

Environmental Assessment May 2009



National Park Service
U. S. Department of the Interior



Lake Michigan Overlooks

Sleeping Bear Dunes
National Lakeshore - Michigan

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1.0 PURPOSE AND NEED

The National Park Service (NPS) proposes improvements to the Lake Michigan Overlooks 9 and 10 on the Pierce Stocking Scenic Drive in Sleeping Bear Dunes National Lakeshore (Sleeping Bear Dunes). This environmental assessment identifies the no action alternative (current management), three action alternatives, and their impacts on the environment. The document has been prepared in accordance with the National Environmental Policy Act of 1969 and regulations of the Council on Environmental Quality (40 CFR 1508.9). The project proposal is consistent with management zoning in the 2009 General Management Plan.

1.1 PURPOSE OF AND NEED FOR THE PROPOSED ACTION

Pierce Stocking Scenic Drive is a 7.4 mile self-guided auto tour that provides visitors insight into the history of the area, a sample of vegetative communities, and overlooks of Glen Lake, the Sleeping Bear Dunes, and Lake Michigan. Overlooks 9 and 10 on the drive attract over 200,000 people each year. These overlooks are situated in an area that allows visitors to view the fragile dune environment, Lake Michigan, and the Manitou Islands.

The site has a parking lot for three buses and 54 cars, and includes two vault toilets. A concrete sidewalk leads upslope to the bluff face. A seasonal boardwalk of wood platforms extending over the dune and slope provides access from the concrete sidewalk to Overlooks 9 and 10. This boardwalk is installed each spring and removed each fall.

The concrete sidewalk and seasonal boardwalk initially brings visitors to the steep bluff face approximately 450 feet above Lake Michigan. Despite signs warning visitors of the steep drop to Lake Michigan and the extremely exhausting return climb, many frequently descend the bluff face. Unfortunately, many of these visitors are injured either during the descent due to missteps or falls or during the ascent from overheating or exhaustion. Rescue operations by park staff or local fire and rescue crews are often required to assist these visitors.

The intense foot traffic in this location has caused considerable erosion of the bluff face. In addition to the potential for personal injury, this erosion has impacted the dune habitat and creates a visual intrusion in the viewshed. Since 1986, when the parking area and overlooks were constructed, a variety of techniques have been employed to protect the resource and keep visitors on the trails. These techniques included boardwalks, boardwalks with rails, sand ladders, posts with cables, posts with ropes, and signage. Attempts to restore the perched dune south of Overlook 9 using special “sand fencing” with biodegradable baling twine have been moderately successful. The current configuration of the path and overlooks requires ongoing maintenance from the park staff. This maintenance is becoming prohibitively difficult and expensive because of the blowing and drifting sand. The park spends roughly \$10,000 per year on sand removal and boardwalk at this site. In addition, park staff have been injured during the installation and removal of the boardwalks and during sand removal activities.

The dynamic nature of this site is manifested in the effects of blowing and drifting sand. The section of trail between the existing paved walk and the crest of the perched dune is the main sand accumulation area and averages several feet needing to be cleared each spring (up to 11 feet at times). The trail section between the crest of the perched dune and the cluster of trees just south of Overlook 9 is a blow out area that receives less sand accumulation, but contributes significantly to sand accumulation to the east. In the past, sand fencing installed to the west of this section of trail, to discourage bluff climbing or increase sand deposition, is typically buried after one season. The section of trail east of the tree cluster averages approximately one foot of sand accumulation needing to be cleared each spring. Annually, about 400 cubic yards of sand are removed between the paved walk and Overlook 9. Maintenance on this area of trail results in the bulk of maintenance activities in the entire overlook complex.

The dynamics of this site can be illustrated in another way. Roughly four years after the construction of Overlook 9 in 1986, a new ramp was installed from the overlook to the removable boardwalk to reduce the grade between the surfaces to provide a more gradual access slope. Sand deposition had made the original ramp unusable.

The section of removable boardwalk between Overlook 9 and Overlook 10, originally called the “Stairway to the Stars,” can be covered in some areas by five feet of sand. The original stairway and boardwalk had to be replaced due to drifting sand. The replacement permanent boardwalk, constructed in the early 1990s, was also buried and had to be removed. A removable boardwalk system to Overlook #10 was begun in the late 1990s and remains in use today.

The following objectives were identified during initial project planning phases and must be achieved for the project to be considered a success.

1. Provide visitors access to the panoramic view of the natural environment with little visible visitor impact.
2. Provide visitors with a quality interpretive experience.
3. Restore the site and reduce or eliminate future impacts to the bluff face and the perched dune from visitor use.
4. Reduce or eliminate injuries to visitors on the bluff face.
5. Reduce or eliminate park staff or local fire and rescue crew response costs.
6. Reduce or eliminate injuries to maintenance employees.
7. Reduce maintenance costs.

1.2 DESCRIPTION OF THE PARK

Sleeping Bear Dunes National Lakeshore is located in Michigan’s northwestern Lower Peninsula, in Leelanau and Benzie Counties (Figure 1-1). Twenty-five miles west of Traverse City, Sleeping Bear Dunes encompasses 31 miles of Lake Michigan’s eastern coastline, as well as another 34 miles of coastline on North and South Manitou Islands. Sleeping Bear Dunes can be accessed by US-31, M-72, and M-22.

Figure 1-1: Vicinity and Location Map



Sleeping Bear Dunes National Lakeshore was established by Public Law 91-479 on October 21, 1970. This Act states that “Congress finds that certain outstanding natural features, including forests, beaches, dune formations, and ancient glacial phenomena, exist along the mainland shore of Lake Michigan and on certain nearby islands in Benzie and Leelanau Counties, Michigan.” In addition to the natural features, Sleeping Bear Dunes is home to many cultural features, including a 1871 lighthouse, three former Life Saving Service/Coast Guard Stations, Glen Haven Village, an example of a 20th century company town, and Port Oneida, a rural historic farm district.

1.3 DESCRIPTION OF THE PROJECT AREA

Dunes are formed by a unique combination of wind, water, and vegetation that move, sort and trap sand particles. Perched dunes are often small features on top of glacial moraines formed from sand blowing off bluff faces (Alliance for the Great Lakes, 2007). Winds lift sand up the slope, which is then collected in these dunes. The perched dune at Pierce Stocking Scenic Drive is approximately 450 feet above Lake Michigan. In general, the park’s bluffs are measurably eroding and retreating. Waves wear away the base support of the bluff and sand and rocks from above slide down to the beach.

In 1967, Pierce Stocking Scenic Drive first opened to the public (prior to establishment of the Lakeshore). The original drive was redesigned by the NPS in the mid-1980s to protect park resources and provide for enhanced visitor enjoyment. The original entrance started at the Great Lakes picnic area and allowed visitors to drive up to a parking lot near what is now the location of Overlooks 9 and 10. The Pierce Stocking Scenic Drive self-guided auto tour meanders through a sample of vegetative communities, providing views of Glen Lake, Lake Michigan, and the Sleeping Bear Dunes.

The parking lot for Overlooks 9 and 10 is currently located adjacent to the existing scenic drive (Figure 1-2). A concrete path leads to the bluff face. Several different materials and designs have been used for the paths leading to the overlooks throughout the years, including concrete, asphalt, and an elevated boardwalk. Today, a seasonal wooden boardwalk provides access to Overlooks 9 and 10. These overlooks are wooden platforms constructed at the bluff that allow visitors to enjoy spectacular views of Lake Michigan, the Manitou Islands, and the fragile dune environment.

1.4 PLANNING CONTEXT

The *General Management Plan* (NPS, 2009) provides a general framework to guide park management decisions over a 20-year period. The project to improve the Lake Michigan Overlooks 9 and 10 represents a continued commitment to preserve significant park resources and is compatible with management zoning in the General Management Plan (GMP). The project area lies within the “High Use” zone, which allows for high numbers of visitors, major developments, and a modified natural environment. This project was specifically addressed in the GMP in the section entitled “Ongoing Projects and Projects Planned for the Near Future.” The proposed action alternatives would not conflict with any ongoing or planned management activities within the park (Table 1-1).

Figure 1-2: Lake Michigan Overlooks 9 & 10

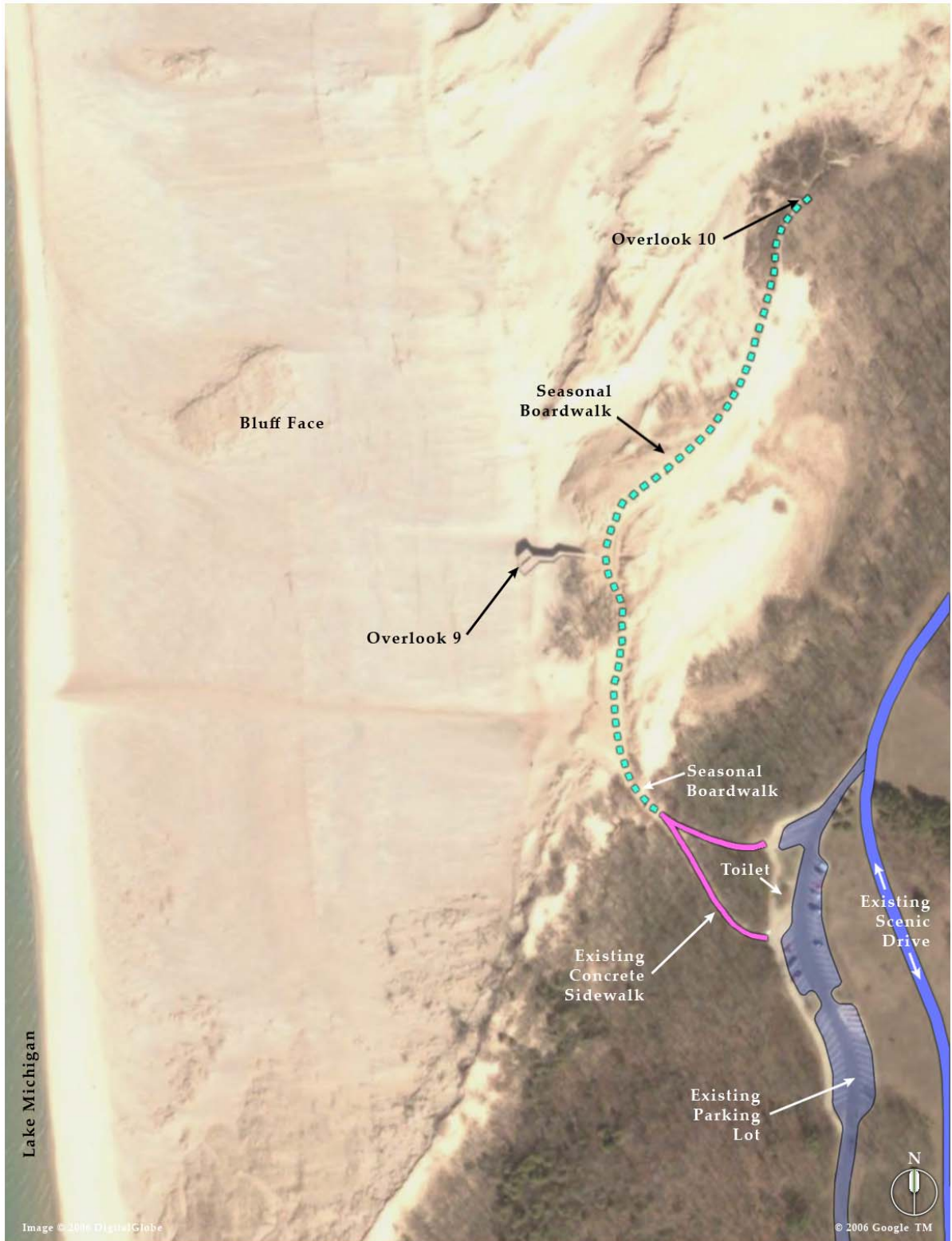


Table 1-1: Project’s Relationship to Other Plans

Management Activities	Relationship to Proposed Action
M-22 from the Benzie/Leelanau county line (Manning Road) to the junction with M-72 northwest of Traverse City was designated as a Scenic Heritage Route.	The M-22 Scenic Heritage Corridor Management Plan (Leelanau Scenic Heritage Route Committee) has five goals. The improvements to the Lake Michigan Overlooks 9 & 10 are consistent with these goals.
Creation of the Leelanau Scenic Heritage Trailway.	A 10-foot wide multi-use trailway that would be parallel to M-22 and M-109 is being proposed from the Benzie/Leelanau county line to County Road 651. Pierce Stocking Scenic Drive is accessed directly off M-109 and the proposed improvements would enhance trailway user experience.
Stabilize and rehabilitate buildings in Glen Haven Village Historic District	Glen Haven is approximately 3 miles northeast of Pierce Stocking Scenic Drive. The park’s goal is to stabilize and rehabilitate historic buildings within the Glen Haven District and provide visitor services.
Port Oneida Rural Historic District Environmental Assessment	Port Oneida is a 3,400 acre historic agricultural landscape located along M-22 approximately 8 miles northeast of Pierce Stocking Scenic Drive. An environmental assessment presents alternatives to provide improvements to Port Oneida by improving visitor amenities, rehabilitating and stabilizing historic structures, and stabilizing cultural landscapes.
General Management Plan/ Wilderness Study/EIS	This document provides long-term management guidance for the park for the next 20 plus years. The document developed management “zones” for all areas of the park, which define the desired future conditions (resource, use, and development) for each zone. The document also determined the location and amount of lands to be recommended to Congress for wilderness designation. The document was completed and signed in January 2009.

1.5 SCOPING

Scoping is the effort to involve federal and state agencies, local government and interests, and the public in determining the issues to be addressed in the environmental evaluation. Among other tasks, scoping identifies 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. The project planning team held an internal scoping meeting at the park in October 2006.

External scoping included coordination with interested federal and state agencies along with associated Indian tribes in November 2006. Scoping letters were sent to associated Indian tribes, resource and regulatory agencies, Michigan Department of Transportation (MDOT), interest groups, and the public. A press release was distributed to the park's media list on November 16, 2006. The Leelanau Enterprise printed the press release on November 23, 2006, and articles were published in the Traverse City Record Eagle on November 23, 2006 and March 19, 2009. Appendix A contains a copy of the scoping letter, the press release, and the articles.

1.6 ISSUES

The following issues were identified by the planning team regarding the need to improve Overlooks 9 and 10 and the surrounding area.

- Heavy visitor use from hiking up and down the bluff face has accelerated natural forces resulting in severe erosion. A trough on the bluff face has formed from decades of intense foot traffic.
- Vegetation at the top of the perched dune has also been impacted from heavy, unregulated foot traffic.
- Every year, more visitors are injured at this site than anywhere else in the Sleeping Bear Dunes. Visitors suffer from heat exhaustion, lacerations or broken bones. Park employees and local fire and rescue departments respond to these incidents, incurring considerable costs in time, money, and personal safety.
- Yearly maintenance costs at the site are high. Due to high winds in the area, sand must be removed from the seasonal boardwalks frequently, either by hand or bulldozer, sometimes daily.
- Due to the loose, rounded beach sand on the seasonal boardwalks and concrete approach walks, they are sometimes very slippery. Removal and placement of the seasonal boardwalks also has resulted in maintenance worker injuries.
- The existing situation does not provide an unimpacted natural setting for viewing one of the park's premier natural attractions. The eroded slope, impacted vegetation, and high numbers of visitors descending and ascending the bluff face detract from the experience for many park visitors.

1.7 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 on the basis of federal laws, regulations, and executive orders, and NPS *Management Policies*, (2006) as well as from input from agencies and the public during scoping. A brief rationale for the selection of each impact topic is given below, as well as the rationale for dismissing specific topics from further consideration.

1.7.1 Impact Topics Selected for Detailed Analysis

Each of the following impact topics would be impacted by one or more of the alternatives and, consequently, they have been retained for detailed analysis.

Geology and Soils

According to NPS *Management Policies* (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.

The alternatives considered would potentially impact soils and the active dune areas. Geology and soils will be retained as an impact topic to allow for evaluation of these impacts.

Vegetation

The National Environmental Policy Act of 1969 (42 USC 4321 *et seq.*) calls for an examination of the impacts on all components of affected ecosystems. According to NPS *Management Policies* (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.

The alternatives considered would potentially impact vegetation; therefore, vegetation will be retained as an impact topic.

Threatened or Endangered Species

The Endangered Species Act (1973) requires an examination of impacts of proposed NPS activities on all federally-listed threatened or endangered species. NPS policy also requires examination of potential impacts on state-listed threatened, endangered, candidate, rare, declining, and sensitive species that are known collectively as species of concern.

The NPS must conference or informally consult with the United States Fish and Wildlife Service (USFWS) and/or National Marine Fisheries Service pursuant to Section 7 of the Endangered Species Act to (1) clarify whether and what listed, proposed, and candidate species or designated or proposed critical habitats may be in the project area; (2) determine what effect proposed actions may have on these species or critical habitats; and (3) determine the need to enter into formal consultation for listed species or designated critical habitats, or conference for proposed species or proposed critical habitats.

Three federally-listed species and 32 state-listed species have been documented in Sleeping Bear Dunes National Lakeshore. The federally threatened Pitcher's thistle (*Cirsium pitcheri*) has been found in the project area. The federally endangered piping plover (*Charadrius melodus*) has not been observed nesting in the immediate project area but the area 1640 feet inland from Lake Michigan has been designated critical habitat by the USFWS. One state-listed threatened species, the Lake Huron locust (*Trimerotropis*

huroniana) is often found in association with Pitcher's thistle; however, no occurrences have been observed in this location. Because of the known or possible occurrence of these three species in the project area, this impact topic will be further evaluated.

Park Operations

Under the current conditions, sand must be bulldozed each spring from where it naturally accumulates at the end of the concrete sidewalk. Once the path is cleared of sand deposits, the boardwalk must be installed and then swept of sand at least twice weekly throughout the summer season. In fall, the boardwalk must once again be picked up and stored in the parking lot, with repairs occurring as needed. The alternatives considered would change the operations at the site and the amount of staff time needed to maintain the site; therefore, park operations are carried forward as an impact topic.

Visitor Use and Experience

Visitors enjoy the site for a variety of reasons, including the spectacular views and the descent down the dunes. The alternatives considered would alter the site and alter the visitor experience. The alternatives differ in the level of accessibility; therefore, visitor use and experience will be further evaluated as an impact topic.

1.7.2 Impact Topics Dismissed from Detailed Analysis

The following impact topics would not be affected by the proposed alternatives resulting in their dismissal from detailed analysis.

Floodplains and 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. Proposed actions that have the potential to adversely impact wetlands must be addressed in a statement of findings. Executive Order 11988, *Floodplain Management*, requires all federal agencies to avoid construction within the 100-year floodplain unless no other practicable alternative exists. Certain construction within a 100-year floodplain requires preparation of a statement of findings. Implementation of the proposed alternatives would not adversely affect the natural values and functions of the floodplain or increase flood risks. No wetlands are present within the project area. This impact topic was dismissed from further analysis.

Water Quality (Surface Water Quality)

NPS *Management Policies* (2006) require protection of water quality consistent with the Clean Water Act. Section 404 of the Clean Water Act authorizes the U.S. Army Corps of Engineers to prohibit or regulate, through a permitting process, discharge of dredged or fill material or excavation in U.S. waters. No construction is proposed in Lake Michigan and no drains or streams are adjacent to the project area for the action alternatives; therefore, there would be no impacts to water quality as a result of the proposed alternatives. This impact topic was dismissed from further analysis.

Land Use

Pierce Stocking Scenic Drive is undeveloped, comprised of a mix of forested areas, dunes, and open water. The overlooks located along the drive provide parking spaces, waste receptacles, and vault toilets. The land is owned by the NPS and is publicly maintained as part of the Sleeping Bear Dunes National Lakeshore. The overall use and purpose of Pierce Stocking Scenic Drive and Overlooks 9 and 10 would not change; therefore, land use is dismissed as an impact topic.

Wildlife

The Sleeping Bear Dunes 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 Sleeping Bear Dune's natural ecosystems. The site is currently developed and experiences a high level of visitation, which is not expected to change. The alternatives would not impact wildlife habitat or corridors; therefore, this impact topic was dismissed.

Cultural Resources

The National Historic Preservation Act, as amended, (16 USC 470 *et seq.*); the National Environmental Policy Act (42 USC 4321 *et seq.*); and the NPS's Director's Order #28: *Cultural Resource Management Guideline* (1998), *Management Policies* (2006), and Director's Order #12 and Handbook: *Conservation Planning, Environmental Impact Analysis, and Decision Making* (2001) 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.

Archeological Resources. Archeological resources are the material remains or physical evidence of past human life or activities. Due to the active nature and use of the project area, archeological resources are unlikely to occur (no formal surveys have been conducted). Therefore, archeological resources were dismissed as an impact topic. If during construction, previously undiscovered cultural resources are discovered, all work in the immediate vicinity of the discovery would be halted until the resources could be identified and documented.

Cultural Landscapes and Historic Structures. According to the Director's Order #28: *Cultural Resource Management Guideline* (1998), 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, the influence of human beliefs and actions over time upon the natural landscape. Shaped through time by historical land-use and management practices, as well as policies

and property laws, levels of technology, and economic conditions, cultural landscapes provide a living record of an area's past, 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 would be no impact to cultural landscapes or historic structures as a result of the proposed alternatives.

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). There are no known ethnographic resources or traditional cultural properties in the vicinity of Lake Michigan Overlooks 9 and 10. Copies of the environmental assessment will be forwarded to each tribe traditionally associated with park lands, for review and comment. 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. Because there are no known ethnographic resources within the area of potential effects, ethnographic resources were dismissed as an impact topic.

Museum Collections. The NPS's *Management Policies* (2006) and Director's Order #28: *Cultural Resource Management Guideline* (1998) require the consideration of impacts on museum collections (historic artifacts, natural specimens, and archival and manuscript material). Because the park's museum collections would be unaffected by any of the action alternatives, museum collections 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, 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.

No Indian Trust Resources are in Sleeping Bear Dunes National Lakeshore. The lands within the Sleeping Bear Dunes are not held in trust by the Secretary of the Interior for the benefit of Indians due to their status as Indians. Therefore, Indian Trust Resources was dismissed as an impact topic in this environmental assessment.

Air Quality

The Clean Air Act, as amended (42 USC 7401 *et seq.*) and Section 118 of the Clean Air Act requires all federal facilities to comply with existing federal, state, and local air pollution control laws and regulations. Section 118 of the 1963 Clean Air Act (42 U.S.C. 7401 *et seq.*) requires a national park unit to meet all federal, state, and local air pollution standards. Sleeping Bear Dunes National 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), sulfur dioxide (SO₂) emissions, as well as 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 local, short-term, negligible 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.

Socioeconomics

Council on Environmental Quality regulations for implementing the National Environmental Policy Act, 40 CFR 1500, requires economic analyses of federal actions that would affect local or regional economy. The topic of socioeconomics evaluates the effect of the proposed action on local and regional businesses and residents, and local and regional economies. The local and regional economies of this area are strongly influenced by tourism. The proposed alternatives involve alterations to the site, however, both overlooks would remain open. Pierce Stocking Scenic Drive would continue to be one of the top tourist attractions at the Sleeping Bear Dunes. Should the proposed actions be implemented, short-term economic benefits for project-related expenditures and employment would include economic gains for some local businesses and individuals. While there may be short-term benefits to local economies, local and regional businesses would not be appreciably affected in the long term. Therefore, socioeconomics is dismissed as an impact topic in this environmental assessment.

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 Environmental Protection Agency, 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 Sleeping Bear Dunes National Lakeshore contains both minority and low-income populations; however, environmental justice was dismissed as an impact topic for the following reasons:

- The Park 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 Park 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.

Lightscape Management

The NPS *Management Policies* (2006) directs 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-cause 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.

To meet this directive, overnight lighting shall not be used. The scenic drive closes one half hour after sunset in the summer. No additional lighting is proposed. Therefore, the action alternatives would not be likely to affect appreciation of the night sky or interfere with activities of nocturnal creatures. For these reasons, night sky is dismissed as an impact topic for further consideration.

Natural Soundscapes

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

Neither the No Action nor any of the action alternatives addressed in this analysis would introduce long-term inappropriate noise levels to the park. The proposed actions largely occur in areas with an existing level of development, including highways, roads, private use, and park facilities. The temporary noise produced during construction and restoration activities would result in negligible, short-term, localized adverse impacts. This temporary increase in noise levels would occur primarily within existing developed areas. Therefore, natural soundscapes was dismissed as an impact topic.

Waste Management

Along Pierce Stocking Scenic Drive solid waste is generated primarily by visitors. Under the alternatives, the amount of solid waste generated would not likely increase as a result of the improvements at Overlooks 9 and 10. Any increase in trash would be negligible as a result of implementing the alternatives; therefore, waste management was dismissed as an impact topic.

Energy Requirements and Conservation Potential

The Council on Environmental Quality (CEQ) guidelines for implementing the National Environmental Policy Act require examination of energy requirements and conservation potential as a possible impact topic in environmental impact statements.

Sleeping Bear Dunes National Lakeshore strives to incorporate the principles of sustainable design and development into all facilities and park operations. Sustainability can be described as the result achieved by doing things in ways that do not compromise the environment or its capacity to provide for present and future generations. Sustainable practices minimize the short- and long-term environmental impacts of developments and other activities through resource conservation, recycling, waste minimization, and the use of energy efficient and ecologically responsible materials and techniques.

The NPS's *Guiding Principles of Sustainable Design* (1993) provides a basis for achieving sustainability in facility planning and design, emphasizes the importance of bio-diversity, and encourages responsible decisions. The guidebook describes principles to be used in the design and management of visitor facilities that emphasize environmental sensitivity in construction, use of nontoxic materials, resource conservation, recycling, and integration of visitors with natural and cultural settings. The

park would reduce energy costs, eliminate waste, and conserve energy resources by using energy efficient and cost effective technology wherever possible. Energy efficiency would also be incorporated into any decision-making process during the design or acquisition of facilities, as well as all decisions affecting park operations. The use of value analysis and value engineering, including life cycle cost analysis, would be performed to examine energy, environmental, and economic implications of proposed development. The park would encourage suppliers, permittees, and contractors to follow sustainable practices and address sustainable park and non-park practices in interpretive programs. Consequently, any adverse impacts relating to energy use, availability, or conservation would be negligible. Therefore, energy requirements and conservation potential is an impact topic dismissed from further consideration.

2.0 ALTERNATIVES CONSIDERED

2.1 INTRODUCTION

A range of alternatives to improve Overlooks 9 and 10 were evaluated as a part of this environmental assessment. An interdisciplinary team analyzed the advantages and disadvantages of each design option. Several alternatives were considered and dismissed because they did not meet project objectives or had the potential to produce an unacceptable level of adverse environmental or visitor use impacts. The alternatives dismissed from consideration are addressed in Section 2.5 “Alternatives Considered and Dismissed”.

Although the option of continuing current management (No Action) does not solve the project objectives, current conditions are used as the baseline against which the action alternatives are analyzed. This is the context for determining the relative magnitude and intensity of impacts (NPS, 2006). The No Action Alternative is referred to as “Alternative A, Continue Current Management/No Action” in this environmental assessment. In addition, there are three action alternatives (Alternatives B, C, and D) being evaluated. The alternatives are summarized in Table 2-1.

Alternatives B, C, and D were determined to meet the project objectives as described in Section 1.1. These alternatives meet the primary objectives of providing visitors with access to panoramic views and a quality interpretive experience, restoring the site and reducing future impacts, reducing injuries to visitors on the bluff face, reducing response costs, reducing injuries to maintenance employees, and reducing maintenance costs.

2.2 ALTERNATIVE A – NO ACTION

Overlooks 9 and 10 are accessed along Pierce Stocking Scenic Drive. A parking lot welcomes visitors to the site (Figure 2-1). From the parking lot, a concrete sidewalk guides visitors to an opening cut in the crest of the dune. A wooden seasonal boardwalk (five feet wide) then leads beyond the crest of the dune, opening to the bluff and beautiful views of Lake Michigan and the Manitou Islands. The boardwalk continues on the bluff in a northerly direction to Overlooks 9 and 10. The boardwalk is installed each spring and removed each fall. Signs are posted along the boardwalk asking visitors to stay on the boardwalk to minimize impacts to the dunes.

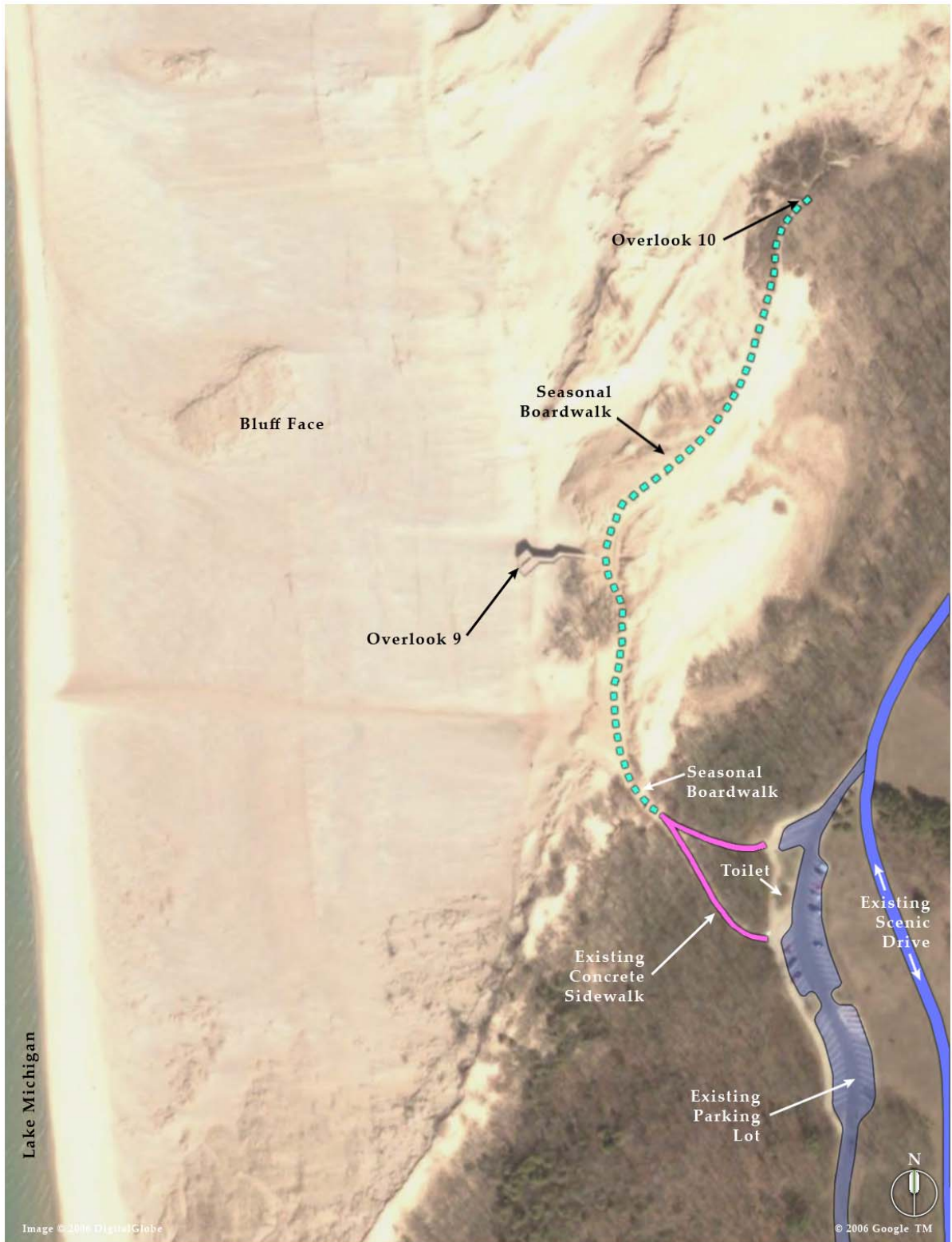
Visitors often approach the edge for a view of the bluff face, which some then choose to descend. A sign is posted that warns visitors of the steep bluff face and that the return climb is extremely exhausting. A trough has formed that is attributed to visitors descending and ascending the bluff face.

Under Alternative A, the park staff would continue with the current management of Overlooks 9 and 10 as it exists today. Routine maintenance would occur as needed. Some of the pilings at existing Overlook 9 are exposed and it is anticipated that major repairs (or replacement) would be required at some point in the future to stabilize the structure.

Table 2-1: Alternatives Considered

Alternative	Description
A: Continue Current Management/No Action	<ul style="list-style-type: none"> • Maintain existing concrete walk and seasonal boardwalks • Overlooks 9 and 10 maintained or replaced, as needed
B: Close Bluff Climbing Area with Barrier	<ul style="list-style-type: none"> • Maintain existing concrete walk and seasonal boardwalks • Overlooks 9 and 10 maintained or replaced, as needed • Close bluff using formal closure with signage, barriers, and enforcement
C: Boardwalks to Overlook 9 and New Path to Overlook 10 Using Trails, Steps, and Boardwalk	<ul style="list-style-type: none"> • Remove concrete walk • Overlook 9 reconstructed in existing location • Routine maintenance to Overlook 10, as needed • New raised boardwalk with switchbacks to a new overlook platform • New boardwalk along the bluff from a new overlook to reconstructed Overlook 9 • New route to Overlook 10 using trails, steps, raised boardwalks, and sand ladders
D: Tunnel with Reconstructed Overlook 9 and Trail to Overlook 10 (The Preferred)	<ul style="list-style-type: none"> • Existing concrete walk maintained • Overlook 9 reconstructed in existing location • Routine maintenance to Overlook 10, as needed • Tunnel and new overlook platform • New raised boardwalk along the bluff from a new tunnel and overlook platform to reconstructed Overlook 9 • New trail to Overlook 10

Figure 2-1: Alternative A – No Action



The existing seasonal boardwalk path requires a high level of maintenance from park staff. The path cuts through an active dune in an area with high wind energy, causing the path to become frequently covered with sand. Park staff must bulldoze accumulated sand from the path each spring, and then maintain the path at least twice a week by removing the accumulated sand. The installation and removal of the seasonal boardwalks is a difficult task and maintenance employees have sustained injuries during this process.

In Alternative A, the route to Overlook 9 is not fully accessible under the requirements of the Americans with Disabilities Act (ADA). It is, however, accessible with assistance, due to steep slopes and sand. The boardwalk to Overlook 10 is also accessible with assistance, but the overlook platform is not accessible due to a step.

2.3 ACTION ALTERNATIVES

Each action alternative has been developed to meet the purpose and need described in Section 1.1. Common elements include revegetation, wayside exhibits, benches, plant identification signs, and area restoration signs.

2.3.1 Alternative B – Close Bluff Climbing Area with Barrier

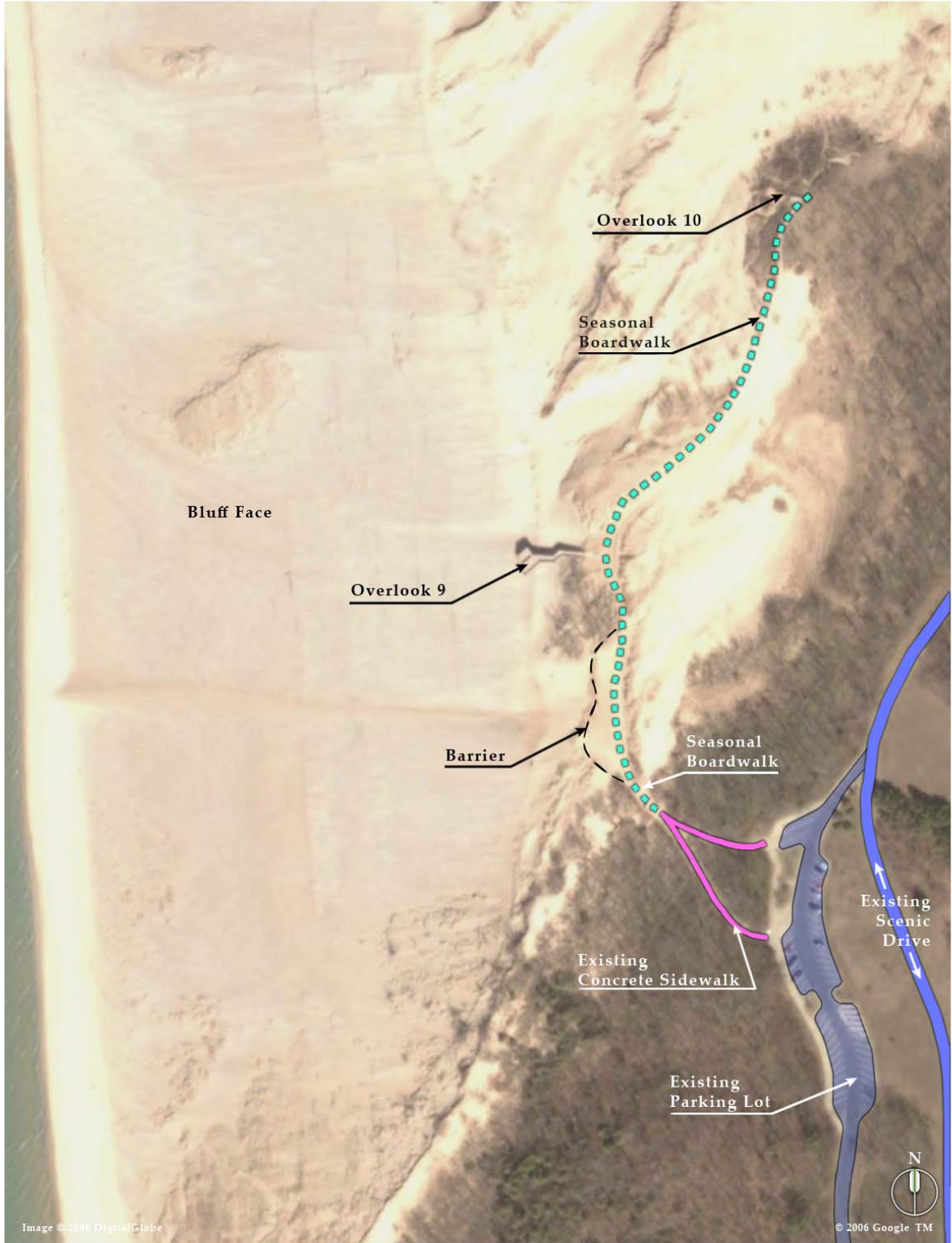
Under Alternative B, the existing site use and configuration would remain. The existing concrete sidewalk would remain and the seasonal boardwalks would continue to be used (Figure 2-2). The existing Overlooks 9 and 10 would also remain in their current locations.

This alternative would differ from the No Action alternative in that the bluff climbing area would be officially closed and signed. Barriers such as post-cable or fence would be erected to discourage visitors from accessing the bluff face.

Routine maintenance would occur as needed. Some of the pilings at existing Overlook 9 are exposed and it is anticipated that major repairs (or replacement) would be required at some point in the future to stabilize the structure. The seasonal boardwalks would need to be maintained as indicated for the No Action Alternative. This alternative would also require maintaining the barriers and signage for the closure and also increase staff for patrolling the area to ensure that visitors are complying with the closure.

As in Alternative A, the route to Overlook 9 is not fully accessible under the requirements of the ADA. It is, however, accessible with assistance, due to steep slopes and sand. The boardwalk to Overlook 10 is also accessible with assistance, but the overlook platform is not accessible due to a step.

Figure 2-2: Alternative B



2.3.2 Alternative C – Boardwalks to Overlook 9 and New Path to Overlook 10 Using Trails, Steps, and Boardwalk

Under Alternative C, the existing paved parking lot would remain, but a new access path to the overlooks would be provided. The existing concrete path leading from the parking lot to the dune would be removed.

A permanent boardwalk would delineate the trail to the existing Overlook 9. A series of switchbacks would be located where the existing concrete sidewalk is located. This section of boardwalk would lead to a new overlook platform. From this overlook, an elevated boardwalk would cross the top of the bluff face. The boardwalk would be located on the edge of the bluff face leading to Overlook 9. Overlook 9 would be reconstructed in its existing location. The new overlook platform and reconstructed Overlook 9 could be a timber deck frame on timber piles with a timber/wire mesh railing, similar in design to existing park structures at this location. The use of sustainable materials would also be considered during the final design as appropriate.

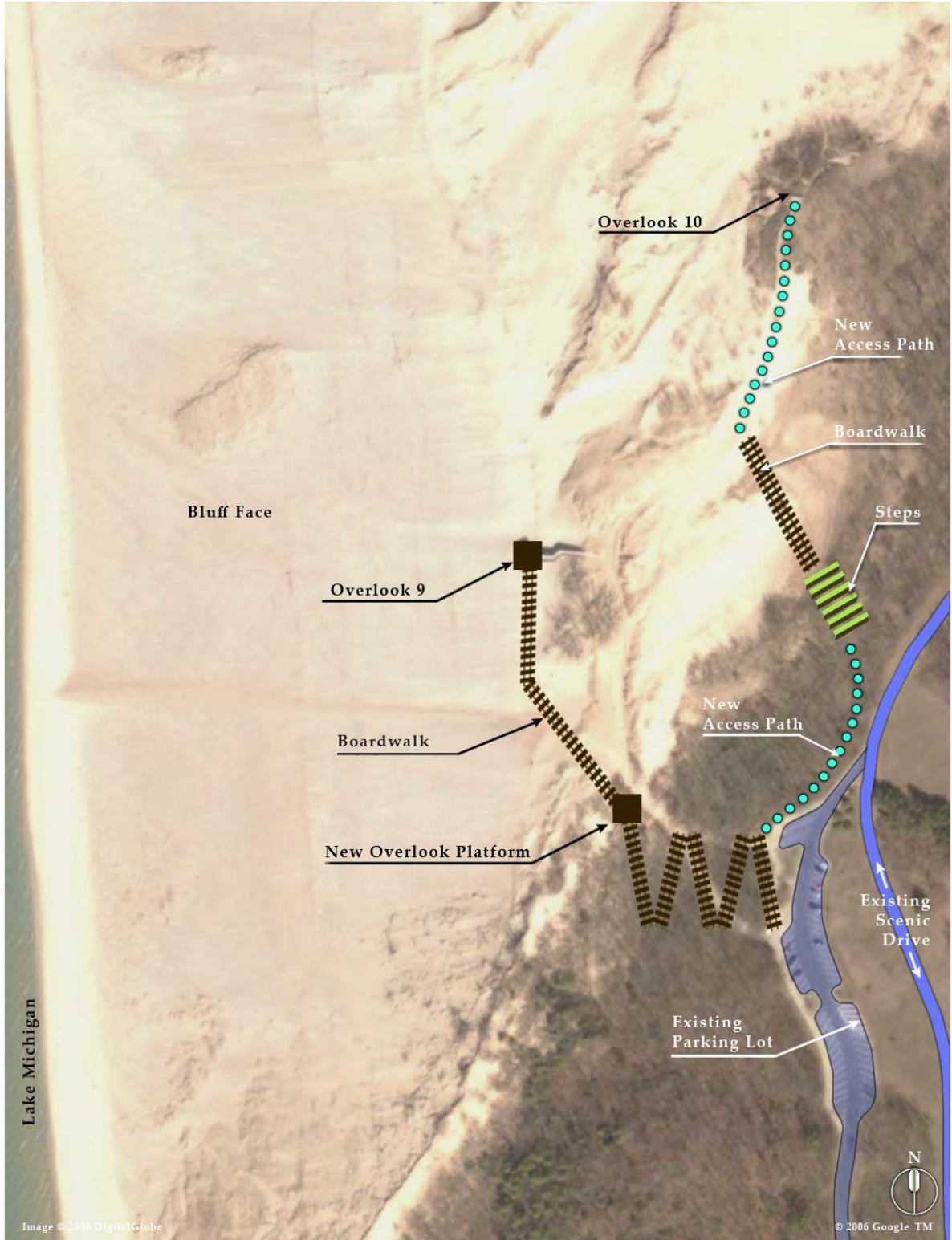
Timber/wire mesh railings located along the boardwalk and the reconstructed Overlook 9 would encourage visitors to stay within the designated locations and would enhance visitor safety.

The new path to Overlook 10 would start at the northern end of the parking lot and proceed through the woods. The initial portion of the path would be parallel to the road. Steps would be used to get over the slope connecting to a boardwalk to cross over a low spot in the dune (Figure 2-3). Elevated boardwalks would be used to cross the low spot, allowing sand to move underneath the structure. The boardwalk would connect to a path across the top of the dune to reach Overlook 10. The path would use cable/post and sand ladders as needed to delineate the trail. Routine maintenance to Overlook 10 would occur as needed.

Sand ladders are made of flexible aircraft cable and tree pole rungs drilled to allow the cable runners to pass through on both ends. Wire clamps would be used to fasten the cable into the sand. The ladders, constructed and installed in 25-foot lengths, are lighter weight and more manageable than the seasonal boardwalks currently in use. This would allow one or two maintenance staff to periodically lift the ladder to remove drifting sand. The sand ladders would be placed in the spring and removed in the fall. Minimal maintenance would be required during the season.

In Alternative C, it is intended that the route to Overlook 9 would be fully accessible under the requirements of the ADA. The ability to fully comply with the requirements of ADA would be further examined during final design. The route to Overlook 10 would not be accessible under the ADA guidelines and would offer a more strenuous climb including a trail, steps, raised boardwalk, and sand ladders.

Figure 2-3: Alternative C



2.3.3 Alternative D – Tunnel with Reconstructed Overlook 9 and Trail to Overlook 10 (The Preferred Alternative)

Under this alternative, the existing concrete sidewalk from the parking lot would be maintained providing access to a pedestrian tunnel constructed through the dunes (Figure 2-4). The proposed tunnel could be a corrugated metal pipe arch with a 16 foot wide by 10 foot high effective opening. The tunnel is assumed to be constructed at a level grade from the starting point where the current concrete sidewalk ends. From the entry, the tunnel would head in a northwest direction and exit at a new overlook platform. The new overlook platform would connect to an elevated boardwalk that would cross the top of the bluff face leading to a newly-constructed Overlook 9. As with Alternative C, Overlook 9 would be constructed in its existing location. The new overlook platform at the tunnel and the Overlook 9 platform could be timber deck frame on timber piles with a timber/wire mesh railing, similar in design to the existing park structures at this location. The use of sustainable materials would also be considered during the final design as appropriate.

Timber/wire mesh railings located along the boardwalk and the reconstructed Overlook 9 would encourage visitors to stay within the designated locations and would enhance visitor safety.

The corrugated metal pipe arch tunnel system does not require an independent foundation. However, this flexible pipe cannot be bored and jacked and would require an open cut through the dune (Figure 2-5) by:

- excavating the dune and stockpiling the excavated soil;
- constructing the overlook platform;
- installing the corrugated metal tunnel sections;
- backfilling the trench with stockpiled soil; and,
- restoring the site to its natural shape and condition.

The tunnel should greatly reduce sand removal activities in this sand accumulation problem area. Sand would accumulate on top of the tunnel and the natural dynamic process of sand deposition and removal would continue. The tunnel exit at the new overlook platform would be constructed at a level high above the perched dune to substantially reduce sand drifting into the tunnel or onto the overlook platform. Also, an enclosure of suitable materials would be placed across the tunnel opening in the fall to prevent sand deposition during the winter. The raised boardwalk from the new overlook platform to Overlook 9 would be constructed high enough above the bluff to eliminate most sand accumulation on the boardwalk walking surface. And, pilings for the raised boardwalk, the new overlook platform, and the new Overlook 9 would be driven deep enough to allow for any changes in bluff elevations during the life of the developments.

Overlook 10 would remain open and routine maintenance would occur as needed. A new path to Overlook 10 would be constructed through the woods, starting at the northern end of the parking lot. The path would use cable/post and sand ladders as needed to delineate the trail. The sand ladders would be constructed and maintained the same as described for

Figure 2-4: Alternative D (The Preferred Alternative)

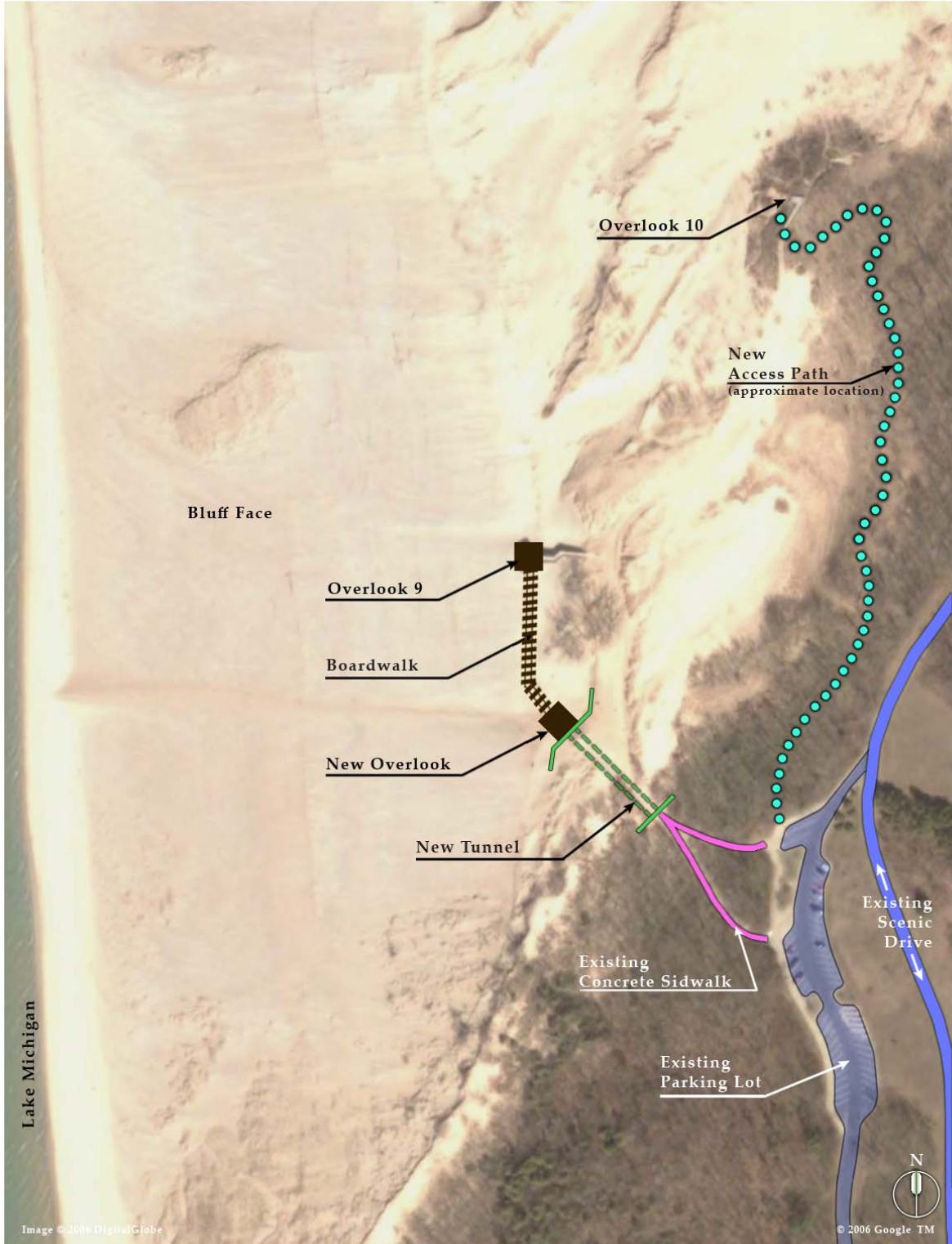
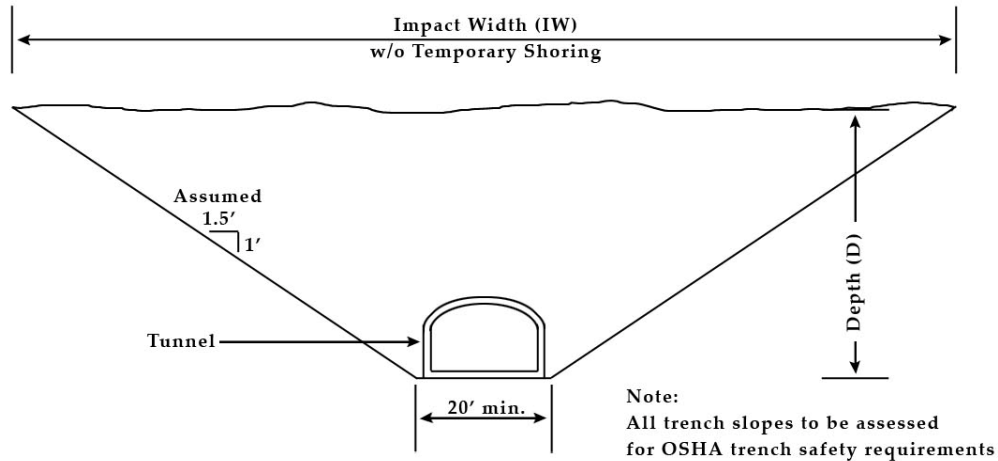


Figure 2-5: Tunnel Details – Typical Tunnel Section



Alternative C. Sand ladders are made of flexible aircraft cable and tree pole rungs drilled to allow the cable runners to pass through on both ends. The ladders, constructed and installed in 25-foot lengths, are lighter weight and more manageable than the seasonal boardwalks currently in use. The path would be located predominately in the forested dunes, ascending the slope and requiring minimal earthwork.

In Alternative D, the route to Overlook 9 is intended to be fully accessible under requirements of ADA. The ability to fully comply with the requirements of ADA would be further examined during final design. The route to Overlook 10 would not be accessible under ADA and would offer a more strenuous climb along a rustic trail.

2.4 MITIGATION MEASURES

The action alternatives would predominately result in beneficial effects. In areas where there is potential for adverse effects, the following mitigation measures are proposed.

- In areas of new grading, restoration with appropriate native species is proposed.
- In areas of new grading, monitoring should occur for invasive vegetation or exotic species.

2.5 ALTERNATIVES CONSIDERED AND DISMISSED

An analysis of all design options led to the dismissal of several alternatives. These alternatives included components that failed to meet the project objectives or actions that

generated unacceptable levels of resource impacts. The nature of the dismissed options and the rationale for their rejection follows.

Close both Overlook 9 and 10: Under this alternative, both overlooks would be closed along with the paths and the parking lot (Figure 2-6, A). This would eliminate the erosion on the dunes caused by visitor access and eliminate the required maintenance. Visitor and employee safety would be improved; however, this alternative was dismissed because these overlooks provide unique opportunities for visitors to view Lake Michigan, the islands, and the surrounding dunes. The location on the Pierce Stocking Scenic Drive is an important part of the visitor experience at Sleeping Bear Dunes and visitor access must be preserved.

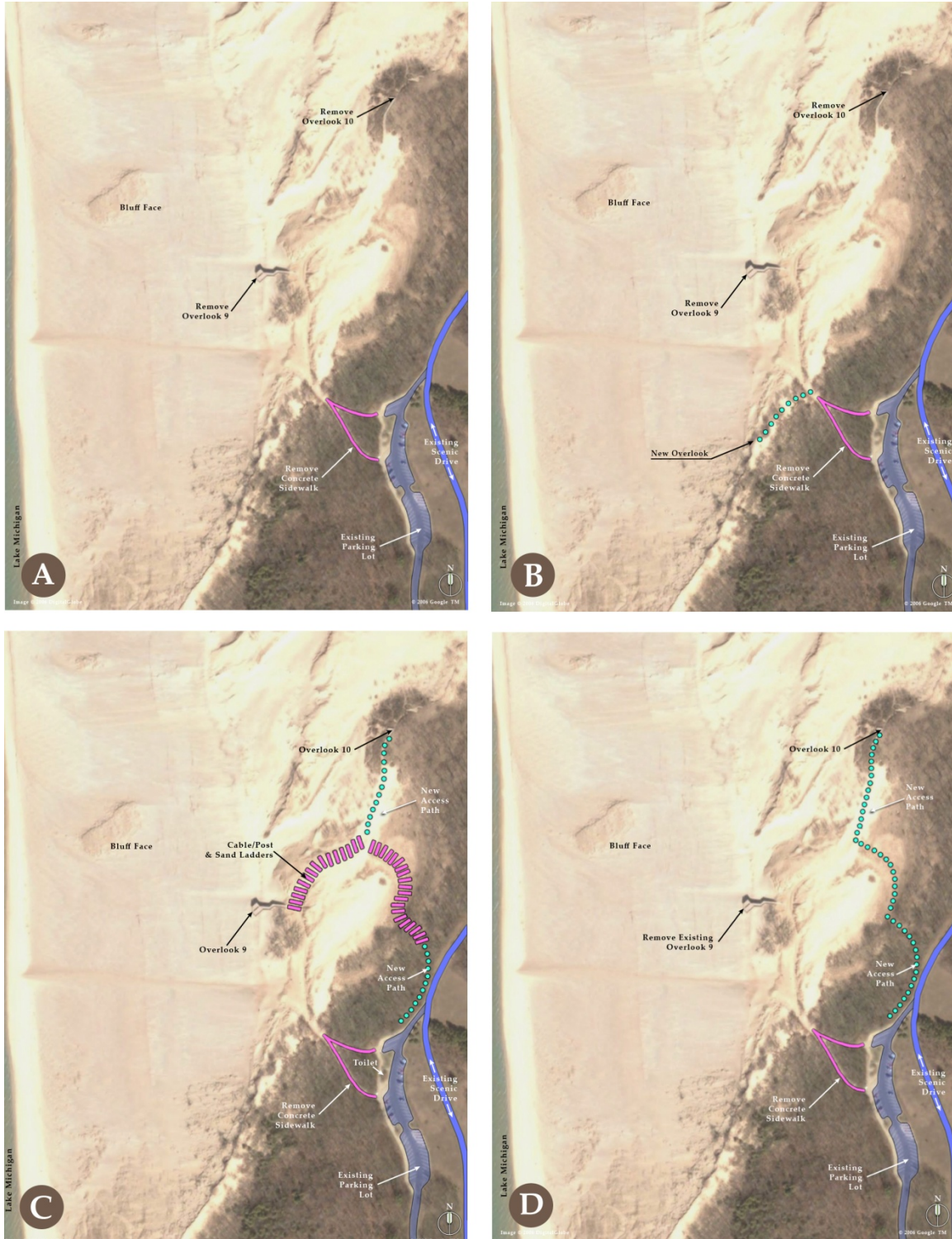
New overlook south of concrete path: This alternative proposes construction of a new overlook south of the existing concrete path and due west of the parking area (Figure 2-6, B). This area includes unstable perched dunes on a narrow ridge, with an impaired view of Lake Michigan. This was dismissed because of the extent of impacts and lower quality views leading to a diminished visitor experience.

New access path to Overlooks 9 and 10 using cable/post and sand ladders with no boardwalks: Under this alternative, the existing paved parking lot would remain, but a new access path to the overlooks would be provided (Figure 2-6, C). The path would start at the northern end of the parking lot and proceed through the woods. The initial portion of the path would be parallel to the road. The path would ascend the slope following the old road grade across the open dunes with minimal earthwork. At the top of the dunes, the trail would split and provide access to both overlooks. Cable/post and sand ladders, as needed, would delineate the trail.

The existing concrete sidewalk leading from the parking lot to the dune would be removed. Accessibility to the overlooks would be more difficult, with visitors having to expend some effort, climbing in sand and on sand ladders. Visitor experience would likely diminish with the new access path to the overlooks. No formal trail access to the bluff would be provided, but visitors would likely create social trails that would cause erosion and impact vegetation. This was dismissed as an alternative because using only foot paths with no boardwalks would not allow all visitors to the park to access this site and the views of Lake Michigan.

New access path to Overlook 10, remove Overlook 9: Under this alternative, Overlook 9 would be removed. The overlook needs repairs and has a limited lifespan (Figure 2-6, D). A new access path would be created to Overlook 10. The path would start at the northern end of the parking lot and proceed through the woods following the old road grade across the open dunes. This new path would connect to the existing path leading to Overlook 10. The remaining portion of the Overlook 9 path to the south would be abandoned along with the existing path from the parking lot. By closing Overlook 9 and the associated path, this would limit access to the bluff face. However, this was dismissed as an alternative because Overlook 10 does not provide the same visitor experience and viewshed quality as the existing Overlook 9.

Figure 2-6: Alternatives Considered and Dismissed



New access path to Overlook 10, relocate Overlook 9 south of parking area: Under this alternative, a new access path would be created to Overlook 10 (Figure 2-7, E). The path would start at the northern end of the parking lot and proceed through the woods following the old road grade across the open dunes. This new path would then connect to the existing path leading to Overlook 10. The remaining portion of the Overlook 9 path to the south would be abandoned along with the existing path from the parking lot. The existing Overlook 9 would be removed.

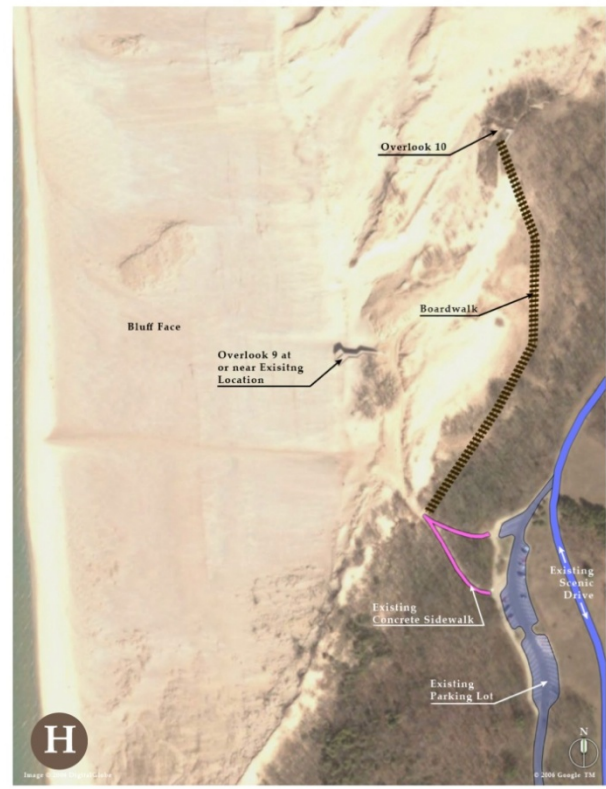
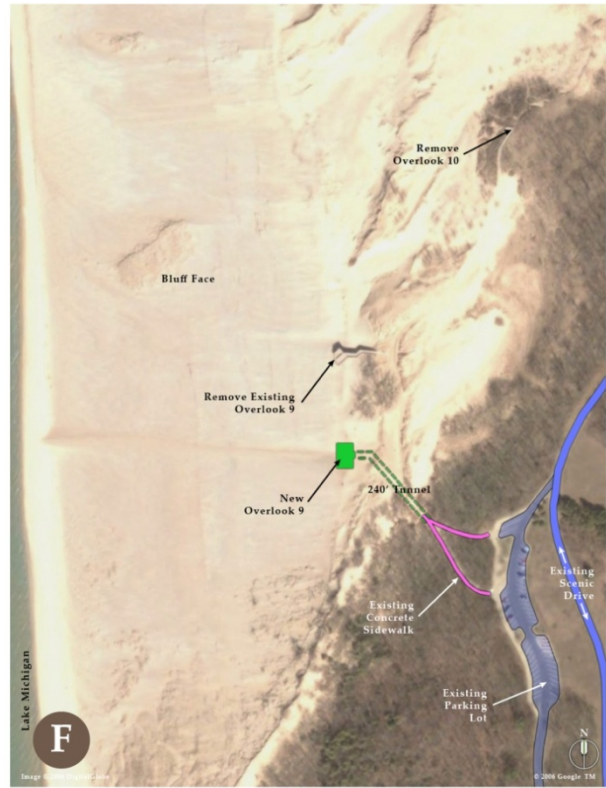
A new access path to a relocated Overlook 9 would be created starting from the southern end of the parking lot. The access path would lead to a new overlook in the woods, at or near the site of an old platform about 500 feet south of the parking area. The overlook would be elevated by a tower to provide views of Lake Michigan. This was dismissed because of the extent of impacts to forest and dune habitat and the impaired views resulting in a diminished visitor experience.

Tunnel from existing path to new overlook, remove Overlooks 9 and 10: Under this alternative, the existing path from the parking lot would be maintained and a tunnel would be constructed through the dunes (Figure 2-7, F). The tunnel would lead to a new Overlook 9, immediately at the exit of the tunnel. The paths leading to existing Overlooks 9 and 10, along with the overlooks themselves, would be removed. This alternative was dismissed because visitors would only have access to one location to view Lake Michigan and the Manitou Islands and the view is not as good from this location, when compared to existing Overlook 9.

Tunnel from existing path to new Overlook 9 passing due west through the dune: This tunnel alignment would start at the intersection of the two existing concrete sidewalks that originate from the parking lot and would pass through the dune at nearly a due west heading to minimize the tunnel length (Figure 2-7, G). This is the location of established native vegetation that has not been previously disturbed. Impacts to native dune habitat eliminated this alternative. Also the view is not as good from this location, when compared to existing Overlook 9.

Raised boardwalk to Overlook 10: A new raised boardwalk would be constructed from the end of the concrete sidewalk along the edge of the forested dune leading to Overlook 10 (Figure 2-7, H). This path would be used in conjunction with some form of access to Overlook 9. This alternative was dismissed due to the impacts that would occur as a result of constructing a permanent raised boardwalk through the dune at the edge of the forested dune.

Figure 2-7: Alternatives Considered and Dismissed



2.6 ENVIRONMENTALLY PREFERABLE ALTERNATIVE

As stated in Section 2.7D of *Director's Order #12 and Handbook* (NPS, 2001), the environmentally preferable alternative is the alternative that would promote the national environmental policy expressed in the National Environmental Policy Act.

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

- Fulfill the responsibilities of each generation as trustee of the environment for succeeding generations.
- Ensure for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings.
- Attain the widest range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable and 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 which 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 this means 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).

Continuing the current conditions under Alternative A, the No Action Alternative, would not preserve the natural aspects of the dunes and the bluff face. The current conditions provide access to the dunes and the views associated with Lake Michigan, however, this has resulted in unintended consequences. Visitors continue to descend and ascend the bluff face, creating an eroding trough. The use of the seasonal boardwalks requires the use of heavy equipment to prep the dunes and then maintain the boardwalks once they have been installed.

Alternative B would close access to the bluff face while maintaining access to Overlooks 9 and 10. Barriers would be constructed. Visitors would still access Overlooks 9 and 10 along the same seasonal boardwalks. However, this area could not be patrolled all the time making it difficult to ensure no visitors were descending the bluff face. Also, sand would still accumulate on the boardwalks, requiring frequent maintenance.

Alternative C would involve the construction of a new boardwalk leading to Overlook 9. The construction of the boardwalk would require excavation in the area of the terminal dune to create an acceptable slope for the boardwalk. This area would be stabilized and revegetated following construction; however, the dune would be impacted for

construction of the boardwalk. Through design, visitors would be discouraged from climbing the bluff face as was possible under Alternative A.

The Preferred Alternative (Alternative D) would involve the construction of a tunnel, beginning at the existing path from the parking lot. The tunnel and the boardwalk leading to new Overlook 9 would restrict access to the bluff face through design. Construction and installation of the tunnel would involve open cuts through the dune. The area of construction would be backfilled with stockpiled soils and then revegetated with appropriate native species.

Alternative B would close access to the bluff face, thereby reducing the number of rescues. However, sand removal and maintenance would still be required. Maintenance costs and injuries to maintenance employees would not be reduced.

Alternatives C and D would both provide new access to Overlooks 9 and 10, reduce injuries that occur on the bluff face through reduced access, reduce rescues, reduce injuries to maintenance employees, and reduce maintenance costs. However, Alternative D would result in the lowest level of impacts to the dune environment. Alternative D would cause the least damage to the biological and physical environment, yet would still protect, preserve, and enhance natural resources. Alternative D would construct a tunnel through an area that is currently disturbed, minimizing impacts to existing natural areas. Therefore, Alternative D, the Preferred Alternative, is the environmentally preferable alternative.

2.7 COMPARISON OF ALTERNATIVES

Table 2-2 compares each project alternative and provides a summary of the potential effects by impact topic.

Table 2-3 compares and contrasts whether each alternative accomplishes the purpose or fulfills the need identified in the purpose and need section.

Table 2-2: Comparison of Impacts by Alternative

Impact Topic	Alternative A	Alternative B	Alternative C	Alternative D (Preferred Alternative)
	No Action	Close Bluff Climbing Area with Barrier	Boardwalks to Overlook 9	Tunnel and Boardwalk to Overlook 9
Geology and Soils	The continued erosion and sand removal activities would result in long-term minor adverse impacts.	The continued erosion and sand removal activities, countered by the lack of erosion on the bluff face would result in long-term minor adverse impacts.	Construction activities, offset by fewer visitors descending the bluff face, would result in short-term minor adverse impacts.	Excavation through the terminal dune and a decrease in visitors descending the bluff face would result in short-term minor adverse impacts.
Vegetation	The continued foot traffic off the designated paths would result in long-term minor adverse impacts.	Reducing the number of visitors straying off the designated paths would result in long-term minor beneficial impacts.	Construction activities, offset by less foot traffic through the dunes, would result in long-term minor beneficial impacts.	Construction and revegetation efforts would result in long-term minor beneficial impacts.
Threatened and Endangered Species	Visitors would continue to descend the bluff face potentially impacting species, resulting in long-term minor adverse impacts.	Fewer visitors would descend the bluff face, reducing the potential for damage or disturbance to species, resulting in long-term negligible beneficial impacts.	Fewer visitors would descend the bluff face, reducing the potential for damage or disturbance to species, resulting in long-term negligible beneficial impacts.	Fewer visitors would descend the bluff face, reducing the potential for damage or disturbance to species, resulting in long-term negligible beneficial impacts.
Park Facilities and Operations	Seasonal and routine management activities along with rescue operations would continue to result in long-term minor adverse impacts.	Seasonal and routine management activities, enforcing the enclosure, along with rescue operations would result in long-term moderate adverse impacts.	Improved facilities that work better with the bluff and dune environment along with a reduction in rescues would result in long-term moderate beneficial impacts.	Improved facilities that work better with the bluff and dune environment along with a reduction in rescues would result in long-term moderate beneficial impacts.
Visitor Use and Experience	The continued accumulated sand, visual intrusions, and injuries to visitors would result in long-term negligible adverse impacts.	The improvements in accessibility and to the viewshed would result in long-term negligible beneficial impacts.	The improvements in accessibility and to the viewshed would result in long-term moderate beneficial impacts.	The improvements in accessibility and to the viewshed would result in long-term moderate beneficial impacts.

Table 2-3: Project Objectives by Alternative

Issue or Concern	Alternative A	Alternative B	Alternative C	Alternative D (Preferred Alt.)
	No Action	Close Bluff Climbing Area with Barriers	Boardwalks to Overlook 9	Tunnels and Boardwalk to Overlook 9
Provide visitors access to the panoramic view of the natural environment with little visible visitor impact.	The Overlooks would remain in their existing locations with no changes to the panoramic views.	The Overlooks would remain in their existing locations with no changes to the panoramic views.	The Overlooks would remain in their existing locations with no changes to the panoramic views.	The Overlooks would remain in their existing locations with no changes to the panoramic views.
Provide visitors with a quality interpretive experience.	The quality of the experience is diminished due to accumulating sand and the visual intrusion in the viewshed.	The quality of the experience would be enhanced by the improvement to the viewshed as the eroding channel restores naturally.	The quality of the experience would be enhanced by the improvement to the viewshed as the eroding channel restores naturally.	The quality of the experience would be enhanced by the improvement to the viewshed as the eroding channel restores naturally.
Restore the site and reduce or eliminate future impacts from visitor use.	The site would continue to be impacted from visitors descending the bluff face.	The bluff face would be closed, reducing erosion and impacts from visitor use.	Visitors would be guided through the dunes to the overlook on a boardwalk to a platform - directing visitors away from the bluff face and reducing impacts.	Visitors would be guided through the dunes and to the overlook through a tunnel to a platform - directing visitors away from the bluff face, and reducing impacts.
Reduce or eliminate injuries to visitors on the bluff face.	This alternative would not reduce the occurrence of injuries.	Limiting access to the bluff face would reduce the occurrence of injuries.	Directing visitors away from the bluff face would reduce the occurrence of injuries.	Directing visitors away from the bluff face would reduce the occurrence of injuries.
Reduce or eliminate employee response costs.	Continuing the current management would not address this issue.	Directing visitors away from the bluff face would reduce the occurrence of injuries, thereby reducing the need for an employee rescue and/or response.	Directing visitors away from the bluff face would reduce the occurrence of injuries, thereby reducing the need for an employee rescue and/or response.	Directing visitors away from the bluff face would reduce the occurrence of injuries, thereby reducing the need for an employee rescue and/or response.
Reduce or eliminate injuries to maintenance employees.	Continuing the current management would not address this issue.	Continuing with the use of the seasonal boardwalks would not address this issue.	Injuries would be reduced because lifting and installing the boardwalks would not be required.	Injuries would be reduced because lifting and installing the boardwalks would not be required.
Reduce maintenance costs.	Continuing the current management would not address this issue.	Continuing the current management would not address this issue.	The elevated boardwalk would accumulate less sand, reducing maintenance costs.	The tunnel would accumulate less sand, reducing maintenance costs.

3.0 EXISTING CONDITIONS/AFFECTED ENVIRONMENT

3.1. GEOLOGY AND SOILS

Lake Michigan and much of the geomorphology in the Michigan Basin were largely formed from the last ice age. The glaciers scoured out the Lake Michigan basin, churning soil and crushing rock, as they made their advance down the continent. When the glaciers finally receded, about 12,000 years ago, they left behind thick accumulations of glacial moraine deposits (Drexler, 1975).

Dunes are formed by a unique combination of wind, water, and vegetation that move, sort and trap sand particles. Perched dunes are often small features on top of glacial moraines formed from sand blowing off bluff faces (Alliance for the Great Lakes, 2007). Winds lift sand up the slope, which is then collected in these dunes. A perched dune occurs at the Lake Michigan Overlooks 9 and 10, located approximately 450 feet above Lake Michigan. The source of sandy material at the perched dune at the Lake Michigan Overlooks is from wind action from the beach and also sand derived from morainic drift (Janes, 2006).

In the vicinity of the Lake Michigan Overlooks 9 and 10, the bluff slope from the perched dune to the beach below is 30 to 31 degrees, consisting of up to 90 percent sand, and some gravel and other material. As the wind blows the lighter sand material up and over the face of the bluff, the heavier gravel is left behind in what is called a gravel lag. This gravel lag acts as a protective barrier against the wind, slowing the movement of sand inland. Migration of sand is also slowed or stopped with the establishment of vegetation (Janes, 2006).

The bluffs at Sleeping Bear Dunes are measurably eroding and retreating. Waves wear away the base support of the bluff and sand and rocks from above slide down to the beach. From 1932 to 2002, the bluffs were reduced by a total of 83.5 feet, an average bluff erosion rate of 1.19 feet per year (Pranger). Since 2002, the park staff has measured a retreat rate at approximately one foot per year. The shallow waters offshore from the Lake Michigan overlooks seem to indicate that a peninsula once extended approximately two miles out into the lake. At one time, the overlook used to be inland, protected from the strong winds that come off the lake. As the waves wore back the peninsula, the site got closer to the lake. The resulting wind exposure produced an active dune environment.

Loss of the bluff face also occurs if the protection of the gravel lag is broken, causing fresh sand to be uncovered from foot travel, rainfall washing sediment down the bluff, and a potential collapse as the bluff recedes (Alexander 1984).

People visiting the Lake Michigan Overlooks 9 and 10 often descend the bluff face. This foot traffic down the bluff created an erosion channel scar on the bluff face and eroded material has collected at the bottom of the channel where sand and till has been deposited (Janes, 2006). This foot traffic is disrupting the protective gravel lag. Without protection from the gravel lag, the sand on the face of the bluff will erode at an accelerated rate

(Janes, 2006). The sand will then either slough down the bluff or will be blown up the bluff onto the existing boardwalks. This erosion channel scar also visually alters the bluff face. Restoration of the visual marring on the bluff face would take approximately 29 years if human foot traffic were to completely cease (Janes, 2006).

Damage to this area from foot traffic is not just limited to the bluff face. Visitors also hike along the eastern side of the boardwalk into the higher sections of the dunes. These higher areas are partially stabilized from the presence of vegetation. Foot traffic has destroyed some of the stabilizing dune grass and created gullies that pour loose sand onto the existing boardwalks (Janes, 2006). Another area threatened by foot traffic is the area around Overlooks 9 and 10, which now contains previously vegetated land that has become barren due to trampling (Janes, 2006). In addition to foot traffic, the annual installation of the boardwalk impacts the perched dune, as sand must be bulldozed each spring to open the path.

The soils in this area are identified as dune land, lake bluff, and Deer Park Sand (NRCS, 2007). Dune land consists of large active dunes along Lake Michigan with a surface layer of shifting sand (NRCS, 1973). Lake bluff has a soil material that is glacial till and consists of the very steep escarpments adjacent to Lake Michigan (NRCS, 1973). The Deer Park series consists of well-drained, gently sloping to very steep, sandy soils on dunes (NRCS, 1973).

The project lies within a designated critical dunes area, administered by the Michigan Department of Environmental Quality under Part 353, Sand Dunes Protection and Management.

3.2. ECOLOGICAL RESOURCES

3.2.1 Vegetation

The *Flora of Sleeping Bear* (Hazlett, 1991) provides data on existing vegetation conditions throughout the park. Sleeping Bear Dune's landforms, shaped by glacial movements and deposits, strongly influence the distribution of vegetative communities found throughout the park. Plant diversity and growth patterns are also influenced by the temperate climate caused by Lake Michigan. More than 900 species of vascular plants in more than 100 taxonomic families occur at Sleeping Bear Dune (NPS, 2002).

The landforms and characteristic plant life include beach and sand dunes, pine woodlands, oak and aspen woodlands, beech-maple (i.e., northern) hardwoods, cedar swamps, bogs, interdunal swales, aquatic zones, meadows, and the giant cedar forest on South Manitou Island.

Beaches and sand dunes are an ecosystem of harsh growing conditions characterized by strong winds, shifting sand, seasonally high surface temperatures and dry conditions. Vascular plants are not present on the beach because of the high waves, ice, and moving

sand. The dunes behind the beach support some pioneer plants. Heavier vegetation is present in the forested dunes.

The plants most commonly found in the sand dune community include beach grass, little bluestem grass, sand reedgrass, low juniper, sand cherry, beach pea, buffalo berry, red osier dogwood, smooth aster, Pitcher's thistle (a state of Michigan and Federally threatened species), and cottonwood trees. In some sites containing actively moving dunes, this zone encroaches directly onto the mature hardwood forest.

3.2.2 Threatened and Endangered Species

The Endangered Species Act of 1973 prohibits the harming of any species listed by the U.S. Fish and Wildlife Service (USFWS) as being either threatened or endangered. Harming such species includes not only directly injuring or killing them, but also disrupting the habitat on which they depend. Section 7 of the Act also requires federal agencies to consult with the USFWS when any activity permitted, funded, or conducted by that agency may affect a listed species or designated critical habitat, or is likely to jeopardize proposed species or adversely modify proposed critical habitat.

Three federally-listed species and 32 state-listed species have been documented in Sleeping Bear Dunes National Lakeshore. The federally threatened Pitcher's thistle (*Cirsium pitcheri*) has been found in the project area. The federally endangered piping plover (*Charadrius melodus*) has not been observed nesting in the immediate project area, but the project area lies within the USFWS-designated critical habitat, which follows much of the Lake Michigan shoreline inward 1640 feet. One state-listed threatened species, the Lake Huron locust (*Trimerotropis huroniana*) is often found in association with Pitcher's thistle; however, none have been observed in this location.

3.3 PARK FACILITIES AND OPERATIONS

In 1986 improvements to the Pierce Stocking Scenic Drive were completed. Included in the project, in this vicinity, were a paved parking area, paved walks, and newly-constructed Overlooks 9 and 10. Since that time, a variety of approaches have been used to provide access to these overlooks in a dynamic dune environment. Every spring brings a new set of conditions and the constant shifting sands create a major maintenance burden. Currently, in the spring, seasonal boardwalks are installed to provide access to Overlooks 9 and 10. Installation requires initial work with a bulldozer to bring the dune surrounding the concrete sidewalk down to a level so that the sidewalk and seasonal boardwalk meet at an acceptable slope. Following site preparation, the maintenance staff places each section of boardwalk with a forklift. Once the boardwalks are in place, maintenance staff must continually remove sand from the boardwalk surface. During the summer months, sand is removed by either sweeping with brooms or the boardwalk is temporarily moved and heavy machinery is used to sweep up the sand, depending on the amount of sand present. In the fall, the boardwalks are removed. During the installation and removal of the boardwalks, maintenance staff have sustained injuries. Due to the loose, rounded beach sand on the boardwalks and concrete sidewalk, the surfaces are

sometimes very slippery. This has caused maintenance worker injury while shoveling and placing the boardwalk and is a concern for visitor safety. Sand removal is the highest maintenance expense at the Lake Michigan Overlooks. Projected annual maintenance costs for each alternative are shown in the table in Appendix B.

The park staff is often required to rescue visitors from the bluff face. As visitors descend or ascend the bluff face, they often suffer from exhaustion or injuries from missteps or falls and need assistance. When this occurs, park staff or the local fire and rescue departments are called for assistance.

3.4 VISITOR USE AND EXPERIENCE

Sleeping Bear Dunes offers a variety of recreational opportunities. Visitors can enjoy hiking, bird watching, picnicking, swimming, camping, backpacking, scenic driving, and a number of other activities. Interpretive tours, hikes and programs are scheduled throughout the year. One of the most intensively used recreation areas is Pierce Stocking Scenic Drive, a 7.4 mile self-guided auto tour that provides visitors insight into the history of the area, a sample of vegetative communities, and overlooks of Glen Lake, the Sleeping Bear Dunes, Lake Michigan, and the Manitou Islands. Motorists are provided an interpretive brochure to guide them through several notable locations. Two picnic areas are available along the drive, at Picnic Mountain and North Bar Overlook.

The site where Overlooks 9 and 10 are located attracts over 200,000 people each year. These overlooks are situated in an area that allows visitors to view the fragile dune environment, Lake Michigan, and the Manitou Islands.

The site has a parking lot for 54 cars and 3 buses, and includes two vault toilets. A concrete sidewalk leads upslope to the bluff. A seasonal boardwalk is installed each spring and removed each fall, providing access from the concrete sidewalk to Overlooks 9 and 10. Overlooks 9 and 10 are wood platforms extending over the dune and slope. These overlooks provide panoramic views of the natural environment.

Visitors often hike up and down the bluff face, resulting in severe erosion. This diminishes the natural beauty of the area and the visitor experience. In addition, a number of visitors are injured on the bluff face each year. Consistently, more visitors are injured at this site than anywhere else in the Sleeping Bear Dunes.

4.0 ENVIRONMENTAL CONSEQUENCES

A determination of the probable consequences (or impacts) of each alternative on park resources was made in accordance with the National Environmental Policy Act (NEPA). The effects to historic resources are considered in accordance with the National Historic Preservation Act (NHPA). The analysis for each impact topic includes identification of impacts of the various actions comprising 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 effects as a result of implementing each alternative discussed in Section 2. The impact analyses were based on professional judgment using information provided by park staff, relevant references and technical literature citations, and subject matter experts. 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 alternative-associated changes on existing conditions. 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 (Council on Environmental Quality, 1978) regulations for implementing the National Environmental Policy Act 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 proposed action alternatives.

Cumulative effects were determined by combining the effects of the alternative with other past, present, and reasonably foreseeable future actions. Therefore, it was necessary to identify other past, ongoing, or reasonably foreseeable future actions at Sleeping Bear Dunes National Lakeshore and in the surrounding region. These other actions in conjunction with this project are intended to preserve and restore cultural resources and to improve visitor experience. These actions include:

Completed:

- M-22 from the Benzie/Leelanau county line (Manning Road) to the junction with M-72 northwest of Traverse City was designated as a Scenic Heritage Route. The Michigan Heritage Route Program, created by the Public Act 69 of 1993, is designed to identify, inventory, protect, enhance, and in some cases, promote state trunklines and adjacent land with distinctive or unique scenic, cultural, or historic

qualities. A Scenic Heritage Route is a state highway having outstanding natural beauty.

Ongoing/Future:

- The Leelanau Scenic Heritage Trailway from the Benzie/Leelanau county line to County Road 651. This non-motorized trail would be constructed adjacent to highways M-22 and M-109. The trail would provide pedestrians and bicyclist opportunities to safely travel adjacent to or near the highways, separate from vehicular traffic, and throughout Sleeping Bear Dunes National Lakeshore.
- Stabilize and rehabilitate buildings in Glen Haven Village Historic District. The primary goal of the project is to provide basic infrastructure upgrades within the Glen Haven Village to accommodate expanded interpretive and water-related recreational opportunities. The implementation of proposed improvements in the Glen Haven Village Historic District would allow visitors to park in one of several locations and safely walk to the various points of destination.
- Improvements to the Port Oneida Rural Historic District. These include creation of a new visitor contact station, rehabilitation and stabilization of selected historic structures, the stabilization of selected cultural landscapes, improved pedestrian and vehicular circulation, and the rehabilitation of an existing structure for employee housing.
- Replace the existing vault toilets at Overlooks 9 and 10 with flush toilets. This would involve construction of a septic field.

4.3 IMPAIRMENT OF PARK RESOURCES

National Park Service *Management Policies* (2006) requires analysis of potential effects to determine whether or not actions would impair park resources or values. The impairment that is prohibited by the Organic Act is an impact that “would harm the integrity of park resources or values, including opportunities that otherwise would be present for the enjoyment of those resources or values.” The determination as to whether an impact meets this definition of impairment depends on the following: the resource(s) affected; the severity, duration, and timing of the impact; the direct and indirect effects of the impact; and the cumulative effects of the impact in concert with other impacts.

An impact to any park resource may constitute impairment. An impact would be more likely to result in impairment if it affects 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 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.

A determination on impairment is included in the impact analysis section for all impact topics relating to park resources and values.

4.4 GEOLOGY AND SOILS

Intensity

- **Negligible:** Soils would not be affected or the effects to soils would be below or at the lower levels of detection. Any effects to soil productivity or fertility would be slight.
- **Minor:** The effects to soils would be detectable. Effects to soil productivity or fertility would be small, as would the area affected. If mitigation was 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 needed, extensive, and their success could not be guaranteed.

Duration

- **Short-term:** Recovers in less than 3 years.
- **Long-term:** Takes more than 3 years to recover.

Impacts of Alternative A: Continue Current Management (No Action)

The seasonal boardwalks are installed in the spring and removed in the fall. Installation requires initial work with a bulldozer to bring the dune surrounding the concrete sidewalk down to a level so that the sidewalk and seasonal boardwalk meet at an acceptable slope. Following site preparation, the maintenance staff places each section of the boardwalk with a forklift. Once the boardwalks are in place, maintenance staff must continually remove sand from the boardwalk surface. During the summer months, sand is removed by either sweeping with brooms or the boardwalk is temporarily moved and heavy machinery is used to remove the sand, depending on the amount of sand present.

Visitors to the site are creating an eroding trough on the bluff face. Eroded material has collected at the bottom of the trough where the sand and till gets deposited and has built up.

Implementation of the No Action Alternative would result in no new routine management activities at the overlooks. Machinery would continue to be used to grade the area prior to installation of the boardwalks. Sand would continue to accumulate on the boardwalks, requiring removal several times a week. Continuation with the current management activities would result in long-term moderate adverse impacts.

Cumulative effects. Other plans and actions occurring in the park that would impact geology or soils at the project site include the future project of installing new flush toilets. During construction, there would be temporary impacts as the septic field is excavated

and installed. This would result in short-term minor adverse impacts on geology and soils. The No Action Alternative in combination with these other actions would result in long-term minor adverse impacts.

Conclusions. Implementation of the No Action Alternative would result in long-term minor adverse impacts as a result of the constant removal of sand to maintain safe access to the overlooks and continued erosion of the bluff face.

Impairment. There would be no impairment of park resources or values.

Impacts of Alternative B: Close Bluff Climbing Area with Barrier

Implementation of Alternative B would require the same maintenance activities as under Alternative A. Machinery would continue to be used to grade the area, and boardwalks would still need to be installed and maintained. However, because the bluff face would be closed to climbing, visitors would not continue to erode the trough, and the face would be restored. Implementation of Alternative B would result in long-term minor adverse impacts.

Cumulative effects. Other plans and actions occurring in the park that would impact geology or soils at the project site include the future project of installing new flush toilets. During construction, there would be temporary impacts as the septic field is excavated and installed. This would result in short-term minor adverse impacts on geology and soils. Alternative B in combination with these other actions would result in long-term minor adverse impacts.

Conclusions. Implementation of Alternative B would result in long-term minor adverse impacts as a result of the annual grading of the site, the constant removal of sand to maintain safe access to the overlooks, countered by the lack of erosion on the bluff face due to closing the bluff to climbing.

Impairment. There would be no impairment of park resources or values.

Impacts of Alternative C: Boardwalks to Overlook 9 and New Path to Overlook 10 Using Trails, Steps, and Boardwalk

The initial portion of the boardwalk would be located in an area that is currently being disturbed by placement of seasonal boardwalks and foot traffic. The boardwalk would reach the bluff face and turn to the north. This second portion of the boardwalk would be constructed at the top of bluff face along the till line. This area is very stable and would result in minimal impacts as a result of construction.

A timber/wire railing would be used along the boardwalk and overlook platform. This railing would encourage visitors to stay on the designated path and the overlook platform, decreasing the number of visitors that descend the bluff face. Impacts to the bluff face would be minimized and the trough area could be restored.

The path through the woods, parallel to the road would cross through Deer Park sandy soils. The path would use a combination of steps and boardwalks to rise over the slope and then to cross the depression.

Construction would involve the use of equipment to drive pilings for the boardwalks and the overlook platform. These actions would temporarily disturb the soil during construction.

The use of equipment to construct the boardwalk and overlook would result in short-term minor adverse impacts.

Cumulative effects. Other plans and actions occurring in the park that would impact geology or soils at the project site include the future project of installing new flush toilets. During construction, there would be temporary impacts as the septic field is excavated and installed. This would result in short-term minor adverse impacts on geology and soils. Alternative C in combination with these other actions would result in long-term negligible adverse impacts.

Conclusions. Implementation of Alternative C would result in short-term minor adverse impacts as a result of the adverse construction impacts combined with a beneficial impact of reduced erosion of the bluff face.

Impairment. There would be no impairment of park resources or values.

Impacts of the Preferred Alternative (Alternative D): Tunnel with Reconstructed Overlook 9 and Trail to Overlook 10

The proposed tunnel would be constructed at a level grade from the starting point where the current concrete sidewalk ends. Construction and installation of the tunnel would require an open cut through the dune by: 1) excavating the dune and stockpiling the excavated soil; 2) constructing the overlook platform; 3) installing the corrugated metal tunnel sections; 4) backfilling the trench with stockpiled soil; and, 5) restoring the site to its natural shape and condition.

Temporary construction cut slopes would be at 1.5:1 to minimize the impact width of the cut. The impact width is based on tunnel depth and will be determined in final design. During construction there could be short-term erosion of surface soils before the site is backfilled and soil is revegetated. Soil erosion and sedimentation control methods employing seed free excelsior erosion blanket without netting or staples would be used to stabilize soils while preventing wildlife conflicts and incidental weed introduction. The site would be reseeded with native grasses. In the long-term, reseeded areas would result in equal or denser ground cover than presently occurs, stabilizing the site and minimizing erosion.

The tunnel would exit at a platform and then connect to a boardwalk that would lead to Overlook 9. The boardwalk would be constructed at the top of bluff face along the till line. This area is very stable and would result in minimal impacts as a result of

construction. Construction would involve the use of equipment to drive pilings for the boardwalk and the overlook platform. These actions would temporarily disturb the soil during construction.

As with Alternative C, a timber/wire railing would be used along the boardwalk and overlook platform encouraging visitors to stay on the designated path and the overlook platform. This would decrease the number of visitors that descend the bluff face. Impacts to the bluff face would be minimized and the trough area could be restored.

The path to Overlook 10 would be constructed with minimal impacts, using cable posts/sand ladders where needed.

As a result of the soil exposure and excavation, Alternative D would result in short-term minor adverse impacts.

Cumulative effects. Other plans and actions occurring in the park that would impact geology or soils at the project site include the future project of installing new flush toilets. During construction, there would be temporary impacts as the septic field is excavated and installed. This would result in short-term minor adverse impacts on geology and soils. Alternative D in combination with these other actions would result in long-term negligible adverse impacts.

Conclusions. Implementation of Alternative D would result in short-term minor adverse impacts to soils and geology as a result of soil exposure and excavation combined with the beneficial impact of reduced erosion on the bluff face.

Impairment. There would be no impairment of park resources or values.

4.5 VEGETATION

Intensity

- **Negligible:** 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 some 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 affect a relatively large area in and out of the park. Mitigation measures to offset the adverse effects

would be required, extensive, and 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 less than two years.

Impacts of Alternative A: Continue Current Management (No Action)

Minimal vegetation exists along the boardwalks. The maintenance activities associated with the boardwalks are confined to the sandy areas that lack vegetation. However, visitors to the site are straying off the boardwalks, hiking on the eastern side of the boardwalks into the higher, vegetated section of the dunes. This foot traffic has trampled and destroyed some of the grass that serves to stabilize the dunes and impedes the establishment of vegetation that would slow erosion and sand migration.

The No Action Alternative results in long-term minor adverse impacts to vegetation.

Cumulative effects. Other plans and actions occurring in the park that would potentially impact vegetation within the project site include the future project of installing flush toilets. Depending on the location of the septic field, there could be temporary impacts during construction. Overall, these actions would result in short-term minor adverse impacts to vegetation. The No Action Alternative in combination with these actions would result in long-term minor adverse impacts to vegetation.

Conclusions. Under Alternative A, No Action, there would be long-term minor adverse impacts to vegetation as a result of foot traffic trampling of the dune grasses and preventing plant establishment as well as the potential for introduction of invasive species.

Impairment. There would be no impairment of park resources or values.

Impacts of Alternative B: Close Bluff Climbing Area with Barrier

The new barrier across the bluff face would be in a location that is devoid of vegetation. Since the bluff face has very little vegetation due to its dynamic nature, reducing foot traffic would have negligible impacts on vegetation on the bluff face.

Visitors also leave the boardwalk to the east into areas that are partially stabilized and vegetated. This foot traffic has destroyed some of the dune grass that serves to stabilize the dunes. Additional signage and barriers could be constructed to close areas currently being impacted by off-trail activity on top of the dune.

As with Alternative A, this alternative would continue with the existing maintenance activities. These activities associated with the boardwalks are confined to the sandy areas that lack vegetation.

Alternative B would result in long-term minor beneficial impacts to vegetation as a result of reduced foot traffic off the boardwalks to create new trails and trampling vegetation.

Cumulative effects. Other plans and actions occurring in the park that would potentially impact vegetation within the project site include the future project of installing flush toilets. Depending on the location of the septic field, there could be temporary impacts during construction. Overall, these actions would result in short-term minor adverse impacts to vegetation. Alternative B in combination with these other actions would result in long-term negligible beneficial impacts to vegetation.

Conclusions. Implementation of Alternative B would result in long-term minor beneficial impacts to vegetation as a result of reducing the number of visitors straying off the boardwalks to create new trails, which results in trampled vegetation.

Impairment. There would be no impairment of park resources or values.

Impacts of Alternative C: Boardwalks to Overlook 9 and New Path to Overlook 10 Using Trails, Steps, and Boardwalk

The switchback section of the boardwalk from the parking lot to the new overlook platform would be located through an area with some vegetation and mature trees. The section of the boardwalk from the new overlook platform to Overlook 9 would be located in an area that is currently being disturbed from foot traffic and then along the bluff face, both of which lack vegetation. Construction would involve the use of piledriving equipment for the boardwalk and the overlook platform. Only the initial section of the boardwalk would impact vegetation and mature trees. The exact location of the switchbacks would be determined during final design with the intent to minimize impacts to trees and vegetation.

Handrails along the boardwalk would also serve to direct visitors to the overlook and would discourage them from descending the bluff face. Since the bluff face has very little vegetation due to its dynamic nature, reducing foot traffic there would have negligible impacts.

Visitors also leave the boardwalk to the east into areas that are partially stabilized and vegetated. This foot traffic has destroyed some of the dune grass that serves to stabilize the dunes. Because no path is proposed between the new Overlook 9 and existing Overlook 10, foot traffic in this area would be reduced. This would prevent additional damage to the dune grass and allow these areas to be revegetated.

The path through the woods would parallel the road and then use a combination of steps and boardwalks to rise over the slope and then to cross the depression. During construction, there would be temporary impacts to vegetation. The areas disturbed by construction would be restored and replanted. The area of disturbance would be planted with native grasses and shrubs.

Under Alternative C the negative impacts from constructing the boardwalks and the path to Overlook 10 would be countered by the beneficial effects of minimizing foot traffic in the partially stabilized areas. This would result in long-term minor beneficial impacts due to reestablishment of vegetation.

Cumulative effects. Other plans and actions occurring in the park that would potentially impact vegetation within the project site include the future project of installing flush toilets. Depending on the location of the septic field, there could be temporary impacts during construction. Overall, these actions would result in short-term minor adverse impacts to vegetation. Alternative C in combination with these other actions would result in long-term negligible beneficial impacts to vegetation.

Conclusions. Implementation of Alternative C would result in long-term minor beneficial impacts to vegetation as a result of the short-term negative impacts of constructing the boardwalks combined with the long term beneficial impacts of revegetation.

Impacts of the Preferred Alternative (Alternative D): Tunnel with Reconstructed Overlook 9 and Trail to Overlook 10

Installation and construction of a tunnel to Overlook 9 would require excavation and the use of construction equipment. The tunnel would impact minimal vegetation because most of the proposed area has been previously disturbed by the installation of the seasonal boardwalks and foot traffic. The vegetation in the undisturbed portions of this area is predominately dune grass.

Soil erosion and sedimentation control methods employing seed free erosion blanket would be used to stabilize soils while preventing wildlife conflicts and incidental weed introduction. The areas disturbed by excavation would be restored and replanted. The area of disturbance would be planted with native grasses and shrubs.

Like the boardwalk in Alternative C, the tunnel would direct visitors to the overlook while discouraging them from descending the bluff face. Since the bluff face has very little vegetation due to its dynamic nature, reducing foot traffic there would have negligible impacts.

Visitors also leave the boardwalk to the east into areas that are partially stabilized and vegetated. This foot traffic has destroyed some of the dune grass that serves to stabilize the dunes. Because no path is proposed between the new Overlook 9 and existing Overlook 10, foot traffic in this area would be reduced. This would prevent additional damage to the dune grass and allow these areas to be revegetated.

The access path to the existing Overlook 10 would use cable/post and sand ladders as needed to delineate the trail. Sand ladders allow vegetation to grow up through the rungs. If visitors stray from the sand ladders into previously undisturbed areas, this could result in additional impacts to vegetation. Signs could be posted to encourage visitors to stay on the marked paths.

Under Alternative D the negative impacts from constructing the tunnel and boardwalks would be countered by the beneficial effects of minimizing foot traffic in the partially stabilized areas. This would result in long-term minor beneficial impacts due to reestablishment of vegetation.

Cumulative effects. Other plans and actions occurring in the park that would potentially impact vegetation within the project site include the future project of installing flush toilets. Depending on the location of the septic field, there could be temporary impacts during construction. Overall, these actions would result in short-term minor adverse impacts to vegetation. Alternative D in combination with these other actions would result in long-term negligible beneficial impacts to vegetation.

Conclusions. Implementation of Alternative D would result in long-term minor beneficial impacts to vegetation as a result of the short term negative impacts of constructing the tunnel combined with the long term beneficial impacts of revegetation.

Impairment. There would be no impairment of park resources or values.

4.6 THREATENED AND ENDANGERED SPECIES

Intensity

- **Negligible:** Rare, threatened, or endangered species would not be affected or the effects would be at or below the level of detection and would not be measurable or of perceptible consequence to these species.
- **Minor:** Effect on rare, threatened, or endangered species or habitats would be measurable or perceptible, but localized within a small area. While the mortality of individual 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 park. Extensive mitigation would be needed to offset adverse effects, and the success of mitigation measures could not be assured.

Duration

- **Short-term:** Effects lasting less than 2 years.
- **Long-term:** Effects lasting longer than 2 years.

Impacts of Alternative A: Continue Current Management (No Action)

Under the No Action Alternative, the park would continue with the current management activities occurring at Overlooks 9 and 10. A single specimen of Pitcher's thistle has been identified on the bluff face, near Overlook 9. The U.S. Fish and Wildlife Service has

designated critical habitat for the piping plover along the shorelines within the Sleeping Bear Dunes, including the area at the base of the bluff near Overlooks 9 and 10. Foot traffic down the bluff face would continue to threaten both species. Visitors could potentially trample Pitcher's thistle during their descent or ascent of the bluff face. Once visitors descend the bluff, they often walk the beach. Piping plovers create nests by forming a depression in the sand within the high beach close to the dunes. Foot traffic may crush nests or young. Excessive disturbance may cause parents to desert the nest (USFWS, 2007). Access to the bluff face is not currently restricted. The sign posted at the top of the bluff discourages visitors from descending the bluff, but does not forbid this action.

Under the No Action Alternative, visitors would continue to descend the bluff face resulting in long-term minor adverse impacts.

Cumulative effects. The other plans and actions occurring in the park would not impact threatened and endangered species within the project site. It is assumed that all efforts would be made to avoid impacts to threatened and endangered species; therefore, there would be no cumulative impacts to threatened and endangered species.

Conclusions. Under the No Action Alternative visitors would continue to descend the bluff face, potentially damaging individual Pitcher's thistle plants or impacting piping plover populations. This would result in long-term minor adverse impacts.

Impairment. There would be no impairment of park resources or values.

Impacts of Alternative B: Close Bluff Climbing Area with Barrier

The new barrier would be located across the bluff face and additional signage and barriers would be constructed to close areas adjacent to the trail that are being impacted by foot traffic. As with Alternative A, this alternative would continue with the existing maintenance activities. These activities associated with the boardwalks are confined to the sandy areas that lack vegetation.

The barriers and signage would reduce the potential for damage or disturbance to either Pitcher's thistle or piping plover populations. This would result in long-term negligible beneficial impacts to threatened and endangered species.

Cumulative effects. The other plans and actions occurring in the park would not impact threatened and endangered species within the project site. It is assumed that all efforts would be made to avoid impacts to threatened and endangered species; therefore, there would be no cumulative impacts to threatened and endangered species.

Conclusions. Reducing foot traffic on the bluff face, shoreline, and areas adjacent to the boardwalk would result in long-term negligible beneficial impacts.

Impairment. There would be no impairment of park resources or values.

Impacts of Alternative C: Boardwalks to Overlook 9 and New Path to Overlook 10 Using Trails, Steps, and Boardwalk

The boardwalk would be located in an area that is currently being disturbed from seasonal boardwalks and foot traffic and then along the bluff face. Construction equipment would be used, however, minimal vegetation would be impacted because the site is currently disturbed, lacks vegetation, and no excavation would be required.

Handrails along the boardwalk would serve to direct visitors to the overlook and discourage them from descending the bluff face or straying into partially stabilized areas. Foot traffic has created an eroding channel scar on the bluff face and eroded material has been deposited at the bottom. The vegetation that typically grows along the shore is absent in this location. Reducing foot traffic off the boardwalk would allow the project area to be revegetated and Pitcher's thistle habitat to recover.

The path through the woods would parallel the road and then use a combination of steps and boardwalks to rise over the slope and then to cross the depression. During construction, there would be temporary impacts to vegetation. The areas disturbed by construction would be restored and replanted. The area of disturbance would be planted with native grasses and shrubs.

Under Alternative C the negative impacts from constructing the boardwalks and the path to Overlook 10 would be countered by the beneficial effects of minimizing foot traffic down the bluff face to the shoreline, and along the partially stabilized areas adjacent to the existing boardwalk. This reduction in foot traffic would reduce the damage or disturbance to either Pitcher's thistle or piping plover populations. This would result in long-term negligible beneficial impacts to threatened and endangered species.

Cumulative effects. The other plans and actions occurring in the park would not impact threatened and endangered species within the project site. It is assumed that all efforts would be made to avoid impacts to threatened and endangered species; therefore, there would be no cumulative impacts to threatened and endangered species.

Conclusions. Reducing foot traffic on the bluff face, shoreline, and areas adjacent to the boardwalk would result in long-term negligible beneficial impacts to threatened and endangered species.

Impairment. There would be no impairment of park resources or values.

Impacts of the Preferred Alternative (Alternative D): Tunnel with Reconstructed Overlook 9 and Trail to Overlook 10

The tunnel to Overlook 9 would be constructed in an area that has been previously disturbed. The tunnel would direct visitors from the parking lot to the overlook and would discourage climbing on the bluff face. The access path to the existing Overlook 10 would use cable/post and sand ladders as needed to delineate the trail.

Reducing foot traffic on the bluff face, shoreline, and areas adjacent to the boardwalk would reduce damage to Pitcher's thistle and piping plover populations. Alternative D would result in long-term negligible beneficial impacts to threatened and endangered species.

Cumulative effects. The other plans and actions occurring in the park would not impact threatened and endangered species within the project site. It is assumed that all efforts would be made to avoid impacts to threatened and endangered species; therefore, there would be no cumulative impacts to threatened and endangered species.

Conclusions. Implementation of Alternative D would reduce foot traffic on the bluff face, shoreline, and areas adjacent to the boardwalk, resulting in long-term negligible beneficial impacts to threatened and endangered species.

Impairment. There would be no impairment of park resources or values.

4.7 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 was 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 of Alternative A: Continue Current Management (No Action)

Under the No Action Alternative, the park would continue with the current management activities occurring at Overlooks 9 and 10. Ongoing routine management activities include the installation of seasonal boardwalks in the spring and their removal in the fall. Installation requires initial work with a bulldozer to bring the dune surrounding the concrete sidewalk down to a level so that the sidewalk and boardwalk meet at an

acceptable slope. Following site preparation, maintenance staff places each section of boardwalk. Once the boardwalks are in place, maintenance staff must continually remove accumulated sand from the boardwalk surface. Depending on the amount of sand present, sand is removed by: 1) sweeping with brooms, or 2) temporarily moving the boardwalk and using heavy machinery to sweep up the sand. During the installation, maintenance, and removal of the boardwalks, maintenance staff have sustained injuries. Sand removal is the highest maintenance expense for the Lake Michigan overlooks.

Under this alternative, visitors would continue to be enticed to descend the bluff face. Descents and ascents result in injuries to visitors that frequently require rescue operations from the Sleeping Bear Dunes staff or from local fire and rescue departments.

Implementation of the No Action Alternative would not result in new routine management activities at Overlooks 9 and 10. The maintenance staff would continue to install and remove the seasonal boardwalks and sand removal would continue on a routine basis. Maintenance staff would continue to be at risk for injuries, and rescue operations would continue at the current levels.

The No Action Alternative would result in long-term minor adverse impacts on park operations and maintenance.

Cumulative effects. Implementing future improvements throughout Sleeping Bear Dunes National Lakeshore would result in new management activities. Assuming that there are no additions in staff, this would increase the demand placed on existing park staff. The improvements in Glen Haven Village Historic District would result in increased management activities as a result of the increase in facilities. Implementing improvements in the Port Oneida Rural Historic District would result in increased management activities as a result of the field restoration and stabilization activities and increased facilities. These other actions combined would result in long-term minor adverse impacts on park operations and maintenance. Implementation of the No Action Alternative in combination with these other activities would result in long-term moderate adverse impacts on park operations.

Conclusions. Implementing the No Action Alternative would result in long-term minor adverse impacts on park operations and maintenance as a result of continuing with the current level of management at the overlooks and periodic visitor rescues.

Impairment. There would be no impairment of park resources or values.

Impacts of Alternative B: Close Bluff Climbing Area with Barrier

Closing the bluff climbing area would require enforcement by park staff. Barriers and signs would be installed to inform visitors of the closure. As a result of fewer visitors descending the bluff face, fewer rescues would be required by Sleeping Bear Dunes staff and the local fire and rescue department. However, the area would need to be staffed during busy days and weekends in order to ensure that the visitors do not attempt to descend the bluff.

As with Alternative A, the park would continue with the current management activities occurring at Overlooks 9 and 10. These activities are described in detail in the previous section for Alternative A.

Implementation of the Alternative B would result in new staffing demands as park employees would be needed to enforce the closure at the bluff. In addition, the maintenance staff would continue to install and remove the seasonal boardwalks and sand removal would continue on a routine basis. Maintenance staff would continue to be at risk for injuries.

Alternative B would result in long-term moderate adverse impacts on park operations and maintenance.

Cumulative effects. Implementing future improvements throughout Sleeping Bear Dunes National Lakeshore would result in new management activities. Assuming that there are no additions in staff, this would increase the demand placed on existing park staff. Improvements in the Glen Haven Village Historic District would result in increased management activities as a result of the increase in facilities. Implementing improvements in the Port Oneida Rural Historic District would result in increased management activities as a result of the field restoration and stabilization activities and increased facilities. These other actions combined would result in long-term minor adverse impacts. Implementation of Alternative B in combination with these other activities would result in long-term moderate adverse impacts on park operations.

Conclusions. Alternative B would increase the demand of park staff through requiring park staff to be present at the bluff to enforce the new closure. Routine maintenance would continue to occur for the temporary boardwalk throughout the summer season. This would result in long-term moderate adverse impacts on park facilities and operations.

Impairment. There would be no impairment of park resources or values.

Impacts of Alternative C: Boardwalks to Overlook 9 and New Path to Overlook 10 Using Trails, Steps, and Boardwalk

Alternative C would involve the installation and construction of a permanent boardwalk to the new relocated Overlook 9. A new path to Overlook 10 would be constructed through the woods, starting at the northern end of the parking lot. The level of maintenance required for this alternative would be decreased compared to Alternative A. The sand ladders could be maintained on a weekly basis by one or two maintenance staff without the use of heavy equipment. The sand ladders would be installed in the spring and removed in the fall with minimal effort and no heavy equipment.

Blowing sand would predominately move and shift below the elevated boardwalks, reducing the need for sand removal maintenance activities. However, over time sand

would accumulate on and around the boardwalk, requiring periodic removal and maintenance, but at a frequency much less than that which occurs currently.

Railings along the boardwalk and overlook would discourage climbing on the bluff face. In addition, no path north of Overlook 9 would be provided. As a result of fewer visitors descending the bluff face, fewer rescues would be required by Sleeping Bear Dunes staff and the local fire and rescue departments.

Alternative C would result in long-term moderate beneficial impacts on park facilities and operations.

Cumulative effects. Implementing future improvements throughout Sleeping Bear Dunes National Lakeshore would result in new management activities. Assuming that there are no additions in staff, this would increase the demand placed on existing park staff. Improvements in the Glen Haven Village Historic District would result in increased management activities as a result of the increase in facilities. Implementing improvements in the Port Oneida Rural Historic District would result in increased management activities as a result of the field restoration and stabilization activities and increased facilities. These other actions combined would result in long-term minor adverse impacts. Implementation of Alternative C in combination with these other activities would result in long-term negligible beneficial impacts on park operations.

Conclusions. Alternative C would decrease the demand of park staff through improved facilities that are more compatible with the bluff and dune environment, including the use of elevated boardwalks and the use of sand ladders that are easier to maintain than the seasonal boardwalks, and would reduce the number of rescues. This would result in long-term moderate beneficial impacts on park facilities and operations.

Impairment. There would be no impairment of park resources or values.

Impacts of the Preferred Alternative (Alternative D): Tunnel with Reconstructed Overlook 9 and Trail to Overlook 10

Under this alternative, a pedestrian tunnel would be constructed through the dunes to a relocated Overlook 9. The tunnel would direct visitors from the parking lot to the overlook and would discourage visitors from climbing on the bluff face.

A new path to Overlook 10 would be constructed through the woods, starting at the northern end of the parking lot. The path would ascend the slope using steps with minimal earthwork. The path would use boardwalks and cable/post and sand ladders as needed to delineate the trail.

The level of maintenance required for this alternative would be less compared to Alternatives A and B. The sand ladders could be maintained on a weekly basis by one or two maintenance staff without the use of heavy equipment. The sand ladders would be installed in the spring and removed in the fall with minimal effort and no heavy equipment.

Because the tunnel would replace the seasonal boardwalks, sand removal activities would be minimized. It is anticipated that occasionally sand would need to be removed from Overlook 9 or from the entrance to the tunnel. The frequency of sand removal would be significantly less than under the No Action Alternative.

The tunnel along with the railings along the overlook would discourage climbing on the bluff face. As a result of fewer visitors descending the bluff face, fewer rescues would be required by Sleeping Bear Dunes staff and the local fire and rescue departments.

Alternative D would result in long-term moderate beneficial impacts on park facilities and operations.

Cumulative effects. Implementing future improvements throughout Sleeping Bear Dunes National Lakeshore would result in new management activities. Assuming that there are no additions in staff, this would increase the demand placed on existing park staff. Improvements in the Glen Haven Village Historic District would result in increased management activities as a result of the increase in facilities. Implementing improvements in the Port Oneida Rural Historic District would result in increased management activities as a result of the field restoration and stabilization activities and increased facilities. These other actions combined would result in long-term minor adverse impacts. Implementation of the Alternative D in combination with these other activities would result in long-term negligible beneficial impacts on park operations.

Conclusions. Alternative D would decrease the demand of park staff through improved facilities that are more compatible with the bluff and dune environment including a new tunnel, boardwalks, and sand ladders that are easier to maintain, and discourage climbing on the bluff face that would reduce the number of rescues. This would result in long-term moderate beneficial impacts on park facilities and operations.

Impairment. There would be no impairment of park resources or values.

4.8 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:** Occurs only during proposed implementation activities.
- **Long-term:** Occurs after proposed implementation activities.

Impacts of Alternative A: Continue Current Management (No Action)

Under Alternative A, the overlooks would be maintained in their existing conditions. The seasonal boardwalks are installed in the spring and removed in the fall. During the summer months, sand accumulates on the boardwalks and maintenance staff must continually remove the sand. The accumulated sand can make walking and maneuvering wheelchairs on the boardwalks difficult.

Visitors to the overlooks often descend the bluff face. This foot traffic has created an eroding channel scar on the bluff face. This erosion has impacted the dune habitat and creates a visual intrusion in the viewshed. Despite signs discouraging visitors from descending toward the lake, many frequently descend the bluff. Unfortunately, many of these visitors are injured either during the descent due to missteps or falls or during the ascent from overheating or exhaustion. Rescue operations by park staff or local fire and rescue crews are often required to assist these visitors.

The visitor use experience is adversely impacted from the accumulating sand, the visual intrusion in the viewshed, and the injuries incurred from descending the bluff face. Continuation with the current management activities, Alternative A, would result in long-term minor adverse impacts.

Cumulative effects. Other plans and actions occurring in the park that would impact visitors at the project site would be the installation of flush toilets. Although there would be a temporary disruption to visitors during construction, the new flush toilets would improve the visitor facilities at the project site. The creation of the Leelanau Scenic Heritage Trailway would potentially improve accessibility to Pierce Stocking Scenic Drive for bicyclists and pedestrians. These actions combined would result in long-term minor beneficial impacts to the visitor experience. Alternative A in combination with these other actions would result in long-term negligible adverse impacts to visitor use and experience.

Conclusions. Implementation of the No Action Alternative would result in long-term minor adverse impacts to visitor use and experience.

Impairment. There would be no impairment of park resources or values.

Impacts of Alternative B: Close Bluff Climbing Area with Barrier

As with Alternative A, visitors would reach Overlooks 9 and 10 via existing sidewalks and the seasonal boardwalks. Overlooks 9 and 10 would remain in their existing locations

and the spectacular views from these locations would not change. However, this alternative would use signage and barriers to close the bluff. Some visitors to the overlooks enjoy descending the bluff face, but visitors would no longer be allowed to descend the steep bluff.

Over time, the viewshed would improve as the eroding channel would be restored naturally. This beneficial effect would be countered by the negative effect to the visitor experience for those that will be disappointed with not being allowed to descend the bluff. As a result, Alternative B would result in long-term negligible beneficial impacts to visitor use and experience.

Cumulative effects. Other plans and actions occurring in the park that would impact visitors at the project site would be the installation of flush toilets. Although there would be a temporary disruption to visitors during construction, the new flush toilets would improve the visitor facilities at the project site. The creation of the Leelanau Scenic Heritage Trailway would potentially improve accessibility to Pierce Stocking Scenic Drive for bicyclists and pedestrians. These actions combined would result in long-term minor beneficial impacts to the visitor experience. Alternative B in combination with these other actions would result in long-term minor beneficial impacts to visitor use and experience.

Conclusions. Implementation of Alternative B would result in long-term negligible beneficial impacts to visitor use and experience as a result of improved visitor access, safety, and an improved viewshed, which is countered by the closing of the bluff.

Impairment. There would be no impairment of park resources or values.

Impacts of Alternative C: Boardwalks to Overlook 9 and New Path to Overlook 10 Using Trails, Steps, and Boardwalk

The new boardwalk leading to Overlook 9 would be elevated, allowing less sand to accumulate on the boardwalks, improving visitor access and safety. In order for visitors to access the existing Overlook 10, they would follow a new path through the woods that would use steps and cable/post and sand ladders as needed to delineate the trail.

Alternative C would still provide the same spectacular views of the Sleeping Bear Dunes, Lake Michigan, and the Manitou Islands as the existing conditions. These views would still be accessible by most visitors by using the newly constructed boardwalk. Over time, the viewshed would improve as the eroding channel would be restored naturally.

Visitors would no longer walk directly from Overlook 9 to Overlook 10. A new experience would be offered, having visitors follow the new path through the woods starting at the northern end of the parking lot. This new path would be more strenuous, climbing up and over the terminal dune utilizing steps. Overlook 10 would remain in its existing location and would still provide the same spectacular views. The experience would be further changed for some visitors that enjoy descending the bluff face, but would find it more difficult to do so.

As a result, Alternative C would result in long-term moderate beneficial impacts to visitor use and experience.

Cumulative effects. Other plans and actions occurring in the park that would impact visitors at the project site would be the installation of flush toilets. Although there would be a temporary disruption to visitors during construction, the new flush toilets would improve the visitor facilities at the project site. The creation of the Leelanau Scenic Heritage Trailway would potentially improve accessibility to Pierce Stocking Scenic Drive for bicyclists and pedestrians. These actions combined would result in long-term minor beneficial impacts to the visitor experience. Alternative C in combination with these other actions would result in long-term moderate beneficial impacts to visitor use and experience.

Conclusions. Implementation of Alternative C would result in long-term moderate beneficial impacts to visitor use and experience as a result of improved visitor access, safety, and an improved viewshed.

Impairment. There would be no impairment of park resources or values.

Impacts of the Preferred Alternative (Alternative D): Tunnel with Reconstructed Overlook 9 and Trail to Overlook 10

The pedestrian tunnel would lead to a new platform, then on to Overlook 9 via a raised boardwalk. Views from this new platform would not be as panoramic as from Overlook 9, but would still offer a breathtaking experience of stepping out roughly 450 feet above Lake Michigan. Visitor safety would improve as sand would not accumulate in the tunnel, eliminating the slipping hazard.

Alternative D would provide the same spectacular views of the Sleeping Bear Dunes, Lake Michigan, and the Manitou Islands as the existing conditions. These views would still be accessible to most visitors by using the newly constructed tunnel and boardwalks. Over time, the viewshed would improve as the eroding channel would be restored naturally.

Visitors would no longer walk directly from Overlook 9 to Overlook 10. A new experience would be offered, having visitors follow the new path through the woods starting at the northern end of the parking lot. This new path would be more strenuous, climbing up and over the terminal dune using sand ladders. Overlook 10 would remain in its existing location and would still provide the same spectacular views. The experience would be further changed for some visitors that enjoy descending the bluff face, but would find it more difficult to do so. As a result, Alternative D would result in long-term moderate beneficial impacts to visitor use and experience.

Cumulative effects. Other plans and actions occurring in the park that would impact visitors at the project site would be the installation of flush toilets. Although there would be a temporary disruption to visitors during construction, the new flush toilets would improve the visitor facilities at the project site. The creation of the Leelanau Scenic

Heritage Trailway would potentially improve accessibility to Pierce Stocking Scenic Drive for bicyclists and pedestrians. These actions combined would result in long-term minor beneficial impacts to the visitor experience. Alternative D in combination with these other actions would result in long-term moderate beneficial impacts to visitor use and experience.

Conclusions. Alternative D would result in long-term moderate beneficial impacts to visitor use and experience as a result of improved visitor access, safety, and an improved viewshed.

Impairment. There would be no impairment of park resources or values.

5.0 CONSULTATION AND COORDINATION

5.1 EARLY COORDINATION

Coordination and public participation was initiated early in this project. Public participation began with scoping letters that were sent in November 2006 and information that was posted on the National Park Service (NPS) Planning, Environment, and Public Comment (PEPC) website. Letters were sent to associated Indian tribes, resource and regulatory agencies, MDOT, interest groups, and the public. A copy of the scoping letter and a comprehensive mailing list is included in Appendix A.

The following tribes have demonstrated interest in Sleeping Bear Dunes National Lakeshore and were sent letters:

- Bay Mills Indian Community
- Grand Traverse Band of Ottawa and Chippewa Indians
- Little River Band of Ottawa Indians
- Little Traverse Bay Band of Odawa Indians
- Sault St. Marie Tribe of Chippewa Indians

A total of eleven comments were received, two from agencies and nine from the general public. Each of the parties contacted during the scoping process will have an opportunity to review the environmental assessment.

5.2 PUBLIC PARTICIPATION

A public meeting for this project is planned for summer 2009. The purpose of the public meeting is to provide the general public with information regarding the study purpose and need, alternatives considered, and the recommended alternative. Input from this meeting will be used to obtain comments and refine study information assembled to date.

5.3 LIST OF PREPARERS

The following people assisted with preparation of this document.

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<u>PREPARERS</u>			
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Dan Kriber	COTR	SLBE	Planning & Design

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Appendix A

Letters and Other Coordination Documentation



United States Department of the Interior

NATIONAL PARK SERVICE
Sleeping Bear Dunes National Lakeshore
9922 Front St. (Hwy M-72)
Empire, Michigan 49630-9797

IN REPLY REFER TO:

November 15, 2006

L76(SLBE)

Dear Friends:

The National Park Service (NPS) has begun the process of planning for improvements to the Lake Michigan Overlooks 9 and 10 on the Pierce Stocking Scenic Drive in Sleeping Bear Dunes National Lakeshore. Pierce Stocking Scenic Drive is a 7.4 mile self-guided auto tour that provides visitors insight into the history of the area, a sample of vegetative communities, and overlooks of Glen Lake, the Sleeping Bear Dunes, and Lake Michigan. This highly-visited site attracts over 200,000 people each year. These overlooks are situated in an area that allows visitor to view the fragile dune environment, Lake Michigan, and the Manitou Islands.

The perched dune bluff at this location is roughly 450 feet above Lake Michigan. The path from the parking area to the overlooks takes visitors directly across the top of the bluff face, and despite signs discouraging visitors from descending toward Lake Michigan, many do so. Many of these visitors are injured either during the descent, due to missteps or falls, or during the ascent, from heat injuries or exhaustion. The intense foot traffic in this location has caused considerable erosion of the dune face. Finally, maintaining the current configuration of the path and overlooks is becoming prohibitively difficult and expensive because of the blowing and shifting sand.

The NPS will be preparing an environmental assessment (EA) that will identify and evaluate a range of alternatives for improvements to these overlooks. The goal is to implement a sustainable method of providing visitors with safer access to these spectacular vistas, while also reducing maintenance costs and impacts to the dunes. We would like your ideas on how to best provide this important visitor opportunity and yet still preserve the natural resources of the area. We also need your input on what impacts and issues we should to consider as we plan how to achieve these goals. We request that you provide your comments to us by **December 31, 2006**. The comments you submit during this "scoping" phase of planning will be incorporated into the range of alternatives and impact analyses in the EA. The EA will be made available for further public review and comment, scheduled for release in summer 2007, when we will again solicit your input. Comments may be mailed to the National Lakeshore at the above address or electronically through a link on the park's website (www.nps.gov/slbe).

Sincerely,

Dusty Shultz
Superintendent



National Park Service
U.S. Department of the Interior

Sleeping Bear Dunes
National Lakeshore

9922 Front Street
Empire, Michigan 49630

231-326-5134 phone
231-326-5382 fax

Sleeping Bear Dunes National Lakeshore News Release

For Immediate Release
Michael Duwe
(231) 326-5134
November 16, 2006

Sleeping Bear Dunes National Lakeshore Announces Planning for Improvements to the Lake Michigan Overlooks on the Pierce Stocking Scenic Drive

EMPIRE, MI - Superintendent Dusty Shultz announced today that the National Park Service has begun planning for improvements to the Lake Michigan Overlooks 9 and 10 on the Pierce Stocking Scenic Drive in Sleeping Bear Dunes National Lakeshore.

Pierce Stocking Scenic Drive is a 7.4 mile self-guided auto tour that provides visitors insight into the history of the area, a sample of vegetative communities, and overlooks of Glen Lake, the Sleeping Bear Dunes, and Lake Michigan. This highly-visited site attracts over 200,000 people each year. These overlooks are situated in an area that allows visitor to view the fragile dune environment, Lake Michigan, and the Manitou Islands.

The perched dune bluff at this location is roughly 450 feet above Lake Michigan. The path from the parking area to the overlooks takes visitors directly across the top of the bluff face, and many visitors descend toward Lake Michigan. Some of these visitors are injured either during the descent, due to missteps or falls, or during the ascent, from heat injuries or exhaustion. The intense foot traffic in this location has caused considerable erosion of the dune face. Also, maintaining the current configuration of the path and overlooks is becoming prohibitively difficult and expensive because of the blowing and shifting sand.

The National Park Service will be preparing an environmental assessment (EA) that will identify and evaluate a range of alternatives for improvements to these overlooks. The goal is to implement a sustainable method of providing visitors with safer access to these spectacular vistas, while also reducing maintenance costs and impacts to the dunes. Superintendent Shultz would like your ideas on how to best provide this important visitor opportunity and yet still preserve the natural resources of the area. She also needs public input on what impacts and issues should be considered as we plan how to achieve these goals. Comments should be provided to the National Lakeshore by **December 31, 2006**. The comments submitted during this "scoping" phase of planning will be incorporated into the range of alternatives and impact analyses in the EA. The EA will be made available for further public review and comment,

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The National Park Service cares for special places saved by the American people so that all may experience our heritage.

[REDACTED]

scheduled for release in summer 2007, when the National Lakeshore will again solicit your input. Comments may be mailed to the National Lakeshore at Superintendent, 9922 Front Street, Empire, MI 49630 or electronically through a link on the park's website (www.nps.gov/slbe). For more information call (231) 326-5134.

-NPS/SLBE-

Dune overlook upgrades eyed

Park improvements are planned along Pierce Stocking Dr.

The National Park Service has begun planning for improvements to two Lake Michigan overlooks on the Pierce Stocking Scenic Drive in the Sleeping Bear Dunes National Lakeshore and is seeking public input before the end of 2006.

The 7.4-mile drive allows more than 200,000 visitors per year to take self-guided vehicle tours of an area overlooking Glen Lake, the Sleeping Bear Dunes and Lake Michigan.

According to a news release from the National Park Service, a perched dune bluff some 450 feet above Lake Michigan, at overlooks 9 and 10 on the drive, has been subjected to con-

siderable erosion on the dune face due to foot traffic. Some visitors have been injured while descending the dune due to missteps or falls, or from heat injuries or exhaustion while ascending the dune.

"Also, maintaining the current configuration of the path and overlooks is becoming prohibitively difficult and expensive because of the blowing and shifting sand," according to Sleeping Bear Dunes superintendent Dusty Shultz.

She said the National Park Service will prepare an environmental assessment that will identify and evaluate a range of alternatives for improvement to the two overlooks.

"The goal is to implement a sustainable method of providing visitors with safer access to these spectacular vistas, while also reducing maintenance costs and impacts to the dunes," Shultz said.

The National Park Service is currently seeking public input on what impacts and issues should be considered as it works to achieve its goals, Shultz said.

Comments should be submitted to the National Lakeshore by Dec. 31, 2006. Comments may be mailed to the National Lakeshore superintendent's office at 9922 Front Street, Empire, MI 49630, or electronically through the park's website at www.nps.gov/slbe.

Shultz said that comments submitted during the "scoping" phase of planning will be incorporated into a range of alternatives to be presented and analyzed in an environmental assessment. The assessment will be made available for further public review and comment when it is released in the summer of 2007.

For more information, call the Lakeshore headquarters at 326-5134.

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Overlooks to get a look-over

BY CHRISTINE FINGER
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EMPIRE — Officials at Sleeping Bear Dunes National Lakeshore want input on potential changes at two of the park's most stunning scenic overlooks.

A perched dune bluff that sits about 450 feet above Lake Michigan is home to overlooks No. 9 and No. 10 on the Pierce Stocking Scenic Drive.

A boardwalk path from the parking area leads visitors across the top of the bluff face, and many visitors climb down the steep bluff despite posted warnings.

That foot traffic puts visitor safety and the fragile dune environment at risk, said Michael Duwe, an environmental specialist at Sleeping Bear. Maintaining the current boardwalk path is also becoming difficult and expensive because of blowing and shifting sand.

An environmental assessment by the National Park Service will examine potential improvements.

"It's something that we've been concerned about for years and years," Duwe said. "This is the first step in the process."

Jeannette Feeheley, president of Citizens for Access to the Lakeshore, said the group hadn't yet received notice of the pending environmental assessment but would examine the impact of any possible changes.

"We'd still want the overlooks there," she said. "We'd have to wait and see what they're



Record-Eagle/Tyler Sipe
Michael Duwe, an environmental specialist at Sleeping Bear Dunes, looks over damage caused by shifting sands and visitors' foot traffic.

proposing.”

Duwe said maintaining public access will be part of any final solution.

“We're not looking at anything that would close that site,” he said. “But we need to do something.”

Comments for the “scoping” phase of planning should be submitted to the park by Dec. 31. The input will be incorporated into the environmental assessment that will be available for public review and additional comments in summer 2007.

Citizens for Access formed in 2002 in response to plans unveiled that year that called for much of the park to become “wilderness,” or revert back to nature. Members continued to monitor and respond to any actions by the National Park Service that could diminish public access where it is not necessary to protect Lakeshore resources.

The group is participating in the renewed effort by the NPS to develop a general management plan and wilderness study for Sleeping Bear. A draft of that plan should be completed in the spring of 2008.

Public comments about the scenic overlooks should be mailed to park Superintendent Dusty Shultz, 9922 Front St., Empire, Mich., 49630, or submitted online at www.nps.gov/slbe.

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Erosion near Dunes overlooks a concern

Visitors to Sleeping Bear Dunes National Lakeshore love the view of dunes and water from Pierce Stocking Drive.

It's a view they're loving to death.

The National Park Service is studying how to keep visitors on trails and off dune hills near overlooks 9 and 10, which are accessed off Pierce Stocking Trail. Erosion has cut a deep trench off Overlook 9, and the Park Service is concerned more will follow.

"It's pretty inviting to them," said Sleeping Bear superintendent Dusty Shultz of the visitors who can't help but climb over the bank and run down the open face of a dune.

At this point Lakeshore officials have taken one option off the table: They are not considering closing access to the overlooks.

"We consider that area to be the icon of the park," said Shultz. "At this point we're thinking we need to find a better way to get visitors out there so everyone can enjoy that sight."

Overlooks 9 and 10 are the most popular stops along Pierce Stocking Drive, a looped, narrow road that starts and ends from M-109 between Empire and Glen Haven. It's generally near the top of the list of "must see" places in Leelanau County, and requires a Na-

tional Park vehicle pass to access. While not considered handicapped accessible, Shultz said some hardy visitors have gotten their wheelchairs up the trail.

Regardless of how access is gained, views along the trail keep visitors coming back.

From a parking lot on Pierce Stocking Drive, visitors are beckoned 250 feet along a trail that leads to Overlook No. 9, which offers views of Lake Michigan and North and South Manitou islands. A little farther along the trail is Overlook No. 10, which takes in Lake Michigan while also providing views of big and little Glen Lake.

The Park Service installed fencing to discourage side trips and retard erosion only to have sand bury the fence. Patrons paid little attention anyway, walking on through and down the dune.

The area is open to foot traffic, so the Park Service does not issue tickets for dune travelers.

Shultz said no consideration has been given to banning foot traffic on the dunes. She expects a draft environmental report to be released in late spring or early summer outlining options for containing erosion. Public meetings will be held later in the summer, and eventually a policy will be adopted and published.

Appendix B

Annual Maintenance Costs

ANNUAL MAINTENANCE COSTS*
LAKE MICHIGAN OVERLOOKS ALTERNATIVES
SLEEPING BEAR DUNES NATIONAL LAKESHORE

ALTERNATIVE	COST	ITEM
No Action (Alternative A)	\$10,000	Labor costs only @400 staff hours (no fuel, vehicles, supplies/materials or heavy equipment costs included), an average of past six years. Includes: <ul style="list-style-type: none"> • sand removal (for installation and daily maintenance) • placement of 1320 feet of boardwalk (spring) and removal (fall) by heavy equipment • minor overlook repairs (#9 and #10,100 feet) • minor boardwalk repairs
Total Cost	\$10,000	
Alternative B	\$10,000	Labor costs only @400 staff hours (no fuel, vehicles, supplies/materials or heavy equipment costs included), an average of past six years. Includes: <ul style="list-style-type: none"> • sand removal (for installation and daily maintenance) • placement of 1320 feet of boardwalk (spring) and removal (fall) by heavy equipment • minor overlook repairs (#9 and #10,100 feet) • minor boardwalk repairs
	\$2,100	Maintain barriers/fence (300 feet)
	\$20,000	(2) seasonals @ 3 months, law enforcement
Total Cost	\$32,100	
Alternative C	\$7,700	Maintenance on raised boardwalk to #9 overlook (sand removal, boardwalk repairs (1100 feet)
	\$300	Maintenance on path to #10 overlook (300 feet)
	\$500	Maintenance on steps to #10 overlook
	\$1,400	Maintenance on raised boardwalk to #10 overlook (200 feet)
	\$2,800	Maintenance on sand ladders (400 feet)
Total Cost	\$12,700	
Alternative D (Preferred Alternative)	\$2,800	Maintenance on Tunnel, new overlook and raised boardwalk to overlook #9 (400 feet)
	\$1,200	Maintannce on path to #10 overlook (1,200 feet)
Total Cost	\$4,000	

*Construction of a new #9 overlook is assumed in all alternatives.

** Maintenance costs for boardwalks in all action alternatives are based on current no action costs of \$7 foot.

*** Maintenance costs for paths estimated at \$1 foot.

**** All maintenance costs above are labor only.