No Action Alternative, no new multi-use trail would be constructed on federal land within the national lakeshore boundary. Bicyclists and other users would continue to use the travel surface or shoulder of existing roads. There would be no impact to wildlife.

Cumulative Impacts: There are no current plans or actions that would contribute to wildlife impacts at the project site. The three studies currently underway, described in the “Cumulative Impacts” section, are management plans that focus on restoring natural resources in the national lakeshore.

Conclusions: Implementation of the No Action Alternative would result in no impact to wildlife.

IMPACTS TO WILDLIFE BY THE PREFERRED ALTERNATIVE

Under the Preferred Alternative, much of the trail route is located on previously disturbed lands, providing little high-quality wildlife habitat. From Howe Road to Oak Hill Road the route follows the existing trail over the sewer line, then runs along the buried sewer line on the south side of Oak Hill Road until it crosses the road. It then follows an NPS administrative trail (a former driveway) before traversing the open field near the administrative headquarters and maintenance facilities. The field has been disturbed by past uses (agricultural and military), and provides habitat for a variety of grassland bird species, small rodents, and garter snakes. When the trail enters the woods just west of the maintenance facility, some trees would be removed and soils would be altered during trail construction, reducing the amount of wildlife habitat. There would be a permanent asphalt path bisecting the forest, just 20 feet from headquarters grounds causing minimal fragmentation. There would be some minor impact to small animal movement

across the path due to mortality from non-motorized wheeled vehicles or pedestrians or because of the path acting as a barrier to movement of some insect species. Impacts to wildlife would be long-term, minor, and adverse.

Cumulative Impacts: There are no current plans or actions that would contribute to wildlife impacts at the project site. The three studies currently underway, described in the “Cumulative Impacts” section, are management plans that focus on restoring natural resources in the national lakeshore. The Preferred Alternative, when combined with these other actions, would result in long-term, minor, and adverse impacts to wildlife.

Conclusions: Implementation of the Preferred Alternative would result in long-term, minor, and adverse impacts to wildlife.

IMPACTS TO WILDLIFE BY ALTERNATIVE C

As with the Preferred Alternative, much of the Alternative C trail route is located on previously disturbed lands, providing little high-quality wildlife habitat. From Howe Road to Oak Hill Road the route follows the existing trail over the sewer line, then runs along the buried sewer line on the south side of Oak Hill Road until it crosses the road at the intersection with Mineral Springs Road. It then follows previously disturbed land along the west side of Mineral Springs Road until entering the forest north of the maintenance complex. The open areas along the roadways provide minimal habitat for wildlife, except for small rodents. The trail enters the woods just north of the maintenance facility, along the same alignment as the Preferred Alternative. In this area some trees would be removed and soils would be altered during trail construction, reducing the amount of wildlife habitat. There would be a permanent asphalt path in the forest, just 20 feet from headquarters grounds causing minimal fragmentation. There would be some minor impact to small animal movement across the path due to mortality from non-motorized wheeled vehicles or pedestrians or because of the path acting as a barrier to movement of some insect species. Impacts to wildlife would be long-term, minor, and adverse.

Cumulative Impacts: There are no current plans or actions that would contribute to wildlife impacts at the project site. The three studies currently underway, described in the “Cumulative Impacts” section, are management plans that focus on restoring natural resources in the national lakeshore. Alternative C, when combined with these other actions, would result in long-term, minor, and adverse impacts to wildlife.

Conclusions: Implementation of Alternative C would result in long-term, minor, and adverse impacts to wildlife.

4.8 RARE AND ENDANGERED SPECIES (PLANTS AND ANIMALS)

INTENSITY

Negligible: Special concern species would not be affected or the effects would be at or below the level of detection, and there would not be measurable or perceptible consequence to these species.

Minor: Effects to special concern species or habitats would be measurable or perceptible, but localized within a small area. While the mortality of an individual in the species might occur, the viability of populations would not be affected, and the community, if left alone, would recover.

Moderate: A change in populations or habitats would occur over a relatively large area. The change would be readily measurable in terms of abundance, distribution, quantity, or quality of population. Mitigation measures would be necessary to offset adverse effects, and would likely be successful.

Major: Effects on populations or habitats would be readily apparent, and would substantially change populations over a large area in and out of the national lakeshore. Extensive mitigation would be needed to offset adverse effects, and the success of mitigation measures could not be assured.

DURATION

Short-term: Effects would last less than two years.

Long-term: Effects would last longer than two years.

IMPACTS TO RARE AND ENDANGERED SPECIES BY ALTERNATIVE A (NO ACTION)

Under the No Action Alternative, no new multi-use trail would be constructed on federal land within the national lakeshore boundary. Bicyclists and other users would continue to use the travel surface or shoulder of existing roads. There would be no impact to rare and endangered species.

Cumulative Impacts: There are no current plans or actions that would contribute to rare and endangered species impacts at the project site. The three studies currently underway, described in the “Cumulative Impacts” section, are management plans that focus on restoring natural resources in the national lakeshore.

Conclusions: Implementation of the No Action Alternative would result in no impact to rare and endangered species.

IMPACTS TO RARE AND ENDANGERED SPECIES BY THE PREFERRED ALTERNATIVE

Under the Preferred Alternative, much of the trail route is located on previously disturbed lands, providing little high-quality wildlife habitat, until it enters the forest north of the maintenance complex. There are no known federally threatened or endangered species in the project area, although the area is within the range of the endangered Indiana bat habitat. The state-listed (special concern) leopard frog and blue-spotted salamander can be found in the project area, but inhabit wetter areas west of the Preferred Alternative route. The state-listed eastern box turtle (special concern) has been found in the project area and might be displaced by trail development. The state-listed (special concern) red-shouldered hawk, common nighthawk, and whip-poor-will have been seen in the more mature woods southwest of this route. Impacts to rare and endangered species would be long-term, negligible, and adverse.

Cumulative Impacts: There are no current plans or actions that would contribute to rare and endangered species impacts at the project site. The three studies currently underway, described in the “Cumulative Impacts” section, are management plans that focus on restoring natural resources in the national lakeshore. The Preferred Alternative, when combined with these other actions, would result in long-term, negligible, and adverse impacts to rare and endangered species.

Conclusions: Implementation of the Preferred Alternative would result in long-term, negligible, and adverse impacts to rare and endangered species.

IMPACTS TO RARE AND ENDANGERED SPECIES BY ALTERNATIVE C

Under Alternative C, much of the trail route is located on previously disturbed lands, providing little high-quality wildlife habitat, until it enters the forest northwest of the maintenance complex and follows the same route as the Preferred Alternative. There are no known federally threatened or endangered species in the project area, although the area is within the range of the endangered Indiana bat habitat. The state-listed (special concern) leopard frog, and blue-spotted salamander can be found in the project area, but inhabit wetter areas west of the Alternative C route. The state-listed eastern box turtle (special concern) has been found in the project area and might be displaced by trail development. The state-listed (special concern) red-shouldered hawk, common nighthawk, and whip-poor-will have been seen in the more mature woods south of this route. Impacts to rare and endangered species would be long-term, negligible, and adverse.

Cumulative Impacts: There are no current plans or actions that would contribute to rare and endangered species impacts at the project site. The three studies currently underway, described in the “Cumulative Impacts” section, are management plans that focus on restoring natural resources in the national lakeshore. Alternative C, when combined with these other actions, would result in long-term, negligible, and adverse impacts to rare and endangered species.

Conclusions: Implementation of Alternative C would result in long-term, negligible, and adverse impacts to rare and endangered species.

4.9 VISITOR USE AND EXPERIENCE

INTENSITY

Negligible: Visitors would not be affected or changes in visitor use and/or experience would be below or at the level of detection. The visitor would not likely be aware of the effects associated with the alternative.

Minor: Changes in visitor use and/or experience would be detectable. The visitor would be aware of the effects associated with the alternative, but the effects would be slight.

Moderate: Changes in visitor use and/or experience would be readily apparent. The visitor would be aware of the effects associated with the alternative and would likely be able to express an opinion about the changes.

Major: Changes in visitor use and/or experience would be readily apparent and have important consequences. The visitor would be aware of the effect associated with the alternative and would likely express a strong opinion about the changes.

DURATION

Short-term: Impact occurs only during proposed implementation activities.

Long-term: Impact extends after proposed implementation activities.

IMPACTS TO VISITOR USE AND EXPERIENCE BY ALTERNATIVE A (NO ACTION)

Under the No Action Alternative, no new multi-use trail would be constructed on federal land within the national lakeshore boundary. Bicyclists and other users would continue to use the travel surface or shoulder of existing roads. There would be no impact to visitor use and experience.

Cumulative Impacts: There are no current plans or actions that would contribute to visitor use and experience impacts at the project site. The three studies currently underway, described in the “Cumulative Impacts” section, are management plans that focus on restoring natural resources in the national lakeshore.

Conclusions: Implementation of the No Action Alternative would result in no impact to visitor use and experience.

IMPACTS TO VISITOR USE AND EXPERIENCE BY THE PREFERRED ALTERNATIVE

The Preferred Alternative, along with the proposed portion of the Porter Brickyard Trail on non-federal lands, would provide a link between two regional trails, Calumet and Prairie Duneland Trails. The segment addressed in this EA would provide a trail separated from motor vehicles, except at one road crossing, providing a safe means of enjoying a non-polluting recreational activity. This alternative would provide a variety of environments, from forest, to field, back into forest, to a bridge over a busy U.S. highway, and back into forest. At the intersection with the Cemetery Trail, a bicycle rack and information kiosk (with interpretation potential) would encourage trail users to leave their bicycles and hike north to the Bailly Cemetery or south to the Bailly Homestead, Chellberg Farm, and the Bailly/Chellberg Visitor Center. No visitor use studies have been conducted and no use projections have been made for this segment of trail. However, it is expected that the trail would be heavily used, as it is near major population centers and would provide a key link with other regional trails. Impacts to visitor use and experience would be long-term, moderate, and beneficial.

Cumulative Impacts: There are no current plans or actions that would contribute to visitor use and experience impacts at the project site. The three studies currently underway, described in the “Cumulative Impacts” section, are management plans that focus on restoring natural resources in the national lakeshore.

Conclusions: Implementation of the Preferred Alternative would result in long-term, moderate, and beneficial impacts to visitor use and experience.

IMPACTS TO VISITOR USE AND EXPERIENCE BY ALTERNATIVE C

Alternative C, along with the proposed portion of the Porter Brickyard Trail on non-federal lands, would provide a link between two regional trails, Calumet and Prairie Duneland Trails. The segment addressed in this EA would provide a trail separated from motor vehicles, except at one road crossing, providing a safe means of enjoying a non-polluting recreational activity. This alternative would provide a variety of environments, from forest, to open area along roadways, back into forest, to a bridge over a busy U.S. highway, and back into forest. The experience along the roadways would not be as quiet and relaxed as with the Preferred Alternative field route, but would be similar to many other trail segments along the Porter Brickyard Trail route. There would be potential conflicts with motor vehicles at the two NPS

entrance drives, particularly during the start and finish of the work day and when emergency vehicles are exiting the NPS facilities. Some concern has been expressed that many trail users will use Mineral Springs Road rather than entering the forest north of the maintenance complex. This action could result in a downhill run culminating with a stop at U.S. 12, a state highway with heavy truck traffic and a blind curve in this location.

At the intersection with the Cemetery Trail, a bicycle rack and information kiosk (with interpretation potential), would encourage trail users to leave their bicycles and hike north to the Bailly Cemetery or south to the Bailly Homestead, Chellberg Farm, and the Bailly/Chellberg Visitor Center. No visitor use studies have been conducted and no use projections have been made for this segment of trail. However, it is expected that the trail would be heavily used, as it is near major population centers and would provide a key link with other regional trails. Impacts to visitor use and experience would be long-term, moderate, and beneficial.

Cumulative Impacts: There are no current plans or actions that would contribute to visitor use and experience impacts at the project site. The three studies currently underway, described in the “Cumulative Impacts” section, are management plans that focus on restoring natural resources in the national lake-shore.

Conclusions: Implementation of Alternative C would result in long-term, moderate, and beneficial impacts to visitor use and experience.

4.10 PARK FACILITIES AND OPERATIONS

INTENSITY

Negligible: Park operations would not be affected, or the effect would be at or below the lower levels of detection and would not have an appreciable effect on park operations.

Minor: The effect would be detectable, but would be of a magnitude that would not have an appreciable effect on park operations. If mitigation were needed to offset adverse effects, it would be relatively simple and would likely be successful.

Moderate: The effects would be readily apparent and would result in a substantial change in park operations in a manner noticeable to staff and the public. Mitigation measures would probably offset adverse effects and would likely be successful.

Major: The effects would be readily apparent, would result in a substantial change in park operations in a manner noticeable to staff and the public and be markedly different from existing operations. Mitigation measures to offset adverse effects would be needed, would be extensive, and their success could not be guaranteed.

DURATION

Short-term: Effects occur only during proposed implementation activities.

Long-term: Effects persist beyond the period of implementation activities.

IMPACTS TO PARK FACILITIES AND OPERATIONS BY ALTERNATIVE A (NO ACTION)

Under the No Action Alternative, no new multi-use trail would be constructed on federal land within the national lakeshore boundary. Bicyclists and other users would continue to use the travel surface or shoulder of existing roads. There would be no impact to park facilities and operations.

Cumulative Impacts: There are no current plans or actions that would contribute to park facilities and operations impacts at the project site. The three studies currently underway, described in the “Cumulative Impacts” section, are management plans that focus on restoring natural resources in the national lakeshore.

Conclusions: Implementation of the No Action Alternative would result in no impact to park facilities and operations.

IMPACTS TO PARK FACILITIES AND OPERATIONS BY THE PREFERRED ALTERNATIVE

Under the Preferred Alternative, a roughly one-mile-long paved, multi-use trail will be constructed on federal lands administered by the NPS. Although the NPS has a Cooperative Management Agreement (CMA) with the Town of Porter to maintain the trail on park lands, national lakeshore staff would expect to have an increased workload as a result of construction of this trail segment. It is likely that all divisions in the park would be impacted to some extent. Law enforcement staff would monitor trail use, respond to medical or law enforcement emergencies, and provide follow up investigations. Resource management staff would implement measures to control invasive plant species. Maintenance staff would be called to supplement the Town’s activities, especially with storm damage (emergency removal) and vandalism. Administrative staff would be responsible to manage the CMA, and interpretive staff would address any visitor use needs or opportunities. There is some concern that vandalism of park facilities might result due to the trail’s proximity to these facilities. Impacts to park facilities and operations would be long-term, minor, and adverse.

Cumulative Impacts: There are no current plans or actions that would contribute to park facilities and operations impacts at the project site. The three studies currently underway, described in the “Cumulative Impacts” section, are management plans that focus on restoring natural resources in the national lakeshore.

Conclusions: Implementation of the Preferred Alternative would result in long-term, minor, and adverse impacts to park facilities and operations.

IMPACTS TO PARK FACILITIES AND OPERATIONS BY ALTERNATIVE C

Under Alternative C, a roughly one-mile-long paved, multi-use trail will be constructed on federal lands administered by the NPS. Although the NPS has a CMA with the Town of Porter to maintain the trail on park lands, national lakeshore staff would expect to have an increased workload as a result of construction of this trail segment. It is likely that all divisions in the park would be impacted to some extent. Law enforcement staff would monitor trail use, respond to medical or law enforcement emergencies, and provide follow up investigations. Resource management staff would implement measures to control invasive plant species. Maintenance staff would be called to supplement the Town’s activities, especially with storm damage (emergency removal) and vandalism. Administrative staff would be responsible to manage the CMA, and interpretive staff would address any visitor use needs or opportunities. There is some

concern that vandalism of park facilities might result due to the trail's proximity to these facilities. There is also concern that the trail intersection with the two NPS entrance drives may result in some safety issues. Impacts to park facilities and operations would be long-term, minor, and adverse.

Cumulative Impacts: There are no current plans or actions that would contribute to park facilities and operations impacts at the project site. The three studies currently underway, described in the "Cumulative Impacts" section, are management plans that focus on restoring natural resources in the national lakeshore.

Conclusions: Implementation of Alternative C would result in long-term, minor, and adverse impacts to park facilities and operations.

CHAPTER 5. CONSULTATION AND COORDINATION

5.1 EARLY COORDINATION

Scoping is the effort to involve agencies and the public in determining the issues to be addressed in the environmental evaluation. Among other tasks, scoping determines important issues and eliminates issues that are ultimately not applicable; allocates assignments among the interdisciplinary team members and other participating agencies; identifies related projects and associated documents; identifies permits, surveys, or consultations required by other agencies; and creates a schedule that allows adequate time to prepare and distribute the environmental document (environmental assessment or environmental impact statement) for public review and comment before a final decision is made.

Internal and external scoping occurred prior to preparation of this environmental assessment. Internal scoping involved an interdisciplinary process to identify issues, alternatives, and data needs. Recent internal scoping meetings were held on June 10 and June 24, 2011, which were attended by members of the project planning team. On July 13, 2011, an agency scoping meeting was held with participants from the Town of Porter, the U.S. Fish and Wildlife Service, and the U.S. Army Corps of Engineers.

However, the project concept is not new, and internal scoping meetings were held as early as 2002. A number of potential alternate trail locations were considered in these earlier meetings. External scoping for this project has occurred at least since 2003 when the State Historic Preservation Office was contacted about archeological studies conducted as part of this project. In 2008, a public hearing was held in the Town of Porter to discuss the project.

5.2 PUBLIC PARTICIPATION

This document will be distributed to key agencies, groups, and individuals. The document will be available on the NPS Planning, Environment, and Public Comment (PEPC) website (parkplanning.nps.gov) and the national lakeshore's website (nps.gov/indu). The document will be available for review for 30 days. Once the review period is over, public comments will be reviewed and considered before taking any action.

5.3 LIST OF PREPARERS

The following persons assisted with the preparation of this document:

TABLE 3. LIST OF PREPARERS

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CHAPTER 6. REFERENCES

AVIS, PETER G.; MUELLER, G.M.; AND LUSSENHOP, J.

2008 *New Phytologist*, “Ectomycorrhizal fungal communities in two North American oak forests respond to nitrogen addition.”

BROCK, KENNETH

1997 *Birds of the Indiana Dunes*

INDIANA DEPARTMENT OF TRANSPORTATION

2007 *Categorical Exclusion -- Porter Brickyard Trail*, Town of Porter, Porter County, Indiana

NATIONAL PARK SERVICE

1980a *General Management Plan*, Indiana Dunes National Lakeshore

1980b *Report on the Special Vegetation of the Indiana Dunes National Lakeshore*, Indiana Dunes National Lakeshore Research Program, Report 80-01

1981 *Ecosystem Study of the Indiana Dunes National Lakeshore -- Volume One*, Indiana Dunes National Lakeshore Research Program, Report 81-01

1984 *Trail Plan*, Indiana Dunes National Lakeshore

1991a *U.S. 12 Scenic Road Feasibility Study*, Indiana Dunes National Lakeshore

1991b *Little Calumet River Corridor Plan*, Indiana Dunes National Lakeshore

1993 *West Unit General Management Plan Amendment / Development Concept Plan*, Indiana Dunes National Lakeshore

1997a *East Unit General Management Plan Amendment*, Indiana Dunes National Lakeshore

1997b Director’s Order #28: Cultural Resource Management Guideline. Washington, D.C.

1997c *East Unit General Management Plan Amendment Environmental Assessment*, Indiana Dunes National Lakeshore

2000 Director’s Order #47: Soundscape Preservation and Noise Management. Washington, D.C.

2001 Director’s Order #12 and Handbook: Conservation Planning, Environmental Impact Analysis, and Decision Making. Washington, D.C.

2006 Management Policies 2006. Washington D.C.

2007 *Porter Lakefront Park Environmental Assessment*, Indiana Dunes National Lakeshore (by contract)

- 2010 *Indiana Dunes National Lakeshore Visitor Study* – Summer 2009, University of Idaho, Park Studies Unit, Visitor Services Project, Report 220
- 2011a Director’s Order #77, Procedural Manual #77-1: Wetland Protection. Washington D.C.
- 2011b “Cooperative Management Agreement between the National Park Service and Town of Porter, Indiana,” Agreement No. H6300-0001, Indiana Dunes National Lakeshore
- 2011c “Hydric Soil Geography of the Wooded Area of a Proposed Bike Trail at Indiana Dunes National Lakeshore,” July 28, 2011, for Indiana Dunes National Lakeshore (by contract)
- 2011d NPSpecies – The National Park Service Biodiversity Database. NRInfo Portal version <https://nrinfo.nps.gov/Species.mvc/Welcome> (accessed July 8, 2011)
- 2011e Park Website, Indiana Dunes National Lakeshore

NORTHWEST INDIANA REGIONAL PLANNING COMMISSION

- 1990 Trail Opportunity Plan for Northwest Indiana, Portage, Indiana
- 1994 Regional Bikeway Plan for Northwest Indiana, Portage, Indiana
- 2005 The Marquette Plan: The Lakeshore’s Reinvestment Strategy, Portage, Indiana
- 2008: The Marquette Plan: Phase II, Portage, Indiana

PORTER COUNTY, INDIANA

- 1976 Soils Survey (maps)

U.S. FISH AND WILDLIFE SERVICE

- 1981 National Wetland Inventory (maps)

U.S. GEOLOGICAL SURVEY

- 2011 Special Vegetation and Flora of the Indiana Dunes National Lakeshore (Draft), by Noel B. Pavlovic and Barbara Plampin

APPENDIX 1. IMPAIRMENT DETERMINATION

In addition to determining the environmental consequences of the alternatives to the roughly one-mile multiuse trail on federal land within the national lakeshore, NPS Management Policies 2006 and Director's Order 12 require an analysis of potential effects of each alternative to determine if actions would impair park resources. The fundamental purpose of the national park system, established by the Organic Act and reaffirmed by the General Authorities Act, as amended, begins with a mandate to conserve park and monument resources and values. However, the laws give NPS management discretion to allow impacts to park resources and values, when necessary and appropriate to fulfill the purposes of a park, as long as the impact does not constitute an impairment of the affected resources and values. Although Congress has given NPS management discretion to allow certain impacts within parks, that discretion is limited by statutory requirements that the NPS must leave park resources and values unimpaired, unless a particular law directly and specifically provides otherwise.

The prohibited impairment is an impact that would, in the professional judgment of the responsible NPS manager, harm the integrity of park resources or values, including opportunities that would otherwise be present for the enjoyment of those resources or values. An impact to any park resource or value may constitute an impairment. However, an impact would more specifically constitute an impairment to the extent that it affects a resource or value whose conservation is:

- necessary to fulfill specific park purposes identified in the establishment legislation or proclamation of the park;
- key to the natural and cultural integrity of the park or to opportunities for enjoyment of the park; or
- identified as a goal in the park's general management plan or other relevant NPS planning documents.

An impact would be less likely to constitute an impairment if it is an unavoidable result of an action necessary to preserve or restore the integrity of park resources or values and cannot be further mitigated. Impairment may result from visitor activities; NPS administrative activities; or activities undertaken by concessioners, contractors, and others operating in the park. Impairment may also result from sources or activities outside of the park. An impairment determination is not typically made for the benefit of visitor experience/recreational values, socioeconomic values, or park operations, as these impact areas are not generally considered park resources or values according to the Organic Act and cannot be impaired in the same way that park resources and values can be impaired.

Based on the aforementioned guidelines and basis for determining impairment of park resources and values, a determination of impairment is made for each of the resource impact topics previously analyzed in the environmental assessment for the Preferred Alternative.

GEOLOGY AND SOILS

Soils in the national lakeshore vary from clay-rich soils in the southern portion to sand with little clay in the dune ridges. These soils were derived from glacial deposition originating from the underlying bedrock layer consisting of limestone, dolomite, sandstone, and shale.

The East Unit of the national lakeshore is a sand plain with many dunes interspersed with areas of wetlands. Topographical relief varies almost 200 feet from the Lake Michigan shore to dune tops. The lowest elevation is at the Lake Michigan shoreline, which is about 585 feet above sea level, whereas Mt. Baldy is 706 feet above sea level.

Water, wind, plant and animal communities, and human activities are all elements in the geomorphology of the dunes area, but glaciation is responsible for most of the current landform and drainage patterns. Glaciers alternately retreated and advanced until about 11,000 years ago, when moraines of glacial till and outwash materials were deposited.

The silt, sand, and clay sediments found in the national lakeshore are of the Pleistocene and Holocene ages and overlie Antrim shale of Devonian age. The underlying bedrock consists of limestone, dolomite, sandstone, and shale of the Paleozoic age.

Many fluctuations and a general lowering of the water level of Lake Michigan have created as many as seven successive lake shorelines, including beach, dune, and wetland areas.

According to the 1976 Soil Survey of Porter County, Indiana (Porter 1976), there are seven soil types in the project area. They include Blount silt loam (0–3% slopes) and Morley silt loam (2–6% slopes) in the lower half, Oakville fine sand (18–40% slopes) and Morley silt loam (18–30% slopes) in the moraine ridge in the upper (northern) part, Oakville fine sand (4–12% slopes) on either side of U.S. 12, and Maumee loamy sand near the railroad tracks. The soils under the sewer line running southwesterly from Oak Hill Road to Howe Road include Blount silt loam, Pewamo silty clay loam, and Morley silt loam, but these soils have been greatly disturbed by placement of the sewer line. No soils within the project site are defined as prime or unique.

Many of the soil profiles in the project area have been disturbed by past practices, including logging, farming, and infrastructure development.

Geology is mentioned in one of the purpose statements for the national lakeshore: “To preserve, restore, and protect outstanding ecological and biological diversity along with the geological features that characterize the southern shore of Lake Michigan.” Soils are important because they determine the ecological diversity of the national lakeshore.

Under the Preferred Alternative, much of the trail route is located on previously disturbed soils. From Howe Road to Oak Hill Road, the route follows the existing trail over the sewer line and then runs along the buried sewer line on the south side of Oak Hill Road until it crosses the road. It then follows an NPS administrative trail (a former driveway) before traversing the open field near the administrative headquarters and maintenance facilities. The soils in the field have been disturbed by past uses (agricultural and military). When the trail enters the woods just north of the maintenance facility, minor impacts to soils would result during trail construction. However, in this wooded area the trees have been timbered at least 2–3 times, and it is unknown the level of soils impact that

occurred during these past activities. Trail construction would alter any surface soil profiles in the 18-foot-wide construction zone as a result of compaction, removal, ruts from heavy equipment, and tree stump removal. Surface contours would also be altered to meet engineering requirements. Soil contamination may result from chemical spills from heavy equipment or chainsaws.

Standard construction practices would be applied, including limiting the construction zone to 18 feet and encouraging well-maintained equipment and the use of bio fuels and bio lubricants.

The Preferred Alternative would not result in an impairment to geology and soils. Impacts would be long-term, minor, and adverse.

DRAINAGE CHARACTERISTICS

The Preferred Alternative crosses a small drainage (intermittent stream) north of the maintenance area and another drainage (intermittent stream), adjacent to and paralleling Mineral Springs Road. The small drainage north of the maintenance area is approximately five feet deep in Morley silt loam soils. The other drainage near Mineral Springs Road is quite narrow and pinches between the escarpment to the west and the Mineral Springs roadbed to the east. Soil in this area is Oakville fine sand (18-40% slopes). Both drainages are down gradient from the national lakeshore maintenance area and headquarters complex.

These drainages are a very small component of the national lakeshore's resources and are not specifically mentioned in the purpose and significance statements. They could be broadly included in purpose statement 1 ("geologic features").

These are intermittent watercourses with water flowing only during rain events or periods of snowmelt. Trail construction over these two drainages under the Preferred Alternative would alter their soils and topography, but placement of culverts would result in little change in water flow.

The Preferred Alternative would not result in an impairment to drainage characteristics. Impacts would be long-term, minor, and adverse.

WETLANDS

Wetlands have been identified in the National Wetland Inventory (NWI) throughout the East Unit. They include ponds, marshes, swamps, peatlands, and bogs. Seasonal and annual variations in water levels may affect wetlands. Major wetland systems delineated for the national lakeshore are palustrine, riverine, and lacustrine.

Historically, wetlands in the national lakeshore were more prominent. Surface ditching, stream channelization, and road development have claimed or altered many wetlands. The alteration of natural drainage and hydrological regimes due to human action could change the distribution of wildlife and plants in the national lakeshore or compromise threatened and endangered species.

According to the NWI maps for the national lakeshore, no wetlands were identified within the project boundary. However, due to field investigations, two wetland areas were discovered: between U.S. 12 and the Northern Indiana Commuter Transportation District as well as north of Oak Hill Road.

Park staff have described some areas between U.S. 12 and the Northern Indiana Commuter Transportation District as having wetland characteristics, but no formal delineation has been performed. A U.S.

Army Corps of Engineers representative visited the site on August 23, 2011, and determined that the Preferred Alternative would have minor impacts on wetlands in the area (about 0.02 acres). The representative mentioned that a Section 404 permit would be required, but most likely, either a nationwide or regional permit would be required due to the type of project and the minimal impact expected. The soils in the area north of Oak Hill Road were sampled in March 2011, and the survey determined that soils at this site are very poorly drained and hydric soils that formed under a forested environment. Additionally, sedges and swamp white oaks were present at the site in a June 2011 field trip, both indicative of hydric soils. On July 21, 2011, a representative from the U.S. Army Corps of Engineers conducted a wetland evaluation (not a formal delineation) of areas that might be impacted by two possible alternative routes. The results of that evaluation determined that along the general location of the original preferred alternative (since dismissed), the forested wetland extends 451 feet from the ditch along Oak Hill Road in a northerly direction. During the same wetland evaluation, it was determined that wetlands in the field near the Preferred Alternative could be avoided by skirting them to the east and north.

Wetlands are an important component of the national lakeshore and contribute to purpose statement 1 (“outstanding ecological and biological diversity”).

The Preferred Alternative would avoid the wetland in the field north of Oak Hill Road, as described above. The Preferred Alternative would have minor impact (0.02 acres) to the wetland north of U.S. 12. Standard construction practices would be applied, including limiting the construction zone to 18 feet, installing silt fencing, and encouraging well-maintained equipment and the use of bio fuels and bio lubricants. A number of Best Management Practices, adapted from Procedural Manual #77-1 (Appendix 2), are included in the Mitigation section in Chapter 2.

The Preferred Alternative would not result in an impairment to wetlands. Impacts to the field wetland north of Oak Hill Road would be indirect, short-term, negligible, and adverse. Impacts to the wetland north of U.S. 12 would be long-term, minor, and adverse.

VEGETATION

Because the national lakeshore is located in several ecological transition zones, the diversity of vegetation is many times greater than most areas of similar size. Remnant species from past climatic changes have survived in sheltered habitats. The moderating effect of Lake Michigan along with the great variety of habitats within a small area explains much of the plant diversity (NPS 2007). The national lakeshore has a remarkably rich flora population. NPSpecies data indicate 1,501 species of vascular plants have been identified (NPS 2011d). There are 1,196 species of native plants and 304 non-native plant species within the national lakeshore’s boundaries. Many of these non-natives are invasive species and, once established, can severely alter natural succession (NPS 1997a). The national lakeshore is home to populations of thirty percent of Indiana’s listed rare, threatened, endangered, and special concern plant species. Shaped by glacial events and changing climates, the dunes landscape contains disjunct flora representative of eastern deciduous forests, boreal forest remnants, and species with Atlantic coast affinities. In addition, the national lakeshore is part of the upper- and eastern-most limits of the tallgrass prairie peninsula and supports high quality remnants of this ever-diminishing vegetation type. The presence of many unique dune and wetland plant community types has led to a long history of botanical exploration and research.

This vegetative diversity and opportunities to study ecological succession are mentioned in the purpose and significance statements for the national lakeshore.

The 2010 vegetation mapping project for the national lakeshore used the National Vegetation Classification (NVC) System that standardizes vegetation categories for all units of the national park system. This project determined the following four NVC System classifications for the project area:

LOWLAND OR SUBMONTANE COLD–DECIDUOUS FOREST:

This classification includes the Midwestern White Oak – Red Oak Forest, which have either red oak or a mix of red and white oaks as the dominant tree species. Shagbark hickory trees are a less than dominant component and can even be absent. These forests are typically mature, having large–crowned canopies.

This classification also includes the Northeastern Modified Successional Forest, which are further divided into Black Oak Forest and have black oak as the dominant tree on non–active well–established dunal and dry settings; a white oak presence increases when in more mesic settings. Some pin oak is also present.

SEMIPERMANENTLY FLOODED TEMPERATE OR SUBPOLAR GRASSLAND:

This classification includes the Midwest Cattail Deep Marsh, which includes deep marsh wetlands dominant with cattail, often growing in monotypic stands. Cattail and eastern reed are common species.

MEDIUM–TALL SOD TEMPERATE OR SUBPOLAR GRASSLAND:

This classification includes Mixed Herbaceous Fallow Field.

DEVELOPED AREA:

This classification includes residential and commercial areas.

In addition to vegetation, fungi are an important component of the ecosystem of the project area. Although fungi are no longer classified as plants, they are often studied in botany since fungi are often associated with plants in the role of decomposer and pathogen. Ongoing studies in the large tree area within the project, west of park headquarters, have found roughly 400 species of fungi above and below ground, making the area one of the best–known forest fungal communities in the national park system.

Under the Preferred Alternative, much of the trail route is located on previously disturbed lands, with vegetation consisting of herbaceous grasses and non–native vegetation. From Howe Road to Oak Hill Road the route follows the existing trail over the sewer line and then runs along the buried sewer line on the south side of Oak Hill Road until it crosses the road. It then follows an NPS administrative trail (a former driveway) before traversing the open field near the administrative headquarters and maintenance facilities. The field has been disturbed by past uses (agricultural and military) and includes a mix of herbaceous grasses, non–native vegetation, and scrub–shrub vegetation. Native vegetation common to a forest environment will be planted to screen the trail from the NPS administrative headquarters and maintenance complex (and vice versa). When the trail enters the woods just west of the maintenance facility, some trees would be removed during trail construction and some would ultimately die due to root zone disturbance. However, according to park staff, in this area the trees have been timbered at least 2–3 times and are not of a size or species composition quality when compared to the forest immediately to the south. Because

of this, the forest habitat in this area is not as unique or significant as the more mature forest to the south. The trail will be routed to bypass any quality trees.

The Preferred Alternative would not result in an impairment to vegetation. Impacts would be long-term, minor, and adverse.

WILDLIFE

The national lakeshore is home to not only a diverse population of plants, but also a diverse wildlife population. Forty-six species of mammals, 15 species of amphibians, 22 species of reptiles, 71 species of fish, 60 species of butterflies, and 60 species of dragonflies and damselflies are present. This biological diversity is one of the most significant features and a primary reason for the national lakeshore's establishment. Because the national lakeshore is located in several ecological transition zones, the diversity of species is many times greater than most areas of similar size. Remnant species from past climatic changes have survived in sheltered habitats. The moderating effect of Lake Michigan along with the great variety of habitats within a small area explains much of the plant and animal diversity.

Wildlife is generally mentioned in the national lakeshore's purpose statement 1 ("biological diversity") and significance statement 1 ("complexity of natural systems").

Under the Preferred Alternative, much of the trail route is located on previously disturbed lands, providing little high-quality wildlife habitat. From Howe Road to Oak Hill Road the route follows the existing trail over the sewer line and then runs along the buried sewer line on the south side of Oak Hill Road until it crosses the road. It then follows an NPS administrative trail (a former driveway) before traversing the open field near the administrative headquarters and maintenance facilities. The field has been disturbed by past uses (agricultural and military), and provides habitat for a variety of grassland bird species, small rodents, and garter snakes. When the trail enters the woods just west of the maintenance facility, some trees would be removed and soils would be altered during trail construction, reducing the amount of wildlife habitat. There would be a permanent asphalt path bisecting the forest, but according to park staff, fragmentation is not a concern. There would be some minor impact to small animal migration across the path due to mortality from non-motorized wheeled vehicles or pedestrians or because of the path acting as a barrier to migration.

The Preferred Alternative would not result in an impairment to wildlife. Impacts would be long-term, minor, and adverse.

RARE AND ENDANGERED SPECIES (PLANTS AND ANIMALS)

Both state and federally protected threatened and endangered plant and animal species are known to occur or potentially occur in the national lakeshore. According to the U.S. Fish and Wildlife Service (FWS), the project area is within the range of the federally endangered Indiana bat (*Myotis sodalists*) and the candidate eastern massasauga rattlesnake (*Sistrurus catenatus catenatus*). The Little Calumet River corridor is considered a potential habitat for the Indiana bat by FWS, and there are historical records of the massasauga rattlesnake in Cowles Bog just north of the project area. Several beaches within the national lakeshore are designated as critical habitat for the federally endangered piping plover (*Charadrius melodus*), but there are no beaches in the project area. There is also potential in the national lakeshore for the presence of the federally endangered Karner blue butterfly (*Lyca eides Melissa samuelis*), which relies on

populations of wild lupine (*Lupinus perennis*) for larval food. However, the habitat of the project area is not suitable for this species. The federally threatened Pitcher's thistle (*Cirsium pitcheri*) occurs in the national lakeshore, but only in the open dune environment, which is not present in the project area.

In the area of older trees (approx 120–150 years old), west of the NPS administrative headquarters there are medium to large sized decaying logs and leaf litter on the ground that provide excellent habitat for several species of salamanders, among them the blue-spotted salamander, which is a state-listed species of special concern.

Other state-listed animal species that could potentially be found in the project area include the northern leopard frog (special concern), eastern box turtle (special concern), red-shouldered hawk (special concern), common nighthawk (special concern), and whip-poor-will (special concern).

Rare and endangered species are generally mentioned in the national lakeshore's purpose statement 1 ("biological diversity") and significance statement 1 ("complexity of natural systems").

Under the Preferred Alternative, much of the trail route is located on previously disturbed lands, providing little high-quality wildlife habitat, until it enters the forest northwest of the maintenance complex. There are no known federally threatened or endangered species in the project area, although the area is within the range of the endangered Indiana bat. The state-listed (special concern) leopard frog, blue-spotted salamander, and eastern box turtle are in the project area, but inhabit wetter areas west of the Preferred Alternative route. The state-listed (special concern) red-shouldered hawk, common nighthawk, and whip-poor-will have been seen in the more mature woods south of this route.

The Preferred Alternative would not result in an impairment to rare and endangered species. A few individuals may be displaced, but impacts to the overall populations of rare and endangered species would be long-term, negligible, and adverse.

APPENDIX 2. FLORA OF THE BAILLY A UNIT OF INDIANA DUNES NATIONAL LAKESHORE (INCLUDES THE PROJECT AREA)

Retrieved from the draft database for the Special Vegetation and Flora of the Indiana Dunes National Lakeshore by Noel B. Pavlovic and Barbara Plampin, U.S Geological Survey (in draft). A total of 167 plant species are recorded from Bailly A around park headquarters, including the woods to the west and disturbed areas further west.

COMMON NAME	SCIENTIFIC NAME
VELVETLEAF, BUTTERPRINT	ABUTILON THEOPHRASTI MEDIK.
BOX ELDER	ACER NEGUNDO L.
RED MAPLE	ACER RUBRUM L.
SILVER MAPLE	ACER SACCHARINUM L.
SUGAR MAPLE	ACER SACCHARUM MARSHALL
TALL AGRIMONY	AGRIMONIA GRYPOSEPALA WALLR.
BENT GRASS	AGROSTIS ALBA L.
WILD ONION, WILD GARLIC	ALLIUM CANADENSE L.
WILD LEEK	ALLIUM TRICOCCUM AITON VAR. BURDICKII HANES
TALL AMARANTH	AMARANTHUS POWELLII S. WATSON
GIANT RAGWEED	AMBROSIA TRIFIDA L.
JUNEBERRY, SHADBUSH, SERVICEBERRY	AMELANCHIER ARBOREA (MICHX. F.) FERN.
BROOM SEDGE	ANDROPOGON VIRGINICUS L.
WOOD ANEMONE	ANEMONE QUINQUEFOLIA L.
RUE ANEMONE	ANEMONELLA THALICTROIDES (L.) SPACH
BUR CHERVIL	ANTHRISCUS CAUCALIS M. BIEB.
WILD SARSAPARILLA	ARALIA NUDICAULIS L.

COMMON NAME	SCIENTIFIC NAME
BURDOCK	ARCTIUM MINUS SCHKUHR
GREEN DRAGON	ARISAEMA DRACONTIUM (L.) SCHOTT
JACK-IN-THE PULPET	ARISAEMA TRIPHYLLUM (L.) SCHOTT
PAWPAW	ASIMINA TRILOBA (L.) DUNAL
ARROW-LEAVED ASTER	ASTER SAGITTIFOLIUS WILLD. VAR. DRUMMONDII (LINDL.) SHINNERS
OATS	AVENA SATIVA L.
SPRING CRESS	BARBAREA VULGARIS R. BR.
JAPANESE BARBERRY	BERBERIS THUNBERGII DC.
RATTLESNAKE FERN	BOTRYCHIUM VIRGINIANUM (L.) SW.
TALL BELLFLOWER	CAMPANULA AMERICANA L.
LONG-BRACTED TUSSOCK SEDGE	CAREX AQUATILIS WAHLENB. VAR. ALTIOR (RYDB.) FERN.
PLAINS OVAL SEDGE	CAREX BREVIOR (DEWEY) LUNELL
LONG-SCALED GREEN SEDGE	CAREX BUSHII MACK.
SHORT-HEADED BRACKETED SEDGE	CAREX CEPHALOPHORA WILLD.
BLUE SEDGE	CAREX GLAUCODEA TUCK.
WOOD GRAY SEDGE	CAREX GRISEA WAHLENB.
HAIRY GREEN SEDGE	CAREX HIRSUTELLA MACK.
WOOD SEDGE	CAREX LAXIFLORA LAM.
PENNSYLVANIA SEDGE	CAREX PENNSYLVANICA LAM.
CURLY-STYLED WOOD SEDGE	CAREX ROSEA SCHKUHR
LANCE-FRUITED OVAL SEDGE	CAREX SCOPARIA WILLD.

COMMON NAME	SCIENTIFIC NAME
NARROW-LEAVED OVAL SEDGE	CAREX SQUARROSA L.
FOX SEDGE	CAREX VULPINOIDEA MICHX.
BITTER HICKORY	CARYA CORDIFORMIS (WANGENH.) K. KOCH
SHAGBARK HICKORY	CARYA OVATA (MILL.) K. KOCH
CATALPA	CATALPA SPECIOSA WARDER
ORIENTAL BITTERSWEET	CELASTRUS ORBICULATUS THUNB.
HACKBERRY	CELTIS OCCIDENTALIS L.
OX-EYE DAISY	CHRYSANTHEMUM LEUCANTHEMUM L. VAR. PINNATIFIDUM LECOQ & LAMOTTE
ENCHANTER'S NIGHTSHADE	CIRCAEA LUTETIANA L. VAR. CANADENSIS L.
SPRING BEAUTY	CLAYTONIA VIRGINICA L.
LILY OF THE VALLEY	CONVALLARIA MAJALIS L.
GRAY DOGWOOD	CORNUS RACEMOSA LAM.
HAZELNUT	CORYLUS AMERICANA WALTER
LARGE-SEEDED HAWTHORN	CRATAEGUS FLABELLATA ASHE
DOWNY HAWTHORN	CRATAEGUS MOLLIS (T. & G.) SCHEELE
FROSTED HAWTHORN	CRATAEGUS PRUINOSA (H. WENDL.) K. KOCH
HONEWORT	CRYPTOTAENIA CANADENSIS (L.) DC.
QUEEN ANNE'S LACE, WILD CARROT	DAUCUS CAROTA L.
TEASEL	DIPSACUS SYLVESTRIS HUDS.
MARSH FLEABANE	ERIGERON PHILADELPHICUS L.
LEAFY SPURGE	EUPHORBIA ESULA L.

COMMON NAME	SCIENTIFIC NAME
AMERICAN BEECH	FAGUS GRANDIFOLIA EHRH.
FESCUE	FESTUCA ELATIOR L.
WILD STRAWBERRY	FRAGARIA VIRGINIANA DUCHESNE
WHITE ASH	FRAXINUS AMERICANA L.
ANNUAL BEDSTRAW	GALIUM APARINE L.
SHINING BEDSTRAW	GALIUM CONCINNUM T. & G.
SWEET-SCENTED BEDSTRAW	GALIUM TRIFLORUM MICHX.
WILD GERANIUM	GERANIUM MACULATUM L.
WHITE AVENS	GEUM CANADENSE JACQ.
AVENS	GEUM LACINIATUM MURRAY VAR. TRICHOCARPUM FERN.
GROUND IVY	GLECHOMA HEDERACEA L.
TICK SEED	HACKELIA VIRGINIANA (L.) I. M. JOHNST.
WITCH HAZEL	HAMAMELIS VIRGINIANA L.
DAYLILY	HEMEROCALLIS FULVA L.
HEPATIC	HEPATIC ACUTILOBA DC.
FIELD HAWKWEED	HIERACIUM CAESPITOSUM DUMORT.
VIRGINIA WATERLEAF	HYDROPHYLLUM VIRGINIANUM L.
COMMON ST. JOHN'S WORT	HYPERICUM PERFORATUM L.
ORANGE JEWELWEED	IMPATIENS CAPENSIS MEERB.
YELLOW JEWELWEED	IMPATIENS PALLIDA NUTT.
BUTTERNUT	JUGLANS CINEREA L.

COMMON NAME	SCIENTIFIC NAME
COMMON RUSH	JUNCUS EFFUSUS L.
INLAND RUSH	JUNCUS INTERIOR WIEGAND
PATH RUSH	JUNCUS TENUIS WILLD.
MOTHERWORT	LEONURUS CARDIACA L.
MICHIGAN LILY	LILIUM MICHIGANENSE FARW.
SPICEBUSH	LINDERA BENZOIN (L.) BLUME
ASIAN BUSH HONEYSUCKLE	LONICERA X MUENDENIENSIS REHDER
WOOD RUSH	LUZULA MULTIFLORA (RETZ.) LEJ.
IOWA CRAB	MALUS IOENSIS (A. W. WOOD) BRITTON
YELLOW SWEET CLOVER	MELILOTUS OFFICINALIS (L.) PALL.
SPEARMINT	MENTHA SPICATA L.
VIRGINIA BLUEBELLS	MERTENSIA VIRGINICA (L.) PERS.
WHITE MULBERRY	MORUS ALBA L.
CATNIP	NEPETA CATARIA L.
HAIRY SWEET CICELY	OSMORHIZA CLAYTONII (MICHX.) CLARKE
SMOOTH SWEET CICELY	OSMORHIZA LONGISTYLIS (TORR.) DC.
INTERRUPTED FERN	OSMUNDA CLAYTONIANA L.
OXALIS	OXALIS EUROPAEA JORD.
PANIC GRASS	PANICUM IMPLICATUM BRITTON
THICKET CREEPER	PARTHENOCISSUS INSERTA (A. KERN.) C. FRITSCH
VIRGINIA CREEPER	PARTHENOCISSUS QUINQUEFOLIA (L.) PLANCH.

COMMON NAME	SCIENTIFIC NAME
LOPSEED	PHRYMA LEPTOSTACHYA L.
JACK PINE	PINUS BANKSIANA LAMB.
WHITE PINE	PINUS STROBUS L.
SCOTCH PINE	PINUS SYLVESTRIS L.
KENTUCKY BLUE GRASS	POA PRATENSIS L.
MAY APPLE	PODOPHYLLUM PELTATUM L.
TALL SOLOMON'S SEAL	POLYGONATUM CANALICULATUM (MUHL.) PURSH.
DOWNY SOLOMON'S SEAL	POLYGONATUM PUBESCENS (WILLD.) PURSH
JAPANESE KNOTWEED	POLYGONUM CUSPIDATUM SIEBOLD & ZUCC.
PENNSYLVANIA KNOTWEED	POLYGONUM PENNSYLVANICUM L.
WOODLAND KNOTWEED	POLYGONUM VIRGINIANUM L.
COMMON CINQUEFOIL	POTENTILLA SIMPLEX MICHX.
HEAL-ALL	PRUNELLA VULGARIS L. VAR. LANCEOLATA (BARTON) FERN.
WILD BLACK CHERRY	PRUNUS SEROTINA EHRH.
CHOKE CHERRY	PRUNUS VIRGINIANA L.
DOUGLAS FIR	PSEUDOTSUGA MENZIESII
BRACKEN FERN	PTERIDIUM AQUILINUM (L.) KUHN. VAR. LATIUSCULUM (DESV.) UNDERW.
WHITE OAK	QUERCUS ALBA L.
RED OAK	QUERCUS RUBRA L.
SMALL-FLOWERED BUTTERCUP	RANUNCULUS ABORTIVUS L.
HOOKEED BUTTERCUP	RANUNCULUS RECURVATUS POIR.

COMMON NAME	SCIENTIFIC NAME
POISON IVY	RHUS RADICANS L.
PRICKLY WILD GOOSEBERRY	RIBES CYNOSBATI L.
BLACK LOCUST	ROBINIA PSEUDOACACIA L.
ROUGH MARSH CRESS	RORIPPA PALUSTRIS (L.) BESSER VAR. FERNALDIANA (BUTTERS & ABBE) STUCKEY
MULTIFLORA ROSE	ROSA MULTIFLORA THUNB.
COMMON DEWBERRY	RUBUS FLAGELLARIS WILLD.
BLACK DEWBERRY	RUBUS OCCIDENTALIS L.
CURLY DOCK	RUMEX CRISPUS L.
BITTER DOCK	RUMEX OBTUSIFOLIUS L.
ELDERBERRY	SAMBUCUS CANADENSIS L.
BLOODROOT	SANGUINARIA CANADENSIS L.
CLUSTERED BLACK SNAKEROOT	SANICULA GREGARIA E. P. BICKNELL
BOUNCING BET	SAPONARIA OFFICINALIS L.
WOOL GRASS	SCIRPUS CYPERINUS (L.) KUNTH
STRINGY STONECROP	SEDUM SARMENTOSUM BUNGE
FIRE PINK	SILENE VIRGINICA L.
FEATHERY FALSE SOLOMON'S SEAL	SMILACINA RACEMOSA (L.) DESF.
STARRY FALSE SOLOMON'S SEAL	SMILACINA STELLATA (L.) DESF.
BRISTLY GREENBRIER	SMILAX TAMNOIDES L. VAR. HISPIDA (TORR.) FERN.
BITTERSWEET NIGHTSHADE	SOLANUM DULCAMARA L.
TALL GOLDENROD	SOLIDAGO ALTISSIMA L.
EARLY GOLDENROD	SOLIDAGO JUNCEA AITON

COMMON NAME	SCIENTIFIC NAME
ELM-LEAVED GOLDENROD	SOLIDAGO ULMIFOLIA MUHL.
COMMON CHICKWEED	STELLARIA MEDIA (L.) VILL.
DANDELION	TARAXACUM OFFICINALE WEBER
EARLY MEADOW RUE	THALICTRUM DIOICUM L.
BASSWOOD, AMERICAN LINDEN	TILIA AMERICANA L.
JAPANESE HEDGE PARSLEY	TORILIS JAPONICA (HOULT.) DC.
PRAIRIE TRILLIUM	TRILLIUM RECURVATUM L. C. BECK
AMERICAN ELM	ULMUS AMERICANA L.
SIBERIAN ELM	ULMUS PUMILA L.
SLIPPERY ELM	ULMUS RUBRA MUHL.
MOTH MULLEIN	VERBASCUM BLATTARIA L.
CORN SPEEDWELL	VERONICA ARVENSIS L.
PURSLANE SPEEDWELL	VERONICA PEREGRINA L.
THYME-LEAVED SPEEDWELL	VERONICA SERPYLLIFOLIA L.
MAPLE-LEAVED ARROW-WOOD	VIBURNUM ACERIFOLIUM L.
EUROPEAN Highbush CRANBERRY	VIBURNUM OPULUS L.
DOWNY ARROW-WOOD	VIBURNUM RAFINESQUIANUM SCHULT.
PERIWINKLE	VINCA MINOR L.
MISSOURI VIOLET	VIOLA MISSOURIENSIS GREENE
SWEET VIOLET	VIOLA ODORATA L.
COMMON BLUE VIOLET	VIOLA SORORIA WILLD.
RIVER BANK GRAPE	VITIS RIPARIA MICHX.

APPENDIX 3. BIRDS FOUND IN THE PROJECT AREA

SPECIES	
American Crow	Great Crested Flycatcher
American Goldfinch	House Finch
American Robin	House Wren
Black-billed Cuckoo	Indigo Bunting
Black-capped Chickadee	Northern Cardinal
Blue Jay	Ovenbird
Blue-gray Gnatcatcher	Pileated Woodpecker
Brown-headed Cowbird	Red-bellied Woodpecker
Cedar Waxwing	Red-eyed Vireo
Chipping Sparrow	Red-shouldered Hawk*
Common Nighthawk*	Ruby-throated Hummingbird
Common Yellowthroat	Scarlet Tanager
Downy Woodpecker	Song Sparrow
Eastern Bluebird	Tufted Titmouse
Eastern Phoebe	Whip-poor-will*
Eastern Towhee	White-breasted Nuthatch
Eastern Wood-Pewee	Wood Thrush
Field Sparrow	
Gray Catbird	

***STATE-LISTED
(SPECIAL CONCERN)**