Shoreline Restoration and Management Plan/
Final Environmental Impact Statement
August 2014
The Shoreline Restoration and Management Plan / Final Environmental Impact Statement (EIS) has been prepared to provide scientifically-based alternatives for the restoration of natural sediment movement along the southern shore of Lake Michigan within and adjacent to Indiana Dunes National Lakeshore. The purpose of the plan / final EIS is to provide comprehensive guidance for restoring natural shoreline processes, preserving shoreline ecosystems, and providing opportunities for quality visitor experiences at Indiana Dunes National Lakeshore. The intent of the plan / final EIS is not to provide specific and detailed answers to every issue facing the park, but rather to provide a framework to assist National Park Service (NPS) managers, stakeholders, and locals governing bodies in making current and future decisions.

For the purpose of the plan / final EIS the shoreline has been divided into four reaches based on sediment erosion and accretion. Due to the natural process-driven interconnectivity of these areas the final EIS is formatted so that reaches 1 and 2, which extend from Crescent Dune to Willow Lane, and reaches 3 and 4, which extend from Willow Lane to the Gary-U.S. Steel East Breakwater, are discussed in the context of two independent sediment transport cells. The National Park Service will consider a no-action alternative (alternative A) in all reaches as a baseline of current conditions and management practices.

For reaches 1 and 2 seven alternatives were initially developed including the no-action alternative. All alternatives provide for beach nourishment at Crescent Dune differing in the source of material (upland versus dredged), method of placement (hydraulic versus mechanical), and frequency of placement (every year or every five years). Additionally, one of the alternatives incorporates a permanent bypass system, and another incorporates the construction of a temporary submerged cobble berm. Through a value analysis process the alternative that incorporated the submerged cobble berm was selected as the preferred alternative for reaches 1 and 2 for the plan / draft EIS. This alternative provided the best combination of strategies resulting in a high level of protection of natural resources while providing for a wide range of beneficial uses of the environment. However, public comment on the plan / draft EIS (July 2012) was extensive and ranged from support for the goals of the project to concerns about a number of aspects of the draft alternatives. The public was generally supportive of beach nourishment but there was consistent, negative response to the proposed cobble berm in alternative E (preferred alternative in the draft EIS).

It was determined through the draft EIS process that all alternatives meet park purposes and objectives while protecting park resources by minimizing impacts, and are consistent with the legislative intent of Indiana Dunes National Lakeshore, applicable federal laws, policies, and regulations.

The only variation between the alternatives is in the consistency of the aggregate (sediment/rock), frequency of placement, and method of placement. Therefore a new hybrid alternative was designed that incorporated desired aspects of multiple alternatives, which would meet park purposes and objectives, yet
addresses public concern with the submerged cobble berm.

The criteria critical to the selection of alternative E as the draft EIS preferred alternative for reaches 1 and 2 focused on the restoration of native materials (sediment, gravel, rock) to the shoreline and not necessarily on the method of placement (i.e., creating a submerged berm). The new hybrid alternative would provide the identical materials to the shoreline only through a direct placement process. The majority of material used for beach nourishment would be obtained from fine and medium grained sediments that could be hydraulically dredged (as in alternative C-1). The specific source location of the nourishment material would be determined in coordination with Indiana Department of Natural Resources (IDNR) in areas of accretion so that dredging activities would not disturb areas of equilibrium. The additional gravel and rock component would be obtained by implementing a portion of alternative B-1. Rather than using the inland mined source to provide the entire spectrum of beach nourishment, only the coarse component (gravel and rock), proposed under alternative E, would be hauled to the beach and mixed on-site with the hydraulically dredged sediments. The new hybrid alternative F incorporates the benefit of the gravel and rock materials from alternative E using the inland mined and hauled sources outlined in alternative B-1 with the hydraulically dredged sands outlined in alternative C-1.

For reaches 3 and 4 four alternatives were developed including the no-action alternative. All alternatives provide for beach nourishment at Portage Lakefront and Riverwalk differentiated by the frequency of nourishment (every year or every five years), and one includes the development of a permanent bypass system. Only dredged material was considered for these alternatives, because no viable access to the nourishment site exists for trucking in upland materials. Through a value analysis process the alternative that provides sediment nourishment material every five years through a combination of mechanical and hydrologic means was selected as the preferred alternative for reaches 3 and 4 in the draft EIS. This alternative is cost efficient and provides the greatest potential for both foredune creation and protection from major storm events. While the public was generally supportive of beach nourishment for reaches 3 and 4, there was negative response to alternative C-5 that provided beach nourishment every five years during the public comment on the plan / draft EIS. In response to the public’s concerns, the preferred alternative for reaches 3 and 4 has been changed to alternative C-1 that provides for beach nourishment annually.

The plan / draft EIS was available for public comment for a period of 60 days commencing when the U.S. Environmental Protection Agency published the Notice of Availability in the Federal Register on September 14, 2012. One public meeting was held on October 23, 2012.

A copy of the plan / final EIS is available on the internet on the NPS Planning, Environment, and Public Comment website at: http://www.parkplanning.nps.gov/indu. The plan / final EIS can also be accessed through the park’s home page at: http://www.nps.gov/indu. In addition, a limited number of hardcopies and CDs are available at the Indiana Dunes National Lakeshore headquarters located at 1100 North Mineral Springs Road in Porter, Indiana. If you have any questions, please call Charles Morris, Environmental Protection Specialist, at 219-983-1352.

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SUMMARY

PURPOSE OF AND NEED FOR ACTION

The purpose of this Shoreline Restoration and Management Plan / Final Environmental Impact Statement (EIS) is to provide comprehensive guidance for restoring natural shoreline processes, preserving the shoreline ecosystem, and providing opportunities for quality visitor experiences at Indiana Dunes National Lakeshore. The purposes of this plan / final EIS are as follows:

- Ensure that the foundation for decision-making has been developed in consultation with the public and is adopted by NPS leadership after sufficient analysis of the benefits and impacts of alternative courses of action.
- Develop strategies that would support the reestablishment of more sustainable shoreline sediment movement and a more natural ecosystem of shoreline vegetation, foredune and dune complexes.
- Define desired resource conditions for the shoreline, foredunes and dunes.
- Identify approaches for shoreline restoration and management that are consistent with a regional approach to management of the lakeshore that encourages maintenance of a natural shoreline and functioning ecosystems.

Prior to industrial and residential development along Lake Michigan, the shoreline was comprised of a highly diverse landscape including swamp and marsh lands, dunes, oak savanna, and prairies. The natural shoreline processes along southern Lake Michigan have been heavily impacted by the construction of numerous navigational harbors and hardened (man-made) structures that have greatly affected the integrity and sustainability of the natural landscape. These structures altered Lake Michigan's natural littoral drift, resulting in areas of sediment accretion (accumulation) east (updrift) of Michigan City and the Port of Indiana, and sediment starvation to the west (downdrift) of these same harbors. The lack of continued sediment replenishment from natural littoral drift has resulted in extensive beach and dune erosion which threatens both public and private resources. Although the U.S. Army Corps of Engineers (COE) conducts beach nourishment on an intermittent basis and the staff at Indiana Dunes National Lakeshore conduct certain resource management actions to protect resources (such as sensitive plant and animal habitats), no specific shoreline restoration plan exists, and the impact of severe shoreline and beach erosion would compromise the park’s outstanding ecological and biological diversity found within its boundaries. This plan / final EIS is needed to:

- Address the severe shoreline and beach erosion and the impacts on dune ecology that are caused by interruptions to the natural processes along the shoreline, including the movement of sediment.
- Address the adverse impacts to the fragile shoreline ecosystem caused by the interrupted natural processes and sediment movement.
- Identify a series of management actions that can be implemented by park staff, as needed, to provide a balance between protection of the shoreline ecosystem and appropriate visitor enjoyment of the park.

OBJECTIVES IN TAKING ACTION

Objectives define what must be achieved for an action to be considered a success. Alternatives selected for detailed analysis must meet all objectives and must also resolve the purpose of and need for action.

Using the park’s enabling legislation, mandates, and direction in other planning documents as well as NPS service-wide objectives, NPS Management Policies 2006, and the NPS Organic Act of 1916, the staff of Indiana Dunes National Lakeshore identified
the following management objectives relative to shoreline management at the park.

**Shoreline Restoration**

- Develop strategies that would support the reestablishment of more sustainable shoreline sediment movement and a more natural ecosystem of shoreline vegetation, foredune and dune complex.

**Exotic and Invasive Species**

- Develop strategies to identify, manage, and remove aquatic and terrestrial nonnative and invasive species.
- Develop strategies to support ongoing management efforts to remove aquatic and terrestrial nonnative and invasive species, and to prevent conditions detrimental to those efforts.

**Management Methodology**

- Determine shoreline desired conditions that would serve as thresholds for management actions within Indiana Dunes National Lakeshore.
- Develop and implement an adaptive management approach for maintaining a sustainable shoreline ecosystem within Indiana Dunes National Lakeshore.

**ALTERNATIVES CONSIDERED**

For the purpose of this plan / final EIS, the shoreline has been divided into four reaches based on accretion and erosion rates. Proposed alternatives are presented for reaches 1 and 2 and reaches 3 and 4. Under all proposed action alternatives, the sediment used for beach nourishment would be compatible with native site sediment, meaning similar in terms of color, shape, size, mineralogy, compaction, organic content, and texture. Beach nourishment material would be free of harmful chemical contaminants, trash, debris, and large pieces of organic material. Placement of the nourishment material would be conducted in a manner to avoid or minimize potential impacts on both natural resources and visitors of the park. The alternatives considered addressed the public's main concerns of protecting habitat, maintaining a natural viewshed, and not causing additional disruptions to sediment movement in the area.

Once this plan is completed, several of the nourishment activities proposed under the alternatives could be implemented without further compliance or study. Other more detailed studies and plans would be needed before some specific actions could be implemented, including design specifications. These additional plans and studies would include an in-depth analysis of potential impacts.

**Reaches 1 and 2**

The National Park Service would continue current management practices. For the foreseeable future, there would be no new actions taken to restore the park shoreline. For reaches 1 and 2 seven alternatives were developed including the no-action alternative. All alternatives provide for beach nourishment at Crescent Dune differing in the source of material (upland versus dredged), method of placement (hydraulic versus mechanical), and frequency of placement (every year or every five years). Additionally, one of the alternatives incorporates a permanent bypass system, and another incorporates the construction of a temporary submerged cobble berm. Through a value analysis process the alternative that incorporated the submerged cobble berm was selected as the preferred alternative for reaches 1 and 2. This alternative provided the best combination of strategies resulting in a high level of protection of natural resources while providing for a wide range of beneficial uses of the environment.
Public involvement and comment on the plan/draft EIS was extensive, ranging from support to concern with various aspects of the alternatives presented. While the public was generally supportive of beach nourishment, there was consistent, negative response to the submerged cobble berm. Therefore the National Park Service chose to review the array of alternatives to determine the feasibility of both satisfying public concern and achieving the project goals through the development of a new hybrid alternative.

A new hybrid alternative was developed for reaches 1 and 2 that incorporates the full range of native materials using an approach other than the submerged berm would achieve the same objectives. The majority of material used for beach nourishment would be obtained from fine and medium grained sediments that would be hydraulically dredged. The additional gravel and rock component would be obtained from an upland source. Thus, a new hybrid alternative was created as the new preferred alternative for reaches 1 and 2.

Reaches 3 and 4

The National Park Service would continue current management practices. For the foreseeable future, there would be no new actions taken to restore the park shoreline. For reaches 3 and 4 four alternatives were developed including the no-action alternative. All alternatives provide for beach nourishment at Portage Lakefront and Riverwalk differentiated by the frequency of nourishment (every year or every five years), and one includes the development of a permanent bypass system. Only dredged material was considered for these alternatives, because no viable access to the nourishment site exists for trucking in upland materials. Through a value analysis process the alternative that provides sediment nourishment every five years through a combination of mechanical and hydrologic means was selected as the preferred alternative for reaches 3 and 4. This alternative is cost efficient and provides the greatest potential for both foredune creation and protection from major storm events. However, in response to public concerns related to the large volume of material that would be placed on the beach under the preferred alternative the frequency of placement was changed from every five years to annual beach nourishment activities. The preferred alternative for reaches 3 and 4 is now alternative C-1.

Terrestrial Management Actions

In addition to the shoreline restoration alternatives, natural resource management strategies are proposed for the protection and improvement of the park's terrestrial ecosystem. Plant communities and physiography are continually changing with the disturbance-prone habitats of the foredune complex. The foredune and dune complex encourages biological diversity unique to this region of the country. Migratory bird habitat, intradunal wetlands, and the various stages of dune succession are critical components of the park. The National Park Service is responsible for the protection of these sensitive habitats. Protection is currently accomplished with the following management strategies:

- preservation or restoration of sensitive habitat
- management of nonnative invasive plant species
- reduction of anthropogenic influences on native dune vegetation and critical habitat

ENVIRONMENTAL CONSEQUENCES

The analysis of environmental consequences considers the actions being proposed and the cumulative effects from occurrences inside and outside Indiana Dunes National Lakeshore. The analysis addresses the potential environmental consequences of the actions for coastal processes, including
sediment transport and dune formation, aquatic fauna, terrestrial habitat, threatened and endangered species and species of concern, wetlands and pannes, soundscape, visitor experience, and park operations.

In analyzing the impacts on natural resources, all action alternatives would benefit coastal processes. There would be adverse effects on aquatic fauna, terrestrial habitat, threatened and endangered species and species of concern, and soundscape as a result of activities associated with the placement of nourishment material. The duration and intensity of these effects would vary depending on the source of the nourishment material (i.e., upland or dredged) and the volume of nourishment material proposed under each alternative. Under the NPS preferred alternative (alternative F) in reaches 1 and 2, effects on all resources would be no greater than moderate and adverse. Under the NPS preferred alternative (alternative C-1) in reaches 3 and 4, effects would be no greater than short-term, minor, and adverse on all resources.

However, under all the action alternatives, the impacted resources (e.g., coastal processes, aquatic fauna, terrestrial habitat, threatened and endangered species and species of concern, and soundscape) would benefit in the long term from the reduction of severe shoreline and beach erosion and the creation of a more natural ecosystem of shoreline vegetation and foredune and dune complexes and processes.
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<td>CEQ</td>
<td>Council on Environmental Quality</td>
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<td>E. coli</td>
<td><em>Escherichia coli</em></td>
</tr>
<tr>
<td>EA</td>
<td>environmental assessment</td>
</tr>
<tr>
<td>EIS</td>
<td>environmental impact statement</td>
</tr>
<tr>
<td>EPA</td>
<td>U.S. Environmental Protection Agency</td>
</tr>
<tr>
<td>ft./yr.</td>
<td>feet per year</td>
</tr>
<tr>
<td>FWS</td>
<td>U.S. Fish and Wildlife Service</td>
</tr>
<tr>
<td>GHG</td>
<td>greenhouse gas</td>
</tr>
<tr>
<td>IDNR</td>
<td>Indiana Department of Natural Resources</td>
</tr>
<tr>
<td>LIDAR</td>
<td>Light Detection and Ranging</td>
</tr>
<tr>
<td>LWD</td>
<td>Low Water Datum</td>
</tr>
<tr>
<td>m³</td>
<td>cubic meters</td>
</tr>
<tr>
<td>mtCO₂e</td>
<td>metric tons of carbon dioxide equivalent</td>
</tr>
<tr>
<td>NEPA</td>
<td>National Environmental Policy Act of 1969, as amended</td>
</tr>
<tr>
<td>NHPA</td>
<td>National Historic Preservation Act, as amended</td>
</tr>
<tr>
<td>NIPSCO</td>
<td>Northern Indiana Public Service Company</td>
</tr>
<tr>
<td>NPS</td>
<td>National Park Service</td>
</tr>
<tr>
<td>PEPC</td>
<td>Planning Environment and Public Comment</td>
</tr>
<tr>
<td>SHPO</td>
<td>state historic preservation officer</td>
</tr>
<tr>
<td>U.S.</td>
<td>United States</td>
</tr>
<tr>
<td>USC</td>
<td>United States Code</td>
</tr>
<tr>
<td>USGS</td>
<td>U.S. Geological Survey</td>
</tr>
<tr>
<td>yd³</td>
<td>cubic yards</td>
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This Shoreline Restoration and Management Plan / Draft Environmental Impact Statement (EIS) is organized into five chapters plus appendixes. Each section is described briefly below.

The “Purpose and Need for Action” chapter describes the context for the entire final EIS. It explains why this plan is being prepared and what issues it addresses. It provides guidance (e.g., park purpose, significance, resources and values, special mandates, and service-wide laws and policies) for the alternatives that are considered. The “Purpose and Need for Action” chapter also describes how this plan relates to other plans and projects and identifies impact topics to be discussed relative to the no-action alternatives. It also includes a discussion of impact topics that were dismissed from detailed analysis.

“The Alternatives” chapter discusses management zones and the management alternatives. Mitigating measures for minimizing or eliminating impacts of some proposed actions are presented. A section on the selection of the preferred alternative and environmentally preferable alternative follows.

The “Affected Environment” chapter describes areas and resources that would be affected by actions that are part of the various alternatives — including coastal processes, aquatic fauna, terrestrial habitat, threatened and endangered species and species of concern, wetlands and pannes, soundscape, visitor experience, and park operations.

The “Environmental Consequences” chapter analyzes the impacts of implementing the alternatives. Approaches used to assess impacts are outlined at the beginning of the “Environmental Consequences” chapter.

The “Consultation and Coordination” chapter describes the history of public and agency coordination during the planning effort; it also lists agencies and organizations that will receive copies of the final EIS.

The appendixes present information on enabling legislation, technical references, species lists, and initial agency consultation.