National Park Service
U.S. Department of the Interior

Gulf Islands National Seashore
Florida

Environmental Assessment to Improve Barrier Island Habitat and Visitor Access at Perdido Key / Johnson Beach Area

June 2016

This page is intentionally left blank

Environmental Assessment to Improve Barrier Island Habitat and Visitor Access at Perdido Key / Johnson Beach Area
GULF ISLANDS NATIONAL SEASHORE

June 2016

The National Park Service (NPS) at Gulf Islands National Seashore has prepared this environmental assessment to analyze the effects of altering visitor access at the Perdido Key / Johnson Beach Area, located in Florida. The purpose of the project is to improve barrier island habitat and improve visitor access and safety along Johnson Beach Road. This document has been prepared in accordance with the National Environmental Policy Act of 1969 (NEPA); regulations of the Council on Environmental Quality (CEQ) (40 CFR 1500-1508); and NPS Director's Order #12: *Conservation Planning, Environmental Impact Analysis, and Decision-Making* and accompanying National Park Service National NEPA Handbook (2015).

Four alternatives were analyzed for meeting the objectives of the plan:

Alternative 1, No Action / Continue Current Management: Alternative 1 represents a continuation of the existing situation. The Perdido Key and the Rosamond Johnson Beach area would continue to be managed to offer convenient and easy access to recreational beaches for sunbathing, swimming, surfing, strolling, surf fishing, and sand castle play. There would continue to be one entry lane and fee both into the Perdido Key / Johnson Beach Area of Gulf Islands National Seashore and parking would continue to be available both in the main visitor facility parking lot (323 spaces) and along a 1.2-mile stretch of Johnson Beach Road (up to 185 parked cars have been observed on a busy summer day, though there is the potential for additional spaces pending road conditions)). Public access to the beaches would continue to be provided by eleven existing dune crossovers.

Alternative 2: Under alternative 2, visitors would be able to park in one of two locations at either end of the drivable portion of Johnson Beach Road. This alternative would concentrate visitor access to these two locations and allow for greater dune habitat protection along the remainder of the Johnson Beach Road corridor. Public access to the beaches would be provided by six newly constructed, elevated dune crossovers.

Alternative 3, the Alternative Preferred by the National Park Service: Under alternative 3, visitors would be able to park in one of four locations along the drivable portion of Johnson Beach Road. This alternative would concentrate the greatest visitor access to lots at either end of the drivable portion of Johnson Beach Road and two smaller lots in between. Concentrating parking to these areas would allow for greater dune habitat protection between the parking lots along the Johnson Beach Road corridor while still allowing for visitor access along the road. Public access to the beaches would be provided by nine newly constructed, elevated dune crossovers.

Alternative 4: Under alternative 4, visitors would be able to park in one of eight locations along the drivable portion of Johnson Beach Road. This alternative would spread visitor access across the road corridor in smaller, but more numerous parking lots. Although more spread out, concentrating parking to these areas would allow for dune habitat protection between the parking lots along the Johnson Beach Road corridor. Public access to the beaches would be provided by 12 newly constructed, elevated dune crossovers.

PUBLIC COMMENT

If you wish to comment on the environmental assessment, you may mail comments to the name and address below or post comments online at http://parkplanning.nps.gov/guis. This environmental assessment will be on public review for 30 days. Before including your address, phone number, e-mail address, or other personal identifying information in your comment, you should be aware that your entire comment – including your personal identifying information – may be made publicly available at any time. Although you can ask us in your comment to withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so.

Please address written comments to:

Dan Brown, Superintendent
Gulf Islands National Seashore
Attn: Perdido Key / Johnson Beach EA
1801 Gulf Breeze Parkway
Gulf Breeze, FL 32563

CONTENTS

1.0 CHAPTER 1: PURPOSE AND NEED FOR ACTION 1

1.1 INTRODUCTION 1

1.2 PURPOSE OF AND NEED FOR ACTION 2

1.3 GOALS AND OBJECTIVES 2

1.4 STUDY AREA DESCRIPTION 2

1.5 SIGNIFICANCE OF GULF ISLANDS NATIONAL SEASHORE 3

1.6 PLANNING ISSUES AND IMPACT TOPICS 7
1.6.1 Planning Issues 7
1.6.2 Impact Topics Retained for Analysis 7
1.6.3 Impact Topics Dismissed from Further Analysis 8

2.0 CHAPTER 2: ALTERNATIVES 13

2.1 ALTERNATIVES DEVELOPMENT 13

2.2 ALTERNATIVE 1: NO ACTION / CONTINUE CURRENT MANAGEMENT 13
2.2.1 Parking / Road Configuration 13
2.2.2 Visitor Access and Circulation 18

2.3 ELEMENTS COMMON TO ALL ACTION ALTERNATIVES 18
2.3.1 Habitat Protection Measures 18
2.3.2 Parking / Road Configuration 18
2.3.3 Visitor Access and Circulation 20

2.4 ALTERNATIVE 2 20
2.4.1 Parking / Road Configuration 20
2.4.2 Visitor Access and Circulation 20
2.4.3 Habitat Improved and Reclaimed 20

2.5 ALTERNATIVE 3, THE ALTERNATIVE PREFERRED BY THE NATIONAL PARK SERVICE 26
2.5.1 Parking / Road Configuration 26
2.5.2 Visitor Access and Circulation 26

2.6 ALTERNATIVE 4 30
2.6.1 Parking / Road Configuration 30
2.6.2 Visitor Access and Circulation 30

2.7 MITIGATION MEASURES 34
2.7.1 General Measures 34
2.7.2 Natural Resources 34
2.7.3 Proposed Species – Specific Conservation Measures 34

2.8 ALTERNATIVES AND ACTIONS CONSIDERED BUT DISMISSED FROM FURTHER ANALYSIS 37
2.8.1 Converting All of Johnson Beach Road to a Multiuse Trail 37
2.8.2 Use of a Shuttle Bus 38

2.9 COMPARISON OF THE ALTERNATIVES 38

3.0 CHAPTER 3: AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES 42

3.1 GENERAL METHODS FOR ANALYZING IMPACTS 42
3.1.1 Geographic Area Evaluated for Impacts 42
3.1.2 Methods and Assumptions 42
3.1.3 Type of Impact 42
3.1.4 Cumulative Impact Analysis Methods 43

3.2 FLOODPLAINS 45
3.2.1 Affected Environment 45
3.2.2 Impacts of Alternative 1: No Action / Continue Current Management 50
3.2.3 Impacts of Alternative 2 53
3.2.4 Impacts of Alternative 3 53

3.2.5 Impacts of Alternative 4 55

3.3 VEGETATION 57
3.3.1 Affected Environment 57
3.3.2 Impacts of Alternative 1: No Action / Continue Current Management 58
3.3.3 Impacts of Alternative 2 60
3.3.4 Impacts of Alternative 3 62
3.3.5 Impacts of Alternative 4 63

3.4 SPECIAL STATUS SPECIES AND WILDLIFE 66
3.4.1 Affected Environment 66
3.4.2 Impacts of Alternative 1: No Action / Continue Current Management 73
3.4.3 Impacts of Alternative 2 74
3.4.4 Impacts of Alternative 3 77
3.4.5 Impacts of Alternative 4 79

3.5 SOILS AND SEDIMENTS 82
3.5.1 Affected Environment 82
3.5.2 Impacts of Alternative 1: No Action / Continue Current Management 83
3.5.3 Impacts of Alternative 2 85
3.5.4 Impacts of Alternative 3 86
3.5.5 Impacts of Alternative 4 88

3.6 VISITOR USE AND EXPERIENCE AND RECREATION RESOURCES (INCLUDING PUBLIC HEALTH AND SAFETY) 91
3.6.1 Affected Environment 91
3.6.2 Impacts of Alternative 1: No Action / Continue Current Management 94
3.6.3 Impacts of Alternative 2 96
3.6.4 Impacts of Alternative 3 99
3.6.5 Impacts of Alternative 4 101

4.0 CHAPTER 4: CONSULTATION AND COORDINATION 104

4.1 BRIEF HISTORY OF PLANNING AND PUBLIC INVOLVEMENT 104
4.1.1 Internal Scoping 104
4.1.2 Public Scoping 104

4.2 AGENCY CONSULTATION 105
4.2.1 Agency Involvement 105
4.2.2 Tribal Involvement 107

4.3 LIST OF PREPARERS AND CONTRIBUTORS 108

4.4 PUBLIC REVIEW 108

5.0 REFERENCES 110

5.1 BIBLIOGRAPHY 110

5.2 APPENDIX A: FLOODPLAINS STATEMENT OF FINDINGS 114

5.3 APPENDIX B: COASTAL ZONE MANAGEMENT ACT CONSISTENCY DETERMINATION FOR THE ALTERNATIVE PREFERRED BY THE NATIONAL PARK SERVICE 130

5.4 APPENDIX C: RELEVANT CORRESPONDENCE 148

FIGURES

FIGURE 1: GULF ISLANDS NATIONAL SEASHORE PERDIDO KEY AREA 5

FIGURE 2: ALTERNATIVE 1, NO ACTION / CONTINUE CURRENT MANAGEMENT 15

FIGURE 3: ENTRANCE LANE CONFIGURATION UNDER ALTERNATIVE 1: NO ACTION / CONTINUE CURRENT MANAGEMENT 17

FIGURE 4: ALTERNATIVE 2 23

FIGURE 5: ENTRANCE LANE EXPANSION UNDER ALL ACTION ALTERNATIVES 25

FIGURE 6: ALTERNATIVE 3, THE ALTERNATIVE PREFERRED BY THE NATIONAL PARK SERVICE 28

FIGURE 7: ALTERNATIVE 4 32

FIGURE 8: COMPARISON DEPICTION OF ALL ALTERNATIVES 40

FIGURE 9: FLOODPLAIN MAP 48

FIGURE 10: TOTAL ANNUAL RECREATION VISITORS AT GULF ISLANDS NATIONAL SEASHORE (1973-PRESENT) 92

TABLES

TABLE 1: LIST OF MIGRATORY BIRD SPECIES THAT POTENTIALLY OCCUR AT PERDIDO KEY / JOHNSON BEACH AREA 67

TABLE 2: LIST OF FEDERALLY PROTECTED SPECIES THAT POTENTIALLY OCCUR AT PERDIDO KEY / JOHNSON BEACH AREA. 68

TABLE 3: LIST OF PREPARERS AND CONTRIBUTORS 108

1.0 CHAPTER 1: PURPOSE AND NEED FOR ACTION

1.1 INTRODUCTION

The National Park Service (NPS) is planning to improve barrier island habitat and visitor access at the Perdido Key / Johnson Beach Area. Johnson Beach, located within the Perdido Key Area of Gulf Islands National Seashore, consists of a 2.3-mile paved road beginning at the west boundary and ending at a turnaround. An entrance station is located just inside the west boundary to collect fees and distribute visitor information. The main visitor use facility is located approximately 0.3 miles inside the national seashore and contains 323 vehicle parking spaces. Up to 185 parked cars have been observed along the 1.2-mile stretch of Johnson Beach Road, not including the easternmost half mile. Many visitors use this parking for access to the beach. Natural dune migration is occurring across Perdido Key, pushing sands from the Gulf of Mexico side across the road and towards the Big Lagoon side. These shifting sands encroach upon the asphalt surface of the road, narrowing the driving surface. While the NPS routinely plows and maintains the road surface, the road shoulders are frequently inundated with sand and roadside-parked vehicles are obstructing the driving lanes and creating safety concerns. Other areas of the national seashore, including Santa Rosa and Fort Pickens, have converted roadside parking areas to parking lots.

A total of 11 dune crossovers were constructed in 2001 to provide visitor access to the beaches. These dune crossovers protect the sand dune vegetation, primary habitat for the Perdido Key beach mouse, a state and federally listed endangered species. While many beach goers do use the dune crossovers, others continue to cut through the dunes, creating trails and damaging habitat. Since 2001, natural dune migration has engulfed several of the dune crossovers rendering them unusable. As a result, multiple foot trails have developed through sensitive barrier island habitat. The entrance to the national seashore portion of Perdido Key consists of a single lane and fee booth. During the peak summer season, wait times to enter have increased and traffic has been backing up towards Perdido Key Drive. The NPS proposes to improve and reclaim barrier island habitat of the Perdido Key Area of Gulf Island National Seashore to protect sensitive species and preserve natural functions of the barrier island while improving visitor access and safety along Johnson Beach Road. This is proposed to be accomplished by:

- Replacing roadside parking with off-road fenced parking areas with direct access to Gulf and Sound beaches via upgraded higher dune crossovers;
- Repaving the road surface and adding a second entrance lane;
- Converting the last half mile to a multiuse bike and pedestrian path; and
- Adding parking spots and two new boardwalks at the main parking lot.

This environmental assessment evaluates four alternatives; a no-action alternative (alternative 1) and three action alternatives (alternatives 2, 3, and 4). The environmental assessment further analyzes the potential impacts these alternatives would have on the natural and human environment. This environmental assessment has been prepared in accordance with the requirements of the National Environmental Policy Act of 1969, as amended and its implementing regulations (40 CFR 1500-1508), and NPS Director's Order #12, *Conservation Planning, Environmental Impact Analysis, and Decision-Making* NPS 2011) and accompanying DO-12 Handbook (2015).

1.2 PURPOSE OF AND NEED FOR ACTION

The purpose of the project is to improve barrier island habitat and improve visitor access and safety along Johnson Beach Road.

The proposed project is needed for the following reasons:

- Currently, visitors are parking along the narrow shoulder creating safety concerns by partially blocking the travel corridor. This safety concern is heightened by the limited space for motorists, pedestrians, and bicyclists to maneuver around each other.
- Roadside parking widens the footprint of the road corridor and area to be maintained.
- While dune crossovers provide visitor access from the road to the beach, not all visitors use dune crossovers and several of the crossovers have been impacted by naturally occurring dune migration and shifting sands rendering some of them unusable.
- Because visitors have been walking through the adjacent dunes, valuable dune habitat along the road corridor has been threatened.
- Wait times at the entrance station have grown and there is a need to reduce wait times to enter the Perdido Key portion of the national seashore.
- Protection of the dune ecosystem is necessary to preserve the natural functions of the barrier island to provide habitat for numerous wildlife species including the Perdido Key Beach mouse and other special status species.

1.3 GOALS AND OBJECTIVES

Goals and objectives identified for this project include the following:

- Improve access and safety along Johnson Beach Road for visitors, including motorists, pedestrians, and bicyclists.
- Improve and protect sensitive habitat along the road corridor in order to protect sensitive species and preserve the natural functions of the barrier island.

1.4 STUDY AREA DESCRIPTION

Gulf Islands National Seashore was established by the U.S. Congress on January 8, 1971. As part of the national park system, the national seashore encompasses barrier islands and coastal mainland in Mississippi and Florida and comprises 12 separate areas stretching along 160 miles from Cat Island in Mississippi to the eastern end of Santa Rosa Island in the northwest section of Florida's panhandle. The national seashore was set aside for the purpose of preserving areas possessing outstanding natural, historic, and recreational values for public use and enjoyment. The current authorized acreage of the national seashore is 139,175 acres. The Florida District of the national seashore includes areas on Santa Rosa Island, Perdido Key, and mainland areas in Pensacola and Gulf Breeze (see figure 1). The Perdido Key Area of the park is located southwest of Pensacola, Florida and offers recreational opportunities like swimming, boating, fishing, hiking, and primitive camping.

1.5 SIGNIFICANCE OF GULF ISLANDS NATIONAL SEASHORE

As outlined in the park's recent general management plan (NPS 2014), Gulf Islands National Seashore is nationally significant because:

- In contrast to the surrounding urban development of the northern Gulf Coast, Gulf Islands National Seashore possesses a rare combination of recreational, educational, and scenic opportunities on publicly accessible natural coastal areas.
- Gulf Islands National Seashore preserves and protects the natural processes of an extensive range and variety of terrestrial and marine ecosystems within a very dynamic and rapidly changing landscape of the northern Gulf Coast.
- Represented by Horn and Petit Bois islands, Gulf Islands National Seashore preserves one of the few nationally designated barrier island wilderness areas in the national park system.
- Gulf Islands National Seashore contains one of the most complete collections of structures relating to the evolution of seacoast defense in the United States. Publicly accessible sites represent a continuum of development from the Spanish colonization of the 18th century through World War II.
- The terrestrial and submerged cultural resources located throughout Gulf Islands National Seashore represent a continuum of human occupation and use that is important in enhancing the knowledge of past habitation along the northern Gulf Coast.

This page is intentionally left blank

Figure 1: Gulf Islands National Seashore Perdido Key Area

This page intentionally left blank.

1.6 PLANNING ISSUES AND IMPACT TOPICS

1.6.1 PLANNING ISSUES

During public scoping and the initial phases of the proposed project, the NPS identified critical issues that could affect project development. These issues describe environmental problems or relationships between a resource or national seashore function and an action. Together with the purpose and need, these issues guided the development of the conceptual design alternatives. Preliminary issues identified include the following:

- Wildlife habitat concerns:
- Concerns over disturbance to critical habitat for the Perdido Key Beach mouse and habitat for piping plovers.
- Concern over beach dune wildlife and vegetative communities.
- Visitor use and experience concerns:
- Concerns over public access to the beaches.
- NPS management and maintenance at Perdido Key – Public scoping expressed a desire for increased enforcement along and maintenance of Johnson Beach Road.

1.6.2 IMPACT TOPICS RETAINED FOR ANALYSIS

Impact topics are resources of concern that could be affected by the range of alternatives presented in this environmental assessment. The topics were identified during scoping and agency consultation, as described in "Chapter 4: Consultation and Coordination."

Impact topics identified and analyzed in this environmental assessment are listed below along with reasons for their selection. Each impact topic is further discussed in detail in "Chapter 3: Affected Environment and Environmental Consequences."

Floodplains. According to Federal Emergency Management Agency (FEMA) flood insurance rate maps (community panel numbers 12033C0516 G and 12033C0517 G), the entirety of Perdido Key falls within the 100-year floodplain. The proposed alternatives are located within a coastal flood zone with velocity hazard from wave action. This area is a special flood hazard area subject to inundation by the 1% annual chance flood. Proposed actions include placement of infrastructure within the 100-year floodplain that could cause impacts. Therefore, this impact topic was retained for analysis. Also, a statement of findings has been prepared in accordance with Executive Order 11988 (Floodplain Management), NPS Director's Order #77-2, and Floodplain Management and Procedural Manual #77-2 and is provided in appendix A.

Vegetation. 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 (NPS 2006). While Perdido Key is sparsely vegetated, the dune grass vegetation provides essential habitat for several species and some actions proposed in this environmental assessment could require clearing of existing vegetation. Construction activity could also damage some vegetation, or compress soils that would in turn affect vegetation. Vegetation is also currently impacted by visitors walking through the dune habitat and the proposed actions should reduce

this impact. Therefore, vegetation is addressed as an impact topic in this environmental assessment.

Special Status Species and Wildlife. Perdido Key offers habitat for a variety of species, including the Perdido Key Beach mouse, piping plover, snowy plover, least tern, black skimmer, and a number of sea turtles. A number of wildlife and habitat concerns were voiced during public scoping, including the need to address the impacts to habitat for piping plover and critical habitat for the Perdido Key Beach mouse.

A range of alternatives were developed to address these concerns and maintenance objectives for the park. Alternatives developed would consider replacing roadside parking with various options for new parking lot configurations. Implementing the alternatives would cause temporary disturbance or displacement of wildlife during construction activity and would permanently remove some critical habitat for the Perdido Key Beach mouse while improving habitat quality along the road over the long-term. Because of the potential to impact wildlife and special status species, this impact topic was retained for further assessment.

Soils and Sediments. Natural dune migration is occurring across Perdido Key, pushing sands from the Gulf of Mexico side across the road to the Big Lagoon side. Many of the actions proposed in this environmental assessment would involve limited ground-disturbing activity. There is the potential for soil erosion associated with this activity and for changing soils and sediment conditions in the vicinity of construction activity. Proposed site activities would not alter geologic features; however, surface disturbance could occur under some of the alternatives. Therefore, soils and sediment were retained as an impact topic for analysis.

Visitor Use and Experience and Recreation Resources (Including Public Health and Safety). The Perdido Key / Johnson Beach Area currently serves several different user groups, including beach goers, campers, picnickers, and boaters. Implementation of the proposed actions and changes to the parking configuration could affect public safety, access, and the visitor experience at this area of the national seashore. Relocation of visitor parking could increase the walking distance for some visitors depending on what area of the national seashore they are trying to access. There would be potential safety concerns for people crossing and/or walking along the road, which could affect the potential for accidents and/or collisions. Temporary closures during construction could affect visitors. Therefore, visitor use and experience is addressed as an impact topic in this environmental assessment.

1.6.3 IMPACT TOPICS DISMISSED FROM FURTHER ANALYSIS

Impact topics were dismissed from further evaluation either because the resource does not occur in the area or because implementing the alternatives would have only slight impacts on the resource or value.

Coastal Processes. Coastal processes at Perdido Key are defined by its barrier island dynamics and changing coastline. Coastal processes involve the interaction of water, land, and air through waves/currents, sand, and wind. Coastal processes on either side of the barrier island are different. The ocean shoreline of Perdido Key experiences a longshore transport system and high-energy waves. The bay side shoreline is a lower energy system where circulation patterns and currents within the coastal bays are dependent on proximity to the inlets and wind conditions. Because proposed actions would not occur along the edge of the ocean shoreline or the bay side shoreline, there would be no noticeable impact on coastal shoreline processes.

Therefore, this impact topic was dismissed from further analysis. Other processes that involve sediment movement across the barrier island are discussed under other impact topics.

Wetlands. There are no wetlands within the proposed project area. Should any wetlands be identified within the vicinity of the project, they would be avoided during any construction activity and a buffer would be established to protect them from construction related impacts during the short term construction timeframe. The National Park Service would comply with the provisions of Executive Order 11990 (Protection of Wetlands) and NPS Director's Order #77-1. Since no wetlands have been identified within the project vicinity, this impact topic was dismissed from further consideration.

Ecologically Critical Areas or Other Unique Natural Resources. The proposed action and alternatives being considered would not affect any designated ecologically critical areas, wild and scenic rivers, or other unique natural resources, as referenced in the Wild and Scenic Rivers Act, NPS *Management Policies 2006*, 40 *Code of Federal Regulations* [CFR] 1508.27, or the 62 criteria for national natural landmarks. Coastal resources are addressed under floodplains and special status species and wildlife. In addition, information regarding the coastal zone consistency determination would be included in a decision document. Therefore, the topic was not retained for further analysis.

Marine or Estuarine Resources. Proposed actions would be conducted on upland environments of the national seashore and appropriate buffers and setbacks would be designated and avoided by construction equipment in compliance with protection of estuarine resources in Florida. Best management practices would be conducted during construction activities to prevent any damage to estuarine resources by personnel, vehicles, or use. Best management practices would be implemented to avoid and minimize potential impacts to water quality and hydrology. Impacts to marine or estuarine resources would be negligible and this impact topic was dismissed from further analysis.

Water Quality. Construction activity during implementation of the project would result in ground disturbing activity and the associated potential for soil erosion and storm water runoff. Best management practices would be implemented to avoid and minimize potential impacts to water quality and hydrology. Aquatic resources in the nearby Big Lagoon and Gulf of Mexico would not be adversely impacted because erosion and sediment control measures and best management practices would be used to address runoff. The National Park Service would coordinate with the Florida Department of Environment with regard to any permit requirements to address storm water. Any impacts to water quality would be expected to be negligible; therefore, this impact topic was not further addressed.

Cultural Resources. In the early 20th century, Pensacola's black community continued to prosper despite segregation and "Jim Crow" laws imposed at the end of the Reconstruction Era. Segregation extended to the beaches. While Pensacola Beach was "whites only," Rosamond Johnson Beach, within Perdido Key, was one of the few beaches open to African-Americans. Private Rosamond Johnson, Jr. was killed on July 26, 1950 during the Korean Conflict. He carried two wounded men to safety under enemy fire and was killed going back for a third. He was the first African-American from the Pensacola area to be killed in that conflict. The beach was named as a memorial to him (NPS 2015 African American History Website). Despite this history, no historic structures, cultural landscapes, or archaeological resources were identified through archival research or surveys in the project area. An archeological survey was conducted from January 19-22, 2016 for the Perdido Key/Johnson Beach Area. Results indicated there are no cultural resources listed on, or eligible for, inclusion in the National Register of Historic

Places; there are no cultural landscapes; nor are there any known ethnographic resources located within the study area. The archeological survey recommended archaeological monitoring for the proposed project activities. There are no Indian Trust resources, sacred sites, nor ethnographic resources identified within the national seashore. The National Park Service determined that implementing the proposed action would have no effect on historic properties. The Florida Division of Historical Resources (the State Historic Preservation Officer) concurred with the NPS' findings and the determination of "no historic properties affected." Copies of correspondence are included in appendix C. Therefore, this impact topic was dismissed.

Energy Requirements and Conservation Potential. The National Park Service reduces energy costs, eliminates waste, and conserves energy resources by using energy-efficient and cost-effective technologies. Energy efficiency is incorporated into the decision-making process during the design and acquisition of buildings, facilities, and transportation systems that emphasize the use of renewable energy sources. Under any alternative, the National Park Service would continue to implement its policies of reducing costs, eliminating waste, and conserving resources by using energy-efficient and cost-effective technologies (NPS 2006). The proposed alternatives would not appreciably change short- or long-term energy use or conservation practices. Fuel used during construction activities would not result in detectable changes in energy consumption at a local or regional level; therefore, this impact topic was dismissed from further evaluation.

Environmental Justice. 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 disproportionately high and adverse human health or environmental effects of their programs and policies on minorities and low-income populations and communities. Guidelines for implementing this executive order under the National Environmental Policy Act are provided by the Council on Environmental Quality. According to the U.S. Environmental Protection Agency (1998), environmental justice is defined as:

> 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 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 this "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.

Residents within the surrounding communities of Perdido Key are not disproportionately minority or low-income. Changes to visitor access and associated activities would not disproportionately affect low-income or minority populations; therefore, this topic was dismissed from further consideration.

Natural or Depletable Resource Requirements and Conservation Potential. The National Park Service strives to minimize the environmental impacts of development and other activities through resource conservation, recycling, waste minimization, and the use of energy-efficient and ecologically responsible materials and techniques. Although energy and construction materials would be used for changes to visitor access and barrier island habitat activities, none of the proposed alternatives would change the park's overall energy consumption, use of

nonrenewable (depletable) resources, or conservation potential. Thus, this topic was eliminated from further analysis.

Possible Conflicts with Other Land Use Plans and Policies. Florida's Coastal Construction Control Line Program, which includes Perdido Key, was designed to define the beach and dune system and to allow for the natural fluctuations caused by storm surges and other forces that allow for natural functioning and post-storm recovery and stability. The control line and 50-foot setback call attention to this important property, but do not preclude all development or alteration of coastal property seaward of these lines. The program prohibits construction that will cause significant adverse impacts to marine turtles or the coastal system. The National Park Service would ensure that no significant adverse impacts to marine turtles or the coastal system would occur as a result of the proposed actions. The National Park Service would also comply with appropriate enforceable policies of the Florida Coastal Management Program addressed in the consistency determination submittal to the state, included in the decision document. The proposed project would not interfere with other regional land use plans. The relationship of this project to other past, present, and reasonably foreseeable actions, within and adjacent to the park, is addressed in the cumulative impact analyses. Therefore, this impact topic was not further evaluated.

Prime and Unique Agricultural Lands. Prime farmland has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops. Unique land is land other than prime farmland used for producing specific high-value food and fiber crops. Both categories require the land be available for farming uses (Council on Environmental Quality 1980). The map of prime and unique agricultural lands and other high-quality farmlands prepared by the American Farmland Trust (2002) show that these high-value resources do not occur in Escambia County, Florida where the project area of concern is located. Therefore, this impact topic was not further evaluated.

This page is intentionally left blank

2.0 CHAPTER 2: ALTERNATIVES

This environmental assessment evaluates four alternatives: the no-action (alternative 1) and three action alternatives (alternatives 2, 3, and 4). The elements of these alternatives are described in the following sections. In addition, this chapter describes the alternatives considered but dismissed from detailed analysis, identifies the alternative preferred by the National Park Service, the environmentally preferable alternative, and provides a summary of the alternatives and their environmental consequences. Impacts associated with the alternatives are further described in "Chapter 3: Affected Environment and Environmental Consequences."

2.1 ALTERNATIVES DEVELOPMENT

The alternatives are schematic designs that present the principal elements of each alternative and emphasize the physical and functional relationships of project components throughout the project area.

After the National Park Service has selected a final alternative, the design process will continue and engineers will develop final designs and construction documents that will specify the full detail for implementing the selected alternative.

2.2 ALTERNATIVE 1: NO ACTION / CONTINUE CURRENT MANAGEMENT

Under alternative 1, the Perdido Key and the Rosamond Johnson Beach area would remain in the recreational beaches management zone, as determined by the existing general management plan. As such, this area would continue to be managed to offer convenient and easy access to recreational beaches for sunbathing, swimming, surfing, strolling, surf fishing, and sand castle play.

Alternative 1 represents a continuation of the existing situation. Each aspect of the no action alternative is described more fully in the subsections that follow.

2.2.1 PARKING / ROAD CONFIGURATION

Johnson Beach Road runs along the center of the barrier island within the Perdido Key Area of Gulf Islands National Seashore (see figure 2). Visitors use this road to access various activities both on the Big Lagoon bayside of the island and the Gulf of Mexico.

Under alternative 1, there would continue to be one entry lane and fee both into the Perdido Key / Johnson Beach Area of Gulf Islands National Seashore (see figure 3). Johnson Beach Road would remain a two-lane asphalt road from the entrance station to the turnaround at the road terminus. Shoulders along the road would remain unimproved. The entire 2.3-mile length road would remain accessible by motorists, pedestrians, and bicyclists from the west boundary of the park unit to the turnaround.

Parking would continue to be available both in the main visitor facility parking lot (323 spaces) and along a 1.2-mile stretch of Johnson Beach Road (up to 185 parked cars have been observed on a busy summer day, though there is the potential for additional spaces pending road

conditions) as depicted on figure 2. A total of approximately 508 parking spaces would remain available within the Perdido Key Area. Parking along the easternmost half mile of road and at the turnaround would continue to be prohibited.

Under alternative 1, maintenance of Johnson Beach Road would continue to require plowing by park staff in order to keep shifting sands off of the road surface. Encroachment of sand would continue to impact the space and availability of roadside parking depending on the season, weather conditions, and the availability of staff. There would not be any resurfacing of Johnson Beach Road.

Stormwater at the existing main visitor facility parking lot is treated by sheetflow that is directed off the asphalt surface. Under alternative 1, these features would be left in place and cleaned and repaired on an as-needed basis.

In the event of future storm events, the main visitor facility parking lot and Johnson Beach Road could be temporarily closed and the park staff would make necessary spot repairs to keep the parking area and road functional.

Legend

- Existing Boardwalks
- Existing Parking Area
- Project Area
- Gulf Islands National Seashore Boundary

Figure 2: No Action / Continue Current Management

Gulf Island National Seashore - Perdido Key Area

United States Department of Interior / National Park Service

Figure 3: Entrance Lane Configuration Under Atlernative 1: No Action / Continue Current Management
Gulf Islands National Seashore
U.S. Department of the Interior / National Park Service

2.2.2 VISITOR ACCESS AND CIRCULATION

Public access to the beaches would continue to be provided by eleven dune crossovers, five of which are universally accessible (see figure 2). These crossovers provide access across the dune vegetation. Of these crossovers, three provide access to the beaches on the Big Lagoon to the north and the other eight provide access to the beaches on the Gulf of Mexico to the south. However, several of these crossovers have been engulfed in shifting sands and are no longer useable, including the easternmost crossover located at the turnaround. Under alternative 1, the remaining dune crossovers would be maintained by NPS staff for as long as practicable.

There would continue to be one non-elevated boardwalk off the eastern corner of the main visitor facility parking area. This boardwalk would continue to provide access to the edge of the facilities, but would not extend any further onto the beach.

Pedestrians and bicyclists would continue to share the Johnson Beach Road surface with motorists. Social trails through the dune habitat, especially during times of high use when visitors need to park far away from the dune crossovers would continue, causing damage to the sensitive habitat. Access to primitive beach, which is allowed starting at least a half mile east of the road terminus, would continue to be permitted.

2.3 ELEMENTS COMMON TO ALL ACTION ALTERNATIVES

2.3.1 HABITAT PROTECTION MEASURES

To minimize impacts to natural resources under all action alternatives, the National Park Service considered avoidance of wetlands and minimization of impacts to vegetation and wildlife. Each action alternative also considers the need to address resiliency due to the impacts of sea level rise, storm damage, and the need to continue to provide visitor access.

Under all of the action alternatives, the easternmost half mile of road would be closed to motor vehicles (with the exception of emergency/administrative use) and converted to a 10-12 foot wide multiuse path. A 10-foot wide swath of asphalt would be removed along this stretch, allowing approximately 26,400 square feet (0.61 acres) of habitat to naturally restore itself. Therefore, resurfacing of Johnson Beach Road under each of the action alternatives would only occur on a 10-12 foot wide stretch of this last half mile. Removal of motor vehicle access would further protect dune habitat along this stretch of road by narrowing the impact corridor.

Under all of the action alternatives, roadside parking along Johnson Beach Road would be eliminated and concentrated in specific areas, thereby reducing the number of visitors cutting through the sensitive dune habitat along the road corridor. The proposed parking areas would be surrounded by split rail fencing to discourage visitors from walking through the sensitive dune habitat. Openings in the fence would direct visitors to several proposed new dune crossovers, as indicated under each alternative description.

2.3.2 PARKING / ROAD CONFIGURATION

As part of routine maintenance, Johnson Beach Road would be resurfaced with asphalt under all of the proposed action alternatives. The configuration of the resurfacing would differ slightly between the alternatives and is described further below. Routine maintenance of Johnson Beach

Road and the parking areas would continue to require occasional plowing by park staff in order to keep shifting sands off the road surface.

Under all action alternatives, the proposed new parking areas would remain in the recreational beaches management zone, as determined by the existing general management plan. As such, this area would continue to be managed to offer convenient and easy access to recreational beaches for sunbathing, swimming, surfing, strolling, surf fishing, and sand castle play.

Under all of the action alternatives, a new parking lot would be constructed at the end of the drivable portion of Johnson Beach Road. This parking lot would have a separate entrance and exit lane to allow east-bound vehicles to easily enter and return to the park entrance. The parking lot would accommodate 50-54 vehicles and may be constructed entirely, or partially, with an alternative paving surface. A limited number of parking spaces would be designated for overnight parking use by backcountry campers. The approximate size of this parking area would be 20,900 square feet (about 0.48 acres).

Additional parking areas would be expanded and/or constructed in various locations depending on the alternative. An alternative paving surface would be considered for all or portions of the proposed lots. If the parking areas were constructed with asphalt, parking spots would be delineated with paint and/or curb stops. If the parking areas were constructed with an alternative paving surface, parking spots and traffic circulation would be suggested using signage and/or curb stops. During construction, staging and stock piling of construction materials would take place in the existing main facility parking area.

The proposed parking areas would be surrounded by split rail fencing to discourage visitors from walking through the sensitive dune habitat. Openings in the fence would direct visitors to several proposed more resilient dune crossovers, as indicated under each alternative description. The fencing and dune crossovers would help to protect sensitive dune habitat and discourage the formation and use of social trails through the sensitive dune habitat. The existing dune crossovers along Johnson Beach Road would be removed. In addition, two handicap accessible dune crossovers would be installed at the main visitor facility parking area.

Under the action alternatives, oversize recreational vehicle (RV) parking would not be provided in the newly proposed parking areas and therefore, RVs would not be permitted on Johnson Beach Road east of the main visitor facility parking lot.

An additional entrance lane and fee station would be constructed at the Perdido Key entrance under all of the action alternatives (see figure 5).

Construction of the new parking area(s) would require the use of mechanized equipment and could require the need for minor recontouring at the new parking areas. Staging for construction of the new parking areas would be located in nearby main visitor facility parking area within the national seashore.

Storm water management measures at the expanded portion of the main visitor facility parking lot and the new proposed parking lots would be implemented pending coordination with the Florida Department of Environmental Protection and identification of appropriate measures. Stormwater would be treated by sheetflow and directed off the paved surface. Site specific storm water design features would be addressed during permitting with the State of Florida. The National Park Service would use best management practices to address storm water and water quality. Permitting requirements would be addressed with the State of Florida as appropriate in advance of any construction activity.

Pending future storm events, both the parking areas and Johnson Beach Road could be temporarily closed until park staff were able to make necessary repairs to keep the parking areas and road functional.

2.3.3 VISITOR ACCESS AND CIRCULATION

As mentioned above, new crossovers and split rail fencing would be installed in various locations depending on the proposed alternative. These crossovers would be further elevated in order to be more resilient to the shifting sands and more easily maintained.

Speed tables and crosswalks would be installed across Johnson Beach Road at each of the proposed parking areas. These crossovers would provide a safe crossing between the new parking areas on the north side of the road to the newly installed dune crossovers on the south side of the road. New parking areas would be located in previously disturbed areas where access was previously provided and where there would be the least impact to established viewing areas.

During summer months and holidays, wait times to enter into the Perdido Key Area would be decreased as a result of the additional entrance lane and fee both.

Pedestrians and bicyclists would continue to share the western portion of Johnson Beach Road surface with motorists. Motor vehicles would not be permitted on the eastern half mile of Johnson Beach Road. Access to primitive beach camping, which is currently allowed no less than one half mile east of the road terminus, would continue to be permitted (1 mile east of the last parking area).

2.4 ALTERNATIVE 2

Under alternative 2, visitors would be able to park in one of two locations at either end of the drivable portion of Johnson Beach Road. This alternative would concentrate visitor access to these two locations and allow for greater dune habitat protection along the remainder of the Johnson Beach Road corridor.

2.4.1 PARKING / ROAD CONFIGURATION

Under alternative 2, the main visitor facility parking lot would be expanded to include an additional 50-60 parking spots, expanding the capacity of this lot to 373-383 spots (see figure 4). In combination with the parking lot at the end of the drivable surface of Johnson Beach Road, there would be a total of 423-437 parking spots available within the Perdido Key Area.

The limit of new disturbance for the expanded main visitor facility parking area would be approximately 25,620 square feet (about 0.6 acres). Combined with the parking lot at the end of the drivable surface, the combined total area of the proposed new parking lots would be approximately 46,520 square feet (1.07 acres) under alternative 2.

2.4.2 VISITOR ACCESS AND CIRCULATION

Public access to the beaches would be provided by six elevated dune crossovers; three to the south at the main parking area, one to the north and one to the south at the new parking area at the end of the drivable portion of Johnson Beach Road, and one to the south at the road terminus and existing turnaround (see figure 4). The crossovers at the new parking area and two of those at the main parking area would be universally accessible.

2.4.3 HABITAT IMPROVED AND RECLAIMED

Under Alternative 2, there would be 154.9 acres of beach dune habitat that would be improved due to proposed activities in the portion of the park where roadside parking starts and ends on Johnson Beach Road. These calculations were made based on summing areas where human foot traffic would be reduced; where efforts would be made to minimize social trails, dune trampling, and disturbance to wildlife and habitat; and where efforts would be made to allow natural processes and vegetation to return. This acreage includes 10 ft. road shoulders along Johnson Beach Road for roadside parallel parking, removal of 1/2 mile asphalt where the road would be converted to a multi-use path, and removal without replacement of existing boardwalks under this alternative. Within these 154.9 acres, 4.9 acres of dune habitat would be reclaimed. Reclaimed areas are defined as those areas currently impacted by structures, asphalt, or parking, that would be able to naturally attenuate to natural conditions by direct removal of roadside parking, asphalt, or structures.

This page is intentionally left blank

Legend

- Dune Crossover Proposed Location
- 10-12 Foot Wide Multiuse Trail
- Existing Parking Area
- Expanded Parking
- Project Area
- Gulf Islands National Seashore Boundary

Note: No parking or driving allowed along Multiuse Trail

Figure 4: Alternative 2

Gulf Island National Seashore - Perdido Key Area

United States Department of Interior / National Park Service

Figure 5: Conceptual Design for Entrance Lane Expansion Under All Action Alternatives
Gulf Islands National Seashore
U.S. Department of the Interior / National Park Service

2.5 ALTERNATIVE 3, THE ALTERNATIVE PREFERRED BY THE NATIONAL PARK SERVICE

Alternative 3 is the alternative preferred by the National Park Service. Under alternative 3, visitors would be able to park in one of four locations along the drivable portion of Johnson Beach Road. This alternative would concentrate the greatest visitor access to lots at either end of the drivable portion of Johnson Beach Road and two smaller lots in between. Concentrating parking to these areas would allow for greater dune habitat protection between the parking lots along the Johnson Beach Road corridor while still allowing for visitor access along the road.

2.5.1 PARKING / ROAD CONFIGURATION

Under the alternative preferred by the National Park Service, the main visitor facility parking lot would be expanded to include an additional 25-30 parking spots, for a total of 348-353 spots. In addition, two new smaller parking lots would be constructed along the road corridor. Each of these lots would accommodate approximately 30 parking spots (see figure 6). In combination with the parking lot at the end of the drivable surface of Johnson Beach Road, there would be a total of 458-467 parking spots available within the Perdido Key Area.

The limit of new disturbance for the expanded main visitor facility parking area would be approximately 12,915 square feet (about 0.3 acres). The approximate size of the smaller lots would be 12,550 square feet (0.29 acres), 25,100 square feet (0.58 acres) combined. Combined with the parking lot at the end of the drivable surface, the total area of the proposed new parking lots would be approximately 58,915 square feet (1.35 acres) under alternative 3.

2.5.2 VISITOR ACCESS AND CIRCULATION

Under the alternative 3, public access to the beaches would be provided by nine elevated dune crossovers; two to the south at the main parking area, one to the north and one to the south at each of the three new parking areas along the road, and one to the south at the road terminus and existing turnaround (see figure 6). The two crossovers at the new parking area at the end of the drivable surface and the two at the main parking area would be universally accessible.

2.5.3 HABITAT IMPROVED AND RECLAIMED

Under Alternative 3, there would be 154.9 acres of beach dune habitat that would be improved due to proposed activities in the portion of the park where roadside parking starts and ends on Johnson Beach Road. These calculations were made based on summing areas where human foot traffic would be reduced; efforts would be made to minimize social trails, dune trampling, and disturbance to wildlife and habitat; and where efforts would be made to allow natural processes and vegetation to return. This acreage includes 10 ft. road shoulders along Johnson Beach Road for roadside parallel parking, removal of 1/2 mile asphalt where the road would be converted to a multi-use path, and removal without replacement of existing boardwalks under this alternative. Within these 154.9 acres, 4.9 acres of dune habitat would be reclaimed. Reclaimed areas are defined as those areas currently impacted by structures, asphalt, or parking,

that would be able to naturally attenuate to natural conditions by direct removal of roadside parking, asphalt, or structures.

Legend

- Dune Crossover Proposed Location
- 10-12 Foot Wide Multiuse Trail
- Existing Parking Area
- Expanded Parking
- Project Area
- Gulf Islands National Seashore Boundary

Note: No parking or driving allowed along Multiuse Trail

Figure 6: Alternative 3 / the Alternative Preferred by the National Park Service

Gulf Island National Seashore - Perdido Key Area

United States Department of Interior / National Park Service

This page intentionally left blank.

2.6 ALTERNATIVE 4

Under alternative 4, visitors would be able to park in one of 8 locations along the drivable portion of Johnson Beach Road. This alternative would spread visitor access across the road corridor in smaller, but more numerous parking lots. Although more spread out, concentrating parking to these areas would allow for dune habitat protection between the parking lots along the Johnson Beach Road corridor.

2.6.1 PARKING / ROAD CONFIGURATION

Under alternative 4, six small pull-in parking lots would be constructed along the road corridor (see figure 7). Each of these lots would accommodate approximately 20 parking spots. In combination with the parking lot at the end of the drivable surface of Johnson Beach Road, there would be a total of 493-497 parking spots available within the Perdido Key Area.

The approximate size of each of the smaller lots would be 4,000 square feet (0.09 acres), 24,000 square feet (0.55 acres) combined. Combined with the parking lot at the end of the drivable surface, the total area of the proposed new parking lots would be approximately 44,900 square feet (1.03 acres) under alternative 4.

2.6.2 VISITOR ACCESS AND CIRCULATION

Under alternative 4, public access to the beaches would be provided by 12 elevated dune crossovers: two to the south at the main parking area, four of the seven new parking areas along the road will have one to the north and one to the south, the other three new parking areas will have one to the south, and there will be one to the south at the road terminus and existing turnaround (see figure 7).The two crossovers at the new parking area at the end of the drivable surface and the two at the main parking area would be universally accessible.

2.6.3 HABITAT IMPROVED AND RECLAIMED

Under Alternative 4, there would be 154.9 acres of beach dune habitat that would be improved due to proposed activities in the portion of the park where roadside parking starts and ends on Johnson Beach Road. These calculations were made based on summing areas where human foot traffic would be reduced; where efforts would be made to minimize social trails, dune trampling, and disturbance to wildlife and habitat; and where efforts would be made to allow natural processes and vegetation to return. These acreages include 10 ft. road shoulders along Johnson Beach Road for roadside parallel parking, removal of 1/2 mile asphalt where the road would be converted to a multi-use path, and removal without replacement of existing boardwalks. Within these 154.9 acres, 4.6 acres of dune habitat would be reclaimed. Reclaimed areas are defined as those areas currently impacted by structures, asphalt, or parking, that would be able to naturally attenuate to natural conditions by direct removal of roadside parking, asphalt, or structures.

This page is intentionally left blank

Legend

- 10-12 Foot Wide Multiuse Trail
- Dune Crossover Proposed Location
- Existing Parking Area
- Expanded Parking
- Project Area
- Gulf Islands National Seashore Boundary

Note: No parking or driving allowed along Multiuse Trail

Figure 7: Alternative 4

Gulf Island National Seashore - Perdido Key Area

United States Department of Interior / National Park Service

This page intentionally left blank.

2.7 MITIGATION MEASURES

Mitigation is used to avoid, prevent, or minimize adverse impacts during construction and implementation of the project. The following mitigation measures would be incorporated into the alternative by the National Park Service, as needed. The National Park Service may need to obtain federal and state environmental permits and, as part of that process, additional mitigation measures could be required by other agencies.

The National Park Service would commit to the mitigation measures identified in this section as a part of implementing the alternative 3. Impacts on the alternatives (presented in chapter 3) were analyzed with these mitigation measures in place, tailored to meet site-specific conditions.

2.7.1 GENERAL MEASURES

- Share information with the public regarding implementation of this project and its effects on access, parking, and circulation through the national seashore. Distribute or post information at entrance stations, on the park's website, at trailheads, at other visitor sites, and through press releases.
- Develop and enforce an NPS-approved traffic and pedestrian control plan for use during construction. The plan would minimize disruption to visitors and park operations and ensure safety of the public, park employees, contractors, and residents. Require contractors to coordinate with park staff to minimize disruption of normal park activities. Inform construction workers and supervisors about the special sensitivity of park values, regulations, and appropriate house-keeping measures to be used.
- Clearly state all protection measures in construction specifications.
- Minimize the amount of ground disturbance for activities not directly related to construction, such as staging and stockpiling areas. Restore all staging and stockpiling areas following construction. Limit parking of construction and employee vehicles to designated staging areas or existing roads and parking lots.
- Encourage that construction equipment uses the best available technology for sound dampening muffler and exhaust systems.
- To save fuel and reduce noise and emissions, require contractors to develop and implement a plan that prevents excessive idling of all vehicles used in construction.
- Encourage good housekeeping practices such as placing debris in refuse containers daily and emptying containers regularly.

2.7.2 NATURAL RESOURCES

- Identify specific provisions in construction contract(s) to prevent storm water pollution during construction activities, in accordance with the National Pollutant Discharge Elimination System permit program of the Clean Water Act and all other federal regulations, and in accordance with the storm water pollution prevention plan to be prepared for this project.
- Plan and maintain buffers between areas of soil disturbance and wetlands or waterways.

- Delineate protection zones and vegetation line limits and/or limits of disturbance to protect existing natural resources.
- Use soil erosion best management practices such as sediment traps and erosion check screen filters to prevent the entry of sediment into waterways.
- Inspect equipment for leaks of oil, fuels, or hydraulic fluids before and during use to prevent soil and water contamination. Minimize onsite fueling and maintenance. If these activities cannot be avoided, fuels and other fluids in a restricted/designated area, and perform fueling and maintenance in designated areas that are bermed and lined to contain spills. Require provisions for the containment of spills and the removal and safe disposal of contaminated materials, including soil.
- Take actions that would minimize effects on site hydrology and fluvial processes, including flow, circulation, water level fluctuations, and sediment transport. Take care to avoid any rutting caused by vehicles or equipment.
- Conduct the action to minimize adverse effects on normal movement, migration, reproduction, or health of terrestrial fauna. Time construction seasonally to avoid impacts to migratory and shoreline bird populations.
- Access to nesting areas would be limited during certain times of the year to provide for species protection, as appropriate. No construction would occur between February 15 and August 30 to protect beach nesting birds.
- Measures would be implemented to prevent the spread or introduction of invasive vegetation, such as ensuring that construction-related equipment arrives at the site free of mud or seed-bearing materials and certifying that any seeds or straw material are weed free. Tools and machinery would be thoroughly cleaned when moving from an area heavily covered with invasive vegetation, to an area without invasive vegetation. The tires or tracks of trucks and equipment entering and leaving project sites would be washed off to prevent seed transport.
- A pocket guide of the special status species would be kept on site and would include pictures and identification guides for the work crew to refer to when or if they encounter potential sign of special status species. This guide would also include names and radio numbers on whom to contact if a positive identification were made.

2.7.3 PROPOSED SPECIES-SPECIFIC CONSERVATION MEASURES

The National Park Service proposes to implement the species-specific conservation measures listed in this section to avoid and minimize adverse effects on sea turtles, the Perdido Key beach mouse, and shorebirds. Implementation of these conservation measures would be considered mandatory unless specifically noted below or if modifications are made through consultation or conference with the U.S. Fish and Wildlife Service. The analyses and effects determinations in this biological assessment have considered implementation of these conservation measures.

Surveys would be conducted, as appropriate, for threatened and endangered species and species of concern before ground-disturbing activities are undertaken. Current monitoring programs would be continued under all action alternatives, including but not limited to the following:

- An active sea turtle monitoring program would continue to occur during the period of May 1 through November 30 using replicate survey protocols for detecting and identifying nests soon after becoming established. Each nest would continue to be identified and a protective enclosure perimeter established to minimize any inadvertent trampling by visitors or operational/management actions. Each nest would also be posted

with an informational sign to alert passersby to the nest and effectively close an approximate 5-meter square area to ingress/egress through the area for the approximate 60-day gestational period until hatchlings emerge and enter the ocean.

- Mitigation for effects on the critically endangered Perdido Key beach mouse would continue with actions defined in the Perdido Key Beach Mouse Recovery Plan, developed by the national seashore and U.S. Fish and Wildlife Service. These measures would continue to include maintaining dune crossovers and installing rope barriers to discourage incidental take of the beach mouse and minimize habitat trampling.
- During the period of March through August, the national seashore would continue to be involved in a focused and committed effort to maximize protection of the shorebirds within both districts. These efforts are part of the NPS protection of species under the Endangered Species Act, the Migratory Bird Treaty Act, and related policies. Areas where concentrations of solitary nesting shorebirds (e.g., snowy plover) were identified, and where appropriately cordoned off by establishing perimeter enclosures to control access, prevent encroachment to the extent possible, and therefore minimize effects. While vehicular traffic on roadways remains a concern with respect to mortality adjacent to shorebird nesting colonies from passing motorists, the national seashore would continue to engage other regulatory agencies in coordinating efforts to reduce road kill. Specifically, the national seashore, in cooperation with the U.S. Fish and Wildlife Service and Florida Fish and Wildlife Conservation Commission, would continue to meet on an annual basis to outline management actions, including:
    - implementation of speed limit reduction zones during the primary shorebird nesting period April through August
    - deployment of speed radar detection signs and message reader boards to alert motorist to adjacent shorebird nesting activities
    - installation of speed tables will be used at all crosswalks to reduce the speed of traffic in areas where pedestrians are crossing the roadway
    - implementation of increased law enforcement during the shorebird nesting period in proximity to posted speed limit reduction zones in Florida, as well as increased patrols by staff on the islands
    - continued efforts to install/convert all external lighting fixtures on national seashore facilities to low pressure sodium lights in order to minimize artificial light pollution and reduce sea turtle disorientation
    - continued contributions to interagency outreach and education efforts to encourage landowners on the gulf coast to convert to low pressure sodium light fixtures
    - continued encouragement to local media to prepare feature stories about shorebirds and public cooperation
    - continued efforts for interpretive staffing to directly contact motorists

Conservation measures would be undertaken to reduce potential effects on federally listed species or candidate species as needed. Conservation measures would be implemented in consultation with the U.S. Fish and Wildlife Service and would be required if activities expected to have effects on listed species or their designated critical habitat beyond those addressed in this document were initiated.

Should any of the above events occur, renewed discussion and consultation with the U.S. Fish and Wildlife Service would focus on development of specific conservation measures to reduce potential effects on these species and/or designated critical habitat. Such conservation measures

would be based on the recommendations provided by the U.S. Fish and Wildlife Service on a project basis during consultation.

Conservation measures would likely include, but would not be limited to, the following:

- Protecting sensitive species by fencing or another system designed to prevent effects from human activity and discouraging predators.
- Restricting visitor use from certain breeding areas during the breeding season. Providing education about species and habitats and conservation.
- Designating alternate access points.

Conservation Measures for the Perdido Key beach mouse would likely include, but would not be limited to, the following:

- All construction personnel will be notified of the potential presence of Perdido Key beach mice and reminded of criminal and civil penalties associated with harassing, injuring, or killing Perdido Key beach mice.
- To minimize impacts to burrows, a qualified biologist will survey the project site before work commences and flag potential burrows and tracks, and notify onsite construction management.
- Equipment use and staging will be contained within the construction area or adjacent paved areas as much as possible and construction noise will be kept to the minimum feasible.
- Construction will occur during the day to minimize disturbance to nocturnal patterns.
- Equipment, vehicles, and project debris will not be stored in a manner or location where it could be colonized by mice.
- Construction personnel will be notified that the area surrounding equipment left onsite overnight will be inspected by a qualified biologist for signs of mice before moving the equipment.

2.8 ALTERNATIVES AND ACTIONS CONSIDERED BUT DISMISSED FROM FURTHER ANALYSIS

The following options were considered during the early stages of the planning process but were dismissed based on their inability to meet the purpose and need and/or the objectives of the project. Not all of these options encompass an entire alternative, but rather various components of the alternatives.

2.8.1 CONVERTING ALL OF JOHNSON BEACH ROAD TO A MULTIUSE TRAIL

Eliminating nonemergency vehicle access on Johnson Beach Road east of the main visitor facility parking lot was considered. Although this approach would improve the sensitive barrier island habitat, it would not fulfill the purpose of the project to improve visitor access along Johnson Beach Road and therefore this alternative was not carried forward. This option would also fail to meet the project objective to improve access and safety along Johnson Beach Road for visitors.

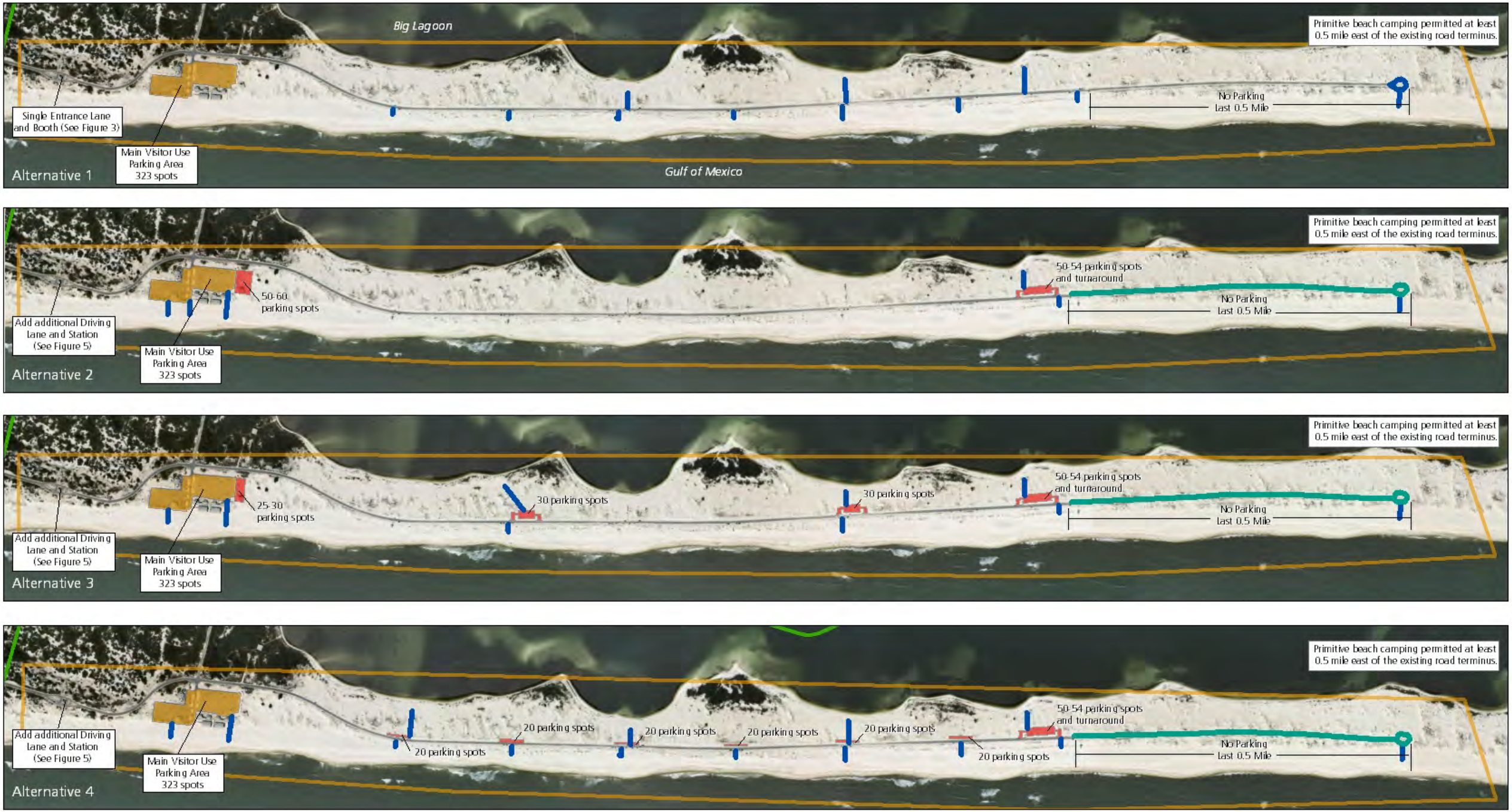
2.8.2 USE OF A SHUTTLE BUS

Removal of all parking and motor vehicle access along Johnson Beach Road and use of a shuttle bus to transport visitors from the main visitor facility parking lot was considered. However, this alternative was dismissed because of the enormous infrastructure, costs, and operation requirements associated with an alternative transportation system.

2.9 COMPARISON OF THE ALTERNATIVES

Figure 8 provides a depiction of each alternative and its respective characteristics.

This page is intentionally left blank



Legend

- 10-12 Foot Wide Multiuse Trail
- Dune Crossover Proposed Location
- Existing Boardwalk (Alternative 1)
- Existing Parking Area
- Expanded Parking
- Project Area
- Gulf Islands National Seashore Boundary

Note: No parking or driving allowed along Multiuse Trail

N

0 0.25 0.5
Miles

Figure 8: Summary of Alternatives

Gulf Island National Seashore - Perdido Key Area

United States Department of Interior / National Park Service

This page intentionally left blank.

3.0 CHAPTER 3: AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter describes the resources that could be impacted by the proposed actions. Impact topics are presented in the order they appear in chapter 1.

3.1 GENERAL METHODS FOR ANALYZING IMPACTS

In accordance with the Council on Environmental Quality regulations, direct, indirect, and cumulative impacts are described (40 CFR 1502.16) and the impacts are assessed in terms of context and intensity (40 CFR 1508.27). Where appropriate, mitigating measures for adverse impacts are also described and incorporated into the evaluation of impacts.

3.1.1 GEOGRAPHIC AREA EVALUATED FOR IMPACTS

The geographic study area for the assessment of impacts is broadly defined as the width of the Perdido Key barrier island between the Gulf of Mexico and the Big Lagoon along the Johnson Beach Road corridor and within the boundary of Gulf Islands National Seashore. Graphical images for each alternative concept are provided in chapter 2.

3.1.2 METHODS AND ASSUMPTIONS

The impact analysis was conducted for each of the alternatives based on conceptual designs for a project timeframe of approximately 10 years. The analysis for each alternative was based on review of existing literature and maps, information obtained from other federal and state agencies as referenced, and professional judgment. Implementation of each of the alternatives would take up to one year.

3.1.3 TYPE OF IMPACT

Impacts are discussed by type, as follows (the terms “impact” and “effect” are used interchangeably throughout this document):

- **Direct:** Impacts that would occur as a result of the proposed action at the same time and place of implementation (40 CFR 1508.8).
- **Indirect:** Impacts that would occur as a result of the proposed action but later in time or farther in distance from the action (40 CFR 1508.8).
- **Adverse:** An impact that causes an unfavorable result to the resource when compared to the existing conditions.
- **Beneficial:** An impact that would result in a positive change to the resource when compared to the existing conditions.

Impacts are discussed in terms of duration are defined as follows:

- Short-term: Usually less than one year. Impacts would not be measurable or measurable only during the life of construction.
- Long-term: Usually more than one year. Impacts would be measurable during and after project construction.

3.1.4 CUMULATIVE IMPACT ANALYSIS METHODS

Cumulative impacts are defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, or reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions" (40 CFR 1508.7). Cumulative impacts were determined for each impact topic by combining the impacts of the alternative being analyzed and other past, present, and reasonably foreseeable actions that would also result in beneficial or adverse impacts. Because some of these actions are in the planning stages, the evaluation of the cumulative impact is based on a general description of the projects. These actions were identified through the internal and external project scoping processes and are summarized below.

The 2014 *Gulf Islands National Seashore General Management Plan* is a 15-25 year plan that serves as the national seashore's primary guidance document and reflects a systematic approach to management whereby recreational use and development is balanced with the need to ensure long-term preservation of natural resources and values (NPS 2014b). The plan provides overall direction for future management of the national seashore, and a framework for managers to use in making decisions about how best to protect national seashore resources, how to respond to climate change and sea level rise, what levels and types of uses are appropriate, what facilities should be developed, and how people should access the national seashore. Under the *General Management Plan*, the width of Perdido Key around Johnson Beach Road and approximately 1.5 miles to the east are within the recreational beaches zone. Areas within this zone are managed to maintain or restore their natural conditions, although allowances are permitted for minor impacts associated with visitor access, sanitation, and public safety. The recreational beach zone accommodates traditional recreational beach activities and facilities. Recreational beaches are defined as those beach areas that correlate with a parking lot, boardwalk or trail, and where the public is invited to participate in sunbathing, beach combing, sand sculpture, swimming, and other customary recreational pursuits, and where such activities are frequent and commonplace. The proposed actions in this environmental assessment are consistent with the goals set out for the Perdido Key Area within the *General Management Plan*.

The *Beach Enhancement Project at Gulf Islands National Seashore for Asphalt Debris Clean Up* is an ongoing project that involves removing fragments of asphalt and road-base material that have been scattered widely across the Fort Pickens, Santa Rosa, and Perdido Key areas of Gulf Islands National Seashore in Florida. Several storms and hurricanes occurring since 1995 caused damage to area roads and spread road fragments over hundreds of acres of barrier island wildlife habitat. The material is strewn over 14 miles in both vegetated and unvegetated dune areas and in flat open beaches. These projects are still in the process of being implemented, but will likely involve primarily mechanized equipment, supplemented by small crews using hand tools. If approved, implementation of the proposed actions in this environmental assessment could overlap with asphalt debris removal actions.

The Escambia County *Habitat Conservation Plan*, *A Plan for the Protection of the Perdido Key Beach Mouse, Sea Turtles, and Piping Plovers on Perdido Key, Florida*, the U.S. Fish and Wildlife Service *Alabama Beach Mouse, Perdido Key Beach Mouse, and Choctawhatchee Beach Mouse*

Recovery Plan, and the *Gulf Islands National Seashore Environmental Assessment for Perdido Key Beach Mouse Habitat Protection, Johnson Beach Perdido Key Area* all focus on maintaining the long-term viability of these special status species and their habitat. Each of these plans strives to satisfy the safety, functional, and recreational needs of the Perdido Key community, while maintaining the long-term viability of the special status species and their habitat. Escambia County has implemented a multi-faceted program to conserve and manage Perdido Key beach mouse habitat along with beach and dune habitats associated with sea turtles and shorebird ecosystems in a manner that accommodates site-specific and landscape approach conditions. The National Park Service and U.S. Fish and Wildlife plans set forth strategies for each agency to manage habitat and activities throughout the species' range. The proposed actions in this environmental assessment would be consistent with the objectives of these plans.

Gulf Islands National Seashore is in the process of completing the *Gulf Islands National Seashore Wilderness Stewardship and Backcountry Management Plan Environmental Assessment.* When complete, this plan will provide a framework to preserve and improve wilderness character within the national seashore and to accommodate sustainable use and protection of backcountry resources. The purpose of the plan is to guide the preservation, management, and use of the park's wilderness and backcountry areas to ensure they remain unimpaired for future use and enjoyment. The plan will also include "desired future conditions, and thresholds beyond which management actions would be taken to reduce human impacts to wilderness resources." The plan will address details of primitive camping, including overnight parking, at Perdido Key.

3.2 FLOODPLAINS

3.2.1 AFFECTED ENVIRONMENT

Floodplains perform important natural functions, including temporary storage of floodwaters, dissipation of storm water runoff, moderation of peak flows, groundwater recharge, prevention of erosion, and maintenance of water quality. In general, natural buffers, such as the sandy beach, dunes, and vegetation in the vicinity of the study area help maintain the natural functions of the floodplain. In the study area, the beach and sand dunes act as natural barriers to dissipate wave energy and protect the back dune area from flooding and erosion. These land forms begin with the accumulation of marine sand transported to the Gulf coast by waves and currents. Dunes form when sand is moved by strong onshore winds, deposited behind the beach, stabilized by vegetation and other obstructions, and eventually becoming higher and wider. Primary dunes act as a reservoir of sand which can buffer inland areas from the effects of storm waves and, in the process, act as natural levees against coastal flooding (FEMA 2008). Vegetation in this area traps and anchors sand, helping to stabilize the dunes that protect the shoreline against storms and hurricanes. Farther back from the ocean, the dunes flatten, ending at a saltwater lagoon.

The island supports a number of natural features that reduce flooding severity. For example, dunes along the seashore impede storm surge, and lagoons and other depressions also function to store water during overwash or large precipitation events. Flooding on the island can range from minor overwash events during high tides to major flooding from hurricanes and other coastal storms. Excessive precipitation can also flood low elevation areas across the island. Major storms can drive ocean storm surges completely across the island, dramatically changing habitats and the entire landscape. As storm winds and waves scour sand away from the ocean beaches, sediments are deposited along the lagoon side. Many of the highest points on the islands are within the relict dune fields. Soils are sandy and the vegetation cover is often incomplete. During the 2004-2005 hurricane seasons, many of the relict dune areas were heavily impacted, greatly reducing the size of these features and eliminating much of the vegetation communities occurring there (NPS 2014b).

Dynamic and challenging weather conditions are typical for the national seashore. Storms continuously reshape the landscape. The Gulf and Atlantic hurricane season begins on June 1 and continues through November 30 each year. These dates encompass over 97% of tropical activity (NOAA 2015). The peak season runs from August through October, with 78% of the tropical storm days, 87% of the minor hurricane days, and 96% of the major storms. The number of tropical storms (sustained winds between 39 and 73 mph) occurring each season typically ranges from 4 to 12.

Dune systems experience a high level of natural disturbance and recovery every year, associated with the natural coastal dynamics of the area (Talora et al 2007). This very resilient ecosystem endures consistent stresses including high tidal variations, storm surges, and hurricanes. To maintain the floodplain value of this ecosystem, it is important the dune line is able to withstand and recover from natural and human-caused erosion. Erosion includes, but is not limited to, horizontal recession and scour and can be induced or intensified by human activities. It will appear in the form of wearing away of land, removal of beach/dune sediments by wave action, tidal currents, wave currents, drainage, or wind.

Portions of the project area are within the mapped coastal zone and 100-year floodplain, as shown on Federal Emergency Management Agency Flood Insurance Rate Map (FIRM) Panels: 12033C0516G and 12033C0517G (FEMA 2006). The Federal Emergency Management Agency defines geographic areas as flood zones according to varying levels of flood risk. Each zone

reflects the severity or type of flooding in the area, as depicted on figure 9. The first zone, labeled "AE" on the Federal Emergency Management Agency map, is within the 100-year floodplain and ranges in elevation from 8-10 ft. National Geodetic Vertical Datum of 1988 (NAV88). This zone encompasses mostly the western portion of the study area. The major source of flooding in this area would be flooding from overwash in the lagoon. The second zone on the Federal Emergency Management Agency map is labeled "VE" (Coastal Flood Zone), which extends from offshore to the inland limit of a primary frontal dune along an open coast and any other area and is subject to high velocity wave action from storms. The majority of the project activities are proposed in zone VE. A statement of findings has been prepared in accordance with Executive Order 11988 (Floodplain Management), NPS Director's Order #77-2, and Floodplain Management and Procedural Manual #77-2 and is provided in appendix A.

In 2013, the U.S. Fish and Wildlife Service updated maps produced through the Coastal Barrier Resources System, originally produced in the 1980s. The comprehensive revision of maps along the Atlantic coast is intended to assist federal agencies' compliance with the Coastal Barriers Resources Act. This legislation, signed into law in 1982, designated relatively undeveloped coastal barriers as part of the Coastal Barrier Resources System, and made these areas ineligible for most new federal expenditures and assistance. Perdido Key was added to the Coastal Barrier Resources System in 1990 (USFWS 2015). While the projects being proposed in this environmental assessment would not qualify for federal flood insurance, they would be in compliance with the Coastal Barriers Resources Act.

Climate change affects sea level, amounts of rainfall, intensity and amount of runoff, the height, duration, and frequency of waves, and long-term tracks, intensity and frequency of coastal storms (Nicholls 2004) that could, in turn, affect coastal processes, wetlands, and floodplains. Climate change is expected to increase the extent and frequency of coastal flooding (Loehman and Anderson 2009) from storm surges and sea level rise. Changes in the frequency of severe storms and increased rainfall intensity could further aggravate flooding and storm damage (Titus and Richman 2001). Island sands and topography naturally shift with storms, tides, and sand accretion and erosion. The combined effects of absolute sea level rise and the natural subsidence of soils along the Gulf Coast are expected to result in greater relative sea level rise. The primary impacts of sea level rise include intensified coastal flood events, increased shore erosion, inundation of low-lying lands, and salt-water intrusion into groundwater. Sea-level rise increases the height of storm waves, enabling them to extend farther inland. In low-lying coastal areas, a one-foot rise in sea level translates into a one foot rise in flood level, intensifying the impact of coastal flood waters and storm surge (IPCC 2007a, b). The island is highly susceptible to all such impacts.

This page is intentionally left blank

Legend

- Zone AE (100-year Floodplain)
- Zone VE (Coastal Flood Zone)
- Existing Boardwalks
- Existing Parking Area
- Project Area
- Gulf Islands National Seashore Boundary

Figure 9: Floodplain Map

Gulf Island National Seashore - Perdido Key Area

United States Department of Interior / National Park Service

This page intentionally left blank.

3.2.2 IMPACTS OF ALTERNATIVE 1: NO ACTION / CONTINUE CURRENT MANAGEMENT

Direct and Indirect Impacts

Under alternative 1, there would be no new construction-related actions and no proposed changes to the existing parking, road configuration, or visitor access to the Perdido Key / Johnson Beach Area. Activities under the no-action alternative with impacts on floodplain values include changes to stormwater treatment, changes in impervious surfaces, availability of dune crossovers, and human traffic through dune habitats.

Stormwater at the existing main visitor facility parking lot is treated by sheetflow that is directed off the asphalt surface. These features would be left in place and cleaned and repaired on an as-needed basis. In the event of future storm events, the main visitor facility parking lot and Johnson Beach Road could be temporarily closed and the park staff would make necessary repairs to keep the parking area and road functional. Under this alternative, no additional acreage of impervious surface area would result. Because the quantity and quality of storm water would not change due to this action, there would be no change to floodplain values.

Public access to the beaches would continue to be provided by the eleven existing dune crossovers, though several have been engulfed in shifting sands and are no longer useable. The remaining dune crossovers would be maintained by NPS staff for as long as practicable. The non-elevated boardwalk at the main visitor facility parking area would continue to be used, but it would not extend any further onto the beach. Social trails through the dune habitat would continue, causing damage to the sensitive habitat. Roadside parking (approximately 185 spots) would continue to be available along the 1.2-mile stretch of Johnson Beach Road, which would foster continued visitor traffic through sensitive dune habitat. Foot traffic on the dunes damages vegetation by trampling and routine foot traffic destroys it permanently. Once the vegetation is gone, the chances of dune erosion are greatly enhanced as the stabilization benefits provided by their roots systems are lost. This would lead to continued destabilization of the dune structure. Because the quantity and quality of the remaining crossovers would diminish, the use of social trails would continue, and parking would continue along Johnson Beach Road where visitors are walking through sensitive habitats, long-term adverse impacts to floodplain values would be expected as a result of the stress placed on these dune ecosystems.

The permanent loss of vegetation in the Perdido Key/Johnson Beach Area would have negative impacts on floodplain values by threatening the natural barrier of defense against storms and erosion in this area because dunes absorb the impact of storm surge and wave action. The loss of dunes can make inland areas more vulnerable to the impact of storms and therefore more susceptible to erosion and the potential for breaches in the dunes. These impacts collectively would attribute a substantial adverse impact to dune stability and therefore floodplains within the Perdido Key/ Johnson Beach Area because the impact would be a permanent loss of dune vegetation and stability with resulting dune de-stabilization in this localized area.

Cumulative Impacts

Past, present, and reasonably foreseeable actions with the potential to impact floodplains in the study area include past repairs associated with storm damage response and management plans and actions with impacts within the floodplain. Under the *Beach Enhancement Project at Gulf*

*Islands National Seashore for Asphalt Debris Clean U*p project, removal of unwanted asphalt within the ecosystem and restoring the area to a more naturally vegetated condition would allow natural coastal processes to occur, with beneficial floodplain impacts. The Escambia County *Habitat Conservation Plan*, *A Plan for the Protection of the Perdido Key Beach Mouse, Sea Turtles, and Piping Plovers on Perdido Key, Florida*, the U.S. Fish and Wildlife Service *Alabama Beach Mouse, Perdido Key Beach Mouse, and Choctawhatchee Beach Mouse Recovery Plan*, and the *Gulf Islands National Seashore Environmental Assessment for Perdido Key Beach Mouse Habitat Protection, Johnson Beach Perdido Key Area* all provide responsible planning and oversight that balances the safety, functional, and recreational needs of the community, while maintaining the long-term viability of these species' habitats, and will therefore provide the indirect benefit of providing beneficial floodplain impacts when dune and beach habitats are preserved. The *Wilderness Stewardship and Backcountry Management Plan* will also guide the preservation, management, and use of the park's wilderness and backcountry areas to ensure they remain unimpaired for future use and enjoyment. The overarching goal of the plan is to restore, protect, and enhance overall wilderness and backcountry character, which will include, for example, management of human traffic and social trails that can trample and ultimately remove vegetation that stabilize soils and substrates that function as necessary components of floodplains. In addition, the variety of improvements proposed under the 2014 *Gulf Islands National Seashore General Management Plan*, could have an intermediate, long-term, beneficial impact on floodplain values within Perdido Key Area by decreasing erosion.

These plans and actions have altered or would alter conditions, with varied beneficial effects on floodplains within the national seashore. When the long-term adverse impacts of alternative 1 are combined with the beneficial impacts of past, present and future plans, projects and activities affecting floodplains at the national seashore, the overall cumulative impacts would be beneficial. Alternative 1 would contribute a substantial adverse increment to the cumulative impacts.

Conclusion for Alternative 1 – Floodplains

The impact to floodplains associated with alternative 1 would be slight and adverse because the remaining crossovers would eventually diminish, the use of social trails would continue, and impacts to sensitive habitats would continue as a result of continued roadside parking along Johnson Beach Road. When the extent of the impacts of alternative 1 are considered in the context of floodplain functions and values, these impacts would be considered substantially adverse.

When the long-term adverse impacts of alternative 1 are combined with the beneficial impacts of past, present and future plans, projects and activities affecting floodplains at the national seashore, the overall cumulative impacts would be beneficial. Alternative 1 would contribute substantial adverse increment to otherwise beneficial cumulative impacts.

3.2.3 IMPACTS OF ALTERNATIVE 2

Direct and Indirect Impacts

The majority of the project activities proposed under alternative 2 fall within Federal Emergency Management Agency mapping zone VE (Coastal Flood Zone), which extends from offshore to the inland limit of a primary frontal dune along an open coast and any other area and is subject to high velocity wave action from storms. The remaining portions of the project area are within the mapped coastal zone and 100-year floodplain (see figure 9).

Under alternative 2, the main visitor facility parking lot would be expanded to include an additional 50-60 parking spots with a limit of new disturbance of approximately 25,620 square feet (about 0.6 acres). Combined with the parking lot at the end of the drivable surface, there would be a total new disturbance of approximately 46,520 square feet (1.07 acres) for parking areas. Additionally, impervious surface area would be added with the installation of the additional entrance lane and fee station. Stormwater management measures at the expanded portion of the main visitor facility parking lot, the additional entrance lane and fee station, and the new proposed parking lot would be implemented pending coordination with the Florida Department of Environmental Protection and identification of appropriate measures. Stormwater would be treated by sheetflow and directed off the paved surface. An alternative paving surface would be considered for all, or portions of, the proposed lot. If constructed with asphalt, surface materials would continue to convey sheetflow into surrounding areas during precipitation events. If constructed with an alternative paving surface, though it may not be considered permeable, it would likely increase the surface roughness of the parking lot. Roughness is an important variable in measuring a surface's ability to convey water across the surface. A smoother surface, such as asphalt, would convey water faster than a rough surface. Therefore, an alternative paving surface would continue to convey sheetflow into surrounding areas during precipitation events, but at a much slower rate than a paved asphalt surface. In addition, reduced sheetflow rates would reduce the risk of sedimentation and erosion. The addition of impervious surface area would result in adverse impacts to the floodplain but, given their inland location away from immediately adjacent waterways, these impacts would be slight. Additionally, the easternmost half mile of road would be closed to motor vehicles (with the exception of emergency/administrative use) and converted to a 10-12 foot wide multiuse path. A 10-foot wide swath (approximately 26,400 square feet [0.61 acres]) of asphalt would be removed along this stretch. Resurfacing of Johnson Beach Road would only occur on a 10-12 foot wide stretch of this last half mile. Returning this area to natural conditions would restore floodplain functions as this area reverts from an impervious surface to a permeable one. Precipitation and overwash during storms would have the opportunity to penetrate back into the ground along this half mile stretch. Finally, returning a portion of this stretch to a more natural condition would allow for the return of natural processes of dune formation and migration to occur, with beneficial floodplain impacts.

Public access to the beaches would be directed to six elevated dune crossovers and roadside parking along Johnson Beach Road would be eliminated and concentrated in specific areas, thereby reducing the number of visitors cutting through the sensitive dune habitat along the road corridor. Removal of motor vehicle access at the end of Johnson Beach Road would also further protect dune habitat along this stretch of road by providing a more pedestrian-friendly walking area and encouraging more foot traffic on the road and paths and off the dunes. Foot traffic on the dunes damages vegetation by trampling and routine foot traffic destroys it permanently. Once the vegetation is gone, the chances of dune erosion are greatly enhanced as the stabilization benefits provided by their roots systems are lost. Focusing foot traffic to the proposed crossovers through the use of split rail fences and the removal of parking along Johnson Beach Road would reduce visitor traffic through sensitive habitats and lead to long-term beneficial impacts to floodplain values as a result of the protection afforded to these dune ecosystems.

Construction of the additional entrance lane and fee station and new parking areas would require the use of mechanized equipment and could require the need for minor recontouring. Best management practices would be in place during construction to control erosion and runoff impacts to protect adjacent habitats during construction. Because best management practices would be in place, the localized nature of the construction activities, and the recoverability after disturbance, long-term adverse consequences to floodplains would not expected to result from construction activities associated with minor recontouring of the new parking areas. Therefore,

impacts from construction on floodplains would be considered temporary and minimally adverse.

Efforts to concentrate parking and foot traffic would have beneficial impacts on floodplains by reducing opportunities for unauthorized trails which have a negative impact on dune-stabilizing vegetation. Overall, there would be 154.9 acres of beach dune habitat that would be improved due to proposed activities along Johnson Beach Road, 4.9 of these acres would be reclaimed. All efforts to stabilize the dune systems and associated dune vegetation would strengthen the natural barrier of defense against storms and erosion in this area because dunes absorb the impact of storm surge and wave action. The increase in habitat area for vegetation to stabilize would attribute a substantial beneficial impact to floodplains through dune vegetation and stability within the Perdido Key/ Johnson Beach Area because the impact would be a permanent benefit to dune vegetation with resulting dune stabilization in this localized area.

Cumulative Impacts

As described for alternative 1, collective management actions, and efforts to improve and restore natural resource conditions and floodplain values across the national seashore would result in beneficial long-term benefits to floodplains in the region inclusive of the national seashore and Perdido Key. The beneficial cumulative impacts associated with other management actions at the park, along with the long-term beneficial impacts to floodplain values of alternative 2, would have a beneficial cumulative impact on floodplain functions. Alternative 2 would contribute a substantial beneficial increment to the cumulative impacts.

Conclusion for Alternative 2 – Floodplains

The impact to floodplains associated with alternative 2 would be long-term and beneficial as a result of increased protection to sensitive habitats that would result from the removal of roadside parking along Johnson Beach Road and the focusing of foot traffic to crossovers through the use of split rail fences.

The beneficial cumulative impacts associated with other management actions at the park, along with the long-term beneficial impacts to floodplain values of alternative 2, would have a beneficial cumulative impact on floodplain functions. Alternative 2 would contribute a substantial beneficial increment to otherwise beneficial cumulative impacts.

3.2.4 IMPACTS OF ALTERNATIVE 3

Direct and Indirect Impacts

As under alternative 2, the majority of the project activities proposed under alternative 3 fall within Federal Emergency Management Agency mapping zone VE (Coastal Flood Zone). The remaining portions of the project area fall within the mapped coastal zone and 100-year floodplain. A statement of findings (see appendix A) has been prepared for alternative 3 in accordance with Executive Order 11988 (Floodplain Management), NPS Director's Order #77-2, and Floodplain Management and Procedural Manual #77-2.

Direct and indirect impacts to floodplains under alternative 3 would be similar to those described under alternative 2. Under alternative 3, the additional entrance lane and fee station would have construction impacts in the floodplain, and the expansion of the main visitor facility

parking area, and the addition of three new parking lots would result in a new disturbance of approximately 58,915 square feet (1.35 acres). Additionally, impervious surface area would be added with the installation of the additional entrance lane and fee station. The following impacts would be similar to those described for alternative 2:

- Although the addition of impervious surface area would result in adverse impacts to the floodplain, slight beneficial impacts would result if an alternative paving source were used due to its ability to convey sheetflow into surrounding areas at a much slower rate than a paved asphalt surface. This would reduce the risk of sedimentation and erosion.
- Beneficial impacts to floodplains would result from the removal of a 10-foot wide swath of asphalt at the end of Johnson Beach Road, which would allow for the return of natural processes of dune formation and migration to occur in this area.
- Beneficial impacts would result from focusing foot traffic to the nine elevated dune crossovers proposed under this alternative, which would reduce the number of visitors cutting through sensitive dune habitat and protect the dune ecosystems.
- Adverse impacts to floodplains from the use of mechanized equipment and minor recontouring would be considered temporary and minimally adverse due to the use of best management practices during construction.

Efforts to concentrate parking and foot traffic would have beneficial impacts on floodplains by reducing opportunities for unauthorized trails which has a negative impact on dune-stabilizing vegetation. Overall, there would be 154.9 acres of beach dune habitat that would be improved due to proposed activities along Johnson Beach Road, 4.9 of these acres would be reclaimed. All efforts to stabilize the dune systems and associated dune vegetation would strengthen the natural barrier of defense against storms and erosion in this area because dunes absorb the impact of storm surge and wave action. The increase in habitat area for vegetation to stabilize would attribute a substantial beneficial impact to floodplains through dune vegetation and stability within the Perdido Key/ Johnson Beach Area because the impact would be a permanent benefit to dune vegetation with resulting dune stabilization in this localized area.

Cumulative Impacts

Cumulative impacts to floodplains under alternative 3 would be similar to those described under alternatives 1 and 2. As described for alternative 1, collective management actions, and efforts to improve and restore natural resource conditions and floodplain values across the national seashore would result in beneficial long-term benefits to floodplains in the region inclusive of the national seashore and Perdido Key. The beneficial cumulative impacts associated with other management actions at the park, along with the long-term beneficial impacts to floodplain values of alternative 3, would have a beneficial cumulative impact on floodplain functions. Alternative 3 would contribute a substantial beneficial increment to the cumulative impacts.

Conclusion for Alternative 3 – Floodplains

Overall impacts to floodplains under alternative 3 would be similar to those described under alternative 2. The impact to floodplains associated with alternative 3 would be long-term and beneficial as a result of increased protection to sensitive habitats that would result from the removal of roadside parking along Johnson Beach Road and the focusing of foot traffic to dune crossovers through the use of split rail fences.

The beneficial cumulative impacts associated with other management actions at the park, along with the long-term beneficial impacts to floodplain values of alternative 3, would have a beneficial cumulative impact on floodplain functions. Alternative 3 would contribute a substantial beneficial increment to otherwise beneficial cumulative impacts. A statement of findings has been prepared for the preferred alternative 3 in accordance with Executive Order 11988 (Floodplain Management), NPS Director's Order #77-2, and Floodplain Management and Procedural Manual #77-2 and is provided in appendix A.

3.2.5 IMPACTS OF ALTERNATIVE 4

Direct and Indirect Impacts

The majority of the project activities proposed under alternative 4 fall within Federal Emergency Management Agency mapping zone VE (Coastal Flood Zone), which extends from offshore to the inland limit of a primary frontal dune along an open coast and any other area and is subject to high velocity wave action from storms. The remaining portions of the project area fall within the mapped coastal zone and 100-year floodplain.

Direct and indirect impacts to floodplains under alternative 4 would be similar to those described under alternatives 2 and 3. Under alternative 4, the additional entrance lane and fee station would have construction impacts in the floodplain, and the addition of six small pull-in parking lots and one larger lot at the end of the drivable surface would result in a new disturbance of approximately 44,900 square feet (1.03 acres) for parking areas. Additionally, impervious surface area would be added with the installation of the additional entrance lane and fee station. The following impacts would be similar to those described for alternatives 2 and 3:

- Although the addition of impervious surface area would result in adverse impacts to the floodplain, slight beneficial impacts would result if an alternative paving source were used due to its ability to convey sheetflow into surrounding areas at a much slower rate than a paved asphalt surface. This would reduce the risk of sedimentation and erosion.
- Beneficial impacts to floodplains would result from the removal of a 10-foot wide swath of asphalt at the end of Johnson Beach Road, which would allow for the return of natural processes of dune formation and migration to occur in this area.
- Beneficial impacts would result from focusing foot traffic to the 12 elevated dune crossovers proposed under this alternative, which would reduce the number of visitors cutting through sensitive dune habitat and protect the dune ecosystems.
- Adverse impacts to floodplains from the use of mechanized equipment and minor recontouring would be considered temporary and minimally adverse due to the use of best management practices during construction.

Efforts to concentrate parking and foot traffic would have beneficial impacts on floodplains by reducing opportunities for unauthorized trails which has a negative impact on dune-stabilizing vegetation. Overall, there would be 154.9 acres of beach dune habitat that would be improved due to proposed activities along Johnson Beach Road, 4.6 of these acres would be reclaimed. All efforts to stabilize the dune systems and associated dune vegetation would strengthen the natural barrier of defense against storms and erosion in this area because dunes absorb the impact of storm surge and wave action. The increase in habitat area for vegetation to stabilize would attribute a substantial beneficial impact to floodplains through dune vegetation and stability within the Perdido Key/ Johnson Beach Area because the impact would be a permanent benefit to dune vegetation with resulting dune stabilization in this localized area.

Cumulative Impacts

Cumulative impacts to floodplains under alternative 4 would be similar to those described under alternatives 1 and 2. As described for alternative 1, collective management actions, and efforts to improve and restore natural resource conditions and floodplain values across the National Seashore would result in beneficial long-term benefits to floodplains in the region inclusive of the national seashore and Perdido Key. The beneficial cumulative impacts associated with other management actions at the park, along with the long-term beneficial impacts to floodplain values of alternative 4, would have a beneficial cumulative impact on floodplain functions. Alternative 4 would contribute a substantial beneficial increment to the cumulative impacts.

Conclusion for Alternative 4 – Floodplains

Overall impacts to floodplains under alternative 4 would be similar to those described under alternatives 2 and 3. The impact to floodplains associated with alternative 4 would be long-term and beneficial as a result of increased protection to sensitive habitats that would result from the removal of roadside parking along Johnson Beach Road and the focusing of foot traffic to dune crossovers through the use of split rail fences.

The beneficial cumulative impacts associated with other management actions at the park, along with the long-term beneficial impacts to floodplain values of alternative 4, would have a beneficial cumulative impact on floodplain functions. Alternative 4 would contribute a substantial beneficial increment to otherwise beneficial cumulative impacts.

3.3 VEGETATION

3.3.1 AFFECTED ENVIRONMENT

Perdido Key is a predominantly a flat barrier island containing old dune ridges with an elevation ranging from 0 to 25 feet and a relatively narrow width (USFWS 2011). The undeveloped areas of Perdido Key are mainly composed of primary, secondary, and scrub dunes. The secondary and scrub dunes are found mostly in wider areas of the key, and wetlands are found further west and north of State Route 292. The vegetation in this region is subject to sediment deposition, ocean currents, tides, wind, saltwater, spray, erosion, and tropical storms.

The Perdido Key Area of Gulf Islands National Seashore consists of approximately 1,100 acres along 7- miles of the 16.9-mile island. The developed portion of the Perdido Key Area (see figure 2) consists of approximately 290 acres with a 2.3- mile paved road, an entrance station, main parking lot, snack bar, ranger station, maintenance building, public restrooms and showers, picnic pavilions, and public swimming beach. Three major terrestrial vegetated habitat types have been identified as occurring within or near the project area and are described below based on the Florida Natural Areas Inventory definition (USFWS 2011). The project area falls almost entirely within the beach dune and coastal strand habitat types.

Beach Dune

The beach dune habitat ecotype is a wind-deposited, foredune, and wave deposited upper beach that is sparsely to densely vegetated. Pioneer species include sea oats (*Uniola paniculata*). Other typical pioneer species include sand spur (*Cenchrus spp.*), panic grass (*Panicum amarum*), railroad vine (*Ipomoea pes caprae*), beach morning glory (*Ipomoea imperati*), seashore paspalum (*Paspalum vaginatum*), beach elder (*Iva imbricata*), dune sunflower (*Helianthus debilis*), sea purslane (*Sesuvium portulacastrum*), and sea rocket (*Cakile edentula*) (USFWS 2011). Beach dune communities can be subject to waves that continuously deposit sand to form the beach. In addition, onshore winds move sand until it is slowed by an obstacle such as vegetation. Dune height is affected by vegetation since vegetation can assist in formation and stabilization of the dune.

Vegetation species that are part of the beach dune environment have evolved to survive a variety of environmental conditions including loose, dry, unstable, nutrient poor soils and exposure to wind, water, intense sunlight, and storms. Thus, beach dune vegetation can often root easily from small fragments, root from nodes along stems promoting upward growth, and produce larger seeds that are able to be transported by ocean currents. Furthermore, they have adapted to have thickened cuticles and succulent foliage to retain water and reduce the effects of salt spray.

Coastal Strand

The coastal strand ecotype is characterized as stabilized, wind-deposited coastal dunes. Vegetation is dense, salt tolerant shrubs including species such as saw palmetto (*Serenoa repens*). Typical plants include, but may not necessarily be limited to: sand live oak (*Quercus geminata geminata*), myrtle oak (*Quercus myrtifolia*), yaupon (*Ilex vomitoria*), lantana (*Lantana spp.*),

greenbrier (*Smilax spp.*), Spanish bayonet (*Yucca aloifolia*), woody goldenrod (*Chrysoma pauciflosculosa*), and Florida rosemary (*Ceratiola ericoides*).

Coastal strand dunes are generally stable, but vegetation disturbance can make the dune more susceptible to damage. Shrubs in this ecotype are commonly dwarfed as a result of sea spray winds that kill branches on the seaward side. Coastal strand originally occurred as a nearly continuous band along the Perdido Key shoreline; however, the majority of these habitats have been developed or separated by storms and now occur as broken and isolated small patches.

Coastal Scrub

The coastal scrub habitat is similar to the coastal strand and is located west of the project area in proximity to or more likely north of SR 292 (Perdido Key Drive). It is often characterized as a closed to open canopy forest of sand pines with dense clumps or vast scrub oaks. Scrub habitat on Perdido Key is more indicative of a coastal influence to the vegetative species in this ecotype, which includes more slash pine (*Pinus elliottii*) than sand pine (*Pinus clausa*). The ground cover is generally very sparse, being dominated by ground lichens or few herbs. Patches of barren sand are common where the overstory of pines and oaks is widely scattered or absent. Typical plants include slash pine, sand pine, sand live oak, myrtle oak, Chapman's oak (*Quercus chapmanii*), saw palmetto, rosemary, and ground lichens.

Coastal scrub is commonly found along sand ridges of former shorelines. It is susceptible to damage from off-road vehicle traffic or foot traffic that may destroy ground cover and promote further damage from erosion and tropical storms. Coastal scrub is also susceptible to being lost to development.

3.3.2 IMPACTS OF ALTERNATIVE 1: NO ACTION / CONTINUE CURRENT MANAGEMENT

Direct and Indirect Impacts

Under alternative 1, there would be no new construction-related actions and no proposed changes to the existing parking, road configuration, or visitor access to the Perdido Key / Johnson Beach Area. There would be no change in the fundamental nature of vegetation at Perdido Key under the no-action alternative. The road would continue to impede the natural colonization by vegetation. Although the area is sparsely vegetated, the vegetation provides essential habitat for several species. Under this alternative, vehicular traffic would continue to be allowed along the entire 2.3 mile roadway, and there would continue to be approximately 185 roadside parking spots. Vehicles parked alongside the paved roadway would continue to crush and fragment vegetation in those areas, which could lead to elimination of important habitat as well as a destabilization of the dunes.

The existing dune crossovers would remain in place with several of them being unusable. There would continue to be adverse impacts to vegetation from visitors parking along the road and generating unauthorized trails through the dunes, trampling and breaking vegetation. The trampling of ground cover from both vehicular and foot traffic would continue to destabilize vegetation in these areas resulting in greater damage to the dunes than from just erosion and tropical storms. Foot traffic on the dunes damages vegetation by trampling and routine foot traffic destroys it permanently. Once the vegetation is gone, the chances of dune erosion are greatly enhanced, as the stabilization benefits provided by their roots systems are lost. The

permanent loss of vegetation in the Perdido Key/Johnson Beach Area would threaten the natural barrier of defense against storms and erosion in this area because dunes absorb the impact of storm surge and wave action. The loss of dunes can make inland areas more vulnerable to the impact of storms and therefore more susceptible to erosion and the potential for breaches in the dunes. These impacts collectively would attribute a substantial adverse impact to dune vegetation and dune stability within the Perdido Key/ Johnson Beach Area because the impact would be a permanent loss of dune vegetation with resulting dune de-stabilization in this localized area.

Cumulative Impacts

Implementation of past, present and future management plans that affect vegetation within the Perdido Key Area of the national seashore include the *General Management Plan* (NPS 2014b) and ongoing wilderness stewardship and backcountry management planning. Implementation of these plans causes both adverse and beneficial impacts to vegetation. Short-term adverse impacts to vegetation could result during implementation of various projects as a result of trampling and small areas of vegetation removal. However, over the long-term, management actions proposed in these plans would further protect natural resources resulting in long-term beneficial impacts to vegetation.

Ongoing asphalt debris removal that is taking place at Perdido Key under the beach enhancement project would result in adverse and beneficial impacts to vegetation. During removal activities, some vegetation may be destroyed by equipment and personnel resulting in short-term adverse impacts. However, removal of this debris would provide long-term beneficial impacts to vegetation by providing a more natural habitat for germination and vegetative community expansion.

Beneficial impacts to vegetation would be expected as an indirect effect from implementation of the Escambia County *Habitat Conservation Plan*, *A Plan for the Protection of the Perdido Key Beach Mouse, Sea Turtles, and Piping Plovers on Perdido Key, Florida*, the U.S. Fish and Wildlife Service *Alabama Beach Mouse, Perdido Key Beach Mouse, and Choctawhatchee Beach Mouse Recovery Plan*, and the *Gulf Islands National Seashore Environmental Assessment for Perdido Key Beach Mouse Habitat Protection, Johnson Beach Perdido Key Area.* Preservation of habitat for the Perdido Key beach mouse would include the preservation of vegetation in the areas where this species is found.

Implementation of past, present, and future management plans at Perdido Key would have an adverse cumulative impact on vegetation as a result of short-term impacts during implementation of these ongoing projects and the continued degradation of vegetation from vehicle parked alongside Johnson Beach Road and visitors walking over the dunes. However, overall, the long-term beneficial impacts from implementation of these plans and projects would result in beneficial cumulative impacts on vegetation because of improved habitat for germination and vegetative community expansion at Perdido Key. When the impacts on vegetation under alternative 1 are combined with the impacts from other past, present and foreseeable future projects at Perdido Key, alternative 1 would contribute a substantial adverse increment to the overall beneficial cumulative impact.

Conclusion for Alternative 1 – Vegetation

Alternative 1 would result in ongoing substantial adverse impacts to vegetation. These impacts would primarily be related to continued habitat destruction and fragmentation from vehicle

traffic parking alongside the roadway and visitors creating unauthorized trails over and around dunes.

Implementation of past, present, and future management plans at Perdido Key would have an adverse cumulative impact on vegetation as a result of short-term impacts during implementation of these ongoing projects and the continued degradation of vegetation from vehicle traffic parked alongside Johnson Beach Road and visitors walking over the dunes. However, overall, the long-term beneficial impacts from implementation of these plans and projects would result in beneficial cumulative impacts on vegetation because of improved habitat for germination and vegetative community expansion at Perdido Key. When the impacts on vegetation under alternative 1 are combined with the impacts from other past, present and foreseeable future projects at Perdido Key, alternative 1 would contribute a substantial adverse increment to the overall beneficial cumulative impact.

3.3.3 IMPACTS OF ALTERNATIVE 2

Direct and Indirect Impacts

Changes to the road configuration under alternative 2 would result in both beneficial and adverse impacts to dune and coastal strand vegetation in the project area. Under this alternative, visitors would be able to park in one of two locations at either end of the drivable portion of Johnson Beach Road. This alternative would concentrate visitor access to two locations allowing for greater dune habitat protection along the remainder of the Johnson Beach Road corridor. The elimination of roadside parking would reduce the amount of vegetation crushed and fragmented by off-road parking, resulting in a long-term beneficial impact.

The last half mile of Johnson Beach Road would be closed to vehicular traffic and would be converted to a multiuse trail under alternative 2. A 10-foot wide swath of asphalt would be removed along this stretch creating approximately 26,400 square feet (0.61 acres) of additional area for vegetation to root. Removal of motor vehicle access would further protect dune habitat by providing a more pedestrian-friendly walking area and encouraging more foot traffic on the road and paths and off the dunes. This would result in beneficial impacts to vegetation.

Expansion of the main visitor parking area and construction of a new parking area at the end of the drivable portion of Johnson Beach Road would result in short term adverse impacts to vegetation. During the construction and expansion of parking lots, some vegetation may need to be removed, which would adversely impact vegetation in the short-term. New disturbance from the construction of parking areas under this alternative would be approximately 46,520 square feet (1.07 acres).

Replacement of the existing dune crossovers with six new elevated dune crossovers would also result in short-term adverse impacts to vegetation under this alternative, as small amounts of vegetation may be removed or damaged during the construction of the new crossovers and removal of the existing. Currently, crossovers are spread along the stretch of Johnson Beach Road. Under alternative 2, the new configuration would limit them to two locations at either end of Johnson Beach Road, reducing the total number of available crossovers as compared to current conditions. Visitors, who prefer not to have to walk more than a very short distance for a more secluded beach experience, may still elect to temporarily stop along the roadway to drop people off and unload vehicles prior to parking their vehicle in a designated parking area. This would result in a small number of visitors that would continue to walk in areas where there are no crossovers; thus, creating unauthorized trails.

Under alternative 2, an additional entrance lane and fee station would be constructed at the Perdido Key entrance, resulting in adverse impacts to vegetation. To accommodate a new two lane entrance, the asphalt would be expanded to the south (see figure 5), which would result in removal of a small amount of vegetation in this area.

Efforts to concentrate parking and foot traffic would have beneficial impacts on vegetation by reducing opportunities for unauthorized trails. Overall, there would be 154.9 acres of beach dune habitat that would be improved due to proposed activities along Johnson Beach Road, 4.9 of these acres would be reclaimed. All efforts to stabilize the dune systems and associated vegetation would strengthen the natural barrier of defense against storms and erosion in this area because dunes absorb the impact of storm surge and wave action. The increase in habitat area for vegetation to stabilize would attribute a substantial beneficial impact to dune vegetation and dune stability within the Perdido Key/ Johnson Beach Area because the impact would be a permanent benefit to dune vegetation with resulting dune stabilization in this localized area.

Cumulative Impacts

Related projects and their impacts to the affected environment under alternative 2 would be similar to those described for alternative 1. Efforts to improve and restore natural resource conditions through the various plans and projects at Perdido Key have resulted in overall beneficial impacts to vegetation. Alternative 2 would contribute adverse impacts to the overall cumulative impacts as a result of tramping and disturbance during the construction phases of the proposed action. Alternative 2 would contribute beneficial impacts to the overall cumulative impact as a result of the reduction of trampling of vegetation. Overall, when the impacts on vegetation under alternative 2 are combined with the impacts from other past, present and foreseeable future projects at Perdido Key, alternative 2 would contribute a substantial beneficial increment to the overall beneficial cumulative impact.

Conclusion for Alternative 2 – Vegetation

Alternative 2 would result in temporarily adverse but overall beneficial impacts to vegetation. Adverse impacts would primarily be related to the removal of vegetation to accommodate the expanded parking areas, dune crossovers, and the additional entrance lane. Beneficial impacts would be associated with elimination of roadside parking and the closure of the last half mile of Johnson Beach Road to vehicular traffic. This configuration would focus visitors to certain areas of the park and restrict vehicles to park in certain designated areas. Both of these changes would reduce the amount of vegetation that is crushed or damaged, specifically in areas adjacent to Johnson Beach Road.

Alternative 2 would contribute adverse impacts to the overall cumulative impacts as a result of tramping and disturbance during the construction phases of the proposed action. Alternative 2 would contribute beneficial impacts to the overall cumulative impact as a result of the reduction of trampling of vegetation. Overall, when the impacts on vegetation under alternative 2 are combined with the impacts from other past, present and foreseeable future projects at Perdido Key, alternative 2 would contribute a substantial beneficial increment to the overall beneficial cumulative impact.

3.3.4 IMPACTS OF ALTERNATIVE 3

Direct and Indirect Impacts

Under alternative 3, visitors would be able to park in one of four locations along the drivable portion of Johnson Beach Road. This alternative would concentrate the greatest visitor access to lots at either end of Johnson Beach Road and two smaller lots in between. This configuration would allow for greater dune habitat protection between the parking lots while still allowing for visitor access points along the road. By concentrating use, but still maintaining access to the entire roadway, this may help reduce instances where visitors create unauthorized access points.

Under alternative 3, the following impacts would be similar to those described for alternative 2:

- Beneficial impacts to vegetation would result from the removal of a 10-foot wide swath of asphalt at the end of Johnson Beach Road, which would create approximately 26,400 square feet (0.61 acres) of additional area for vegetation to root.
- Beneficial impacts to vegetation would result from the removal of motor vehicle access along the easternmost half mile of Johnson Beach Road, which would further protect dune habitat vegetation by providing a more pedestrian-friendly walking area and encouraging more foot traffic on the road and paths and off the dunes.
- Short-term adverse impacts would result from the removal of vegetation in small areas during the expansion of the main visitor parking area and construction of the new parking areas. The area of new disturbance from the new parking areas would be 58,915 square feet (1.35 acres), an area slightly greater than under alternative 2 and further spread out along the roadway corridor.
- Beneficial, long-term impacts to vegetation would result from the elimination of roadside parking, which would reduce the amount of vegetation crushed and fragmented by cars off-road parking.
- Short-term adverse impacts would result during the replacement of the existing dune crossovers with nine new elevated crossovers, which may result in the removal or damage of small amounts of vegetation.
- Long-term beneficial impacts to vegetation would result from use of the new elevated crossovers and the addition of split rail fencing around each parking area that would direct visitors to the crossovers and further discourage visitors from walking through the dune habitat.
- Slight adverse impacts would result from the removal of small areas of vegetation during construction of an additional entrance lane and fee station, which would require that the asphalt be expanded to the south (see figure 5).

Efforts to concentrate parking and foot traffic would have beneficial impacts on vegetation by reducing opportunities for unauthorized trails. Overall, there would be 154.9 acres of beach dune habitat that would be improved due to proposed activities along Johnson Beach Road, 4.9 of these acres would be reclaimed. All efforts to stabilize the dune systems and associated vegetation would strengthen the natural barrier of defense against storms and erosion in this area because dunes absorb the impact of storm surge and wave action. The increase in habitat area for vegetation to stabilize would attribute a substantial beneficial impact to dune vegetation and dune stability within the Perdido Key/ Johnson Beach Area because the impact would be a permanent benefit to dune vegetation with resulting dune stabilization in this localized area.

Cumulative Impacts

Related projects and their impacts to the affected environment under alternative 3 would be similar to those described for alternative 1. Efforts to improve and restore natural resource conditions through the various plans and projects at Perdido Key have resulted in overall beneficial impacts to vegetation. Alternative 3 would contribute adverse impacts to the overall cumulative impacts as a result of tramping and disturbance during the construction phases of the proposed action. Alternative 3 would contribute beneficial impacts to the overall cumulative impact as a result of the reduction of trampling of vegetation. Overall, when the impacts on vegetation under alternative 3 are combined with the impacts from other past, present and foreseeable future projects at Perdido Key, alternative 3 would contribute a substantial beneficial increment to the overall beneficial cumulative impact.

Conclusion for Alternative 3 – Vegetation

Overall impacts to vegetation under alternative 3 would be similar to those described for alternative 2. Alternative 3 would result in temporarily adverse but overall beneficial impacts to vegetation. Adverse impacts would primarily be related to the removal of vegetation to accommodate the expanded parking areas, dune crossovers, and the additional entrance lane. This alternative has the greatest amount of total disturbance from new parking areas compared to other action alternatives. Although this alternative requires the most ground disturbance from new parking areas, the parking configuration allows parking access along the entire stretch of roadway, which would benefit vegetation in the long term. This alternative reduces the number of dune crossovers compared to current conditions, but places them in areas with direct parking access. All of these changes to the road configuration, parking, and crossovers would limit focus parking and visitor access to certain areas, reducing the amount of vegetation that is crushed or damaged by both vehicle and foot traffic.

Alternative 3 would contribute adverse impacts to the overall cumulative impacts as a result of tramping and disturbance during the construction phases of the proposed action. Alternative 3 would contribute beneficial impacts to the overall cumulative impact as a result of the reduction of trampling of vegetation. Overall, when the impacts on vegetation under alternative 3 are combined with the impacts from other past, present and foreseeable future projects at Perdido Key, alternative 3 would contribute a substantial beneficial increment to the overall beneficial cumulative impact.

3.3.4 IMPACTS OF ALTERNATIVE 4

Direct and Indirect Impacts

Under alternative 4, visitors would be able to park in one of eight locations along the drivable portion of Johnson Beach Road. This alternative would spread visitor access across the road corridor in smaller, but more numerous parking lots. This alternative would provide the greatest number of visitor access points and therefore allow for habitat protection between parking areas while maintaining visitor access along the entire length of the roadway, which would result in long-term, beneficial impacts to vegetation.

Under alternative 4, the following impacts would be similar to those described for alternatives 2 and 3:

- Beneficial impacts to vegetation would result from the removal of a 10-foot wide swath of asphalt at the end of Johnson Beach Road, which would create approximately 26,400 square feet (0.61 acres) of additional area for vegetation to root.
- Beneficial impacts to vegetation would result from the removal of motor vehicle access along the easternmost half mile of Johnson Beach Road, which would further protect dune habitat vegetation by providing a more pedestrian-friendly walking area and encouraging more foot traffic on the road and paths and off the dunes.
- Short-term adverse impacts would result from the removal of vegetation in small areas during the expansion of the main visitor parking area and construction of the new parking areas. The area of new disturbance from the new parking areas would be 44,900 square feet (1.03 acres). The total area of disturbance would be similar to that proposed under alternative 2; however, it would be further spread out along the roadway corridor.
- Beneficial, long-term impacts to vegetation would result from the elimination of roadside parking, which would reduce the amount of vegetation crushed and fragmented by cars off-road parking.
- Short-term adverse impacts would result during the replacement of the existing dune crossovers with 12 new elevated crossovers, which may result in the removal or damage of small amounts of vegetation. This action alternative would have the greatest number of new crossovers constructed and therefore would result in additional short-term impacts to vegetation from new disturbance.
- Long-term beneficial impacts to vegetation would result from use of the new elevated crossovers and the addition of split rail fencing around each parking area that would direct visitors to the crossovers and further discourage visitors from walking through the dune habitat.
- Slight adverse impacts would result from the removal of small areas of vegetation during construction of an additional entrance lane and fee station, which would require that the asphalt be expanded to the south (see figure 5).

Efforts to concentrate parking and foot traffic would have beneficial impacts on vegetation by reducing opportunities for unauthorized trails. Overall, there would be 154.9 acres of beach dune habitat that would be improved due to proposed activities along Johnson Beach Road, 4.6 of these acres would be reclaimed. All efforts to stabilize the dune systems and associated vegetation would strengthen the natural barrier of defense against storms and erosion in this area because dunes absorb the impact of storm surge and wave action. The increase in habitat area for vegetation to stabilize would attribute a substantial beneficial impact to dune vegetation and dune stability within the Perdido Key/ Johnson Beach Area because the impact would be a permanent benefit to dune vegetation with resulting dune stabilization in this localized area.

Cumulative Impacts

Related projects and their impacts to the affected environment under alternative 4 would be similar to those described for alternative 1. Efforts to improve and restore natural resource conditions through the various plans and projects at Perdido Key have resulted in overall beneficial impacts to vegetation. Alternative 4 would contribute adverse impacts to the overall cumulative impacts as a result of tramping and disturbance during the construction phases of the proposed action. Alternative 4 would contribute beneficial impacts to the overall cumulative impact as a result of the reduction of trampling of vegetation. Overall, when the impacts on

vegetation under alternative 4 are combined with the impacts from other past, present and foreseeable future projects at Perdido Key, alternative 4 would contribute a substantial beneficial increment to the overall beneficial cumulative impact.

Conclusion for Alternative 4 – Vegetation

Overall impacts to vegetation under alternative 4 would be similar to those described under alternatives 2 and 3. Alternative 4 would result in temporarily adverse but overall beneficial impacts to vegetation. Adverse impacts would primarily be related to the removal of vegetation to accommodate the expanded parking areas, dune crossovers, and the additional entrance lane. Beneficial impacts would be associated with the elimination of roadside parking and the closure of the last half mile of Johnson Beach Road to vehicular traffic. The level of disturbance under this alternative would be similar to that under alternative 2 while the parking configuration would allow for greater access along the length of the road corridor, which would benefit vegetation in the long term by greatly reducing the potential for trampling of and disturbance to dune habitat. All of these changes to the road configuration, parking, and crossovers would focus parking and visitor access to certain areas reducing the amount of vegetation that is crushed or damaged by both vehicle and foot traffic.

Alternative 4 would contribute adverse impacts to the overall cumulative impacts as a result of tramping and disturbance during the construction phases of the proposed action. Alternative 4 would contribute beneficial impacts to the overall cumulative impact as a result of the reduction of trampling of vegetation. Overall, when the impacts on vegetation under alternative 4 are combined with the impacts from other past, present and foreseeable future projects at Perdido Key, alternative 4 would contribute a substantial beneficial increment to the overall beneficial cumulative impact.

3.4 SPECIAL STATUS SPECIES AND WILDLIFE

3.4.1 AFFECTED ENVIRONMENT

Wildlife and habitat at the Perdido Key area of Gulf Islands National Seashore are reflective of the harsh, beach environment, flat terrain, high groundwater table, sandy soils, tidal waters, wind, and salt spray, along with the legacy of human use of the barrier island. Upland mammal species are somewhat limited in number on barrier islands because of the lack of diversity in vegetation, difficulty of access from mainland areas, and the relatively small land area available.

Typical native upland wildlife that reside in the beach dune, coastal strand, and coastal scrub habitats within the project area at Perdido Key include common reptiles, resident and migratory birds, and the Perdido Key beach mouse (*Peromyscus polionotus trissyllepsis*) (USFWS 2011).

There are no common large mammals at the Perdido Key area. Common smaller mammals include raccoon (Procyon lotor), striped skunk (*Mephitis mephitis*), nine-banded armadillo (*Dasypus novemcinctus*), red fox (*Vulpes vulpes*), and gray fox (*Urocyon cinereoargenteus*). Wildlife species that are state or federally listed as endangered or threatened are discussed in the "Special Status Species" section below. Additionally, a biological assessment has been prepared in accordance with the Endangered Species Act.

Migratory Birds

Over 280 species of birds including songbirds, waterfowl, wading birds, birds of prey, marine birds, and shorebirds use the barrier islands of the national seashore for resting, feeding, wintering, or migratory rest-stops (NPS 2014b; USFWS 2016). The east and west ends of Perdido Key receive the majority of migratory bird use.

The Migratory Bird Treaty Act of 1918 was developed to end the commercial trade in birds and their feathers that, by the early years of the 20th century, had wreaked havoc on the populations of many native bird species. The Migratory Bird Treaty Act states that all migratory birds and their parts (including eggs, nests, and feathers) are fully protected, and any person or organization which plans or conducts activities that may result in the take of migratory birds is responsible for complying with the appropriate regulations and implementing appropriate conservation measures. A list of migratory bird species that potentially occur in the area is provided in table 1.

Table 1: List of Migratory Bird Species that Potentially Occur at Perdido Key / Johnson Beach Area.

Common Name	Scientific Name
American Oystercatcher	*Haematopus palliates*
American Bittern	*Botaurus lentiginosus*
Bachman's Sparrow	*Aimophila aestivalis*
Black Skimmer	*Rynchops niger*
Brown-headed Nuthatch	*Sitta pusilla*
Chuck-will's-widow	*Caprimulgus carolinensis*
Gull-billed Tern	*Gelochelidon nilotica*

Henslow's Sparrow	*Ammodramus henslowii*
Le Conte's Sparrow	*Ammodramus leconteii*
Least Bittern	*Ixobrychus exilis*
Least Tern	*Sterna antillarum*
Lesser Yellowlegs	*Tringa flavipes*
Loggerhead Shrike	*Lanius ludovicianus*
Magnificent Frigatebird	*Fregata magnificens*
Marbled Godwit	*Limosa fedoa*
Mississippi Kite	*Ictinia mississippiensis*
Nelson's Sparrow	*Ammodramus nelsoni*
Peregrine Falcon	*Falco peregrinus*
Prothonotary Warbler	*Protonotaria citrea*
Red Knot	*Calidris canutus rufa*
Red-headed Woodpecker	*Melanerpes erythrocephalus*
Reddish Egret	*Egretta rufescens*
Rusty Blackbird	*Euphagus carolinus*
Seaside Sparrow	*Ammodramus maritimus*
Short-billed Dowitcher	*Limnodromus griseus*
Short-eared Owl	*Asio flammeus*
Snowy Plover	*Charadrius alexandrinus*
Swainson's Warbler	*Limnothlypis swainsonii*
Swallow-tailed Kite	*Elanoides forficatus*
Whimbrel	*Numenius phaeopus*
Wilson's Plover	*Charadrius wilsonia*
Wood Thrush	*Hylocichla mustelina*
Worm Eating Warbler	*Helmitheros vermivorum*
Yellow Rail	*Coturnicops noveboracensis*

Source (USFWS 2016)

Special Status Species

The Endangered Species Act of 1973, as amended, requires impacts on all federally listed threatened or endangered species be considered in planning for federal actions. NPS policy also requires examination of the impacts on federal candidate species, as well as state-listed threatened, endangered, candidate, rare, declining, and sensitive species.

Federally protected species found within the project area include the Perdido Key beach mouse, four nesting sea turtle species [loggerhead (*Caretta caretta*), green (*Chelonia mydas*), leatherback (*Dermochelys coriacea*), and Kemp's Ridley (*Lepidochelys kempii*) sea turtles], and the non-breeding piping plover (*Charadrius melodus*). Table 2 provides a list of federally protected species and listing status. Florida state listed species in the project area may include, but are not necessarily limited to: least tern (*Sternula antillarum*), snowy plover (*Charadrius nivosus*), black skimmer (*Rynchops niger*), American oystercatcher (*Haematopus palliatus*), Cruise's golden aster (*Chrysopsis cruseana*), large-leaved jointweed (*Polygonella macrophylla*), and coastal lupine (*Lupinus westianus*). Biological information for federally listed species is provided in the following sections.

Table 2: List of Federally Protected Species that Potentially Occur at Perdido Key / Johnson Beach Area.

Common Name	Scientific Name	Federal Status
Perdido Key Beach Mouse	*Peromyscus polionotus trissyllepsis*	Endangered/Critical Habitat
Loggerhead Sea Turtle	*Caretta caretta*	Threatened/Critical Habitat
Green Sea Turtle	*Chelonia mydas*	Endangered
Leatherback Sea Turtle	*Dermochelys coriacea*	Endangered
Kemp's Ridley Sea Turtle	*Lepidochelys kempii*	Endangered
Piping Plover	*Charadrius melodus*	Threatened
Red Knot	*Calidris canutus rufa*	Threatened

Perdido Key Beach Mouse. The Perdido Key beach mouse is both a federally listed and state-listed endangered species in Florida. Historically, its habitat was mature coastal barrier sand dunes along the Gulf of Mexico, but it is only currently present in the eastern part of Perdido Key, with critical habitat designated within the Perdido Key unit of the national seashore, Perdido Key State Park in Florida, and the Gulf State Park in Alabama. Tropical storms and loss of habitat due to development and habitat fragmentation are the main contributing factors to the current status of the Perdido Key beach mouse (NPS 2014b).

Habitat components considered critical for beach mice extend from the frontal dune landward to the transition from scrub habitat to maritime forest. The food plants most utilized by beach mice are beach grass and sea oats; however, they may eat invertebrates when seed sources are scarce in the late winter or early spring.

The U.S. Fish and Wildlife Service has designated critical habitat on lands that have been determined to be essential to the conservation of Perdido Key beach mice (71 FR 60238-60370). Based on current knowledge of the life history, biology, and ecology of the species and the requirements of the habitat to sustain the essential life history functions of the species, the U.S. Fish and Wildlife Service has determined that the critical habitat primary constituent elements for the Perdido Key beach mouse include:

- A contiguous mosaic of primary, secondary and scrub vegetation and dune structure, with a balanced level of competition and predation and few or no competitive or predaceous nonnative species present, that collectively provide foraging opportunities, cover, and burrow sites.
- Primary and secondary dunes, generally dominated by sea oats, that despite occasional temporary impacts and reconfiguration from tropical storms and hurricanes, provide abundant food resources, burrow sites, and protection from predators.
- Scrub dunes, generally dominated by scrub oaks, that provide food resources and burrow sites, and provide elevated refugia during and after intense flooding due to rainfall and/or hurricane induced storm surge.
- Functional, unobstructed habitat connections that facilitate genetic exchange, dispersal, natural exploratory movements, and recolonization of locally extirpated areas.
- A natural light regime within the coastal dune ecosystem, compatible with the nocturnal activity of beach mice, necessary for normal behavior, growth and viability of all life stages.

A total of five coastal dune areas (units) in southern Alabama and the panhandle of Florida are designated as critical habitat for the Perdido Key beach mouse. The project area for this environmental assessment lies within the Gulf Islands National Seashore Unit (Perdido Key

beach mouse-5), that consists of 638 acres in southern Escambia County, Florida, on the easternmost region of Perdido Key. This unit encompasses essential features of beach mouse habitat within the boundary of the Gulf Islands National Seashore Perdido Key Area (also referred to as Johnson Beach) from approximately 6.0 miles east of the Alabama–Florida State line to the eastern tip of Perdido Key at Pensacola Bay and the area from the mean high water line north to the seaward extent of the maritime forest. Beach mouse habitat in this unit consists mainly of primary and secondary dune habitat and provides the longest contiguous expanse of frontal dune habitat within the historic range of the Perdido Key beach mouse.

Sea Turtles. Four species of sea turtles occur in the waters of Gulf Islands National Seashore: the Atlantic loggerhead turtle, the green sea turtle, Kemp's Ridley sea turtle, and the leatherback turtle. Each of these species is federally listed as threatened or endangered, and all have special status in Florida. Sea turtle populations have been adversely impacted because of the loss and alteration of nesting habitat, increased mortality from boat strikes, and entanglement in commercial fishing gear. Each year numerous adult and sub-adult sea turtles are found dead at the national seashore and surrounding waters. Other causes of death include ingestion of commercial fishing long-line hooks and line, drowning in commercial fishing gear, and natural causes (NPS 2014b).

In the Florida District of the national seashore, sea turtles are primarily in Gulf of Mexico waters. Jellyfish are a common sea turtle prey item and may attract sea turtles into the Perdido Key Area and the area north of Santa Rosa Island. Additionally, green turtles may be attracted to feed in the seagrass beds in the Perdido Key Area and the area north of Santa Rosa Island.

Sea turtles are present in national seashore waters in the spring, summer, and fall until cold weather drives them to warmer southern waters. The national seashore does not have monitoring data on the abundance and distribution of sea turtles in national seashore waters. A loggerhead turtle satellite tagging program in the national seashore has revealed that the loggerhead population is most likely part of a distinct Gulf of Mexico population that is separate from the Atlantic population.

Sea turtles also nest on the beaches within the Florida District of the national seashore during the spring and summer months. The Florida District includes 21 miles of beaches suitable for sea turtle nesting. Most sea turtle nesting in the Florida District are loggerheads, although green turtles and Kemp's Ridley occasionally nest as well. Kemp's Ridley nesting has been improving in recent years. The Florida District of the national seashore averages 40 to 80 sea turtle nests, including all species, annually. The only sea turtle species with critical habitat within the proposed project area is the loggerhead sea turtle.

Nests are marked, dated, and watched by national seashore staff biologists and volunteers. About 60 days after nesting, the turtle hatchlings emerge from the sand and crawl toward the brightest horizon. Hatchlings in the Florida District often crawl in the wrong direction at night due to light pollution from the surrounding developed areas, resulting in high rates of hatchling mortality through predation and desiccation, so national seashore staff and volunteers steer the thousands of hatchlings to the sea. About one-fourth of sea turtle nests in the Florida District are relocated to higher ground because some turtles nest in areas that are vulnerable to flooding from high tides or strong southerly winds.

Loggerhead Sea Turtle – The U.S. Fish and Wildlife Service has designated critical habitat on lands that have been determined to be essential to the conservation of loggerhead sea turtles (79 FR 39756-39854). Based on current knowledge of the physical or biological features and habitat characteristics required to sustain the species' life history processes, the U.S. Fish and Wildlife Service has determined that the terrestrial primary constituent elements specific to the distinct population segment are the extra-tidal or dry sandy beaches from the mean high-water line to

the toe of the secondary dune, which are capable of supporting a high density of nests or serving as an expansion area for beaches with a high density of nests and that are well distributed within each state, or region within a state, and representative of total nesting, consisting of four components:

- Primary Constituent Element 1—Suitable nesting beach habitat that has (a) relatively unimpeded nearshore access from the ocean to the beach for nesting females and from the beach to the ocean for both post-nesting females and hatchlings and (b) is located above mean high water to avoid being inundated frequently by high tides.
- Primary Constituent Element 2—Sand that (a) allows for suitable nest construction, (b) is suitable for facilitating gas diffusion conducive to embryo development, and (c) is able to develop and maintain temperatures and a moisture content conducive to embryo development.
- Primary Constituent Element 3—Suitable nesting beach habitat with sufficient darkness to ensure nesting turtles are not deterred from emerging onto the beach and hatchlings and post-nesting females orient to the sea.
- Primary Constituent Element 4—Natural coastal processes or artificially created or maintained habitat mimicking natural conditions. This includes artificial habitat types that mimic the natural conditions described in primary constituent elements 1 to 3 above for beach access, nest site selection, nest construction, egg deposition and incubation, and hatchling emergence and movement to the sea. Habitat modification and loss occurs with beach stabilization activities that prevent the natural transfer and erosion and accretion of sediments along the ocean shoreline. Beach stabilization efforts that may impact loggerhead nesting include beach nourishment, beach maintenance, sediment dredging and disposal, inlet channelization, and construction of jetties and other hard structures. However, when sand placement activities result in beach habitat that mimics the natural beach habitat conditions, impacts to sea turtle nesting habitat are minimized.

The proposed project area lies within the LOGG–T–FL–38—Perdido Key, Escambia County Critical Habitat Unit. This unit consists of 12.6 miles (20.2 km) of island shoreline along the Gulf of Mexico. The island is separated from the mainland by the Gulf Intracoastal Waterway, Old River, Perdido Bay, Big Lagoon, and coastal islands. The unit extends from the Alabama-Florida border to Pensacola Pass. The unit includes lands from the mean high water line to the toe of the secondary dune or developed structures. The physical or biological features in this unit may require special management considerations or protections to ameliorate the threats of recreational use, predation, beach sand placement activities, in-water and shoreline alterations, climate change, beach erosion, artificial lighting, human-caused disasters, and response to disasters. The existing *Gulf Islands National Seashore General Management Plan* includes management efforts that emphasize sea turtle nest monitoring and closure areas around nests intended to protect nesting and hatchling loggerhead sea turtles from anthropogenic disturbances (NPS 2014b).

Piping Plover. The piping plover is a federally listed threatened species as well as a state-listed threatened species in Florida. The piping plover is a small shorebird that breeds in three distinct areas (the Northern Great Plains, Great Lakes, and Atlantic Coast) and winters in coastal areas of the United States from North Carolina to Texas. Habitat is concentrated in open beaches and tidal flats, and piping plovers begin arriving in Florida in July and remain into the following May. Surveys for the piping plover have been systematically carried out in the past several years. Within the Florida District, piping plovers are known to winter in tidal flat areas on Perdido Key and on the north side of Santa Rosa Island (NPS 2014b). Federally designated critical habitat has been established for the piping plover, but it does not occur within the proposed project area.

Red Knot. The red knot (*Calidris canutus rufa)* was added as a federally listed threatened species in 2015 (79 FR 73705-73748). The red knot is a large sandpiper of North America that breeds mainly in middle and high-arctic zones. Red knots are principally marine shorebirds in the non-breeding season. Red knots in Florida have been observed to use salt marshes, brackish lagoons, and tidal mudflats, while feeding on invertebrates, especially bivalves, small snails, and crustaceans. A lack of data specific to red knots in Florida and specifically to Perdido Key has been noted by the Florida Fish and Wildlife Conservation Commission. The Commission describes red knots as one of the species of greatest conservation concern in Florida. Improving gaps in data is a priority of the Florida Fish and Wildlife Conservation Commission Avian Taxa Team. It is ranked among the most biologically vulnerable avian species in the commission species ranking database and occurs exclusively in coastal habitats, identified as Florida's highest priority biotic region. The red knot is also identified as a species of greatest conservation need in *Florida's State Wildlife Action Plan.* Red knots winter in four distinct areas of the Western Hemisphere with Florida and Georgia being the main locations in the southeastern United States.

Other Shorebirds

The U.S. Fish and Wildlife Service has identified bird conservation regions throughout the U.S. and has determined birds of conservation concern for each region (USFWS 2008). The birds of conservation concern are species that represent our highest conservation priorities, many of which are in decline population-wide and could become candidates for federal listing under the Endangered Species Act unless additional conservation actions are instituted to reverse current trends.

Shorebird nesting, foraging, and loafing areas are along the north and south shorelines of all Florida District islands in the national seashore. Gulf Islands National Seashore implements seasonal closures that are reviewed on an annual basis to protect valuable shorebird habitat from impacts resulting from public use. These areas are used each year by nesting shorebirds. These closures are necessary to protect shorebirds, eggs, and chicks from human disturbance.

A portion of Perdido Key adjacent to Johnson Beach Road that is designated by posted signs is used by nesting shorebirds and is closed to all public use and access from May 1 through September 30 of each year (NPS 2014b).

The following section contains migratory shorebirds that, though not federally listed under the Endangered Species Act, are state-listed and federally protected under the Migratory Bird Treaty Act and are listed as birds of conservation concern. These birds have been documented to occur or have the potential to occur in the project area. They include the snowy plover, Wilson's plover, least tern, black skimmer, and the American oystercatcher.

Snowy Plover. The snowy plover, a small shorebird, is a year-round resident of the national seashore, and is a state-listed threatened species in Florida. Beaches; dry mud or salt flats; and the sandy shores of rivers, lakes, and ponds are the normal habitat for this plover. It nests on the ground of broad open beaches where vegetation is sparse or absent. Nests are often subject to flooding, and the plover faces threats from loss of habitat due to beach development (NPS 2014b). Snowy plover nesting has been well documented at Gulf Islands National Seashore. Resting and feeding habitat also occurs at Perdido Key.

Wilson's Plover. The Wilson's plover, slightly larger than the snowy plover, is also a year-round resident of the national seashore. Ocean beaches, lagoons, and dry mud or salt flats are the normal habitat for this plover. This plover nests on the dry part of beaches, often near a piece of

driftwood, clump of grass, or other conspicuous object. The nest is a simple scrape in sand or shell of beach, usually with sparse lining of pebbles, pieces of shell, or grass. Wilson's plover nesting, resting, and feeding habitat occurs at Perdido Key. Although the Wilson's plover is common in Florida, major threats to the species include destruction of breeding habitat by development of beachfront areas, and disturbance of nesting and roosting sites from various forms of beach recreation, such as beachgoers, pets, and vehicles (Florida Shorebird Alliance 2016; National Audubon Society 2016).

Least Tern. The least tern is a state-listed threatened species in Florida. The least tern nests near water, particularly on seacoasts, beaches, bays, estuaries, lagoons, lakes, and rivers. The least tern rests and loafs on sandy beaches, mudflats, and salt-pond dikes.

The least tern is susceptible to human disturbances, predation, flooding, and loss of habitat (NPS 2014b). Colonies establish and reestablish along the length of the islands because least terns will nest wherever suitable habitat exists and will relocate when habitat disturbances occur.

Least terns have been documented to nest in Escambia County. Least tern nesting has been common on Perdido Key. There were several successful nesting attempts as late as 2013; however attempts in 2014 and 2015 has low success rates (Monica Hardin, personal communication 2016). Suitable resting and nesting habitat exists in the project area.

Black Skimmer. The black skimmer is a state-listed species of concern in Florida. Primary habitat for the black skimmer is coastal waters, including beaches, bays, estuaries, and sandbars, as well as tidal creeks that are used for foraging. It primarily nests in colonies on sandy beaches, small coastal islands, and dredge spoil islands (NPS 2014b). Within the national seashore, black skimmers share colony sites with least terns.

Black skimmer nesting has been documented on Perdido Key, though no attempts have been confirmed since 2013 (Monica Hardin, personal communication 2016). Suitable resting and nesting habitat exists in the project area.

American Oystercatcher. The American oystercatcher is a state-listed species of concern in Florida. The American oystercatcher is the largest and heaviest Florida shorebird. This shorebird eats oysters, clams, barnacles, starfish, crabs, jellyfish, limpets, chitons, marine worms, and other marine invertebrates. Their mating season is from February through July. Nests are shallow scraped depressions lined with tiny pebbles, bits of shell and seaweed and are on higher parts of sandy or rocky beaches above the high tide line. An American oystercatcher nest was documented on Perdido Key in 2014 (Monica Hardin, personal communication 2016). Potentially suitable resting and feeding habitat does occur within the project area.

Nonnative Wildlife Species

Nonnative wildlife species found on Perdido Key include the Norway rat (*Rattus norvegicus*), nine-banded armadillo, coyote (*Canis latrans*), wild hog, red fox, black rat (*Rattus rattus*), free roaming pets, and feral cats (NPS 2014b). Similar to the management of nonnative plant species, nonnative wildlife species are managed to benefit overall ecosystem health, and impacts on individual species are considered where appropriate.

3.4.2 IMPACTS OF ALTERNATIVE 1: NO ACTION / CONTINUE CURRENT MANAGEMENT

Direct and Indirect Impacts

Under alternative 1, there would be no new construction-related actions and no proposed changes to the existing parking, road configuration, or visitor access to the Perdido Key / Johnson Beach Area. Under this alternative, vehicular traffic would continue to be allowed along the entire 2.3 mile roadway, and there would continue to be approximately 185 roadside parking spots. Visitor activities and vehicle parking alongside the entire paved roadway would continue to result in long-term adverse impacts to special status species and wildlife, especially to the Perdido Key beach mouse and nesting shorebirds, as a result of disturbances to species and crushing of vegetation along the roads in those areas. These activities would not result in significant adverse effects on migratory bird populations because of the localized nature of the impacts and the habitat use of migratory birds.

The existing dune crossovers would remain the same under this alternative, with several of them unusable. There would continue to be slight to modest adverse impacts to wildlife habitat from visitors generating unauthorized trails across the dunes. The trampling of ground cover from both vehicular and foot traffic would continue to destabilize vegetation in these areas resulting in greater damage to dune habitat from erosion and tropical storms.

Because the current parking configuration includes no efforts to concentrate parking and foot traffic it continues to have negative impacts on wildlife and wildlife habitat by destabilizing the dunes resulting in increased erosion and permanent loss of vegetation in those areas. The loss of dunes can make inland areas more vulnerable to the impact of storms and therefore more susceptible to erosion and the potential for breaches in the dunes. These impacts collectively would attribute a modest adverse impact to special status species and other wildlife within the Perdido Key/ Johnson Beach Area because the impact would be a permanent loss of vegetation and increased erosion with resulting dune de-stabilization in this localized area.

Cumulative Impacts

Implementation of past, present and future management plans that affect special status species and other wildlife within the Perdido Key Area of the national seashore include the *General Management Plan* (NPS 2014b) and ongoing wilderness stewardship and backcountry management planning. Implementation of these plans causes both adverse and beneficial impacts to wildlife habitat. Short-term adverse impacts to special status species could result during implementation of various projects as a result of trampling and small areas of habitat disturbance. However, over the long-term, management actions proposed in these plans would further protect natural resources resulting in long-term beneficial impacts to special status species and wildlife.

Ongoing asphalt debris removal taking place at Perdido Key under the beach enhancement project would result in adverse and beneficial impacts to special status species and other wildlife. During removal activities, some disturbance to habitat may occur from equipment and personnel resulting in short-term adverse impacts. However, removal of this debris would provide long-term beneficial impacts to wildlife by providing a more natural habitat.

Beneficial impacts to special status species and other wildlife habitat would be expected as a direct effect from the implementation of the Escambia County *Habitat Conservation Plan*, *A*

Plan for the Protection of the Perdido Key Beach Mouse, Sea Turtles, and Piping Plovers on Perdido Key, Florida, the U.S. Fish and Wildlife Service *Alabama Beach Mouse, Perdido Key Beach Mouse, and Choctawhatchee Beach Mouse Recovery Plan*, and the *Gulf Islands National Seashore Environmental Assessment for Perdido Key Beach Mouse Habitat Protection, Johnson Beach Perdido Key Area*. Preservation of habitat for the Perdido Key beach mouse would include the preservation of habitat in the areas where this species is found.

Implementation of past, present, and future management plans at Perdido Key would have an adverse cumulative impact on special status species and other wildlife as a result of short-term impacts during implementation of these ongoing projects and the continued disturbance to dune habitat from vehicle traffic parked alongside Johnson Beach Road and visitors walking over the dunes. However, overall, the long-term beneficial impacts from implementation of these plans and projects would result in beneficial cumulative impacts on special status species and other wildlife because of improved habitat. When the impacts on wildlife habitat under alternative 1 are combined with the impacts from other past, present and foreseeable future projects at Perdido Key, alternative 1 would contribute an intermediate adverse increment to the overall beneficial cumulative impact.

Conclusion for Alternative 1 – Special Status Species and Wildlife

Alternative 1 would result in modest adverse impacts to special status species and wildlife habitat, especially to the Perdido Key beach mouse and to nesting shorebirds, resulting from damage and to barrier island dune habitat due to the continued trampling by visitors parking along the roadside and not using the dune crossovers as they walk from roadway to the beach. Access to primitive camping areas would continue to be used as is, and the habitat degradation being caused by this activity would continue to cause adverse impacts to wildlife habitat.

Implementation of past, present, and future management plans at Perdido Key would have an adverse cumulative impact on special status species and other wildlife as a result of short-term impacts during implementation of these ongoing projects and the continued disturbance to dune habitat from vehicle traffic parked alongside Johnson Beach Road and visitors walking over the dunes. However, overall, the long-term beneficial impacts from implementation of these plans and projects would result in beneficial cumulative impacts on special status species and other wildlife because of improved habitat. When the impacts on wildlife habitat under alternative 1 are combined with the impacts from other past, present and foreseeable future projects at Perdido Key, alternative 1 would contribute an intermediate adverse increment to the overall beneficial cumulative impact.

3.4.3 IMPACTS OF ALTERNATIVE 2

Direct and Indirect Impacts

Under alternative 2, visitors would be able to park in one of two locations at either end of the drivable portion of Johnson Beach Road. This alternative would concentrate visitor access to two locations allowing for greater dune and coastal strand habitat protection along the remainder of the Johnson Beach Road corridor. Construction would be timed seasonally to avoid impacts to migratory and shoreline bird populations and to minimize temporary impacts to wildlife associated with increased construction noise and heavy equipment.

The last half mile of Johnson Beach Road would be closed to vehicular traffic and would be converted to a multiuse trail by removing a 10-foot wide swath of asphalt, creating approximately 26,400 square feet (0.61 acres) of additional wildlife habitat. This change would provide a more pedestrian-friendly walking area and encourage more foot traffic on the road and paths and off the dunes resulting in a beneficial impact for special status species.

Elimination of roadside parking, expansion of the main visitor parking area, and construction of a new parking area at the end of the drivable portion of Johnson Beach Road would result in long-term and short-term adverse and long-term beneficial impacts to wildlife and special status species. A total of approximately 46,520 square feet (1.07 acres) of new parking areas would be constructed under this alternative, removing a small amount of potential habitat for the Perdido Key beach mouse, nesting shorebirds, and other beach dune wildlife species and resulting in a long-term adverse impact. Each of the parking areas would be surrounded by split rail fencing to discourage visitors from walking through adjacent habitat. Habitat fragmentation for shorebirds and beach mice would be minimal under this alternative because there would be only two new parking areas and the lots would be placed to minimize impacts to habitat historically occupied by these species. In addition, the elimination of roadside parking would prevent habitat along the road from being disturbed by off-road parking, which would be a long-term beneficial impact to Perdido Key beach mouse and shorebird resting and nesting habitat.

Replacement of the existing inaccessible dune crossovers with six new elevated dune crossovers would result in short-term adverse and long-term beneficial impacts under this alternative. Small amounts of habitat may be removed or damaged during the demolition of existing crossovers and the construction of new crossovers, resulting in short-term adverse impacts to Perdido Key beach mouse habitat and shorebird habitat. Short-term demolition and construction activities also may result in possible take of the Perdido Key beach mouse. Perdido Key beach mouse tracks have been observed by NPS and U.S. Fish and Wildlife personnel in the sand on and adjacent to existing boardwalks in the action area (Jolene Williams, personal communication 2016). However, surveys would be conducted before construction to avoid beach mouse burrows and other species of concern, and crossovers would be placed to avoid existing dunes, vegetation, and sensitive habitat, if possible.

There would be a long-term reduction in the destruction of dune habitat from unauthorized trails because of the new crossover construction. Reduction of foot traffic on the dunes would result in an increase in the abundance and diversity of vegetation and in dune growth, which would result in long-term beneficial impacts to Perdido Key beach mouse habitat and shorebird nesting habitat, as well as to other beach dune wildlife. Under alternative 2, an additional entrance lane and fee station would be constructed at the Perdido Key Entrance. To accommodate a new two lane entrance, the asphalt area would be expanded slightly to the south (see figure 5) resulting in small areas where marginal Perdido Key beach mouse habitat may be removed or damaged, resulting in long-term adverse impacts to habitat and wildlife in the area.

Temporary impacts to wildlife associated with increased noise from the proposed construction activities could occur as wildlife would be temporarily displaced. However, any wildlife displaced during construction activities would likely return to the area and resume normal behaviors after construction activities were completed. Construction would be timed seasonally to avoid impacts to migratory and nesting shorebird and sea turtle populations.

Efforts to concentrate parking and foot traffic would have beneficial impacts on special status species and other wildlife by reducing opportunities for unauthorized trails. Overall, there would be 154.9 acres of beach dune habitat that would be improved due to proposed activities along Johnson Beach Road, 4.9 of these acres would be reclaimed. These efforts would have positive impacts on wildlife habitat by stabilizing the dunes resulting in decreased erosion and compaction in those areas. All efforts to stabilize the dune systems and associated vegetation would strengthen the natural barrier of defense against storms and erosion in this area because dunes absorb the impact of storm surge and wave action. The increase in habitat area for

vegetation to stabilize would attribute an intermediate beneficial impact special status species and other wildlife within the Perdido Key/ Johnson Beach Area because the impact would be a permanent benefit to wildlife habitat due to resulting dune stabilization in this localized area. These changes would result in long-term beneficial impacts to wildlife and special status species habitat, especially for the federally endangered Perdido Key beach mouse and for migratory shorebirds that use this habitat frequently. This alternative could result in take of the Perdido Key beach mouse. Migratory birds use the habitats within the Perdido Key/ Johnson Beach Area for resting, feeding, wintering, or migratory rest-stops. Because the proposed activities would reduce the destruction of dune habitat from unauthorized trails, and because only a small amount of habitat would be taken for use in the parking area allowing migratory birds to find other suitable adjacent habitat, this alternative would not result in a significant adverse effect on migratory bird populations. Impacts to other wildlife species are expected to be minimal due to seasonal avoidances and other conservation measures.

Cumulative Impacts

Related projects and their impacts to the affected environment under alternative 2 would be similar to those described for alternative 1. Efforts to improve and restore natural resource conditions through the various plans and projects at Perdido Key have resulted in overall beneficial impacts to special status species, other wildlife, habitat, and vegetation within the national seashore. Alternative 2 would contribute adverse impacts to the overall cumulative impacts as a result of habitat disturbance during the construction phases of the proposed action. Alternative 2 would contribute beneficial impacts to the overall cumulative impact as a result of the reduction of trampling of dune habitat. Overall, when the impacts on special status species and wildlife under alternative 2 are combined with the impacts from other past, present and foreseeable future projects at Perdido Key, alternative 2 would contribute an intermediate beneficial increment to the overall beneficial cumulative impact.

Conclusion for Alternative 2 – Special Status Species and Wildlife

Alternative 2 would result in long-term and short-term adverse and long-term beneficial impacts to wildlife and special status species, especially to the Perdido Key beach mouse and to migratory shorebirds. This alternative could result in take of the Perdido Key beach mouse, but would not be expected to have long-term adverse impacts to the beach mouse population. Impacts to other wildlife species are expected to be minimal due to seasonal avoidances and other conservation measures. Short-term adverse impacts would primarily be related to temporary equipment noise and presence of workers associated with construction activities, demolition of existing crossovers, and construction of six new crossovers. Long-term adverse impacts would include removal of habitat to accommodate new dune crossovers, the additional entrance lane, and 46,520 square feet (1.07 acres) of new and expanded parking areas. Habitat fragmentation for shorebirds and beach mice would be minimal under this alternative because there would be only two new parking areas and the lots would be placed to minimize impacts to habitat historically occupied by these species.

Long-term beneficial impacts would be associated with elimination of roadside parking and the closure of the last half mile of Johnson Beach Road. This configuration would focus visitors to certain areas of the park and restrict vehicles to park in certain designated areas. Both of these changes would reduce the amount of habitat that is crushed or damaged in areas adjacent to Johnson Beach Road. In addition, new dune crossovers under alternative 2 would reduce the amount of visitors that access the beach through unauthorized trails in sensitive dune habitat.

Alternative 2 would contribute short-term adverse impacts to the overall cumulative impacts as a result of habitat disturbance during the construction phases of the proposed action. Alternative 2 would contribute long-term beneficial impacts to the overall cumulative impact as a result of the reduction of trampling of dune habitat. Overall, when the impacts on special status species and wildlife under alternative 2 are combined with the impacts from other past, present and foreseeable future projects at Perdido Key, alternative 2 would contribute an intermediate beneficial increment to the overall beneficial cumulative impact.

3.4.4 IMPACTS OF ALTERNATIVE 3

Direct and Indirect Impacts

Under alternative 3, visitors would be able to park in one of four locations along the drivable portion of Johnson Beach Road. This alternative would concentrate the greatest visitor access to lots at either end of Johnson Beach Road and two smaller lots in between. Maintaining access to the entire roadway may reduce instances where visitors create unauthorized access points that result in habitat disturbance. Construction would be timed seasonally to avoid impacts to migratory and shoreline bird populations and to minimize temporary impacts to wildlife associated with increased construction noise and heavy equipment.

Under alternative 3, the following impacts to special status species would be similar to those described for alternative 2:

- Beneficial impacts to wildlife and special status species would result from the removal of motor vehicle access along the easternmost half mile of Johnson Beach Road, which would reduce visitor disturbance and trampling of dune habitat by providing a more pedestrian-friendly walking area and encouraging more foot traffic on the road and paths and off the dunes.
- Short-term adverse impacts would result from the construction disturbance and long term habitat loss of 58,915 square feet (1.35 acres) of potential habitat that would be converted into the new parking areas. The amount of new disturbance would be slightly greater than that for alternative 2, and the impacts associated with habitat fragmentation would be realized over a larger area.
- Long-term beneficial impacts would result from the elimination of roadside parking, which would reduce the amount of wildlife habitat crushed and fragmented by vehicle tires off-road parking, a long-term beneficial impact especially for the Perdido Key beach mouse and shorebird resting and nesting habitat.
- Short-term adverse impacts to species, especially the Perdido Key Beach mouse, would result during removal and replacement of the existing dune crossovers with nine new elevated dune crossovers. This alternative could result in take of the Perdido Key beach mouse, but would not be expected to have long-term adverse impacts to the beach mouse population. Impacts to other wildlife species are expected to be minimal due to seasonal avoidances and other conservation measures.
- Long-term beneficial impacts to wildlife and special status species would result from use of the new elevated crossovers and the addition of split rail fencing around each parking area that would direct visitors to the crossovers and further discourage visitors from creating unauthorized user trails through the dune habitat.

- Slight adverse impacts would result from the small area of habitat loss that would be disturbed during installation of an additional entrance lane and fee station at the Perdido Key entrance.

Efforts to concentrate parking and foot traffic would have beneficial impacts on special status species and other wildlife by reducing opportunities for unauthorized trails. Overall, there would be 154.9 acres of beach dune habitat that would be improved due to proposed activities along Johnson Beach Road, 4.9 of these acres would be reclaimed. These efforts would have positive impacts on wildlife habitat by stabilizing the dunes resulting in decreased erosion and compaction in those areas. All efforts to stabilize the dune systems and associated vegetation would strengthen the natural barrier of defense against storms and erosion in this area because dunes absorb the impact of storm surge and wave action. The increase in habitat area for vegetation to stabilize would attribute an intermediate beneficial impact to special status species and other wildlife within the Perdido Key/ Johnson Beach Area because the impact would be a permanent benefit to wildlife habitat due to resulting dune stabilization in this localized area. These changes would result in long-term beneficial impacts to wildlife and special status species habitat, especially for the federally endangered Perdido Key beach mouse and for migratory shorebirds that use this habitat frequently. This alternative could result in take of the Perdido Key beach mouse. Migratory birds use the habitats within the Perdido Key/ Johnson Beach Area for resting, feeding, wintering, or migratory rest-stops. Because the proposed activities would reduce the destruction of dune habitat from unauthorized trails, and because only a small amount of habitat would be taken for use in the parking area allowing migratory birds to find other suitable adjacent habitat, would not result in a significant adverse effect on migratory bird populations. Impacts to other wildlife species are expected to be minimal due to seasonal avoidances and other conservation measures.

Cumulative Impacts

Related projects and their impacts to the affected environment under alternative 3 would be similar to those described for alternative 1. Efforts to improve and restore natural resource conditions through the various plans and projects at Perdido Key have resulted in overall beneficial impacts to special status species, other wildlife, habitat, and vegetation within the national seashore. Alternative 3 would contribute adverse impacts to the overall cumulative impacts as a result of habitat disturbance in multiple locations during the construction phases of the proposed action. Alternative 3 would contribute beneficial impacts to the overall cumulative impact as a result of the reduction of trampling of dune habitat. Overall, when the impacts on special status species and wildlife under alternative 3 are combined with the impacts from other past, present and foreseeable future projects at Perdido Key, alternative 3 would contribute imperceptible beneficial and adverse increments to the overall beneficial cumulative impact.

Conclusion for Alternative 3 – Special Status Species and Wildlife

Overall impacts to special status species and wildlife under alternative 3 would be similar to those described under alternative 2. Alternative 3 would result in temporary adverse but overall beneficial impacts to wildlife and special status species. Adverse impacts would primarily be related to the temporary construction activities and removal of habitat to accommodate the expanded parking areas, dune crossovers, and the additional entrance lane. This alternative could result in take of the Perdido Key beach mouse, but would not be expected to have long-term adverse impacts to the beach mouse population. This alternative would have the greatest amount of total disturbance (area of new or expanded parking lots) compared to the other action alternatives. However, less habitat fragmentation would occur under this alternative

compared to alternative 4, as there are fewer total parking areas under this alternative. The parking configuration under this alternative allows parking and crossover access along the entire stretch of roadway, which could benefit habitat in the long term by reducing the number of visitors walking through the dune habitat to access the beach area.

Overall, when the impacts on special status species and wildlife under alternative 3 are combined with the impacts from other past, present and foreseeable future projects at Perdido Key, alternative 3 would contribute imperceptible beneficial and adverse increments to the overall beneficial cumulative impacts on wildlife and wildlife habitat.

3.4.5 IMPACTS OF ALTERNATIVE 4

Direct and Indirect Impacts

Under alternative 4, visitors would be able to park in one of eight locations along the drivable portion of Johnson Beach Road. This alternative would spread visitor access across the road corridor in smaller, but more frequent, parking lots. Maintaining access to the entire roadway may reduce instances where visitors create unauthorized access points that result in habitat disturbance. Construction would be timed seasonally to avoid impacts to migratory and shoreline bird populations and to minimize temporary impacts to wildlife associated with increased construction noise and heavy equipment.

Under alternative 4, the following impacts to special status species and wildlife, especially the Perdido Key beach mouse and migratory shorebirds, would be similar to those described under alternatives 2 and 3:

- Beneficial impacts to wildlife and special status species would result from the removal of motor vehicle access along the easternmost half mile of Johnson Beach Road, which would reduce visitor disturbance and trampling of dune habitat by providing a more pedestrian-friendly walking area and encouraging more foot traffic on the road and paths and off the dunes.
- Short-term adverse impacts would result from the construction disturbance and long term habitat loss of 44,900 square feet (1.03 acres) of potential habitat that would be converted into the new parking areas. The amount of new disturbance would be similar to alternative 2, but the impacted areas would be more spread out along the roadway causing more dune habitat fragmentation.
- Long-term beneficial impacts would result from the elimination of roadside parking, which would reduce the amount of wildlife habitat crushed and fragmented by vehicle tires off-road parking, a long-term beneficial impact especially for the Perdido Key beach mouse and shorebird resting and nesting habitat.
- Short-term adverse impacts to species, especially the Perdido Key Beach mouse, would result during removal and replacement of the existing dune crossovers with 12 new elevated dune crossovers. This alternative would have the most additional crossovers and therefore the most adverse impacts to wildlife and special status species as a result of construction and habitat fragmentation. This alternative could result in take of the Perdido Key beach mouse, but would not be expected to have long-term impacts to the population. Impacts to other wildlife species are expected to be minimal due to seasonal avoidances and other conservation measures.
- Long-term beneficial impacts to wildlife and special status species would result from use of the new elevated crossovers and the addition of split rail fencing around each parking

area that would direct visitors to the crossovers and further discourage visitors from creating unauthorized user trails through the dune habitat.

- Slight adverse impacts would result from the small area of habitat loss that would be disturbed during installation of an additional entrance lane and fee station at the Perdido Key entrance.

Efforts to concentrate parking and foot traffic would have beneficial impacts on special status species and other wildlife by reducing opportunities for unauthorized trails. Overall, there would be 154.9 acres of beach dune habitat that would be improved due to proposed activities along Johnson Beach Road, 4.6 of these acres would be reclaimed. These efforts would have positive impacts on wildlife habitat by stabilizing the dunes resulting in decreased erosion and compaction in those areas. All efforts to stabilize the dune systems and associated vegetation would strengthen the natural barrier of defense against storms and erosion in this area because dunes absorb the impact of storm surge and wave action. The increase in habitat area for vegetation to stabilize would attribute a modest beneficial impact special status species and other wildlife within the Perdido Key/ Johnson Beach Area because the impact would be a permanent benefit to wildlife habitat due to resulting dune stabilization in this localized area. These changes would result in long-term beneficial impacts to wildlife and special status species habitat, especially for the federally endangered Perdido Key beach mouse and for migratory shorebirds that use this habitat frequently. This alternative could result in take of the Perdido Key beach mouse. Migratory birds use the habitats within the Perdido Key/ Johnson Beach Area for resting, feeding, wintering, or migratory rest-stops. Because the proposed activities would reduce the destruction of dune habitat from unauthorized trails, and because only a small amount of habitat would be taken for use in the parking area allowing migratory birds to find other suitable adjacent habitat, would not result in a significant adverse effect on migratory bird populations. Impacts to other wildlife species are expected to be minimal due to seasonal avoidances and other conservation measures

Cumulative Impacts

Related projects and their impacts to the affected environment under alternative 4 would be similar to those described for alternative 1. Efforts to improve and restore natural resource conditions through the various plans and projects at Perdido Key have resulted in overall beneficial impacts to special status species, other wildlife, habitat, and vegetation within the national seashore. Alternative 4 would contribute adverse impacts to the overall cumulative impacts as a result of habitat disturbance in multiple locations during the construction phases of the proposed action. Alternative 4 would contribute beneficial impacts to the overall cumulative impact as a result of the reduction of trampling of dune habitat. Overall, when the impacts on special status species and wildlife under alternative 4 are combined with the impacts from other past, present and foreseeable future projects at Perdido Key, alternative 4 would contribute imperceptible beneficial and adverse increments to the overall beneficial cumulative impact.

Conclusion for Alternative 4 – Special Status Species and Wildlife

Overall impacts to special status species and wildlife under alternative 4 would be similar to those described under alternative 2. Alternative 4 would result in temporary adverse but overall beneficial impacts to wildlife and special status species. Adverse impacts would primarily be related to the temporary construction activities and removal of habitat to accommodate the expanded parking areas, dune crossovers, and the additional entrance lane. This alternative could result in take of the Perdido Key beach mouse, but would not be expected to have long-

term adverse impacts to the beach mouse population. Beneficial impacts would be associated with elimination of roadside parking and the closure of the easternmost half mile of Johnson Beach Road. Total area of disturbance under alternative 4 would be similar to that under alternative 2; the parking configuration allows parking and crossover access along the entire stretch of roadway, which while protecting dune habitat from unauthorized user trails, could fragment wildlife habitat in the long term. Because the effects of this alternative occur along the entire stretch of Johnson Beach Road with six new parking lots and 12 new crossovers, it would not be possible to completely avoid shorebird and Perdido Key beach mouse habitat. This alternative would have the most adverse impacts to wildlife and special status species of all the action alternatives, as it would result in higher amounts of habitat fragmentation.

Overall, when the impacts on special status species and wildlife under alternative 4 are combined with the impacts from other past, present and foreseeable future projects at Perdido Key, alternative 4 would contribute imperceptible beneficial and adverse increments to the overall beneficial cumulative impacts on wildlife and wildlife habitat.

3.5 SOILS AND SEDIMENTS

3.5.1 AFFECTED ENVIRONMENT

Escambia County and Perdido Key lie within the East Gulf Coastal Plain physiographic region which extends along the entire gulf coast of the United States. The predominant landform is a flat, weakly dissected alluvial plain formed by deposition of continental sediments onto a submerged, shallow continental shelf. This shelf was later exposed by sea level subsidence. Along the coast, fluvial deposition and shore zone processes are active in developing and maintaining beaches, swamps, and mud flats. Coastal plain sediments, most of which were deposited during higher stands of the sea, consist of unconsolidated sands, limestones, silts, and clays of Cretaceous, Tertiary, and Quaternary age (University of Florida 1991). The Gulf Coastal Plain is further divided into topographic regions, and Perdido Key falls within the Coastal Lowlands, consisting of relatively undissected, nearly level plains lying less than 100 feet above present sea level (University of Florida 1991).Elevations within the Florida Coastal Lowlands ecoregion range from 0 to 80 feet and are noted to range between 0 and 25 feet on Perdido Key. Perdido Key is predominantly a flat barrier island feature, containing old dune ridges with areas exhibiting surface modification by erosion and underground solution.

The Perdido Key barrier island system is composed predominately of well sorted medium grained quartz sand with a low fraction of fine silt and coarser pebbles and shell hash. Like most other barrier islands along the northern Gulf coast, this barrier island is a product of natural functions such as erosion, accretion, and overwash. The island exhibits a net westward migration resulting from the continual longshore transport processes as a function of the approaching wave energy. Extreme storms act to cause a northern migration through overwash processes that transports the sand from the beaches on the Gulf side to the northern island shorelines. The island also responds and migrates relative to sea level and the energy dynamics through the redistribution of sand within the entire littoral system. Recent studies have shown that the volume of sand on the island remains relatively stable; it is just redistributed within the littoral system by waves, storms, and changes in water levels (USACE 2010).

The soils at Gulf Islands National Seashore can by typified as greatly weathered and leached, with little organic material, low natural fertility, and high acidity (NPS 2014b). The parent material of Gulf Islands National Seashore is mostly marine in origin, but also to a lesser degree was deposited and formed in alluvial outwash as part of larger, ancient deltaic plains. Beaches were deposited by the action of tides, waves, and currents of the Gulf of Mexico. Most of the soils are relatively young in age geologically. The soils at Gulf Islands National Seashore have formed under a succession of plants and plant communities. Animals rearrange soil material by mixing and roughening the soil surface, moving plant nutrients to different horizons in the soil, and aerating and changing the porosity of the soil by burrowing and digging. Humans can also affect the soil-forming process through vegetation removal or planting, repeated foot traffic that can compact soil layers, and through direct and indirect displacement, mixing and or covering from construction and development projects.

Barrier island sands and topography naturally shift with storms, tides, and sand accretion and erosion, and wetlands and beaches on mainland units are occasionally flooded during large storms. However, the combined effects of absolute sea level rise and the natural subsidence of soils along the Gulf Coast are expected to result in greater relative sea level rise. Mainland units including wetlands at Davis Bayou, recreational beaches at Johnson Beach and Okaloosa, and soils in campgrounds and visitor facilities also may be affected by rising sea level. Soils in low-lying mainland units and on barrier islands may be inundated more frequently and may erode at

faster rates in the future due to climate change. Longer periods of drought or rain could alter soil moisture, affecting soil stability, nutrient content, and structure.

The beaches of Perdido Key are known for their sugar-white sands. The littoral sands along this area consist of the homogenized quartz sand with grain sizes ranging from 0.30 mm to 0.43 mm. However, some pockets of finer materials of Pleistocene origin are present. In general the sediments found along Perdido Key and Santa Rosa Island are consistent with those found in northern Gulf of Mexico coastal environments.

3.5.2 IMPACTS OF ALTERNATIVE 1: NO ACTION / CONTINUE CURRENT MANAGEMENT

Direct and Indirect Impacts

Under alternative 1, there would be no new construction-related actions and no proposed changes to the existing parking, road configuration, or visitor access to the Perdido Key / Johnson Beach Area. There would be no fundamental change to soils and sediments under this alternative. The entire stretch of Johnson Beach Road would be accessible to vehicles, and there would continue to be approximately 185 roadside parking spots. Vehicles parked alongside the paved roadway would continue to adversely impact the dunes by compacting soil and causing ground disturbance that increases erosion potential. In addition, vehicles would continue to transport foreign materials and debris that would continue to adversely impact soils and sediments in the area.

The existing dune crossovers would remain in place under this alternative with several of them remaining unusable. The current parking and dune crossover configuration encourages visitors to create unauthorized foot trails over and around the dunes. The trampling of ground cover in these areas leads to destabilization the dunes resulting in increased erosion and compaction in those areas resulting in long-term adverse impacts to soils and sediments.

Under the no-action alternative, resurfacing of Johnson Beach Road would not take place and only necessary spot repairs would be conducted. As a result, storm events and normal wear and tear would continue to erode and damage the roadway, resulting in the continued integration of roadway materials and debris into the natural soil regimen, which would continue to have a slight long-term, adverse impact on soils and sediments at Perdido Key. In the event of future storm events, the main visitor facility parking lot and Johnson Beach Road could be temporarily closed and the park staff would make necessary repairs to keep the parking area and road functional.

Because the current parking configuration includes no efforts to concentrate parking and foot traffic it continues to have negative impacts on soils and sediments by destabilizing the dunes resulting in increased erosion and compaction in those areas. The loss of dunes can make inland areas more vulnerable to the impact of storms and therefore more susceptible to erosion and the potential for breaches in the dunes. These impacts collectively would attribute a substantial adverse impact to soils and sediments within the Perdido Key/ Johnson Beach Area because the impact would be a permanent loss of soils and sediments due to erosion with resulting dune destabilization in this localized area.

Cumulative Impacts

Implementation of past, present and future management plans that affect soils and sediments within the Perdido Key Area of the national seashore include the *General Management Plan* (NPS 2014b) and ongoing wilderness stewardship and backcountry management planning. Implementation of these plans causes both adverse and beneficial impacts to soils and sediments. Short-term adverse impacts to soils and sediments could result during implementation of various projects as a result of ground disturbance. However, over the long-term, management actions proposed in these plans would further protect natural resources resulting in long-term beneficial impacts to soils and sediments.

Ongoing asphalt debris removal taking place at Perdido Key under the beach enhancement project would result in long-term beneficial impacts to soils and sediments as a result of the removal of this debris from the beach sediments.

Beneficial impacts to soils and sediments would be expected as an indirect effect from the implementation of the Escambia County *Habitat Conservation Plan*, *A Plan for the Protection of the Perdido Key Beach Mouse, Sea Turtles, and Piping Plovers on Perdido Key, Florida*, the U.S. Fish and Wildlife Service *Alabama Beach Mouse, Perdido Key Beach Mouse, and Choctawhatchee Beach Mouse Recovery Plan*, and the *Gulf Islands National Seashore Environmental Assessment for Perdido Key Beach Mouse Habitat Protection, Johnson Beach Perdido Key Area*. Preservation of habitat for the Perdido Key beach mouse would result in increased soil stabilization through the efforts of vegetation and habitat improvements.

Implementation of past, present, and future management plans at Perdido Key would have an adverse cumulative impact on soils and sediments as a result of short-term impacts during implementation of these ongoing projects and the continued disturbance to soils and sediments from vehicle traffic parked alongside Johnson Beach Road and visitors walking over the dunes. However, overall, the long-term beneficial impacts from implementation of these plans and projects would result in beneficial cumulative impacts because of improved stabilization through habitat improvements and cleanup of debris. When the impacts on soils and sediments under alternative 1 are combined with the impacts from other past, present and foreseeable future projects at Perdido Key, alternative 1 would contribute an imperceptible adverse increment to the overall beneficial cumulative impact.

Conclusion for Alternative 1 – Soils and Sediments

The no-action alternative would result in ongoing substantial adverse impacts to soils and sediments. These impacts would primarily be related to increased erosion and compaction from vehicle traffic parking alongside the roadway and visitors creating unauthorized trails over and around dunes. In addition, storm events and normal wear and tear would continue to erode and damage the roadway, resulting in the continued integration of roadway materials and debris into the natural soil regimen.

Implementation of past, present, and future management plans at Perdido Key would have an adverse cumulative impact on soils and sediments as a result of short-term impacts during implementation of these ongoing projects and the continued disturbance to soils and sediments from vehicle traffic parked alongside Johnson Beach Road and visitors walking over the dunes. However, overall, the long-term beneficial impacts from implementation of these plans and projects would result in beneficial cumulative impacts because of improved stabilization through habitat improvements and cleanup of debris. When the impacts on soils and sediments under alternative 1 are combined with the impacts from other past, present and foreseeable

future projects at Perdido Key, alternative 1 would contribute an imperceptible adverse increment to the overall beneficial cumulative impact.

3.5.3 IMPACTS OF ALTERNATIVE 2

Direct and Indirect Impacts

This alternative would concentrate visitor access to two locations at either end of Johnson Beach Road. The last half mile of Johnson Beach Road would be closed to vehicular traffic and a 10-foot wide swath of asphalt would be removed (approximately 26,400 square feet [0.61 acres]). The reduction of asphalt and the removal of motor vehicles from this section of the national seashore would protect soils and sediments by creating a more pedestrian-friendly walking area, thereby reducing the potential for erosion from visitors cutting through the dunes in this area. Furthermore, the new road configuration would have beneficial long-term impacts to soils and sediments because the smaller roadway and removal of motor vehicles would reduce the potential for foreign material to integrate into the natural soil regimen along this stretch of Johnson Beach Road.

Anticipated construction activities under this alternative include the additional entrance lane and fee station, expansion of the main visitor parking area, construction of a new parking area at the end of the drivable portion of Johnson Beach Road, removal of existing dune crossovers, and the construction of six new elevated dune crossovers. The total ground disturbance from the construction of new parking areas under this alternative would be approximately 46,250 square feet (1.07 acres). Areas disturbed during construction would have increased erosion potential. Soils exposed during the removal of dune crossovers and asphalt areas may be exposed to increased winds that would result in erosion and slight changes to some of the sand dune structures. Soils exposed during the clearing of vegetation would be susceptible to increased erosion until vegetation is reestablished. The amount of erosion would be dependent on the amount of ground disturbance, weather, and any erosion control measures in place. Tire tracks from construction equipment would potentially erode and move soil from the project area to other locations. Heavy construction equipment would also lead to increased soil compaction in and near the project site. Collectively, these construction activities would result in short-term adverse impacts to soils and sediments. As a result of best management practices to minimize runoff, soil disturbance, transfer, and compaction from any construction equipment, these adverse impacts would be slight to modest in nature.

After the construction was complete, there would be slight long-term beneficial impacts to soils and sediments from the new parking and road configuration. Each of the parking areas would be surrounded by split rail fencing to direct visitors towards the new dune crossovers and discourage visitors from walking over and around the dunes to access the beach. The new crossovers under this alternative would be concentrated around the main visitor use parking area and the new parking area at the end of the drivable portion of Johnson Beach Road. By concentrating visitor access to these two locations, it would allow for greater dune protection along the remainder of Johnson Beach Road. There would be a reduction in the amount of vegetation trampled by visitors that would result in beneficial impacts to soil and sediments. Undamaged vegetation would help keep sand in place minimizing adverse impacts from wind and other forces that would lead to increased erosion.

Efforts to concentrate parking and foot traffic would have beneficial impacts on soils and sediments by reducing opportunities for unauthorized trails. Overall, there would be 154.9 acres of beach dune habitat that would be improved due to proposed activities along Johnson Beach Road, 4.9 of these acres would be reclaimed. These efforts would have positive impacts on soils

and sediments by stabilizing the dunes resulting in decreased erosion and compaction in those areas. All efforts to stabilize the dune systems and associated vegetation would strengthen the natural barrier of defense against storms and erosion in this area because dunes absorb the impact of storm surge and wave action. The increase in habitat area for vegetation to stabilize would attribute a substantial beneficial impact to soils and sediments and dune stability within the Perdido Key/ Johnson Beach Area because the impact would be a permanent benefit to soils and sediments with resulting dune stabilization in this localized area.

Cumulative Impacts

Related projects and their impacts to the affected environment under alternative 2 would be similar to those described for alternative 1. Efforts to improve and restore natural resource conditions through the various plans and projects at Perdido Key have resulted in overall beneficial impacts to soils and sediments within the national seashore. Alternative 2 would contribute adverse impacts to the overall cumulative impacts as a result of ground disturbances during the construction phases of the proposed action. Alternative 2 would contribute beneficial impacts to the overall cumulative impact as a result of the reduction of erosion potential and ground disturbances to dune habitat. Overall, when the impacts on soils and sediments under alternative 2 are combined with the impacts from other past, present and foreseeable future projects at Perdido Key, alternative 2 would contribute a slight beneficial increment to the overall beneficial cumulative impact.

Conclusion for Alternative 2 – Soils and Sediments

Under alternative 2, adverse impacts to soils and sediments would primarily be related to ground clearing and disturbance during construction activities. Substantial beneficial impacts would be associated with the elimination of roadside parking and the reduction of asphalt along the last half mile of Johnson Beach Road. This configuration would focus visitors to certain areas of the national seashore thereby reducing the erosion potential and the amount of foreign materials introduced into the soil regime.

Alternative 2 would contribute adverse impacts to the overall cumulative impacts as a result of ground disturbances during the construction phases of the proposed action. Alternative 2 would contribute beneficial impacts to the overall cumulative impact as a result of the reduction of erosion potential and ground disturbances to dune habitat. Overall, when the impacts on soils and sediments under alternative 2 are combined with the impacts from other past, present and foreseeable future projects at Perdido Key, alternative 2 would contribute a slight beneficial increment to the overall beneficial cumulative impact.

3.5.4 IMPACTS OF ALTERNATIVE 3

Direct and Indirect Impacts

Under alternative 3, visitors would be able to park in one of four locations along the drivable portion of Johnson Beach Road. This alternative would concentrate the greatest visitor access to lots at either end of Johnson Beach Road and two smaller lots in between.

The following impacts to soils and sediments would be similar to those described for alternative 2:

- Beneficial impacts to soils and sediments would result from the reduction of asphalt and removal of motor vehicles from the easternmost half mile of Johnson Beach Road, which would create more pervious area for vegetation to root and reduce the potential for erosion from visitors cutting through the dunes in this area by creating a more pedestrian-friendly walking area.
- Short-term adverse impacts would result from 58,915 square feet (1.35 acres) of previously undisturbed ground disturbance to construct the new parking areas. The amount of new disturbance would be slightly greater than that for alternative 2, and the impacted areas would be more spread out along the roadway.
- Short-term adverse impacts would result from the increased susceptibility for erosion associated with ground disturbance associated with the removal of existing dune crossovers, construction of nine new elevated dune crossovers, and an additional entrance lane and fee station. These impacts would be slight to modest in nature as a result of best management practices that would be implemented until areas became stabilized and/or vegetation was reestablished.
- Beneficial impacts to soils and sediments would result from the reduction of vegetation trampled by visitors as a result of the creation of adjacent parking and crossover access points in numerous areas along the corridor, which would potentially result in less need and opportunity for visitors to create their own foot trails. Undamaged vegetation would help keep sand in place and minimize adverse impacts from wind and other forces that lead to increased erosion.

Efforts to concentrate parking and foot traffic would have beneficial impacts on soils and sediments by reducing opportunities for unauthorized trails. Overall, there would be 154.9 acres of beach dune habitat that would be improved due to proposed activities along Johnson Beach Road, 4.9 of these acres would be reclaimed. These efforts would have substantial beneficial impacts on soils and sediments by stabilizing the dunes resulting in decreased erosion and compaction in those areas. All efforts to stabilize the dune systems and associated vegetation would strengthen the natural barrier of defense against storms and erosion in this area because dunes absorb the impact of storm surge and wave action. The increase in habitat area for vegetation to stabilize would attribute a substantial beneficial impact to soils and sediments and dune stability within the Perdido Key/ Johnson Beach Area because the impact would be a permanent benefit to soils and sediments with resulting dune stabilization in this localized area.

Cumulative Impacts

Related projects and their impacts to the affected environment under alternative 3 would be similar to those described for alternative 1. Efforts to improve and restore natural resource conditions through the various plans and projects at Perdido Key have resulted in overall beneficial impacts to soils and sediments within the national seashore. Alternative 3 would contribute adverse impacts to the overall cumulative impacts as a result of ground disturbances in multiple locations during the construction phases of the proposed action. Alternative 3 would contribute beneficial impacts to the overall cumulative impact as a result of the reduction of erosion potential and ground disturbances to dune habitat. Overall, when the impacts on soils and sediments under alternative 3 are combined with the impacts from other past, present and foreseeable future projects at Perdido Key, alternative 3 would contribute an intermediate beneficial increment to the overall beneficial cumulative impact.

Conclusion for Alternative 3 – Soils and Sediments

Overall impacts to soils and sediments under alternative 3 would be similar to those described under alternative 2. Alternative 3 would result in temporary adverse but overall substantial beneficial impacts to soils and sediments. Adverse impacts would primarily be related to ground clearing and disturbance during construction activities. This alternative would have the greatest total disturbance from the construction of new parking areas compared to the other action alternatives. Beneficial impacts would be associated with elimination of roadside parking and the reduction of asphalt along the last half mile of Johnson Beach Road. This configuration would focus visitors to certain areas of the national seashore and thereby reduce the erosion potential and the amount of foreign materials introduced into the soil regime. Although this alternative would reduce the number of dune crossovers compared to current conditions, access to crossovers and parking would be adjacent to each other resulting in less opportunity for visitors to create their own foot trails. Overall, the damaging vehicle and foot traffic along the areas adjacent to Johnson Beach Road would be reduced.

Alternative 3 would contribute adverse impacts to the overall cumulative impacts as a result of ground disturbances in multiple locations during the construction phases of the proposed action. Alternative 3 would contribute beneficial impacts to the overall cumulative impact as a result of the reduction of erosion potential and ground disturbances to dune habitat. Overall, when the impacts on soils and sediments under alternative 3 are combined with the impacts from other past, present and foreseeable future projects at Perdido Key, alternative 3 would contribute an intermediate beneficial increment to the overall beneficial cumulative impact.

3.5.5 IMPACTS OF ALTERNATIVE 4

Direct and Indirect Impacts

Under alternative 4, visitors would be able to park in one of eight locations along the drivable portion of Johnson Beach Road.

The following impacts would be similar to those described for alternatives 2 and 3:

- Beneficial impacts to soils and sediments would result from the reduction of asphalt and removal of motor vehicles from the easternmost half mile of Johnson Beach Road, which would create more pervious area for vegetation to root and reduce the potential for erosion from visitors cutting through the dunes in this area by creating a more pedestrian-friendly walking area.
- Short-term adverse impacts would result from 44,900 square feet (1.03 acres) of previously undisturbed ground disturbance to construct the new parking areas. The total area of disturbance would be further spread out along the roadway corridor than under the other action alternatives.
- Short-term adverse impacts would result from the increased susceptibility for erosion associated with ground disturbance associated with the removal of existing dune crossovers, construction of 12 new elevated dune crossovers, and an additional entrance lane and fee station. These impacts would be slight to modest in nature as a result of best management practices that would be implemented until areas became stabilized and/or vegetation was reestablished.
- Beneficial impacts to soils and sediments would result from the reduction of vegetation trampled by visitors as a result of the creation of adjacent parking and crossover access

points in numerous areas along the corridor, which would potentially result in less need and opportunity for visitors to create their own foot trails. Undamaged vegetation would help keep sand in place and minimize adverse impacts from wind and other forces that lead to increased erosion.

Efforts to concentrate parking and foot traffic would have beneficial impacts on soils and sediments by reducing opportunities for unauthorized trails. Overall, there would be 154.9 acres of beach dune habitat that would be improved due to proposed activities along Johnson Beach Road, 4.6 of these acres would be reclaimed. These efforts would have positive impacts on soils and sediments by stabilizing the dunes resulting in decreased erosion and compaction in those areas. All efforts to stabilize the dune systems and associated vegetation would strengthen the natural barrier of defense against storms and erosion in this area because dunes absorb the impact of storm surge and wave action. The increase in habitat area for vegetation to stabilize would attribute a substantial beneficial impact to soils and sediments and dune stability within the Perdido Key/ Johnson Beach Area because the impact would be a permanent benefit to soils and sediments with resulting dune stabilization in this localized area.

Cumulative Impacts

Related projects and their impacts to the affected environment under alternative 4 would be similar to those described for alternative 1. Efforts to improve and restore natural resource conditions through the various plans and projects at Perdido Key have resulted in overall beneficial impacts to soils and sediments within the national seashore. Alternative 4 would contribute adverse impacts to the overall cumulative impacts as a result of ground disturbances in multiple locations during the construction phases of the proposed action. Alternative 4 would contribute beneficial impacts to the overall cumulative impact as a result of the reduction of erosion potential and ground disturbances to dune habitat. Overall, when the impacts on soils and sediments under alternative 4 are combined with the impacts from other past, present and foreseeable future projects at Perdido Key, alternative 4 would contribute a substantial beneficial increment to the overall beneficial cumulative impact.

Conclusion for Alternative 4 – Soils and Sediments

Overall impacts to soils and sediments under alternative 4 would be similar to those described under alternatives 2 and 3. Alternative 4 would result in temporary adverse but overall substantial beneficial impacts to soils and sediments. Adverse impacts would primarily be related to ground clearing and disturbance during construction activities. Beneficial impacts would be associated with the elimination of roadside parking and the reduction of asphalt along the last half mile of Johnson Beach Road. This configuration would focus visitors to certain areas of the national seashore and thereby reduce the erosion potential and the amount of foreign materials introduced into the soil regime. This alternative would provide nearly the same number of dune crossovers as exist currently, but access to the crossovers and parking would be adjacent to each other resulting in less opportunity for visitors to create their own foot trails. Overall, the damaging vehicle and foot traffic along the areas adjacent to Johnson Beach Road would be reduced compared to current conditions.

Alternative 4 would contribute adverse impacts to the overall cumulative impacts as a result of ground disturbances in multiple locations during the construction phases of the proposed action. Alternative 4 would contribute beneficial impacts to the overall cumulative impact as a result of the reduction of erosion potential and ground disturbances to dune habitat. Overall, when the impacts on soils and sediments under alternative 4 are combined with the impacts

from other past, present and foreseeable future projects at Perdido Key, alternative 4 would contribute a substantial beneficial increment to the overall beneficial cumulative impact.

3.6 VISITOR USE AND EXPERIENCE AND RECREATION RESOURCES (INCLUDING PUBLIC HEALTH AND SAFETY)

3.6.1 AFFECTED ENVIRONMENT

Recreational Opportunities

Gulf Islands National Seashore is the largest seashore in the national park system and provides public access to barrier islands, historic coastal fortifications, and a bayou. The national seashore is open year-round and is one of the few publicly accessible points along the gulf coast of the United States where visitors can enjoy seashore values such as clean ocean water and beaches, undeveloped coastline, natural sounds free of man-made disturbances, seashore viewsheds, night skies, and wildlife viewing. Visitors to the Perdido Key area of the national seashore can enjoy a variety of activities, including camping, walking, boating, biking, hiking, shell collecting, fishing, swimming, and surfing. The waters, beaches, coastal marshes, and wildlife in the national seashore provide a stark contrast to the rapidly growing coastal communities and major population centers along the northern Gulf of Mexico coastline.

Under the park's existing general management plan, the width of Perdido Key around Johnson Beach Road and approximately 1.5 miles to the east are within the recreational beaches zone. Areas within this zone are managed to maintain or restore their natural conditions, although allowances are permitted for minor impacts associated with visitor access, sanitation, and public safety. The recreational beach zone accommodates traditional recreational beach activities and facilities. Recreational beaches are defined as those beach areas that correlate with a parking lot, boardwalk or trail, and where the public is invited to participate in sunbathing, beach combing, sand sculpture, swimming, and other customary recreational pursuits, and where such activities are frequent and commonplace.

In addition to parking along the road and at the main visitor facility parking area, visitor amenities at Perdido Key are located near the main visitor facility and include picnic shelters, trash receptacles, restrooms, water fountains, and a shade pavilion. Lifeguards are on duty near the main visitor facility during the summer months. East of the main visitor facility parking area, the only visitor amenities available include dune crossovers and informational signage. As mentioned above, there are currently 11 dune crossovers that provide visitor access over the dunes and vegetation to the beaches. While many visitors use the crossovers, others cut through the dunes, which damages habitat. Since they were installed, natural dune migration has engulfed several of the dune crossovers rendering them unusable. In the areas area around these particular crossovers, visitors have created multiple foot trails through the sensitive barrier island habitat.

Primitive camping is allowed on Perdido Key 0.5 miles beyond the end of Johnson Beach Road (to the east). Primitive campers arriving by vehicle or foot at Perdido Key must obtain a free self-registration form located at the outside of the Perdido Key Entrance Station. Leave No Trace principles and camping rules are posted on the back of the form. Primitive campers may stay no more than 14 consecutive days and no more than 42 days annually. The primitive camping area begins 0.5 mile beyond the east end of the paved road. Campers must hike through the sand. No camping is allowed in the dunes or on vegetation. Currently, campers arriving by vessel do not need to register for a free camping permit. In 2014, there were 4,228 camper nights at Perdido Key with the largest number of reservations occurring in July (NPS 2014a). This number equals the number of campers times the number of nights they stayed. So for example two campers

staying for two nights would equal 4 camper nights. The camping area typically has some occupants year round with a peak between May through July.

The Perdido Key Area of the national seashore is a fee-based area. The cost to enter the national seashore is $7 per person, $15 per standard private vehicle. Currently, there is a single entrance and fee both at the western boundary. During the peak summer season (especially during holidays), wait times to enter are common and traffic frequently backs up towards Perdido Key Drive. The area is open from 5:00 am until 10 pm with exceptions for primitive camping and permits. Entrance fees are valid for 7 days.

Visitation

The national seashore is the most heavily visited seashore in the national park system, and it is one of the 10 most visited park units in the national park system (NPS 2014b). The national seashore is the nearest coastal beach to most of the nation's midsection, so beach use is the primary recreational experience of most visitors. Changes in annual visitation and visitation patterns to the national seashore are influenced by hurricanes and other strong coastal storms. Hurricanes can damage visitor facilities and impact visitor accessibility to areas of the national seashore. At Perdido Key, storms have resulted in temporary closures as a result of temporary flooding and washover of Johnson Beach Road.

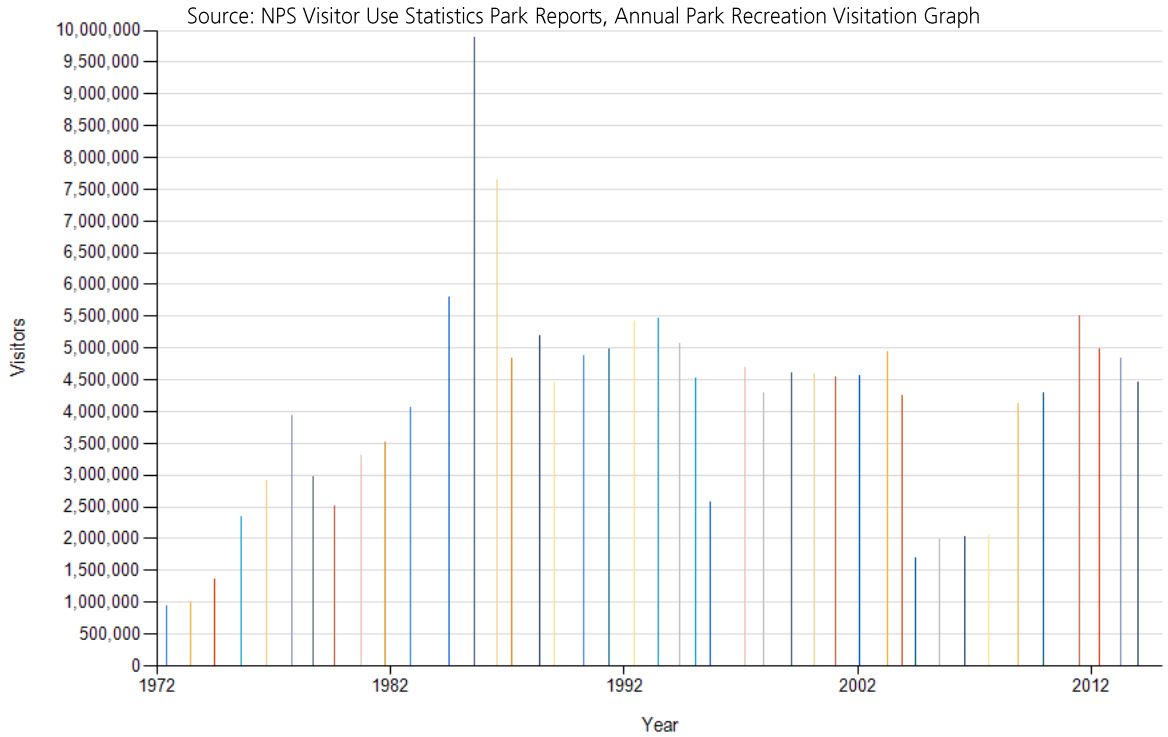


Figure 10: Total Annual Recreation Visitors at Gulf Islands National Seashore (1972-present)

Changes in annual visitation and visitation patterns to the national seashore are influenced by hurricanes and other strong coastal storms. Figure 10 highlights the influences by displaying the decline in visitation following various hurricanes. In October 1995, Hurricane Opal destroyed numerous seashore facilities and roads and thereby limited visitor access and recreational opportunities in 1996. In an 11-month period, beginning with Hurricane Ivan in September 2004, the national seashore was damaged by four hurricanes and two tropical storms. Each

hurricane and tropical storm interrupted and impacted the reconstruction efforts and created barriers that limited visitor access and use at the national seashore. As a result, visitation numbers were lower four years in a row after the hurricanes and tropical storms. Annual visitation rebounded in 2009 to near pre-storm levels.

Although the national seashore is open year-round, the highest visitor use occurs from May through August (nearly 50% of annual recreation visits). June and July generally receive the highest levels of visitation, while December and January generally have the lowest visitation. On average, the Florida District receives about 75% of the recreation visitors, although visitation fluctuates from year to year (NPS 2014b). At Perdido Key, increased visitation tends to extend from spring through fall (NPS 2016). Perdido Key's visitation consists primarily of family groups arriving by private vehicles. Local residents frequently use Johnson Beach Road for walking in the early summer mornings and evenings.

Climate change could alter the timing of visits at the national seashore. Visitor numbers currently tend to dip in the fall and winter months, but higher temperatures and sea level rise associated with climate change could shift visitation toward cooler seasons and could also alter visitor access to Perdido Key and other portions of the national seashore in the future. Climate change and the projected increase in the intensity, duration, and frequency of storms and their impacts could also alter patterns in visitation and the availability of park amenities. An increase in the number and severity of storms associated with climate change could affect visitor experiences, access to these activities, availability, and condition of visitor services and facilities. Specific impacts to the national seashore are as yet unknown; however, it is anticipated that Perdido Key, a narrow barrier island, would be subject to flooding and erosion. Visitor access to this portion of the national seashore could be impacted if portions of the barrier island and amenities were submerged and or eroded.

Visitor Health and Safety

Public and employee health and safety are affected throughout the national seashore by the interactions of people with the natural environment, with other people, and with park operations and activities. Past, present, and future actions of the National Park Service are directed toward meeting statutory and regulatory health and safety requirements and managing risks to the public and employees. The types of public health and safety concerns identified in relationship to this project include those associated with sand encroachment along Johnson Beach Road, traffic, and pedestrian access.

Currently, visitors either park in the main visitor facility parking area or along both sides of a 1.2-mile stretch of Johnson Beach Road. Natural dune migration across Perdido Key has resulted in frequent inundation of sand along the road corridor. As a result, roadside-parked cars frequently obstruct the driving lanes creating safety concerns for both motorists and pedestrians walking to and from their parked cars. In addition to a narrow driving area, depending on where they park, visitors must walk along the narrow road corridor and/or cross the road before reaching their desired dune crossover. In addition, during peak summer visitation, emergency vehicle access down the road can be impaired by sections that are congested and become limited to almost one way traffic. While the main health and safety concern in this area is the potential for vehicle/vehicle and vehicle/pedestrian accidents, the conditions mentioned above result in slow traffic speeds and there have not, as of yet, been any recorded incidents between vehicles and pedestrians in this area of the park. The flat terrain, lack of dense vegetation, and road layout currently allow for a line of site that enables good visibility. However, the variety of park users, the eagerness of visitors to get to the beach, and parking vehicles pulling off and on the roadway all have the potential to distract the attention of drivers.

3.6.2 IMPACTS OF ALTERNATIVE 1: NO ACTION / CONTINUE CURRENT MANAGEMENT

Direct and Indirect Impacts

Under alternative 1, there would be no new construction-related actions and no proposed changes to the existing parking, road configuration, or visitor access to the Perdido Key / Johnson Beach Area. There would be no change in the fundamental nature of visitor experience or recreational opportunities at Perdido Key under the no-action alternative. Johnson Beach Road and Perdido Key would remain susceptible to continued sand encroachment on the road due to natural dune migration. There would be adverse impacts on visitor use and experience resulting from any temporary closures associated with necessary plowing and/or clean up and maintenance projects following future storm events. Depending on the availability of staff for continued maintenance and future weather patterns, parking area conditions could deteriorate to the point that the quality of the visitor experience would be diminished for visitors that favor roadside parking. Under the no-action alternative, up to 508 parking spaces would remain available to visitors, including approximately 185 roadside parking spots); however, if the availability of parking was temporarily reduced, visitors to Perdido Key could be adversely impacted. The magnitude of this impact would depend on the season, the area impacted, and the visitor's desired destination. During times of peak visitation, a reduction in available parking along the road corridor could be considerable. Other times of the year, the impact would be considered trivial.

Under alternative 1, the existing dune crossovers would remain in place with several of them being unusable. This would continue to focus visitor access and encourage visitors to use foot trails through the dunes in some locations. The visual impacts from the continued degradation of the sensitive barrier island habitat in these spot locations (as a result of the foot trails), in addition to restricted or limited access, would both result in slight to modest adverse impacts on the visitor experience, depending on the location.

The no-action alternative would not result in any changes in access or use of primitive camping areas at Perdido Key. It is anticipated that the number of primitive campers would remain similar to existing levels.

Under alternative 1, the entrance station to Perdido Key would remain as a single lane and, during the peak summer season, wait times to enter could be lengthy. Traffic would continue to back up towards Perdido Key Drive. This congestion could be amplified as a result of new construction occurring just outside the Perdido Key entrance. Depending on the level of congestion and the time of year, adverse impacts to the visitor experience could be slight to considerable. It is anticipated that lengthy wait times could cause some visitors to avoid this area of the national seashore during peak summer days.

Under the no-action alternative, routine resurfacing of Johnson Beach Road would not occur. Storm events and normal wear and tear would continue to erode and damage the roadway, resulting in adverse impacts on visitor use and experience during road repairs that result in temporary closures. Depending on the time of year and length of the closure, these impacts could range from slight to considerable in their intensity.

The ongoing narrowed driving lanes caused by naturally migrating dunes and the resulting encroachment of parked vehicles on the driving lane along a portion of Johnson Beach Road would continue to cause safety concerns for visitors under the no-action alternative. Safety concerns would continue to be amplified in areas where visitors are walking along the road corridor to reach one of the dune crossovers. The adverse impacts to the visitor experience as a result of these safety concerns would range from slight to considerable depending on the

number of visitors and vehicles along the road corridor and the corresponding speed at which traffic was able to travel. While increased congestion would result in an increased potential for conflicts, it would also result in decreased vehicular speeds, which could improve the safety of visitors.

Because the current parking configuration and dune crossovers include no efforts to concentrate parking and foot traffic, negative impacts on visitor experience from the continued degradation of the sensitive barrier island habitat would continue to occur. The continued congestion at the entrance station would contribute to lengthy wait times that could cause some visitors to avoid this area of the national seashore during peak summer days. These impacts collectively would attribute ongoing slight to modest adverse impacts to visitor use and experience and recreational opportunities within the Perdido Key/ Johnson Beach Area.

Cumulative Impacts

The park manages the impacts to visitor experience through development of management plans and implementation of subsequent actions to improve the experience of visitors. Implementation of past, present and future management plans that affect visitor use and experience within the Perdido Key Area of the national seashore include the *General Management Plan* (NPS 2014b) and ongoing wilderness stewardship and backcountry management planning.

Implementation of these plans causes both adverse and beneficial impacts to visitor experience. These plans strive to ensure the national seashore remains unimpaired for future use and enjoyment and in so doing have altered or would alter conditions, with varied beneficial and adverse temporary effects on visitor experience within the national seashore. While short-term adverse impacts to visitor experience could result during implementation of various projects, overall, the long-term effects would be beneficial.

Slight adverse impacts routinely occur on visitor experience in and around the national seashore and at Perdido Key from facility maintenance to temporary closures and the use of machinery and equipment for site management. These impacts include restrictions to visitor access or interference with visitor enjoyment of the national seashore. Some visitors may be required to change their plans if an area of the park they want to visit is temporarily closed. Visitors may not be able to access all areas of the park. However, such management actions are generally of short duration and these inconveniences are not likely to impact visitors to a large degree. Under alternative 1, restrictions to visitor access or interference with visitor enjoyment of the national seashore would also be expected, which could result in the visitor having to change plans. Therefore, cumulative adverse impacts to visitor experience could occur from alternative 1 and implantation of these planning efforts.

Implementation the *General Management Plan* and a new wilderness stewardship and backcountry management plan will include potential changes to improve the visitor experience at the national seashore and the primitive camping experience at Perdido Key.

Ongoing asphalt debris removal that is taking place at Perdido Key under the beach enhancement project would result in adverse and beneficial impacts to visitor use and experience. During removal activities, areas of Perdido Key could be temporarily closed to visitors resulting in slight, short-term adverse impacts. However, this work would likely take place during the off season and over the long-term and removal of this debris would provide beneficial impacts to visitors by enhancing the visitor experience and restoring the natural viewshed. Under alternative 1, restrictions to visitor access or interference with visitor enjoyment of the national seashore would also be expected, which could result in the visitor having to change plans. Therefore, cumulative adverse impacts could occur to visitor experience from alternative 1 and asphalt debris removal.

Overall, beneficial impacts from implementation of these plans and projects would result in beneficial cumulative impacts on visitor use and experience because of improved visitor opportunities, management actions, and efforts to improve and restore natural resource conditions at Perdido Key. When the impacts on visitor experience and recreation resources under alternative 1 are combined with the impacts from other past, present and foreseeable future projects at Perdido Key, alternative 1 would contribute a modest adverse increment to the overall beneficial cumulative impact.

Conclusion for Alternative 1 – Visitor Use and Experience and Recreation Resources

The no-action alternative would result in ongoing slight to modest adverse impacts to visitor use and experience and recreational opportunities. These impacts would primarily be related to limited visitor access either from temporary closures associated with road maintenance or necessary repairs from future storm events, unusable dune crossovers, and lengthy entrance wait times. Adverse impacts would also result from increased visitor safety concerns along the 1.2-mile stretch of Johnson Beach Road where roadside parking is permitted.

Overall, cumulative impacts on visitor use and experience would be beneficial because of improved visitor opportunities, management actions, and efforts to improve and restore natural resource conditions at Perdido Key. Alternative 1 would contribute a modest adverse increment to the overall beneficial cumulative impact as a result of the variable roadside parking conditions, unusable dune crossovers, potential entrance wait times, and safety concerns. When the impacts on visitor experience and recreation resources under alternative 1 are combined with the impacts from other past, present and foreseeable future projects at Perdido Key, alternative 1 would contribute a modest adverse increment to the overall beneficial cumulative impact.

3.6.3 IMPACTS OF ALTERNATIVE 2

Direct and Indirect Impacts

Under alternative 2, the closing of the easternmost half mile of Johnson Beach Road to vehicular traffic and its conversion to a multiuse trail would result in both beneficial and adverse impacts to visitor use and experience. Beneficial impacts would result for those visitors who use Johnson Beach Road for walking and biking and would appreciate the improved conditions and safety of a vehicle-free portion of road. For those visitors who wish to drive the length of the road and/or have previously been dropped off at the road terminus to enjoy the more secluded beach area for the day, the closure would result in adverse impacts. Due to the close proximity of additional beach area, these adverse impacts would be considered slight. Adverse impacts could result for those visitors who are primitive camping. Primitive campers would still be required to walk 0.5 miles beyond the end of the paved surface for a total of 1.0 mile beyond the closest parking/drop-off area. Removal of motor vehicle access at the end of Johnson Beach Road would mean backcountry campers would no longer have the option of being dropped off at the end of the road. Depending on the individual visitor and their physical ability, this change could result in slight adverse impacts to their experience. However, removal of vehicular traffic from this portion of Johnson Beach Road would also make walking this stretch of road more pleasant and could therefore result in a beneficial impact to primitive campers. It is anticipated that the number of primitive campers would remain similar to existing levels.

Elimination of roadside parking, the reduction of dune crossovers, the expansion of the main visitor facility parking area, and construction of a new parking area at the end of the drivable portion of Johnson Beach Road would also result in both adverse and beneficial impacts to visitor use and experience. Confining parking to two different lots at either end of the drivable portion of Johnson Beach Road and removing the dune crossovers in between would concentrate visitor use to these areas when compared to current conditions. Short to long-term slight to modest adverse impacts would result for those visitors who prefer roadside parking and for those who prefer not to have to walk more than a very short distance from one of the dune crossovers that would be removed for a more secluded beach experience. These impacts would be greater initially until returning visitors became adjusted to the new layout and parking availability. While the new parking configuration would result in an overall reduction of dune crossovers and available parking spaces (71-85 spots) at Perdido Key, staff would be able to more easily maintain the crossovers and parking areas from encroaching sands and parking spots would not be routinely rendered unavailable. As a result, parking areas within the lots would provide more consistently delineated and available parking for visitors resulting in a long-term benefit. Short-term adverse impacts as a result of the decreased number of parking spaces could result during peak summer holidays. These impacts would be slight to modest depending on the number of visitors.

Due to the proposed change in traffic patterns for Johnson Beach Road and the need for cars to be able to turn around through the proposed new terminal parking area, the use of RVs would not be permitted on Johnson Beach Road east of the main visitor facility parking area. This vehicle restriction would result in long-term impacts to visitors arriving by RV. These impacts are anticipated to be slight due to the continued availability of RV parking and beach access at the main visitor facility parking area.

While the naturally migrating dunes would continue to deposit sand along Johnson Beach Road, the elimination of roadside parking would remove the presence of parked cars encroaching on the driving lanes. In addition, the removal of roadside parking would reduce the presence of pedestrians walking along the roadside. These actions would result in a long-term benefit to visitor safety by allowing for appropriate vehicle passing widths and reducing the potential for pedestrian / vehicle conflicts. These actions could result in an indirect consequence of increased vehicle speeds along Johnson Beach Road, which could adversely impact visitor safety; however, posted speed limits would not increase and these impacts would not be expected to be measurable.

During construction of the new and expanded parking areas, entrance lane expansion, and routine resurfacing of Johnson Beach Road visitors could experience delays and there may be temporary closures to certain areas. Construction would occur during the off season when visitation levels are lower. These activities would result in short-term modest adverse impacts to visitor use and experience as a result of any temporary closures and noise intrusions associated with the construction. Long-term impacts would be beneficial on visitor use and experience. The expanded entrance lane would lessen delays on days with high visitation and resurfacing of Johnson Beach Road would ensure continued public access and reduce the need for future closures for road repairs.

If an alternative paving surface material was used in the new proposed parking area, it could require additional maintenance by park staff. Routine maintenance of the parking area could result in temporary closures; however, these tasks would be scheduled during non-peak visitation hours to the extent practicable. Slight adverse impacts to visitor use and experience would result from temporary disruptions caused by maintenance of an alternative paving surface.

Under alternative 2, replacement of the existing dune crossovers with six new elevated dune crossovers would result in long-term beneficial impacts to visitor use and experience. These benefits would result from more sustainable access to the beaches in these locations as a result

of the dune crossovers being more elevated and therefore more easily maintainable and sustainable against naturally migrating dunes. In addition, beneficial impacts to visitor use and experience would result from several of the crossovers being universally accessible. Over the long-term, visitors would benefit from the indirect impacts of enhanced scenic resources from the reduction of foot trails through the dunes and resulting improved dune habitat.

Efforts to concentrate parking and foot traffic would have beneficial impacts on visitor use and experience and recreational opportunities by reducing opportunities for unauthorized trails. These efforts would have positive impacts on visitor use and experience and recreational opportunities by stabilizing the dunes and creating a positive impact on visitor experience from the efforts to halt the degradation of sensitive barrier island habitat. **The expanded entrance lane would lessen delays on days with high visitation, and resurfacing of Johnson Beach Road would ensure continued public access and reduce the need for future closures for road repairs.** These impacts collectively would attribute beneficial impacts to visitor use and experience and recreational opportunities within the Perdido Key/ Johnson Beach Area.

Cumulative Impacts

Related projects and their impacts to the affected environment under alternative 2 would be similar to those described for alternative 1. Improved visitor opportunities, management actions, and efforts to improve and restore natural resource conditions at Perdido Key have resulted in overall beneficial impacts to the visitor experience and recreation resources. Alternative 2 would contribute adverse impacts to the overall beneficial cumulative impact as a result of adjustments for returning visitors, more concentrated beach use, an overall reduction in parking, limited RV access, and temporary closures or delays. Alternative 2 would contribute beneficial impacts to the overall beneficial cumulative impacts as a result of improved walking/biking conditions, more reliable parking, increased safety, improved infrastructure, and improved beach access via the new dune crossovers. Overall, when the impacts on visitor experience and recreation resources under alternative 2 are combined with the impacts from other past, present and foreseeable future projects at Perdido Key, alternative 2 would contribute a slight beneficial increment to the overall beneficial cumulative impact.

Conclusion for Alternative 2 – Visitor Use and Experience and Recreation Resources

Over the long term, alternative 2 would result in beneficial impacts to visitor use and experience and recreational resources. These impacts would primarily be related to improved walking/biking conditions, more reliable parking, increased safety, improved infrastructure, and improved beach access via the new dune crossovers. Adjustments for returning visitors, more concentrated beach use, an overall reduction in parking, limited RV access, and temporary closures or delays would result in slight to intermediate, mostly short-term adverse impacts to visitor experience.

Cumulative impacts on visitor use and experience and recreation resources would be beneficial because of improved visitor opportunities, management actions, and efforts to improve and restore natural resource conditions at Perdido Key. Alternative 2 would contribute both adverse and beneficial impacts to the overall beneficial cumulative impact. An adverse increment to cumulative impacts would be associated with adjustments for returning visitors, more concentrated beach use, an overall reduction in parking, limited RV access, and temporary closures or delays. A beneficial increment to the overall beneficial cumulative impacts would result from improved walking/biking conditions, more reliable parking, increased safety,

improved infrastructure, and improved beach access via the new dune crossovers. Overall, when the impacts on visitor experience and recreation resources under alternative 2 are combined with the impacts from other past, present and foreseeable future projects at Perdido Key, alternative 2 would contribute a slight beneficial increment to the overall beneficial cumulative impact.

3.6.4 IMPACTS OF ALTERNATIVE 3

Direct and Indirect Impacts

Under alternative 3, the following impacts to visitor use and experience and recreation resources would be similar to those under alternative 2:

- Beneficial impacts would result, for those visitors who use Johnson Beach Road for walking and biking, from the more pedestrian-friendly conditions provided by the removal of motor vehicles from the easternmost half mile of Johnson Beach Road.
- Slight adverse impacts would result, for those visitors who previously enjoyed being dropped off at the road terminus, from the removal of motor vehicles from the easternmost half mile of Johnson Beach Road. Both adverse and beneficial impacts could result for primitive campers who would no longer have the option of being dropped off at the end of the road but would have a more pedestrian-friendly walking experience along the last half mile of Johnson Beach Road.
- Short-term adverse impacts to visitor use and experience would result until returning visitors became adjusted to the new parking configuration, which would concentrate beach users by confining parking to four different lots and reducing the overall number of dune crossovers.
- Short-term impacts could result for some visitors who prefer who prefer the beach and lagoon side areas near the proposed parking lot at the end of the drivable portion of Johnson Beach Road, due to a likely increase of beach users in these locations. These impacts would be greater initially until returning visitors became adjusted to the new layout.
- Short-term adverse impacts could result from the decreased number of parking spaces (41-50 spots) during peak summer holidays. However, long-term benefits would result from the fact that staff would be able to more easily maintain the parking areas from encroaching sands and parking spots would not be routinely rendered unavailable.
- Slight, long-term adverse impacts would result for visitors arriving by RV due to the restriction of RVs on Johnson Beach Road east of the main visitor facility parking area.
- Long-term benefits to visitor safety would result from the removal of roadside parking along Johnson Beach Road as a result of appropriate vehicle passing widths and reduced potential for pedestrian / vehicle conflicts.
- Short-term impacts to visitor use and experience would result from delays, temporary closures, and noise intrusions associated with construction of the new and expanded parking areas, entrance lane expansion, and routine resurfacing of Johnson Beach Road; however, whenever possible, construction would take place during the off season when visitation levels are lower.

- Long-term beneficial impacts would result from decreased delays as a result of the expanded entrance lane and ensured continued public access resulting from resurfacing of Johnson Beach Road.
- If an alternative paving surface was used, slight adverse impacts to visitor use and experience would result from any temporary disruptions caused by the need for additional maintenance of the paving surface.
- Long-term beneficial impacts would result from replacement of the existing dune crossovers with nine new elevated crossovers, which would allow for more sustainable and universal access to the beaches in these locations as a result of the elevated crossovers being more easily maintainable and sustainable against naturally migrating dunes. In addition, indirect long-term benefits would result from enhanced scenic resources as a result of decreased foot trails through the dunes and improved dune habitat.

Efforts to concentrate parking and foot traffic would have beneficial impacts on visitor use and experience and recreational opportunities by reducing opportunities for unauthorized trails. These efforts would have positive impacts on visitor use and experience and recreational opportunities by stabilizing the dunes creating a positive impact on visitor experience from the efforts to halt the degradation of the sensitive barrier island habitat. The expanded entrance lane would lessen delays on days with high visitation, and resurfacing of Johnson Beach Road would ensure continued public access and reduce the need for future closures for road repairs. These impacts collectively would attribute beneficial impacts to visitor use and experience and recreational opportunities within the Perdido Key/ Johnson Beach Area.

Cumulative Impacts

Related projects and their impacts to the affected environment under alternative 3 would be similar to those described for alternative 1. Improved visitor opportunities, management actions, and efforts to improve and restore natural resource conditions at Perdido Key have resulted in overall beneficial impacts to the visitor experience and recreation resources. Alternative 3 would contribute adverse impacts to the overall beneficial cumulative impact as a result of adjustments for returning visitors, slightly more concentrated beach use, a slight overall reduction in parking, limited RV access, and temporary closures or delays. Alternative 3 would contribute beneficial impacts to the overall beneficial cumulative impacts as a result of improved walking/biking conditions, more reliable parking, increased safety, improved infrastructure, and improved beach access via the new dune crossovers. Overall, when the impacts on visitor experience and recreation resources under alternative 3 are combined with the impacts from other past, present and foreseeable future projects at Perdido Key, alternative 3 would contribute a beneficial increment to the overall beneficial cumulative impact.

Conclusion for Alternative 3 – Visitor Use and Experience and Recreation Resources

Overall impacts to visitor use and experience and recreation resources under alternative 3 would be similar to those described under alternative 2. This alternative would have more parking areas and dune crossovers available for visitor use than alternative 2, resulting in more long-term beneficial impacts to visitor experience. These impacts would primarily be related to improved walking/biking conditions, more reliable parking, increased safety, improved infrastructure, and improved beach access via the new dune crossovers. Adjustments for returning visitors, slightly more concentrated beach use, a slight overall reduction in parking,

limited RV access, and temporary closures or delays would result in slight to moderate, mostly short-term adverse impacts to visitor experience.

Cumulative impacts on visitor use and experience and recreation resources would be beneficial because of improved visitor opportunities, management actions, and efforts to improve and restore natural resource conditions at Perdido Key. Alternative 3 would contribute both adverse and beneficial impacts to the overall beneficial cumulative impact. An adverse increment to cumulative impacts would be associated with adjustments for returning visitors, slightly more concentrated beach use, a slight overall reduction in parking, limited RV access, and temporary closures or delays. A beneficial increment to the overall beneficial cumulative impacts would result from improved walking/biking conditions, more reliable parking, increased safety, improved infrastructure, and improved beach access via the new dune crossovers. Overall, when the impacts on visitor experience and recreation resources under alternative 3 are combined with the impacts from other past, present and foreseeable future projects at Perdido Key, alternative 3 would contribute a beneficial increment to the overall beneficial cumulative impact.

3.6.5 IMPACTS OF ALTERNATIVE 4

Direct and Indirect Impacts

Under alternative 4, seven new parking areas and 12 new elevated dune crossovers would be constructed. The following impacts to visitor use and experience and recreation resources would be similar to those described under alternatives 2 and 3:

- Beneficial impacts would result, for those visitors who use Johnson Beach Road for walking and biking, from the more pedestrian-friendly conditions provided by the removal of motor vehicles from the easternmost half mile of Johnson Beach Road.
- Slight adverse impacts would result, for those visitors who previously enjoyed being dropped off at the road terminus, from the removal of motor vehicles from the easternmost half mile of Johnson Beach Road. Both adverse and beneficial impacts could result for primitive campers who would no longer have the option of being dropped off at the end of the road but would have a more pedestrian-friendly walking experience along the last half mile of Johnson Beach Road.
- Short-term adverse impacts to visitor use and experience would result until returning visitors became adjusted to the new parking configuration. However, under alternative 4, the new parking configuration would likely result in a distribution of visitors on the beaches most similar to current conditions The additional parking areas and dune crossovers would distribute visitors over a greater length of beach than the other action alternatives that propose more concentrated parking, resulting in more beneficial impacts for those visitors who prefer not to have to walk more than a very short distance for a more secluded beach experience.
- Short-term adverse impacts could result for some visitors who prefer the beach and lagoon side areas near the proposed parking lot at the end of the drivable portion of Johnson Beach Road, due to a likely increase of beach users in these locations. These impacts would be greater initially until returning visitors became adjusted to the new layout.
- Short-term adverse impacts could result from the slight decreased number of parking spaces (11-15 spots) during peak summer holidays; however, the difference is so slight, it would likely go unnoticed. Over the long-term benefits would result from the fact that

staff would be able to more easily maintain the parking areas from encroaching sands and parking spots would not be routinely rendered unavailable.

- Slight, long-term adverse impacts would result for visitors arriving by RV due to the restriction of RVs on Johnson Beach Road east of the main visitor facility parking area.
- Long-term benefits to visitor safety would result from the removal of roadside parking along Johnson Beach Road as a result of appropriate vehicle passing widths and reduced potential for pedestrian / vehicle conflicts.
- Short-term slight adverse impacts to visitor use and experience would result from delays, temporary closures, and noise intrusions associated with construction of the new and expanded parking areas, entrance lane expansion, and routine resurfacing of Johnson Beach Road; however, whenever possible, construction would take place during the off season when visitation levels are lower.
- Long-term beneficial impacts would result from decreased delays as a result of the expanded entrance lane and ensured continued public access resulting from resurfacing of Johnson Beach Road.
- If an alternative paving surface was used, slight adverse impacts to visitor use and experience would result from any temporary disruptions caused by the need for additional maintenance of the paving surface.
- Long-term beneficial impacts would result from replacement of the existing dune crossovers with 12 new elevated crossovers, which would allow for more sustainable and universal access to the beaches in these locations as a result of the elevated crossovers being more easily maintainable and sustainable against naturally migrating dunes. Alternative 4 would provide the greatest number of new crossovers and therefore the greatest benefit. In addition, indirect long-term benefits would result from enhanced scenic resources as a result of decreased foot trails through the dunes and improved dune habitat.

Efforts to concentrate parking and foot traffic would have beneficial impacts on visitor use and experience and recreational opportunities by reducing opportunities for unauthorized trails. These efforts would have positive impacts on visitor use and experience and recreational opportunities by stabilizing the dunes creating a positive impact on visitor experience from the efforts to halt the degradation of the sensitive barrier island habitat. The expanded entrance lane would lessen delays on days with high visitation, and resurfacing of Johnson Beach Road would ensure continued public access and reduce the need for future closures for road repairs. These impacts collectively would attribute beneficial impacts to visitor use and experience and recreational opportunities within the Perdido Key/ Johnson Beach Area.

Cumulative Impacts

Related projects and their impacts to the affected environment under alternative 4 would be similar to those described for alternative 1. Improved visitor opportunities, management actions, and efforts to improve and restore natural resource conditions at Perdido Key have resulted in overall beneficial impacts to the visitor experience and recreation resources. Alternative 4 would contribute adverse impacts to the overall beneficial cumulative impact as a result of adjustments for returning visitors, limited RV access, and temporary closures or delays. Alternative 4 would contribute beneficial impacts to the overall beneficial cumulative impacts as a result of improved walking/biking conditions, more reliable parking, increased safety, improved infrastructure, and improved beach access via the new dune crossovers. Overall, when the impacts on visitor experience and recreation resources under alternative 4 are combined with the impacts from other past, present and foreseeable future projects at Perdido Key,

alternative 4 would contribute a beneficial increment to the overall beneficial cumulative impact.

Conclusion for Alternative 4 – Visitor Use and Experience and Recreation Resources

Overall impacts to visitor use and experience and recreation resources under alternative 4 would be similar to those described under alternatives 2 and 3. This alternative would have more parking areas and dune crossovers available for visitor use than under both alternatives 2 and 3, resulting in more long-term beneficial impacts to visitor experience. These impacts would primarily be related to improved walking/biking conditions, more reliable parking, increased safety, improved infrastructure, and improved beach access via the new dune crossovers. Adjustments for returning visitors, limited RV access, and temporary closures or delays would result in slight to moderate, mostly short-term adverse impacts to visitor experience.

Cumulative impacts on visitor use and experience and recreation resources would be beneficial because of improved visitor opportunities, management actions, and efforts to improve and restore natural resource conditions at Perdido Key. Alternative 4 would contribute both adverse and beneficial impacts to the overall beneficial cumulative impact. An adverse increment to cumulative impacts would be associated with the adjustments for returning visitors, limited RV access, and temporary closures or delays. A beneficial increment to the overall beneficial cumulative impacts would result from improved walking/biking conditions, more reliable parking, increased safety, improved infrastructure, and improved beach access via the new dune crossovers. Overall, when the impacts on visitor experience and recreation resources under alternative 4 are combined with the impacts from other past, present and foreseeable future projects at Perdido Key, alternative 4 would contribute a beneficial increment to the overall beneficial cumulative impact.

4.0 CHAPTER 4: CONSULTATION AND COORDINATION

The "Consultation and Coordination" chapter describes the public involvement and agency consultation used during the preparation of the environmental assessment. A combination of activities, including public scoping, internal workshops, and agency briefings, has helped to guide the National Park Service in developing this environmental assessment. This chapter provides a detailed list of the various consultations initiated during the development of the environmental assessment, as well as a list of preparers.

4.1 BRIEF HISTORY OF PLANNING AND PUBLIC INVOLVEMENT

Pursuant to Director's Order #12, the NPS has made a diligent effort to involve the interested and affected public in this National Environmental Policy Act process. This involvement, known as scoping, occurs at the beginning of the National Environmental Policy Act process to identify the range of issues, resources, and alternatives to address in the environmental assessment. Typically, both internal and public scoping is conducted to address these elements. State and federal agencies were contacted to uncover any additional planning issues and to fulfill statutory requirements, as described in the following sections.

4.1.1 INTERNAL SCOPING

The internal scoping process for the proposed project began on June 16, 2015, when representatives from the national seashore, the Southeast Regional Office NPS staff, and their consultants met to discuss the purpose and need of the project, potential alternatives that could meet these needs, and resource conditions and issues within the project area. The group also initiated plans for future agency and public scoping activities. Throughout the development of this environmental assessment, the group coordinated to review relevant issues, discuss the development of alternatives and impact analysis, and further develop means of including agencies and the public in the planning process.

4.1.2 PUBLIC SCOPING

Public scoping for this project began in August of 2015 when a newsletter describing the project and the initial alternative concepts was sent to the national seashore's mailing list and posted on the NPS Planning, Environment and Public Comment (PEPC) website. Additionally, an open house public meeting was held at the Perdido Key Community Center in Pensacola, Florida on September 1, 2015. It was estimated that 30 people were in attendance, with 28 signing in. The official public comment period for the alternatives began on August 14, 2015, and concluded on September 15, 2015.

More than 50 pieces of correspondence were received during the 33-day review period. Commentary on support for the no-action alternative, providing and maintaining access to the beaches, and concern over the need for additional maintenance were expressed most commonly throughout the comments received. Several comments discussed support for proposed alternative 3 and numerous comments expressed concern over impacts to wildlife/habitat.

These comments were taken into consideration during the further development of the alternatives presented in this environmental assessment. The interested public and agencies will have an opportunity to review and comment on this environmental assessment during a 30-day review period.

4.2 AGENCY CONSULTATION

4.2.1 AGENCY INVOLVEMENT

The National Park Service initiated scoping with multiple relevant agencies early in the planning process. Scoping information was sent to the Florida Department of Environmental Protection, Florida Division of Historical Resources (the State Historic Preservation Officer), Florida Fish and Wildlife Conservation Commission, Florida Department of Transportation, National Marine Fisheries Service, U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, and U.S. Fish and Wildlife Service. This consultation is discussed in more detail below. Copies of the responses from the agencies, if applicable, can be found in appendix C.

Section 7 of the Endangered Species Act

Section 7 of the Endangered Species Act requires federal agencies to consult with the U.S. Fish and Wildlife Service regarding the potential for proposed actions to ensure that any action it authorizes, funds, or carries out is not likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of critical habitat. The National Park Service reviewed species data for the project area through the U.S. Fish and Wildlife Information, Planning and Conservation System. Subsequently, in a letter sent in August 2015, the NPS initiated informal consultation with the U.S. Fish and Wildlife Service about the presence of federally listed threatened or endangered species in the vicinity of the national seashore area. During informal consultation with the U.S. Fish and Wildlife Service they stated their preference for an alternative that would enable less direct impacts to the coastal dune ecosystem from parking lots and turnarounds, less indirect impacts to the coastal dunes ecosystem from trampling, trash, noise, people, and dune crossovers that provided a route all the way from the parking to open beach in order to avoid impacts to the habitat immediately adjacent to the crossovers. Based on information gathered during scoping and a review of the U.S. Fish and Wildlife Service Information, Planning and Conservation website, seven federally listed species were considered to potentially have a presence within the project area: piping plover (*Charadrius melodus*), red knot (*Calidris canutus rufa*), Perdido Key beach mouse (*Peromyscus polionotus trissyllepsis*), green sea turtle (*Chelonia mydas*), Kemp's Ridley sea turtle (*Lepidochelys kempii*), leatherback sea turtle (*Dermochelys coriacea*), and the Atlantic loggerhead sea turtle (*Caretta caretta*). Pursuant to the Endangered Species Act, the National Park Service would make a finding that the alternative preferred by the National Park Service *may affect but is not likely to adversely affect* the piping plover, red knot, Atlantic loggerhead sea turtles, green sea turtle, Kemp's Ridley sea turtle, and leatherback sea turtle. The National Park Service would make a finding that the alternative preferred by the National Park Service *may affect and is likely to adversely affect* the Perdido Key beach mouse during construction. However, long-term impacts to the Perdido Key beach mouse are expected to be beneficial. A biological assessment detailing these findings was submitted for review to the U.S. Fish and Wildlife Service in April 2016.

The National Park Service would continue to coordinate with the U.S. Fish and Wildlife Service with regard to listed species.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act of 1918 is the primary legislation in the United States established to conserve migratory birds. The act prohibits the taking, killing, or possessing of migratory birds unless permitted by regulation. As part of the analysis in the environmental assessment, the National Park Service would comply with the provisions of the Migratory Bird Treaty Act by ensuring the proposed action would not have a significant adverse effect on migratory bird populations. As a result, the National Park Service will confer with the U.S. Fish and Wildlife Service during the process if the development and implementation of conservation measures to minimize or mitigate adverse effects to migratory birds, not listed under the Endangered Species Act, is required.

Section 106 of the National Historic Preservation Act

Section 106 of the National Historic Preservation Act requires federal agencies to take into account the impacts of their undertakings on historic properties. At the onset of this environmental assessment process, in accordance with section 800. 3(c) of the Advisory Council on Historic Preservation's regulations (36 CFR 800), the national seashore sent a letter to consult with the Florida Division of Historical Resources to notify them that National Historic Preservation Act compliance would be conducted by the national seashore separately but concurrent to the environmental assessment. Following this consultation, a historic resources survey inventory was completed at the project area. This survey did not locate any National Register of Historic Places-listed or eligible historic structures or cultural landscapes, nor any known ethnographic resources within the study area. A copy of the historic resources survey report was sent to the State Historic Preservation Officer. In a letter dated April 11, 2016, the State Historic Preservation Office concurred that there would be no adverse effect by the proposed action and that should future untested areas be impacted by project activities, archeological testing would be conducted prior to subsurface disturbance.

Clean Water Act and Rivers and Harbors Act

The National Park Service would comply with provisions set forth in the Clean Water Act, the primary federal law governing water pollution. The primary objectives of the act are to restore and maintain the chemical, physical, and biological integrity of the nation's waters by preventing point and nonpoint pollution sources, providing assistance to publicly owned treatment works for the improvement of wastewater treatment, and maintaining the integrity of wetlands. The Rivers and Harbors Act of 1899 makes it a misdemeanor to discharge refuse matter of any kind into the navigable waters, or tributaries thereof, of the United States without a permit. Many activities covered by the Rivers and Harbors Act are regulated under the Clean Water Act. During implementation of the project, stormwater discharge permits and best management practices would ensure that no pollutants enter the waters of the Gulf of Mexico or the Big Lagoon.

National Park Service Procedural Manuals #77-2

Pursuant to NPS Procedural Manuals #77-2: *Floodplain Management* (NPS 2003), a floodplains statement of findings has been developed and is included as appendix A. The statement of findings has been prepared in accordance with Executive Order 11988 (Floodplain Management), NPS Director's Order #77-2, and Floodplain Management and Procedural

Manual #77-2. It summarizes the floodplain development associated with actions proposed in the alternative preferred by the National Park Service. The statement of findings also describes the reasons why encroachment into the floodplain is required to implement the project, the site-specific flood risks involved, and the measures that would be taken to mitigate floodplain impacts.

Coastal Zone Management Act

The National Park Service would comply with the provisions of Florida's Coastal Management Program under the Coastal Zone Management Act. As defined by the Coastal Zone Management Act, the actions subject to the enforceable polices of approved state management programs are any actions that (1) cause changes in the manner in which land, water, or other coastal zone natural resources are used, (2) cause limitations on the range of uses of coastal zone natural resources, or (3) cause changes in the quality or quantity of coastal zone natural resources. Florida's coastal zone reaches inland for the entire state. The seaward boundary in the Gulf of Mexico is 3 marine leagues (9 nautical miles) and is 3 nautical miles in the Atlantic. The National Park Service would review and coordinate the proposed action with the state.

Coastal Barriers Resource Act

The National Park Service would comply with the provisions if the Coastal Barrier Resources System in conjunction with the activities proposed in this project. This legislation, signed into law in 1982, designated relatively undeveloped coastal barriers as part of the Coastal Barrier Resources System, and made these areas ineligible for most new federal expenditures and assistance. Perdido Key was added to the Coastal Barrier Resources System in 1990 (USFWS 2015). While the projects being proposed in this environmental assessment would not qualify for federal flood insurance, they would be in compliance with the Coastal Barriers Resources Act.

4.2.2 TRIBAL INVOLVEMENT

A number of American Indian tribes traditionally, and currently, value the Florida coastal areas of Gulf Islands National Seashore. Traditionally associated tribes include those listed below.

The Muscogee (Creek) Nation responded on August 19th, 2015 stating they would like to review the environmental assessment once it is available. All associated tribes will continue to be kept informed about the status of the environmental assessment. When the environmental assessment is released to the public, the National Park Service will again send letters to the tribes, formally asking for their input.

The following Native American tribes were contacted and invited to participate in the planning process:

- Alabama Coushatta Tribe of Texas
- Alabama-Quassarte Tribal Town
- Chickasaw Nation
- Choctaw Nation of Oklahoma
- Coushatta Tribe of Louisiana
- Jena Band of Choctaw Indians
- Kialegee Tribal Town
- Miccosukee Tribe of Indians of Florida
- Mississippi Band of Choctaw Indians
- Muscogee Creek Nation
- Poarch Band of Creek
- Seminole Nation of Oklahoma
- Seminole Tribe of Florida
- Thlopthlocco Tribal Town
- Tunica-Biloxi Indian Tribe

4.3 LIST OF PREPARERS AND CONTRIBUTORS

This document was prepared by Parsons with input from staff at Gulf Islands National Seashore and the NPS Southeast Regional Office. The list of preparers and contributors is provided in table 3.

Table 3: List of Preparers and Contributors

National Park Service, Gulf Islands National Seashore	
Dan Brown	Superintendent
Jolene Williams	Environmental Protection Specialist
Cassity Bromley	Chief of Science and Resource Stewardship
DeDe Mladucky	Chief Ranger
Mark Nicholas	Biologist
RW Jenkins	Chief of Maintenance
Fred Shott	Project Manager
David Ogden	Cultural Resource Management Specialist
National Park Service, Southeast Regional Office	
Jami Hammond	Regional Environmental Coordinator
Parsons	
Darren Mitchell	Project Manager
Alexa Miles	Environmental Scientist
Amanda Molsberry	Environmental Scientist
Rebecca Porath	Environmental Scientist
Cheryl Quaine	Coastal Resources and Water Resources Specialist

4.4 PUBLIC REVIEW

The environmental assessment will be on formal public and agency review for 30 days and has been distributed to a variety of interested individuals, agencies, and organizations. It also is available for public review on the NPS Planning, Environment, and Public Comment web site <http://parkplanning.nps.gov/guis>, and hard copies are available at the NPS headquarters at the visitor contact station at the Naval Live Oaks Area.

This page is intentionally left blank

5.0 REFERENCES

5.1 BIBLIOGRAPHY

Federal Emergency Management Agency (FEMA)

2006 Flood Insurance Rate Maps, City of Escambia County, Florida. Panel 516 and 517 of 457. Map Numbers 12033C0516G and 12033C0517G. Revised Preliminary Map, Released September 29, 2006.

2008 Emergency Management Institute (EMI). Floodplain Management: Principles and Current Practices. Floodplain Natural Resources and Functions (Chapter 8). Available on the Internet at https://www.training.fema.gov/hiedu/aemrc/courses/coursetreat/fm.aspx.

Federal Register

2006 Designation of Critical Habitat for the Perdido Key Beach Mouse, Choctawhatchee Beach Mouse, and St. Andrew Beach Mouse. 71 Federal Register 197 (12 October 2006), pp. 60238-60370.

2014 Designation of Critical Habitat for the Northwest Atlantic Ocean Distinct Population Segment of the Loggerhead Sea Turtle; Final Rule. 79 FR 39756-39854

2014 Threatened Species Status for the Rufa Red Knot; Final Rule 79 FR 73706-73748

Florida Shorebird Alliance

2016 Wilson's Plover. Available on the Internet at http://flshorebirdalliance.org/resources/bird-guide/wilsons-plover.aspx.

Hardin, Monica

2016 Personal communication between Monica Hardin, NPS and Cassity Bromley, NPS regarding the presence of Wilsons Plover in the national seashore. Information passed on to Parsons in comments received February 1.

Intergovernmental Panel on Climate Change (IPCC)

2007a *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge, UK and New York, NY: Edited by S. Solomon, D. Qin, M. Manning, Z. Chen, M. Marquis, K. B. Averyt, M. Tignor, and H. L. Miller. Cambridge University Press. Available on the Internet at <http://www.ipcc.ch/publications_and_data/publications_ipcc_fourth_assessment_report_wg1_report_the_physical_science_basis.htm>.

2007b *Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. Geneva, Switzerland: Core Writing Team, edited by R.K. Pachauri and A. Reisinger. Available on the Internet at <http://www.ipcc.ch/publications_and_data/publications_ipcc_fourth_assessment_report_synthesis_report.htm>.

Loehman, Rachel and Greer Anderson

2009 Understanding the Science of Climate Change Talking Points: Impacts to the Atlantic Coast. Available on the Internet at <http://www.nature.nps.gov/climatechange/docs/AtlanticCoastTP.pdf>.

National Audubon Society

2016 Wilson's Plover. Available on the Internet at https://www.audubon.org/field-guide/bird/wilsons-plover.

National Oceanic and Atmospheric Administration (NOAA)

2015 Hurricane Research Division. Atlantic Oceanographic & Meteorological Laboratory. Available on the Internet at http://www.aoml.noaa.gov/hrd/tcfaq/G1.html.

National Park Service (NPS)

2003 Director's Order #77-2: *Floodplains Management.* Washington, DC: NPS Office of Policy. Approved 9/8/03.

2006 *Management Policies 2006.* Washington, D.C.: NPS Office of Policy. Available on the Internet at <http://www.nps.gov/policy/MP2006.pdf>.

2014a Camper Night Summary. Gulf Islands National Seashore camper night statistics for 2014. Compiled by park staff.

2014b *Gulf Islands National Seashore Final General Management Plan / Environmental Impact Statement.* Florida and Mississippi. July.

2015 African-American History – Rosamond Johnson. NPS website providing information on Rosamond Johnson Beach. Last updated November 27, 2015. Available on the Internet at http://www.nps.gov/guis/learn/historyculture/african-american-history-rosamond-johnson.htm

2016 Gulf Islands National Seashore (GUIS) Visitation by Locations and State. Monthly counts for the Perdido Key Area from 2014. Available on the internet at: https://irma.nps.gov/Stats/Reports/Park/GUIS.

Nicholls, R.J.

2004 Coastal flooding and wetland loss in the 21st century: changes under the SRES climate and socioeconomic scenarios. *Global Environmental Change*, 14: 69-86.

Talora, D.C., T. C. Magro and A.C. Schilling

2007 Impacts associated with trampling on tropical sand dune vegetation. *For. Snow Landsc. Res.* 81, 1/2: 151–162.

Titus, J.G. & C. Richman

2001 Maps of lands vulnerable to sea level rise: modeled elevations along the US Atlantic and Gulf coasts. *Climate Research*, 18: 205-228.

University of Florida

1991 *Perdido Key Historical Summary and Interpretation of Monitoring Programs.* UFL/COEL- 91/009, Coastal and Oceanographic Engineering Department, University of Florida, Gainesville, FL, June, 49 pp. Co-authors: P. Work and L. Charles.

U.S. Army Corps of Engineers (USACE)

2010 *Environmental Assessment and Finding of No Significant Impact (FONSI) for the Lower Pensacola Harbor Federal Navigation Channel, Escambia County, Florida.* Prepared by U.S. Army Corps of Engineers, Mobile District Planning and Environmental Division Environmental Resources Branch, Coastal Environment Team. January, 2010. U.S. Army Corps of Engineers, Mobile District.

U.S. Fish and Wildlife Service

2008 Birds of Conservation Concern 2008. Division of Migratory Bird Management; Arlington, Virginia. Available at: http://www.fws.gov/migratorybirds/pdf/grants/BirdsofConservationConcern2008.pdf

2014 Perdido Key beach mouse (*Peromyscus polionotus trissyllepsis*) 5-year review: summary and evaluation. U.S. Fish and Wildlife Service, Panama City, Florida.

2015 Coastal Barrier Resources System Mapper. Available on the internet at www.fws.gov/cbra/Maps/Mapper.html

2016 Perdido Key Area EA IPaC Trust Resource Report. Generated January 12, 2016.

This page is intentionally left blank