National Park Service
US Department of the Interior

Canaveral National Seashore
Florida

Canaveral National Seashore

Playalinda District Storm Adaptive Management Plan
Environmental Assessment




SEPTEMBER 2026

This environmental assessment (EA) is substantially complete and fulfills factors mandated by the National Environmental Policy Act of 1969 within the statutorily mandated page and time limits. The National Park Service (NPS) used expert judgment to prioritize documentation of the most important relevant considerations. Therefore, this EA's analysis is adequate to inform and reasonably explain the NPS's decision. Any considerations addressed briefly or left unaddressed are, in the NPS's judgment, comparatively non-substantive and would not meaningfully inform the NPS's consideration of environmental effects and the resulting decision.

US Department of the Interior – National Park Service

Canaveral National Seashore

Playalinda District

Storm Adaptive Management Plan
Environmental Assessment

September 2026

Canaveral National Seashore (the park), a unit of the national park system administered by the National Park Service (NPS), protects one of the longest undeveloped stretches of Atlantic coastline in Florida. Hurricanes Ian and Nicole (2022), Milton (2024), and Tropical Storm Imelda (2025) caused substantial damage to the park's Playalinda District along Florida's Atlantic Coast. These storm events eroded dunes, diminished vegetation cover, and damaged facilities. These impacts have left some areas increasingly vulnerable to flooding and overwash. Floodwaters deposit sand on roadways and parking lots, necessitating closures for sand removal and/or repairs that limit visitor access and disrupt park operations.

The National Park Service is proposing to develop a Storm Adaptive Management Plan (the plan) for the Playalinda District at Canaveral National Seashore. This plan would establish resiliency strategies for managing infrastructure and sand while continuing to provide meaningful visitor experiences and protect park resources.

This environmental assessment (EA) evaluates the potential impacts of two alternatives: 1) take no action, and 2) implement a storm adaptive management plan. The EA is prepared in accordance with 516 Departmental Manual (DM) 1, US Department of the Interior (DOI), Handbook of National Environmental Policy Act (NEPA) Implementing Procedures, February 2026 (DOI NEPA Handbook) and its appendices, along with the DOI NEPA Implementing Regulations at 43 Code of Federal Regulations (CFR) Part 46.

This EA will be available for public and agency review for 30 days from the release date. Comments may be submitted on the NPS Planning, Environment & Public Comment (PEPC) website at https://parkplanning.nps.gov/cana-storm or by mailing to the name and address below. Before including your address, phone number, email 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. If you wish to remain anonymous, please clearly state that within your correspondence; however, the NPS cannot guarantee that personal information, such as email address and phone number, will be withheld. Thank you for your interest in Canaveral National Seashore.

Superintendent
RE: Playalinda Plan
Canaveral National Seashore
212 S. Washington Avenue
Titusville, FL 32796

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CHAPTER 1: PURPOSE AND NEED

INTRODUCTION

In 2016, the National Park Service (NPS) conducted a coastal asset assessment for the Playalinda District at Canaveral National Seashore (the park) to assess vulnerability of infrastructure to coastal hazards such as extreme flooding events and shoreline change. The study assessed 154 park infrastructure assets (such as boardwalks and parking lots) and determined that exposure to coastal hazards is the primary risk factor for vulnerability. Many assets had moderate-to-high exposure, and the vulnerability was relatively consistent across all types of assets (NPS 2016).

This vulnerability was demonstrated over many years of ongoing storm impacts, culminating in substantial erosion and overwash in 2022 when Hurricanes Ian and Nicole caused the park to experience prolonged exposure to relatively high water and high winds, eroding dunes and damaging facilities throughout the park. The northern portions of Playalinda District (and along Klondike Beach) have relatively low dune crest heights when compared to the southern portion of Playalinda District and Apollo District. This makes the dunes themselves and the infrastructure behind them particularly vulnerable to storm-related impacts.

The storms damaged boardwalks and caused water to wash over the dunes in the northern portion of Playalinda District, destroying dune vegetation and causing substantial sand accumulation on park roads, parking lots, and restrooms. Sand on the roadway resulted in the closure of Parking Lots 8-13 for several months. The dunes that lost vegetation in those storms continue to experience repeated overwash during high-water events, causing flooding and sand accumulation on roads and parking lots behind the dunes, prompting the NPS to develop a plan for long-term management of this area.

The NPS is proposing to develop a Playalinda District Storm Adaptive Management Plan (the plan) for the park to implement resilient strategies for the management of infrastructure and sand while continuing to provide meaningful visitor experiences and protecting park resources.

PROJECT LOCATION

The plan is for the Playalinda District of the park. The Playalinda District is located on the eastern side of the state along Florida's Atlantic coast, in Brevard County (Figure 1). A majority of the plan focuses on the beach area of the Playalinda District. The terrain ranges from sandy open beaches to dune ridges to low coastal plains and marshland along Mosquito Lagoon. The Playalinda Beach Entrance Station is located approximately 3.25 miles west (inland) from the beach within a small, developed area surrounded by coastal scrub.

PURPOSE OF AND NEED FOR ACTION

The purpose of the plan is to provide resilient strategies for the management of infrastructure and sand for the Playalinda District while continuing to provide meaningful visitor experiences and protecting park resources. The plan includes strategic updates of certain facilities, strategies for encouraging dune restoration, and decision-points for long-term divestment of park infrastructure if needed.

The plan is intended to establish an adaptive structure that supports sustainable operations amid dynamic coastal processes, increasing storm impacts, and evolving patterns of visitor use.

The single dune ridge that backs the park shoreline historically (prior to storms in 2022) averaged approximately 11 feet in elevation North American Vertical Datum of 1988 (NAVD88) (NPS 2023). The dune ridge is tallest at 20-25 feet NAVD88 along the southern parking lots and decreases in height beginning around Parking Lot 7 to reach a lower height of 10-15 feet NAVD88 by Parking Lot 8. It remains at this lower elevation through Klondike Beach backcountry to the north of these lots (OCM Partners 2026). In this area with a lower dune crest, inland infrastructure is especially vulnerable to storm-related damage because dune systems functionally serve to stabilize sand and absorb erosive forces associated with wave and wind action (EA Engineering 2023).

Hurricanes Ian and Nicole (2022) caused substantial damage to the Playalinda District, eroding dunes that once protected inland areas and damaging boardwalks. The lowered, sparsely vegetated dunes in the northern portion of the district have made some areas susceptible to overwash, which floods parking lots and the road, and during some high-water events covers portions of the road with feet of sand, such as during Hurricane Milton (2024) and Tropical Storm Imelda (2025). Sand accumulation along the road results in closures of some areas to the public, sometimes for months at a time, and complicates access for NPS operations and for the National Aeronautics and Space Administration (NASA), and Cape Canaveral Space Force Station (CCSFS), which rely on the road through the park for access to their equipment.

Future coastal hazards, along with observed higher tides and projections for intensified hurricane activity in the southeastern US, may result in multiple overwash and sand deposition events annually. The likelihood of hurricanes stalling near the coast along the southeastern US has also increased, exacerbating flood threats from these systems as they linger longer over one area (USGCRP 2023).

Although the primary focus of the proposed plan is to improve resilience to storms and reduce access disruptions, the planning effort also provides an opportunity to improve the resilience of the park's entrance station and visitor access infrastructure. Rocket launches from Kennedy Space Center and CCSFS periodically generate high visitation at the Playalinda District, and launch frequency is expected to increase in the coming decades. Improving the entrance station and visitor circulation would reduce operational vulnerabilities, support more efficient recovery following storm events, and better accommodate peak visitation during launch events.

The plan is needed to provide near-term repair and focused updates to improve resilience to storms while also developing a long-range management strategy for storm response in the future.

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STORM ADAPTIVE MANAGEMENT PLAN

FIGURE 1
Project Location

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Goals for the plan are tied closely to the park's fundamental resources and values, as described in the park's Foundation Document (NPS 2015). They are as follows:

- **Visitor Use and Experience**. Continue to offer an uncrowded, natural beach setting that allows for meaningful visitor experiences.
- **Road Access and Parking**. Provide some level of public road access and parking to support visitor access and experiences. Allow for continued administrative access to NASA and CCSFS facilities at the north end of the Playalinda District.
- **Boardwalks and Beach Access**. Keep boardwalks or designated beach access points, ensuring crossings are maintained as managed, structured pathways to protect dune systems.
- **Barrier Island Morphology and Processes**. Allow natural processes (sand movement, overwash, dune migration) to proceed as much as possible, while also preserving access (road and parking lots) to the extent practical.
- **Special Status Species**. Maintain high-quality beach habitat for sensitive species that depend on it for survival.

IMPACT TOPICS

In the context of National Environmental Policy Act (NEPA) reviews, issues can be problems, concerns, conflicts, obstacles, or benefits that would result from implementing the proposed action or alternatives, including the no action alternative. Impact topics are a means of organizing the discussion of issues and analysis of impacts. During the scoping process, the NPS either retained impact topics for further analysis or dismissed them from further consideration. This section provides an overview of the impact topics that the NPS retained for analysis. The NPS retained a topic for analysis if it met one or more of the following conditions:

- Environmental impacts associated with the issue are central to the proposal or of critical importance;
- A detailed analysis of environmental impacts related to the issue is necessary to make a reasoned choice between alternatives;
- Environmental impacts associated with the issue are a significant point of contention among the public or other agencies; or
- There are potentially significant impacts to resources associated with the issue.

For this project, the NPS identified the following impact topics to be retained and completed an impact analysis on those resources in Chapter 3: Affected Environment and Environmental Consequences:

- Barrier Island Morphology: Discusses barrier island processes that affect sandy beaches, dune systems, and wetland areas.
- Visitor Use and Experience: Discusses visitor use patterns and how visitors interact with and/or enjoy park resources.
- Special Status Species: Discusses plant and animal species that are listed by a state or federal agency with special protection or conservation designations.

The NPS considered but dismissed the impact topics below from further analysis for the reasons provided. An impact topic was initially considered but dismissed from detailed analysis if it did not meet the conditions listed above for retention.

Archeological Resources

The Playalinda District has been the subject of numerous archeological surveys. Only a few archeological sites have been identified within the northern stretch of Playalinda District (north of Eddy Creek), and none of the known sites would be affected by the proposed plan. The NPS is conducting consultation under Section 106 of the National Historic Preservation Act concurrently with, but separately from, this environmental assessment (EA). See Appendix A: Consultation and Coordination for a summary of consultation to date. If an unanticipated discovery takes place, work would pause, and the NPS would reinitiate consultation under Section 106.

Socioeconomics

The beach at Playalinda District is a very popular destination due to its undeveloped character and its proximity to the NASA and CCSFS complexes as a prime location to view rocket launches. It draws visitors locally and internationally. Under the proposed plan, some parking lots may be permanently closed to vehicles if condition-based triggers are met; however, the area would remain open to pedestrian access. The closure is not expected to noticeably change the number of visitors to the Playalinda District. NPS would monitor indicators and consider enlarging parking lots to accommodate visitation levels if desired conditions are not being met. Therefore, the NPS does not anticipate the closures would affect local socioeconomics.

CHAPTER 2: ALTERNATIVES

This section of the EA describes two alternatives considered for storm adaptive management in the Playalinda District: 1) Alternative A: No Action and 2) Alternative B: Storm Adaptive Management Plan (Proposed Action). The description and evaluation of a no-action alternative provides a baseline to which the action alternative can be measured. The following sections describe the elements of these alternatives. Chapter 3: Affected Environment and Environmental Consequences describes impacts associated with the alternatives. In addition, the NPS dismissed several alternatives from further consideration; those strategies are found in Appendix B: Alternatives Considered but Dismissed from Further Analysis.

ALTERNATIVE A: NO ACTION

Under Alternative A, the NPS would maintain the existing public beach road and parking lots in their current sizes and locations. Services, such as trash removal and restroom cleaning, as well as preventative and cyclic maintenance on these assets, would continue. The NPS would continue to repair damage to roads, parking lots, and boardwalks as long as feasible. Timing of repairs would be dependent on the level of damage, funding availability, environmental considerations, seasonal use demands, and requisite design processes. See Figure 2 for the existing layout of the Playalinda District.

The NPS would continue to close road segments and/or parking lots that are covered by sand or flooded as needed for visitor safety and/or sea turtle protection. Sand would be cleared from roads and parking lots on an as-needed basis following storm or other high-water events that wash and deposit sand over pavement. Timing and approach to sand moving would continue to depend on many factors, such as the depth of sand, the upcoming weather forecast (additional high-water events forecasted), sea turtle and shorebird nesting season, and seasonal visitor use levels, as well as the availability of park resources to conduct clearing operations.

The NPS would continue to provide restrooms (vault toilets) at the existing parking lots and would continue to maintain the existing facilities, repairing them as feasible, on an as-needed basis. These restrooms would remain at the same elevation as the existing parking lots. Restrooms that flood would be closed periodically.

As boardwalks are damaged or fail, the NPS would continue to make as-needed repairs or replacements. Key considerations for constructing and maintaining boardwalks in this environment include utilizing helical pilings and long-lasting materials such as fiberglass decking and stainless-steel hardware.

Park staff would continue to manage visitor capacities based on parking space availability. For instance, the NPS would continue to temporarily close the entrance gate on the infrequent occasions when parking reaches capacity. The Playalinda Beach Entrance Station would remain in its current configuration.

The NPS would continue to protect and strengthen the dune system by planting beach grass and other vegetation and installing sand fencing to promote natural dune building processes and stability where needed. Sand removed from roads or parking lots would also be moved to dune areas to rebuild or repair dunes.

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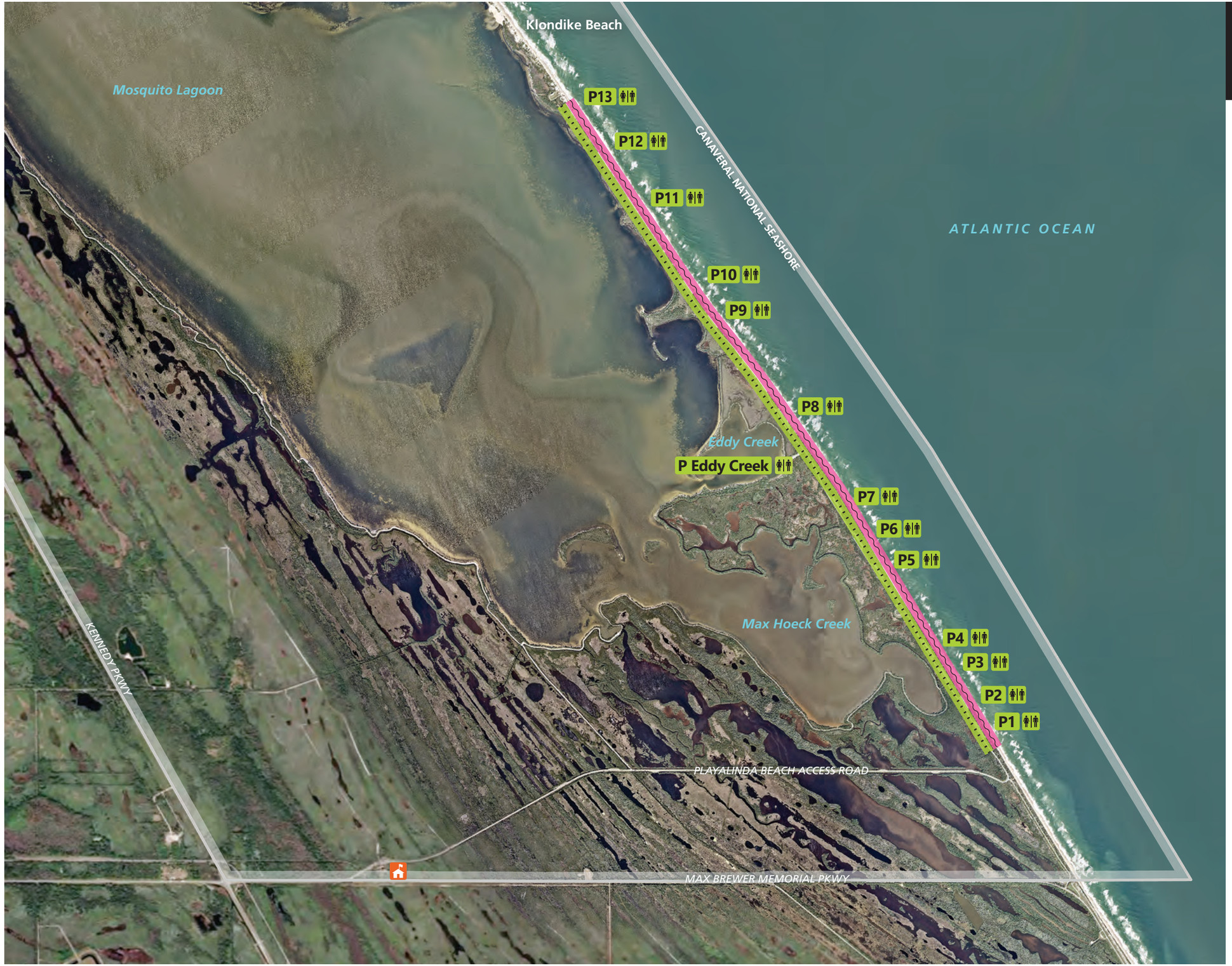

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STORM ADAPTIVE MANAGEMENT PLAN

FIGURE 2

Alternative A: No Action

LEGEND

- Canaveral National Seashore Boundary
- P — Parking for Beach Access - Continued maintenance and repair. Sand removal takes place as needed.
- Restroom - Continued maintenance and repair. Sand removal takes place as needed.
- Entrance Station - Remains as is.
- Beach Road - Continued maintenance and repair. Sand removal takes place as needed.
- Dune - Continued dune planting and sand fencing.

North

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0 0.5 Miles

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ALTERNATIVE B: STORM ADAPTIVE MANAGEMENT PLAN (PROPOSED ACTION)

Under Alternative B, the NPS would continue to maintain the existing public road and parking lots until/if any future storm-related damages are so severe that it is economically infeasible to repair or replace them (as indicated by the triggers discussed later in this section). The NPS would continue to clear sand off the road under formalized standard operating procedures and would continue to protect and strengthen the existing dune system through planting, sand fencing, and renourishment (using overwash sand) where erosion is an issue. The NPS would also update facilities to improve storm resiliency, as described in the "Storm Resilient Updates" section below. The long-range management scenario is described under the "Storm Damage Response" section.

Storm Resilient Updates

Under this plan, the NPS would undertake focused improvements, repair storm damage, and conduct continued cyclic maintenance along the entirety of Playalinda District, depending on funding availability, as outlined in Figure 3.

Road Access

The NPS would continue to clear sand off roads and parking lots, as needed. The cleared sand would then be moved and contoured along dune segments that would benefit from reinforcement or those on the landward side of the road in areas of previous overwash. Under this alternative, park staff would formalize standard operating procedures for sand clearing, which are included as Appendix C: Sand Management Standard Operating Procedures. This purpose of this document is to standardize sand management practices performed at the park and to establish guidelines and procedures to protect park resources and streamline park operations. Contents include (but are not limited to) general sand management procedures, approved equipment, and placement priorities. These procedures formalize guidance for how to clear/manage sand both during and outside of sea turtle nesting and hatching season. During sea turtle nesting and hatching season (March 1 to November 30), if sand needs to be removed from the road, it would be stored in adjacent parking lots or areas previously designated for temporary sand handling to avoid impacts on beaches being used by sea turtles. Outside turtle nesting and hatching season, sand would continue to be moved and contoured along dune segments that would benefit from reinforcement or on the landward side of the road in areas of previous overwash.

Parking Lots

The NPS would improve drainage at all parking lots. The NPS would clean accumulated sand and vegetation out of existing roadside drainage ditches, which occur within 20 feet of parking lots, to allow for improved stormwater runoff and infiltration. Once drainage is re-established, it would require ongoing maintenance to keep ditches clear and functioning. The planning team estimates 5,000-square foot (0.12 acres) pockets of clearing would be required at both north and south ends of each parking lot and strips of up to 12,000 square feet (0.3 acres) between each parking lot and the road. Those three areas together would total approximately half an acre.

Each of the 13 parking lots would be subject to similar clearing, although parking lots vary in size; many would require less clearing than what is described above. These improvements would disturb up to 6.5 acres in scattered patches adjacent to the parking lots along the length of the Playalinda District.

Additionally, Parking Lots 8, 9, and 10 regularly experience standing water multiple days after storms and high-water events; therefore, the base elevation of each parking lot would be raised above the trending average lagoon water levels and would be graded away from the dunes. Any excess sand from these efforts would be available for dune nourishment.

Restrooms

In one initial effort, the NPS would replace all existing restroom facilities with new models, such as the CXT Tioga or Gunnison styles. All new restrooms would be accessible and elevated approximately 6 inches above the parking lot to reduce potential future flooding. All facilities would continue to be independent of septic and water connections; in other words, restrooms would continue to be vault toilets.

At initial installation, the new toilets would provide the same capacity as the existing restrooms at Parking Lots 1 through 8. Parking Lots 9 through 12 would receive one toilet at each parking lot, and Parking Lot 13 would receive two toilets (same as current capacity). The reduced capacity at Parking Lots 9 through 12 reflects both the lower use at these sites and the risk of permanent closure of the area to public vehicle use following storm damage. If northern parking areas are permanently closed, the restrooms would be relocated to southern parking lots to accommodate the anticipated increase in use of those parking lots.

Dune Crossings

The NPS would replace dune crossings that are not currently elevated over the dune with new boardwalks at Parking Lots 8 through 13 to allow for natural dune processes to continue to take place underneath. The new boardwalks would follow a design style similar to existing boardwalks 1 through 7 with added resiliency—addressing elements such as boardwalk elevation (placed above crests of existing dune field) and pile embedment length (appropriately below the historical eroded beach profile) to help withstand the coastal environment. Key considerations for this environment include utilizing helical pilings, as well as longer-lasting materials such as fiberglass decking and stainless-steel hardware. All boardwalks would be barrier-free, and the boardwalks associated with Parking Lots 9, 11, and 13 would be fully accessible. The existing boardwalk at Eddy Creek would also be revised for full accessibility.

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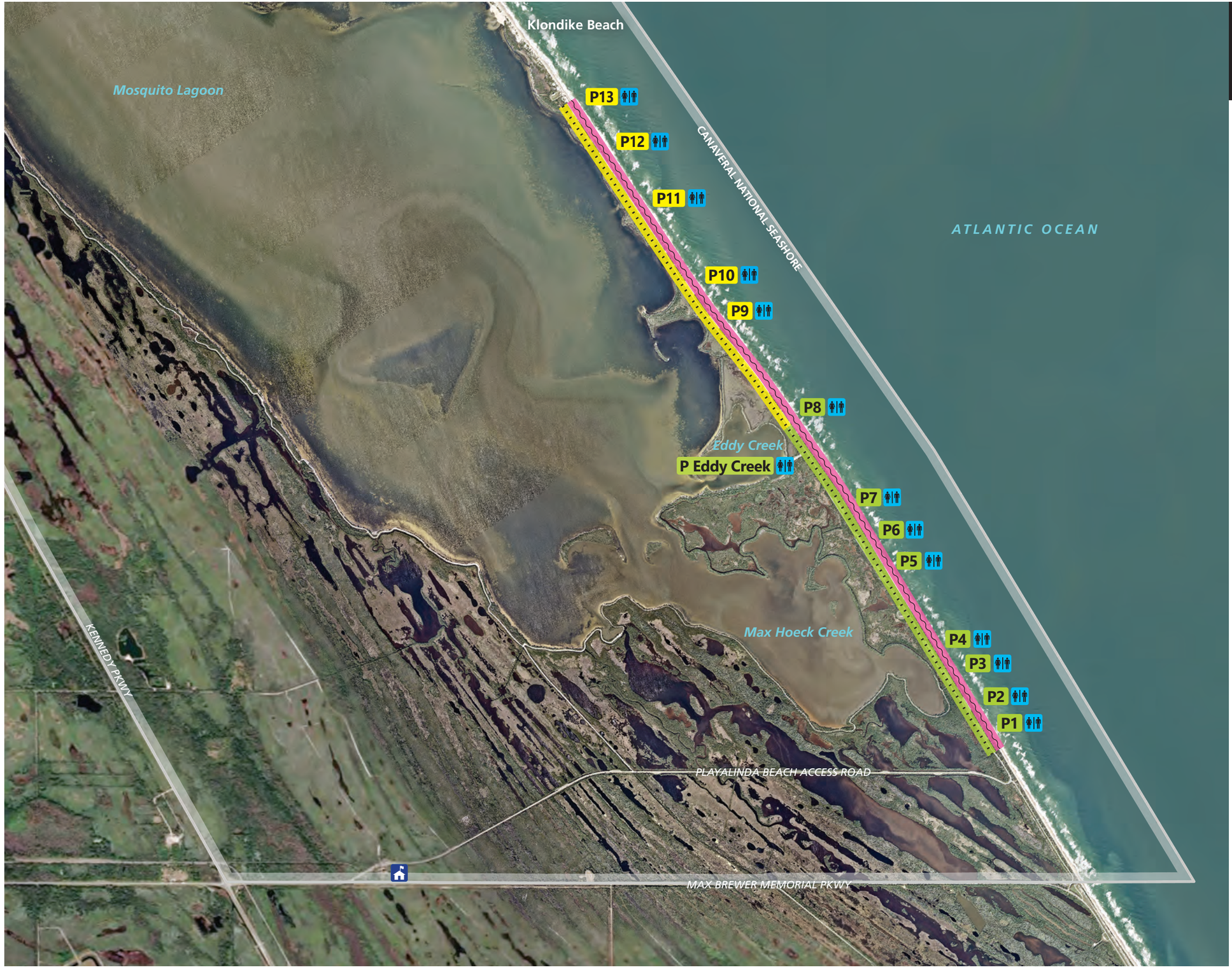
STORM ADAPTIVE MANAGEMENT PLAN

FIGURE 3

Alternative B: Storm Adaptive Management Plan



LEGEND

- Canaveral National Seashore Boundary
- P — Parking for Beach Access - Continued maintenance and repair.
- P — Parking for Beach Access - Maintain/repair/sand removal dependent on divestment triggers.
- Restrooms - Replaced with new facilities and slightly elevated.
- Entrance Station - Reconfigured for efficiency.
- Beach Road - Continued maintenance and repair. Sand removal takes place as needed.
- Beach Road - Maintain/repair dependent on divestment triggers.
- Dune - Continued dune planting and sand fencing.

North

0 0.5 Kilometers

0 0.5 Miles

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Storm Damage Response

Under this plan, the NPS has identified the portion of the Playalinda District north of Parking Lot 8 as particularly vulnerable to storm-related damage due to the dunes in this area having lost vegetation in recent storms and the dune crest being approximately 10 feet lower than the dunes at Parking Lots 1 through 5. The NPS has developed the storm damage response approach described below for the areas north of Parking Lot 8. At Parking Lot 8 and south, the NPS would continue to repair damage to roads, parking lots, and boardwalks as long as feasible. Timing of repairs would be dependent on the level of damage, funding availability, environmental considerations, seasonal use demands, and requisite design processes. Under this alternative, the NPS is committed to the retention of vehicular access and any necessary repair of vehicular infrastructure in the Playalinda District from the entrance station to (and inclusive of) Parking Lot 8. In the event that future environmental conditions make that infeasible, a new planning and compliance process would be undertaken to address new realities of the landscape.

Under this alternative, the NPS would monitor the condition of road segments and/or parking lots north of Parking Lot 8 for damage that would trigger divestment (permanent closure to public vehicles). Costs of necessary repairs[1] for aggregate damage would be compared to the system's total current replacement value (CRV). For one-time repair costs, divestment would be triggered when the aggregate damages exceed 50% for road segments or parking lots north of Parking Lot 8. For repeated repair projects occurring over the 20-year life of the plan, divestment would be triggered when cumulative costs exceed 150% of the system's total CRV.

Once the above triggers for divestment are reached, the NPS would close that road segment/parking lot to public vehicle use (and any road segment/parking lot that becomes inaccessible because of that closure), remove the damaged pavement (pending discussion with agencies that co-manage the area), and relocate associated restroom facilities to parking lots that remain open. For example, a single parking lot could be closed to vehicles, or if a critical segment of road becomes too damaged, the road and parking lots north of that segment would be closed to public vehicle use. Damage to boardwalks alone would not trigger divestment. As long as associated roads and parking lots are in serviceable condition (damage has not triggered divestment), beach access facilities (roads, parking lots, and boardwalks) would be repaired or replaced. A flow chart demonstrating guidance for repair vs closure is included in Appendix D: Condition-Based Triggers for Divestment Flowchart.

Following closure of these areas to public vehicle use, the NPS would replace the road for vehicles with a trail for pedestrians, providing a new and unique opportunity for solitude. Trail access would allow trail users to experience the back dune area using the previously disturbed roadbed (and/or parking lots). The NPS would continue to designate consolidated dune crossings to consolidate access points to the beach and reduce trampling of dune vegetation. The NPS would continue to provide accessible routes, to the extent practicable. Any new trails outside previously disturbed areas would be further developed in the future and would require supplemental environmental review. Figure 4 presents a potential long-range scenario for the

[1] Repair costs would be determined using the methodology and process for conducting Parametric Condition Assessments to produce modeled Deferred Maintenance and Repair estimates (*Parametric Condition Assessment Guide*, October 2024).

Playalinda District, based on the assumption that public vehicle closures extend along the entire road north of Parking Lot 8.

Visitor Capacity

Adopt Monitoring Indicators and Thresholds

Under Alternative B, the park would establish the indicators and thresholds listed below for monitoring the condition of the district's resources and the quality of the visitor experience. These indicators and thresholds are separate from the condition-based triggers for divestment discussed above. The park would monitor these indicators in conjunction with the management actions taken from this plan as well as other recurring and ongoing monitoring in the Playalinda District. If indicators approach or reach identified thresholds, the park may adapt management actions so that the natural resource conditions and visitor experience do not further degrade, as indicated in Appendix E: Indicators, Thresholds, and Visitor Capacity. This iterative practice of implementing management strategies, monitoring, adapting, and continuing to monitor to gauge the effectiveness of those actions would allow park staff to maximize the benefits for visitors while achieving and maintaining desired conditions for resources and visitor experiences in a dynamic setting.

The following indicators and thresholds would be established under Alternative B. For full descriptions of these indicators and thresholds, including their connection to desired conditions and associated management strategies, please see Appendix E: Indicators, Thresholds, and Visitor Capacity.

- Indicator: Observations of visitors in the dunes outside of designated dune crossings.
  - Threshold: Park staff observe instances of visitors in dunes outside designated dune crossings during more than 10% of sampling events.

- Indicator: Vehicles at one time in parking lots.
  - Threshold: Vehicles at one time exceed the design capacity of the parking lots more than 20% of sampling events.

In addition, other related monitoring efforts include (1) evaluating the number of visitor use conflicts reported within Playalinda District and (2) the number of instances in which Playalinda District closes due to full parking lots.

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STORM ADAPTIVE MANAGEMENT PLAN

FIGURE 4

Alternative B: Long-Range Scenario

LEGEND

- Canaveral National Seashore Boundary
- P — Parking for Beach Access - Continued maintenance and repair.
- C — Dune Crossing.
- Restrooms - Replaced with new facilities and slightly elevated.
- Beach Road - Continued maintenance and repair. Sand removal takes place as needed.
- Pedestrian Trail Provided - Pavement removed and area to be closed to public vehicles.
- Dune - Continued dune planting and sand fencing.

North

0 0.25 Kilometers

0 0.25 Miles

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Identify Visitor Capacities

Visitor capacity is the maximum amount and types of visitor use that an area can accommodate while achieving and maintaining the desired resource conditions and visitor experiences for which the area was established (IVUMC 2016). By identifying and managing the maximum amount and types of visitor use (visitor capacities), the NPS can protect resources and provide visitors with the opportunity for a range of high-quality experiences and access.

The proposed visitor capacities for the analysis areas where the visitor capacity directly relates to the plan actions are presented in Table 1 below. For more information on the methodology and data analysis that informed these capacities, please see Appendix E.

TABLE 1. PROPOSED VISITOR CAPACITIES

Analysis Area	Proposed Visitor Capacity
Parking Lots 1 – 8, including Eddy Creek	2,200 people at one time
Parking Lots 9 – 13	850 people at one time

In anticipation of potential future loss of parking in the northern section of the beach, the NPS may enlarge and/or restripe Parking Lot 8 and some of the southern lots (Parking Lots 1, 2, and 3) to accommodate changes in visitation patterns from the northern parking lots to southern lots. Future expansion would require additional environmental compliance and would be based upon the park's adoption of the proposed visitor capacities and monitoring of the indicators and thresholds.

Entrance Station

Under this alternative, the NPS would update the existing Playalinda Beach Entrance Station to be more efficient at admitting visitors to reduce queuing. Specifically, the park would encourage visitors to purchase passes in advance on rec.gov and provide an "express lane" where these pre-purchased passes could be scanned. Physical improvements would include installing new automated gates with associated electrical service within the existing footprint of the road corridor and building.

MITIGATION MEASURES AND BEST MANAGEMENT PRACTICES

The 1916 Organic Act and its associated *Management Policies* (2006) task the NPS with preventing impairment of park resources. This mandate gives the NPS authority to adopt mitigation measures. The NPS places a strong emphasis on avoiding, minimizing, and mitigating potentially adverse impacts to affected resources, whether under the jurisdiction of the NPS or as a result of an NPS decision. The NPS would apply the following mitigation measures and best management practices to avoid or minimize potential adverse impacts from implementation of the proposed action:

- All construction areas would be properly fenced to limit the area of disturbance and to prevent access by park visitors and wildlife.
- During construction activities, the following best practices would be implemented:

  - Use of standard erosion and sediment control measures, as well as dust control management.
  - Maintain construction equipment properly, clean equipment before entering the park to reduce invasive species, minimize idling, and use the cleanest fuels possible.
  - Use the minimum size equipment necessary to minimize the area of disturbance.
- Any sand moving activities would avoid the active nesting season for sea turtles and shorebirds from March 1 through November 30. If sand needs to be removed from the road during the sea turtle and shorebird nesting season, it would be stored in areas designated for temporary sand handling until the end of the nesting season.
- The NPS and contractor personnel would follow all best management practices and relevant measures for special status species including the following:[2]
  - Recovery Plan for the Leatherback Turtle (NOAA 1992)
  - Bi-National Recovery Plan for the Kemp's Ridley Sea Turtle (NOAA 2011)
  - Recovery Plan for US Population of Atlantic Green Turtle (NOAA 1991)
  - Recovery Plan for the Atlantic Population of Loggerhead Sea Turtle (NOAA 2008)
  - Recovery Plan for the Hawksbill Turtle (NOAA 1993)
  - Standard Protection Measures for the Indigo Snake (USFWS 2024)
  - Recovery Plan for the Southeastern Beach Mouse (USFWS 1993)
  - Recovery Plan for the Rufa Red Knot (USFWS 2023)
- An unanticipated discovery plan would be in place and implemented in the event any unanticipated archeological resources are encountered during construction activities. If this occurs, work would pause to allow reinitiation of Section 106 consultation.

[2] The NPS and contractor personnel will use the most recent version of these documents available.

CHAPTER 3: AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter describes the current and expected future condition of barrier island morphology, visitor use and experience, and special status species. Additionally, this chapter analyzes the beneficial and adverse effects that would likely result from implementing the proposed action and the no-action alternative considered in this EA.

METHODS AND ASSUMPTIONS FOR ANALYZING IMPACTS

In accordance with the Department of the Interior, this section's impact evaluation emphasizes direct effects that occur at the same time and place as an alternative. This analysis also considers reasonably foreseeable indirect effects with a demonstrable connection to the alternative. Where practicable, the NPS considered environmental effects of the proposed action that extend outside the project location.

Impact assessments incorporate existing scientific literature, park-specific studies and inventories, consultations with subject-matter experts and cooperating agencies, and the professional judgment and institutional knowledge of NPS staff. The significance discussion considers the degree of effects, including context (importance or value of the resource) and intensity (severity of impacts). Where applicable, the analysis incorporates impact minimization or mitigation measures that are integral to the alternatives. Discussion of resource-specific methodologies is included under each impact topic below.

As part of this planning process, the NPS has identified near-term projects that the NPS expects to implement within the next few years. The NPS also identified a long-range vision for the Playalinda District that may be triggered incrementally over the course of years, with the full vision being implemented within the next 20 years. Construction and/or demolition activities associated with both the near-term updates and the long-range vision could have short-term impacts. Altered conditions or accommodations associated with these updates have varying anticipated lifespans, and those are described under the applicable resource topics. Overall, the impact analyses consider impacts that would occur throughout both the short- and long-term timeframes. Geographically, the impact analyses are focused on the Playalinda District where actions would occur but also consider adjacent areas where effects may be measurable outside of the park boundaries.

BARRIER ISLAND MORPHOLOGY

Methods and Assumptions

Potential impacts on barrier island morphology are assessed based on changes to the characteristics of a natural barrier island system and how alternatives would alter these dynamics. The current conditions of the barrier island environment were compared to the alternatives described in Chapter 2 to determine how these natural processes would be affected. Impacts were also considered in the context of NPS's *Management Policies* (2006) which

attempt to “maintain all the components and processes of naturally evolving park ecosystems” while also balancing visitor access and the enjoyment of park resources and values by the public.

Affected Environment

Most of the park is located on a barrier island that separates the Atlantic Ocean on the east from Mosquito Lagoon on the west. Barrier islands are dynamic systems that change in response to storms, winds, and tides, which shift the sediment supply to and from the island. Generally, sediments are deposited on the beach during calmer summer months, while beach sand is carried offshore during stormy winter months (NPS 2014). Barrier islands inherently protect ecosystems to the west of the seashore (inland) by reducing impacts from storm surge and erosion. Key features of the barrier island system within the project area include sandy beaches, dune systems, and wetland areas.

Shoreline Dynamics

The beach within the project area is a sandy ocean-facing beach and foredune ridge with alongshore variability driven by cape-adjacent shoals, inlet dynamics, and differences in dune elevation and width (Briggs 2025). As a dynamic system, the shoreline has naturally shifted over many years due to erosion and accretion. Erosion (or loss of sand) drives the shoreline landward, resulting in a loss of beach area and potential threats to coastal infrastructure and resources. Accretion of beach sand leads to the seaward expansion of the beach and a corresponding seaward shift of the shoreline (EA Engineering 2023). Prior to Hurricanes Ian and Nicole, the shoreline position was relatively stable and did not substantially shift (see historical shoreline positions in Figure 5). Comparing high tide swash line surveys taken in spring 2022 and fall 2022 (following Hurricanes Ian and Nicole) at a location approximately 8 miles north of Parking Lot 8, the NPS reported shoreline erosion rates between -63.3 feet and -115.5 feet, with an uncertainty of ± 32.8 feet, (NPS 2023) (see Figure 6). This movement indicates heavy erosion and that the shoreline shifts substantially landward during large storm events.

National Park Service
U.S. Department of the Interior

Canaveral National Seashore
Florida

STORM ADAPTIVE MANAGEMENT PLAN

FIGURE 5

Historic Shoreline Positions Near Parking Lot 8

LEGEND

Canaveral National Seashore Boundary

Historical Shoreline Positions

1874

1950

1967

1999

North

0 100 Meters

0 500 Feet

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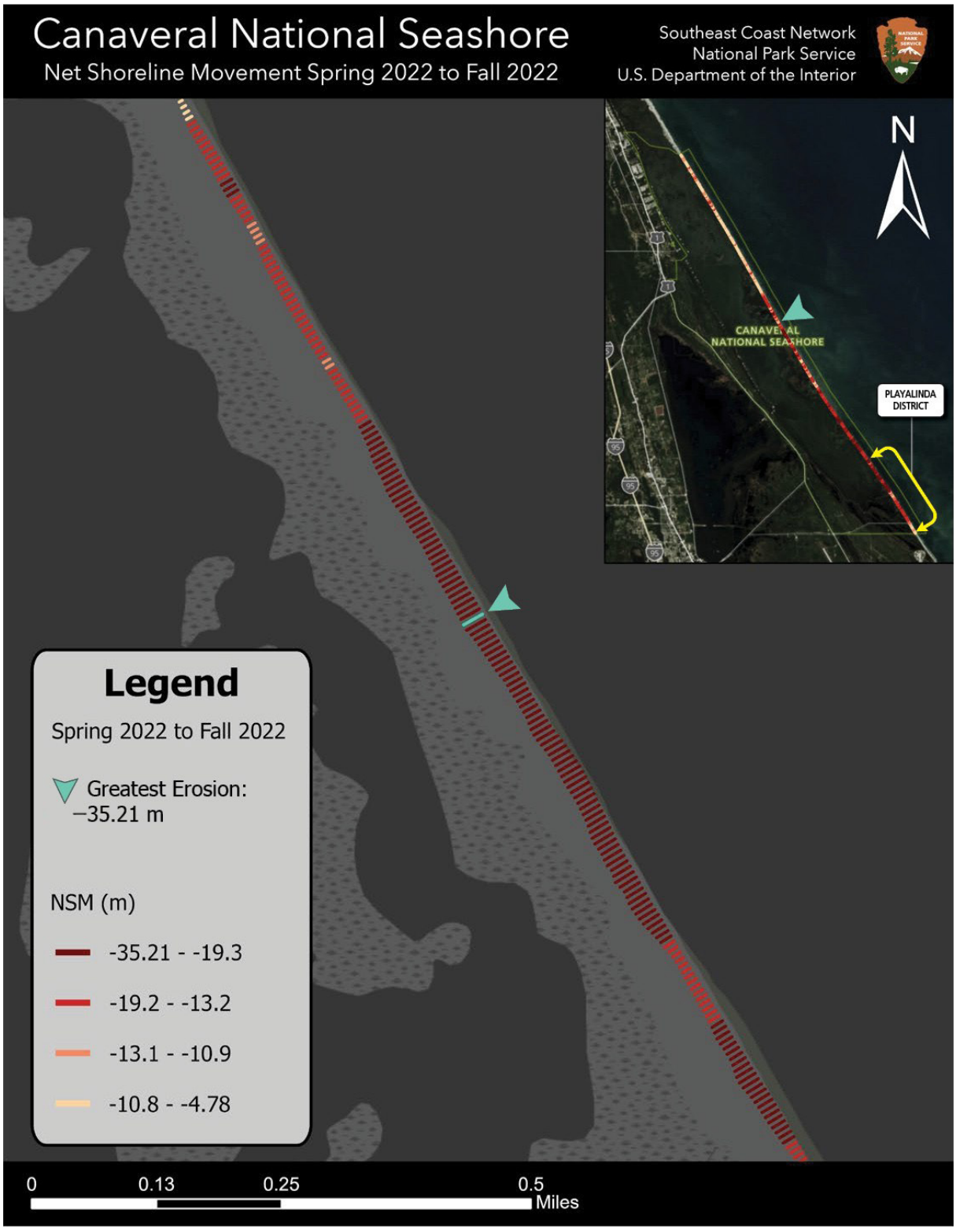

Figure 6. Map of Canaveral National Seashore Showing the Transect with the Maximum Shoreline Movement (highlighted in blue), -35.2 meters (-115.5 feet), from spring 2022 to fall 2022, after Hurricanes Ian and Nicole (NPS 2023)

Within the project area, shoreline rates of change from past observations of long-term shifts (which consider historic data ranging from the 1800s to 2018) indicate a fairly stable shoreline with an average change of up to -0.2 meters per year over this time period (USGS 2026b), indicating slight movement landward. Figure 5 illustrates this trend, showing historic shoreline positions grouped relatively close together, indicating minimal change over a long period of time.

Future coastal hazards, however, may present a more immediate threat to shoreline change. Coastal hazards include future sea level rise, storm surges, and compound flooding (sea level rise and storm surges, combined with tides, rainfall, and/or river flow). To help account for these factors, the US Geological Survey (USGS) has developed a Coastal Vulnerability Index (CVI) which provides "a preliminary overview, at a National scale, of the relative susceptibility of the Nation's coast to sea-level rise using a coastal vulnerability index (CVI). This classification is based upon geomorphology, regional coastal slope, tide range, wave height, relative sea-level rise, and shoreline erosion and accretion rates. The combination and association of these variables furnish a broad overview of regions where physical changes are likely to occur due to sea-level rise" (USGS 2026c). The CVI for the project area is "Very High." Higher tides coupled with projections for intensified hurricane activity in the southeastern US may result in multiple overwash and sand deposition events annually. The likelihood of hurricanes stalling near the coast along the southeastern US has also increased, exacerbating flood threats from these systems as they linger longer over one area (USGCRP 2023).

During Hurricanes Ian and Nicole in 2022, entire dunes were flattened and sand deposited on the roadway and parking lots (EA Engineering 2023), which caused closures on the southern end of the park between Parking Lots 8 through 13. At one of its closest points, the existing road (between Parking Lots 8 and 9) is approximately 100 feet from the shoreline, and within roughly 40 feet from the toe of the low dune. This close proximity makes it highly vulnerable to sand overwash and deposition during high-water events. The NPS required approximately four months to arrange for staff, equipment, and other logistics to move the sand off roads and parking areas back to the beach. Water levels during Hurricane Ian peaked at 4.0 feet above 8 NAVD88 and 4.8 feet NAVD88 during Hurricane Nicole. These two back-to-back storms resulted in the erosion of the existing dune system, loss of the dune vegetation, destruction of boardwalks, and sand deposition into parking lots, roadways, and restrooms (EA Engineering 2023). Subsequent events such as Hurricane Milton in 2024, Tropical Storm Imelda in 2025, and multiple king tide events have continued to degrade park resources by causing additional dune erosion, flooded parking lots, damaged boardwalks, overwash at at-grade dune crossings, and deep sand covering the road (NPS 2024).

Typical overwash seen covering the road following a high-water event.

Seven of the ten highest water levels recorded at the gauge station at Trident Pier (located approximately 18 miles south of Parking Lot 8) have occurred within the past decade (NOAA 2026a), revealing a trend of rising waters over time and potentially indicating higher increases under future conditions. Windy days alone can be enough to affect tides and result in tidal flooding. Following hurricane activity in 2022, an April 2023 tidal-driven high-water event once again pushed sand from the beach onto the road along 2.3 miles of the park, resulting in widespread closures of the road and some parking lots. During this event, water levels peaked at 3.2 feet NAVD88 and wave heights up to 6.2 feet were observed offshore (NDBC 2023 in EA Engineering 2023). It was determined that the flood conditions associated with this event were less than the conditions associated with a 1-year return period event, meaning that a high-water event of this magnitude can be expected on an annual or more frequent basis (NPS 2023).

Recent National Oceanic and Atmospheric Administration (NOAA) data show that between May 2025 and April 2026, the gauge at Trident Pier saw 15 flood days (defined by NOAA's National Ocean Service as water levels above 2.86 feet NAVD88 for at least one continuous hour during the day) (NOAA 2026b). The past decade (meteorological years 2016-2025) experienced approximately 12 flood days per year on average, compared to the previous decade (meteorological years 2006-2015), which averaged approximately 3 flood days per year. With the loss of the protective vegetated dune system during Hurricanes Ian and Nicole, even minor flooding events can cause sand overwash and flooding, leading to roadway closures throughout the project area (EA Engineering 2023).

Dune System

The northern portions of Playalinda District (and along Klondike Beach) have relatively low dune crest heights when compared to the southern portion of Playalinda District and Apollo District. This makes the dunes themselves and the infrastructure behind them particularly vulnerable to storm-related impacts. Natural dune slopes in the Playalinda District range from approximately 3 units of horizontal distance for every 1 unit of vertical rise/fall (3H:1V) for the dune face (eastward side of dune) to approximately 7H:1V for the backshore (westward side of dune). Dune crests generally range from 3-7 feet wide, with the overall dune width varying as a function of dune height to maintain dune face and backshore slopes. According to elevation data gathered following Hurricane Milton, which passed over the area in 2024, the dune ridge is tallest along the southern parking lots (20-25 feet NAVD88) and decreases in height starting at approximately Parking Lot 7 to reach a lower height of 10-15 feet NAVD88 by Parking Lot 8 and remaining at a lower elevation through Klondike Beach backcountry to the north (OCM Partners 2026). Along much of Playalinda District, this ridge is backed by dense growth of saw palmetto (*Serenoa repens*), sea grape (*Coccoloba uvifera*), and other species of hardy shrubs and grasses (NPS 2023).

Dune systems functionally serve to stabilize sand and absorb erosive forces associated with wave and wind action (EA Engineering 2023). In 2022, Hurricanes Ian and Nicole eroded the existing dune system, resulting in substantial vegetation loss in the project area on the front side of the dune, especially north of Parking Lot 8. Subsequent high-water events, including Hurricane Milton in 2024 and Tropical Storm Imelda in 2025, contributed to further loss of dunes and vegetation along much of a 10-mile stretch, some within the Playalinda District and stretching into the adjacent Klondike Beach. Recurring dune overtopping events since 2022 have continued to push large amounts of sand onto the roadway, particularly between Parking Lots 8 and 9 where the road alignment is especially close to the shoreline. Continued overwash onto the roadway also causes flooding, preventing visitor vehicular access (described in more detail in the "Visitor Use and Experience" section later in this chapter). As a result of this continued loss of dune elevation and vegetation cover, inland areas are less protected and more vulnerable to future high-water events. Since 2022, the NPS has cleared sand from roads and parking lots on an as-needed basis and implemented projects to promote dune building processes, such as planting native vegetation and grasses and installing sand fencing.

Wetlands

The ecosystem at the park is extremely diverse and unique in its composition due to its function as a transition zone between tropical and temperate climates. Mosquito Lagoon is one of the most species-rich and diverse estuaries in North America (NPS 2014) and is recognized as an Outstanding Florida Water.

There are various wetland types within the project area, which vary in their makeup based on their relative location to the shoreline. Wetland areas along the ocean shoreline itself along the east side of the barrier island are characterized as Estuarine and Marine Wetlands, also called salt marshes (NPS 2014). Salt marshes may be more resilient to rising water levels if new sedimentation rates are equivalent to the rate of rise (NPS 2014). Wetlands that run directly

parallel to the western side of the road adjacent to Mosquito Lagoon are characterized as Freshwater Forested/Shrub Wetland (USFWS 2026), or mangrove swamps. The mangrove swamps—comprising white (L*agunicularia racemosa*), black (*Avicennia germinans*), red (*Rhizophora mangle*) mangroves, and buttonwood (*Conocarpus erecta*)—are supported by less saline water than the salt marshes. Red mangroves occur naturally here and have been planted at the park to help reduce shoreline erosion along Mosquito Lagoon (NPS 2014) because their specialized root systems help stabilize the shoreline and absorb water that would otherwise flow landward (FDEP 2024). Mangroves are protected under Florida law and are especially vulnerable to rising water levels and storm surges.

Recent water levels measured at Haulover Canal, northwest of the project area and across from Mosquito Lagoon, indicate that water levels in this area have stayed consistently higher in the past three years than levels from the previous decade. A notable jump occurred from 2021 when average water levels were below 1 foot NAVD88, to September 2022, when levels reached just below 2 feet NAVD88, representing an increase of approximately 1 foot. Water level trends since September 2022 have consistently had annual peaks above 1 foot, which was not common before 2022 (NPS 2026a).

Environmental Effects

Effects of Alternative A: No Action

Under Alternative A, the NPS would continue current management actions at the Playalinda District. The NPS would continue to clear sand from roads and parking lots on an as-needed basis following storm or other high-water events that wash and deposit sand over pavement. Timing and approach to sand moving would continue to depend on many factors, such as the depth of sand, the upcoming weather forecast (additional high-water events forecasted), sea turtle and shorebird nesting season, and seasonal visitor use levels, as well as the availability of park resources to conduct clearing operations.

Typically, sand removed from roads or parking lots is moved to dune areas to rebuild or repair dunes. Renourishing the dunes with sand would help reinforce them somewhat against future storms by reducing overtopping and maintaining dune ridge height and width, which prevents collapsing (USGS 2021), thus maintaining a continuous dune profile. At the same time, however, the continued maintenance of these dunes by NPS would hinder the washover process by disrupting the natural deposition of sand elsewhere on the island. This deposition helps promote natural dune rollover processes which occur when a barrier island migrates landward through repeated overwash from the oceanfront dune toward the lagoon (WHOI 2026). This process typically allows the land on the back side of the island (i.e., the wetlands in Mosquito Lagoon) to be replenished with sand. Reoccurring dune stabilization actions therefore exacerbate disequilibrium within the barrier island system by interfering with overwash and restricting natural barrier island rollover (Eisemann et al. 2025). Landward washover deposition is needed to maintain a barrier island's volume and to prevent it from shrinking, and road clearing and dune management can reduce washover volume and extent (Eisemann et al. 2025).

While the NPS would continue to implement projects to promote dune building processes (such as planting native vegetation and installing sand fencing), several factors appear to be preventing long-term dune restoration success. The low elevations of the dune field north of Parking Lot 8, when combined with higher ocean water levels and lack of fully developed vegetation, permit frequent and far-reaching overwash events in several locations within the project area. As a result, plantings are unable to grow to sufficient maturity ahead of storms and high-water events to remain stationary and limit sand transport during overwash events.

Under Alternative A, the existing dune crossings at Parking Lots 8-13 would remain at grade and be repaired on an as-needed basis and as park resources allow. These at-grade crossings would continue to experience overwash as the dune tries to migrate landward; at-grade crossings that cut through the dune field (at elevations less than the surrounding dune crests) are expected to continue to funnel overwash into parking lots. The current placement of at-grade dune crossings also allows visitors to wander off the designated crossing and onto the dune itself, trampling vegetation and roots that are important for dune stabilization.

Based on recent NOAA data from Trident Pier, the area experienced 15 flood days over the past year, resulting in multiple overwash occurrences. With future conditions projected to bring higher tides, increased coastal hazards, and intensified hurricane activity, sand overwash and deposition on the roadway is expected to continue—and likely increase—over time under Alternative A.

If future water levels in Mosquito Lagoon exceed the rate of sediment deposition from the dune field via overwash, this would contribute to a decline of the wetlands of Mosquito Lagoon, as this part of the island depends on sedimentation washed into the lagoon to maintain and build its vertical profile, and thus its resilience, to sea level rise. Declines in coastal water quality due to saltwater intrusion, habitat quality, and biodiversity are the most likely effects of projected sea level rise and storm surges (NPS 2014). However, mangroves here would continue to help stabilize the swamp as they grow into the water and trap sediment (USACE 1989).

Conclusion

Generally speaking, under Alternative A, barrier island processes would continue naturally as the island gradually moves landward through overwash (during high-water events and coastal storms) and wind-driven sand transport. Environmental trends affecting barrier island morphology include higher water levels and increased wave heights and wind speeds associated with intensified hurricane activity. These projected changes in environmental conditions may increase the frequency of overwash and sand deposition on the road and parking lots.

NPS efforts at dune stabilization using planting and sand fencing may provide short-term (seasonal) dune stabilization, but the park's experience is that these efforts are not sufficient to prevent high-water events overtopping the dunes and washing sand into the road. Therefore, sand management (road clearing and dune nourishment) would continue for the foreseeable future. Sand clearing/moving would interfere with natural coastal processes intermittently (likely a few times a year), with the duration needed to accomplish the sand movement depending on many

factors (for example, depth of sand, the upcoming weather forecast, sea turtle and shorebird nesting season, and availability of NPS resources). However, using the cleared sand to renourish dune segments would help strengthen them against projected trends of intensified hurricane activity, rising waters, and increased high-water events. Sand clearing would focus along a stretch of approximately 1,200 linear feet of dune, with a few other shorter spans of sand clearing necessary after some storms. This is a relatively small portion of the Playalinda District, which comprises approximately 5 miles of shoreline and an even smaller portion of the park's 24 miles of shoreline. Therefore, these adverse impacts on natural processes would be relatively localized.

Overall, the barrier island system would continue to maintain natural equilibrium along most of the Playalinda District over the long term. Repeated sand management activities (clearing and dune reshaping) by NPS staff would interfere in natural coastal processes and likely necessitate future clearing. The repeated overwash events would have secondary adverse impacts on visitor use and experience as well as the habitat for some special status species (see the "Visitor Use and Experience" and "Special Status Species" sections respectively for a detailed discussion of these impacts).

Effects of Alternative B: Storm Adaptive Management Plan

Under Alternative B, the NPS would continue to clear sand off the road, protect and strengthen the existing dune system, and implement a collection of storm-resilient updates that would include focused improvements, storm damage repair, and continued cyclic maintenance. Long-term, the NPS would continue to repair damage to roads, parking lots, and boardwalks at Parking Lot 8 and south as long as feasible. At Parking Lots 8 and north, the NPS would monitor the condition of road segments and/or parking lots for damage that would trigger divestment.

Storm Resilient Updates

As part of its effort to maintain vehicular access, the NPS would continue clearing sand off of roads. Road clearing actions and their impacts would be similar to those described under Alternative A, with the primary differences under the proposed plan being the establishment of Sand Management Standard Operating Procedures and the condition monitoring for divestment. Similar to Alternative A, sand cleared from roads or parking lots would be moved to dune areas that would benefit from nourishment, which would help reinforce them somewhat against future storms and maintain a continuous dune profile. At the same time, however, the continued maintenance of these dunes by NPS would hinder the washover process by disrupting the natural deposition of sand elsewhere on the island, which promotes natural dune rollover. This interference would result in disequilibrium within the barrier island system (Eisemann et al. 2025). However, because these actions would focus on a relatively small portion of the shoreline, as described under Alternative A, adverse impacts from near-term dune maintenance would be localized.

Under this alternative, the NPS would also replace existing at-grade dune crossings with new elevated boardwalks at Parking Lots 8 through 13 to allow natural processes to continue underneath and protect dunes from human activity. Elevated crossings would allow sand to continue to move in its natural cycle and enable the dune to migrate landward. This action would

also reduce foot traffic directly on dunes, which damages vegetation and inhibits its growth. With weakened roots or loss of vegetation, dune cores are not as stable and erode more easily. Elevated crossings would help protect the dune system and allow it to function and grow naturally.

Proposed drainage improvements at all parking lots would involve recurring maintenance cleaning of roadside drainage ditches to remove accumulated sand and vegetation. This would be unlikely to impact barrier island dynamics generally but would result in some isolated effects following clearing activity. For instance, cleared ditches would act as an easy pathway for overwash, catching sand and keeping it from spreading more broadly across the landscape and building up the back-barrier area. Raising the base elevation of Parking Lots 8, 9, and 10 would involve limited sand grading/possible removal near the edge of the pavement. Smoothing and limited grading of the sand in the immediate vicinity of the parking lots may minimally change overwash pathways and volume, which determines the speed and direction water flows if stormwater breaches the beach. Removal and grading would also prevent the natural increase in barrier island elevation that this sand would otherwise provide (Anarde et al. 2024). On a broader scale, inhibiting this growth typically would reduce protection for resources further landward. However, the amount of sand moved and graded for parking lot improvements would be minimal given the total amount of sand available within the system and would likely not result in impacts on a morphological scale. As excess sand from these efforts would be available for dune nourishment, this action would benefit dune resiliency.

Storm Damage Response

If future damage triggers divestment north of Parking Lot 8, the NPS would close specific areas to public vehicular access and remove the infrastructure in these locations. The removal of pavement and other infrastructure such as restroom facilities would benefit the natural morphology of the barrier island by allowing roll-over to occur in this area without infrastructure impeding this process. Ceasing repeated sand clearing and dune nourishment activities once divestment triggers are reached would also benefit barrier island migration and dynamics, as it would remove human interference in natural processes. Vegetation would be able to establish and grow without frequent burial by sand clearing and dune nourishment. As future high-water events take place, washover would disperse where it is naturally intended and the island would rebuild. While visitor access would be allowed, proposed pedestrian trails would follow previously disturbed areas and utilize boardwalks which would continue to be maintained following divestment to protect vegetation growth and allow for overwash that would naturally build up the back dune profile of the island. A more natural landscape without hardened infrastructure would better allow the barrier island to maintain its natural equilibrium, protecting mainland resources while continuing its natural westward migration.

Conclusion

Overall, under Alternative B, barrier island processes would continue naturally as the island moves landward through overwash. Projected environmental trends described under Alternative A would continue to affect the system and may increase the frequency of overwash and sand deposition on the road and parking lots. Proposed near-term storm resilient updates such as sand clearing and

dune stabilization would result in an intermittent, reoccurring adverse impact on natural processes in the local area where these efforts take place, as described under Alternative A. However, under Alternative B, Sand Management Standard Operating Procedures would be in place and articulate best management practices for integrating this cleared sand into the dune system.

Unlike Alternative A, once triggers for divestment are reached and a road segment/parking lot is closed to public vehicle use, Alternative B would allow barrier island dynamics to proceed in a natural state. Intermittent sand clearing and dune stabilization would cease. The NPS would also replace existing at-grade dune crossings with new elevated boardwalks which would beneficially impact the short-term stability of the barrier island system by removing infrastructure and protecting dune integrity while allowing natural processes to occur. With no continued sand clearing or dune nourishment, overwash deposition would proceed with little to no interference (aside from minor foot traffic along pedestrian trails in previously disturbed areas) and disperse naturally, facilitating the island's natural rollover process and long-term migration landward. Overwash would replenish the back side of the island, maintaining its overall sand volume and raising the vertical profile of existing wetlands to increase their resilience to future coastal hazards such as increased water levels, as described above. Parking lot drainage improvements involving ditch clearing as well as minor removal and grading of sand would have a negligible adverse impact on barrier island morphology. Removal and grading of sand would restrict the dune rollover process within a drainage improvement project footprint, though the effect on the broader island-wide dune rollover process would be minimal. Similarly, cleared drainage ditches would initially catch sand and prevent it from spreading more broadly to build up the back-barrier area, though this adverse impact would be short-term and isolated; sand from other areas would still disperse throughout the back-barrier area. Therefore, parking lot drainage improvements would not result in a long-term morphological impact.

As the island reaches its natural equilibrium over the long term, proposed storm damage response actions under Alternative B would promote the continuation of this natural process while also balancing public safety and access, unique visitor experiences, and the protection of special status species.

VISITOR USE AND EXPERIENCE

Methods and Assumptions

Potential impacts on visitor use and experience are assessed based on changes in how people use the project area and how alternatives would alter their experiences. The goal of this plan is for the Playalinda District to continue to offer an uncrowded, natural beach setting that allows for meaningful visitor experiences. The way that visitors currently use and experience the Playalinda District is presented in the "Affected Environment" section below and was compared to the alternatives described in Chapter 2 to determine how visitor use and experience would be affected.

Affected Environment

Overall, visitation to the Playalinda District has remained relatively constant, with a slight increase over the last 10 years, as shown in Figure 7 below (NPS 2026c). The beach is known to

draw visitors from near and far, with many locals visiting regularly and international visitors being drawn by the natural beach and its proximity to view rocket launches from NASA and CCSFS. Data from a visitor survey suggest that many visitors to the park are repeat visitors, with 38% of respondents indicating they had visited the park 5 or more times within the previous year of their visit (NPS 2017).

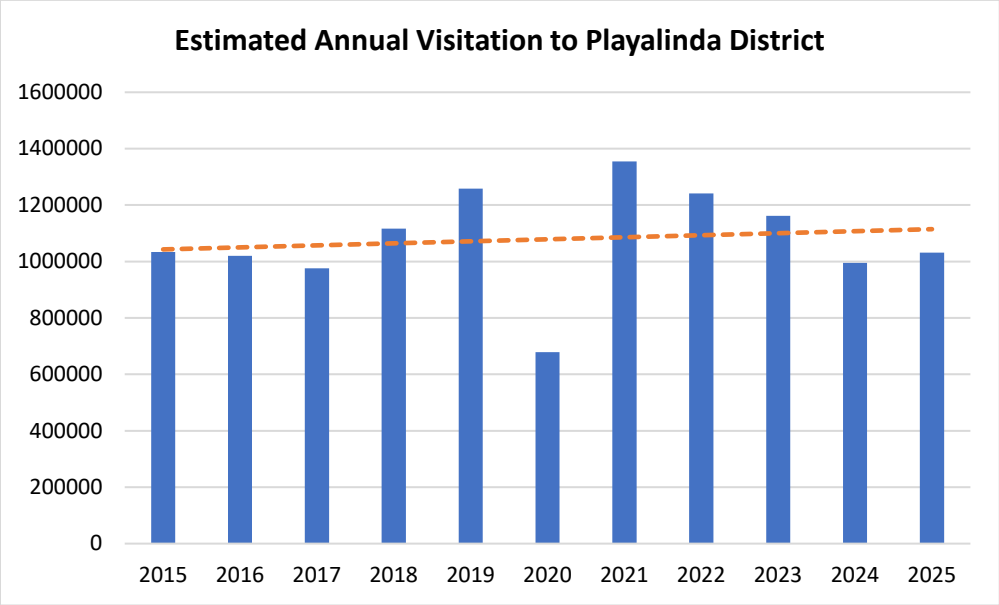

Figure 7. Estimated Annual Visitation from 2015 through 2025 to Playalinda District; the dashed line indicates the overall trend of slightly increasing visitation (NPS 2026c)

Nearly all visitors to the Playalinda District arrive by personal vehicle. In a 2017 visitor survey, 99% of respondents who visited Canaveral National Seashore indicated they used a personal vehicle to access the park, which park staff continues to observe (NPS 2017).

Visitors enter the Playalinda District through the Playalinda Beach Entrance Station where fees are collected. All visitor vehicles entering the district must pass through the collection point before proceeding along Beach Road to the designated parking areas. During periods of high visitation, vehicle queues sometimes form at the entrance station. These queues result in wait times for visitors, sometimes causing backups to extend beyond the park boundary. Wait times at the entrance station during busy weekends can often be 10-15 minutes. It is not uncommon on busy days for this backup to extend to the intersection with the Kennedy Parkway (0.8 miles to the west), which affects traffic operations at this intersection. Visitors may have to wait up to 20 minutes in these instances. In extreme cases, this congestion can extend as far back as the Merritt Island National Wildlife Refuge headquarters driveway (an additional 2 miles of congestion). During these days, wait times can be closer to 45 minutes, which can degrade the visitor experience and interfere with local (non-visitor) traffic.

Once they arrive at the beach, visitors use the beach road that runs parallel to the shoreline to arrive at one of 14 designated beach access areas, equipped with parking, restrooms, and

boardwalk trails over the dunes (NPS 2014). Playalinda District offers visitors several recreational, interpretive, and educational opportunities on land and in the water. These opportunities invite user groups, including swimmers, fishermen, surfers, wildlife viewers, environmental groups, and school groups, to enjoy the largely undeveloped and natural landscape. According to a visitor survey, the primary activities visitors participate in are sunbathing (20%) and swimming (20%). The survey also inquired about the most important reasons for visiting the park, with respondents suggesting spending time with friends and family (21%), viewing wildlife or natural scenery (19%), and relaxation (17%). In addition to beach recreation, the Playalinda District offers education programming, primarily in the Eddy Creek area (NPS 2014).

Park staff have observed that visitors prefer the southernmost and northernmost parking lots. Northern Parking Lots 12 and 13 fill first, followed by southern Parking Lots 1, 2, and 3, and then the middle lots. All 14 lots only fill to capacity a few days a year, typically during holiday weekends.

Since 2022, the roadway between Parking Lots 8 and 9 has repeatedly experienced sand overwash that results in closure of the road, preventing access to parking lots north of Eddy Creek. The park has needed to close the road in this area several times per year due to overwash, each time lasting weeks to months. Additionally, Parking Lots 8, 9, and 10 are most susceptible to flooding during storm events, heavy rainfall, or high tides. Slow drainage at these parking lots can result in closure or limited use of these lots and their associated restroom facilities for days following high-water events or heavy rainfall. Overall visitation to the Playalinda District does not notably decline during road and/or parking lot closures as visitors are able to shift their use to the parking lots and areas that remain open.

Additionally, nearby rocket launch activities at NASA's Kennedy Space Center and CCSFS have influenced visitor use patterns within the Playalinda District with increasing frequency. In some cases, launches trigger closure by NASA of the Playalinda District due to safety or security concerns; however, when beach closures are not required, visitors can use the beach for launch viewing and park their vehicles in any designated parking area.

When the beach is open for launch viewing, high concentrations of visitors gather at the south end of the Playalinda District. Parking areas closest to the entrance (particularly Parking Lots 1 through 4) often reach capacity during these periods. Park staff and volunteers manage the parking lots to direct visitors to lots that still have capacity and will often establish a temporary boundary on the beach south of Parking Lot 1, particularly for Falcon Heavy or crewed launches. Visitors tend to walk as far south as possible to gather near this boundary. Anecdotally, visitors gathering at the Playalinda District for rocket launches are overwhelmingly enthusiastic and have not expressed concerns or complaints about the crowding associated with the experience.

As of publication of this document, there have been more than 50 total rocket launches at NASA's Kennedy Space Center and CCSFS in 2026 (Tribou 2026). During those launches, Playalinda District was closed for a total of 8 days. Parking Lots 1 through 3 were closed during

one launch, and two launches caused Parking Lots 1 through 6 to reach capacity. Based on current planning efforts, the NPS anticipates that the frequency of rocket launches will increase.

Environmental Effects

Effects of Alternative A: No Action

Under Alternative A, the Playalinda District would continue to provide the uses and experiences described in the "Affected Environment" section above. Parking lots and roadways north of Parking Lot 8 would remain vulnerable to flooding, overwash, and periodic closures that limit visitors' ability to drive north of Eddy Creek and alter visitor patterns. If current environmental trends continue and the NPS takes no action, future storm events could result in closures of up to six parking lots for months at a time, as occurred in 2022 when Parking Lots 8-13 were closed for several months after Hurricanes Ian and Nicole.

Road closures require visitors who typically use the northernmost parking lots to shift their use to the parking lots at or near Eddy Creek. These visitors include those who prefer clothing-optional recreation, which can be an unexpected experience for other visitors who typically use parking lots at Eddy Creek and south. This may continue to cause conflicts between visitor groups during closure of the road north of Eddy Creek due to overwash. Once the park has cleared overwash and reopened the road and northern parking lots, typical user group dispersal patterns would resume. As discussed under the "Barrier Island Morphology" section above, overwash and ongoing dune erosion may become a more frequent and/or widespread occurrence if current environmental trends continue. Therefore, these closures and the resulting visitor use shifts and conflicts may also become more frequent and/or prolonged.

During busy weekends, visitors would likely continue to wait 10-15 minutes for their turn to go through the entrance station. During peak visitation days (during certain holidays and surrounding high-profile launches), wait times may extend up to 45 minutes or beyond. The parking lots rarely fill to capacity, and this trend is expected to continue. In instances that parking lots do fill to capacity, the park would continue to temporarily close the entrance gate, negatively impacting visitor access and experience.

An increase in launch activity at NASA's Kennedy Space Center and CCSFS may increase the frequency of days where the southernmost beach experiences brief pulses of intense crowding for launch viewing. The increase in launch activity is also likely to increase the number of days the beach will be closed to visitors.

In summary, because repeated overwash events requiring road and parking lot closures are expected to continue under Alternative A, as discussed under "Barrier Island Morphology" above, the intermittent conflicts and wait times currently experienced by visitors would continue, with these adverse impacts potentially taking place more frequently and/or for longer periods of time if environmental trends continue as projected. The NPS would continue to maintain existing vehicle access and parking north of Parking Lot 8 to the extent practicable using sand management actions (clearing and dune reshaping), and the road and parking lots south of

Parking Lot 8 would continue to provide sufficient capacity during northern closures to accommodate the shift in visitor use to the southern parking lots, with the exception of periods of very high visitation such as rocket launches. Overall, under Alternative A, the Playalinda District would continue to offer a natural beach that is typically relatively uncrowded (compared to developed beaches), and visitors would continue to be able to enjoy the same uses and experiences as described in the "Affected Environment" section above.

Effects of Alternative B: Storm Adaptive Management Plan

Under the proposed action, the Playalinda District would continue to provide the uses and experiences described in the affected environment section above in the near term with some adaptations in the longer term.

Storm Resilient Updates

Under this plan, the NPS would monitor damage to the road and parking lots for the condition-based triggers for permanent closure to public vehicle use described in Chapter 2. Because it is not possible to predict when a closure would be triggered; therefore, in the meantime, the NPS would address other ongoing infrastructure issues.

The NPS would improve drainage at all parking lots (with specific attention to Parking Lots 8, 9, and 10) to reduce the amount of time these parking lots (and associated restrooms) are closed due to flooding, thus improving visitor access and experience by improving reliability of available parking and restrooms in these areas.

Similarly, the NPS would replace all existing restroom facilities with new models at an elevated floor level, which would improve visitor access and experience by reducing the amount of time the restrooms are closed due to flooding. The change in the number of restrooms in Parking Lots 9 through 12 would better accommodate the current visitor use at each parking lot, and visitors would continue to have access to restrooms in these parking lots. Because the restroom facilities are modular and would be independent of septic and water connections, they can be relocated to other parking lots in the event of permanent closures. This would remove the availability of restroom facilities in the areas permanently closed, but the overall number of available restrooms within the Playalinda District would remain.

New boardwalk-based dune crossings at Parking Lots 8-13 would result in a mixture of beneficial and adverse impacts to visitor use and experience. Beneficial impacts include more convenient and comfortable visitor access due to the barrier-free design of the boardwalks, as well as three fully accessible boardwalks (at Parking Lots 9, 11, and 13), which would provide more opportunities for visitors with limited mobility to cross the dunes. The boardwalks would remain clear of sand, improving the accessibility over the existing at-grade crossings. The boardwalks would also provide an improved viewshed of the beach and of natural dune processes, which some visitors would consider a beneficial experience. Some visitors may find the need to use the boardwalk dune crossings less convenient than walking along the sand because the boardwalks would require a slightly longer walk than the existing at-grade crossings.

Storm Damage Response

Damaged road segments and parking areas would be closed to public vehicle access if condition-based triggers for divestment are met. The extent of the closure would depend on where damage occurs, with closures expected to reach as far south as Parking Lot 8 under this plan (divestment extending south of Parking Lot 8 is not anticipated to occur under this plan and would be subject to a separate, future planning effort if needed). As a result of condition-based closures, visitor use would shift to the remaining open areas, potentially shifting the majority of visitor use from Parking Lots 12 and 13 to parking lots that become the northernmost parking lots following closure. While pedestrian access to northern beaches would be maintained, the loss of vehicle access would reduce convenience and accessibility for some visitors, shifting the majority of visitor use to the more southern parking lots. As a result, it is likely that fewer visitors would use the northern beaches, providing opportunities for a more dispersed and quieter experience of the beach and back dune ecosystems.

Parking lots rarely reach capacity and are expected to continue to operate below capacity under typical conditions of the proposed action. As such, visitors would largely continue to find available parking, avoiding the need for NPS staff to turn away visitors, thus supporting a positive visitor experience. Monitoring for the visitor-related indicators as described in Chapter 2 and Appendix E would allow the NPS to better understand visitor use patterns and respond if conditions approach established thresholds. For instance, if parking lots do fill to capacity more often as the result of condition-based closures or other influences, the NPS would consider expanding or re-striping the remaining parking lots. Such an expansion would be subject to additional environmental review.

Entrance Station and Visitor Capacity

Reconfiguring the Playalinda Beach Entrance Station would reduce wait times during busy weekends and shorten queues (and associated waits) during peak visitation, improving the visitor experience and reducing congestion on local roadways. The introduction of an express lane would further shorten queues and wait times, particularly for those who were able to purchase a pass online in advance.

An increase in launch activity at NASA's Kennedy Space Center and CCSFS may increase the frequency of days where intense crowding is experienced at the southernmost beach and is likely to increase the number of days the beach would be closed to visitors, which are the same impacts as described under Alternative A.

Conclusion

In summary, the proposed storm resilient updates under Alternative B would allow the NPS to maintain existing vehicle access and parking to the extent practicable, with improved facilities (parking, restrooms, and dune crossings) for visitor convenience provided throughout Parking Lots 1-13. Drainage improvements around parking lots and the raised boardwalk dune crossings would allow natural dune accretion to occur with fewer impediments than current conditions

allow, which would better protect the road and parking lots north of Parking Lot 8 from overwash. The road and parking lots north of Parking Lot 8 would still experience overwash during high-water events under Alternative B, which would lead to similar intermittent visitor conflicts and wait times as described under Alternative A. However, the storm resilient updates are expected to reduce the frequency and duration of road and parking lot closures, which would be a benefit to the visitor experience over Alternative A.

Under the proposed storm damage response, public vehicle access north of Parking Lot 8 would eventually be replaced by a pedestrian-only trail. This trail would provide a new opportunity for solitude, which would benefit visitors seeking a quieter, vehicle-free experience. While this would be a new visitor experience that maintains dune crossing access, it would take some time for regular visitors to adjust to new patterns of use and some may see the change as an adverse impact on their experience. Adverse impacts on visitor access would be mitigated by accommodating the same number of visitors in the parking areas (including the number of restroom facilities) south of Parking Lot 8. Under Alternative B, the Playalinda District would continue to offer a natural beach that is typically relatively uncrowded (compared to developed beaches), and visitors would continue to be able to enjoy the same uses and experiences as described in the "Affected Environment" section above.

SPECIAL STATUS SPECIES

Methods and Assumptions

Special status species are defined as plant and animal species that are listed by a state or federal agency with special protection or conservation designations. The US Fish and Wildlife Service (USFWS) and Florida Fish and Wildlife Conservation Commission (FWC) are the two agencies providing regulatory protection to special status species that live within the park.

Listing designations include the following:

- Endangered (E) – species considered rare enough that without special management efforts they may become extinct (federal and state designation)
- Threatened (T) – species that without special management efforts are likely to become endangered in the near future (federal and state designation)
- Threatened due to Similarity of Appearance (TSA) – species listed due to similarity of appearance with another species that is listed as threatened. These species are not biologically endangered and are not subject to Section 7 consultation (federal and state designation)
- Species of Special Concern (SSC) – species that warrant special protection because of concerns that these species could become threatened or endangered (state designation)
- Delisted, Monitored (DM) – these species are no longer federally listed, but are being monitored
- Proposed (PT/PE) – species proposed in the Federal Register to be listed as endangered or threatened under the Endangered Species Act

- Candidate (C) – species that has sufficient information on biological vulnerability and threats to support a proposal to list as endangered or threatened but has not yet been proposed in the Federal Register
- Birds of Conservation Concern (BCC) – birds, other than those federally listed as threatened or endangered, that are of the highest conservation concern to the USFWS.
- Commercially Exploited (CE) – plants native to the state that are subject to being removed in significant numbers from native habitats and sold or transported for sale (state designation)

The environmental effects analysis in this chapter addresses both adverse and beneficial impacts on special status species within the context of NEPA, wherein potential environmental impacts are being reviewed for any significant effects on the environment. Potential impacts on special status species are assessed based on changes to the characteristics of their natural habitats and population within the park. The current conditions of special status species within the park were compared to the alternatives described in Chapter 2 to determine how these species would be affected under NEPA.

The NPS is conducting consultation under Section 7 of the Endangered Species Act separately from, but concurrent with, the NEPA process. It should be noted that an adverse impact under NEPA may differ from an adverse effect determination under Section 7 standards. A summary of the anticipated Endangered Species Act determinations for special status species is included at the end of this chapter.

Affected Environment

The park contains 58,000 acres of barrier island, open lagoon, coastal hammock, pine flatwoods, and offshore waters along the east-central coast of Florida. The barrier island separates Mosquito Lagoon from the Atlantic Ocean. The park's 24 miles of undeveloped beach is the longest stretch of undeveloped beach on the east coast of Florida. The park contains a diversity of wildlife communities, providing important habitat for resident and migrating species. Many of these species are considered special status species and are listed in Table 2 below.

TABLE 2. SPECIAL STATUS SPECIES WITHIN THE PARK

Scientific Name	Common Name	Federal Status	State Status
Reptiles			
Dermochelys coriacea	Leatherback sea turtle	E	E
*Caretta caretta**	Loggerhead sea turtle	T	T
*Chelonia mydas***	Green sea turtle	T	T
Eretmochelys imbricata	Hawksbill sea turtle	E	E
Lepidochelys kempii	Kemp's ridley sea turtle	E	E
Nerodia clarkii taeniata	Atlantic salt marsh snake	T	T
Drymarchon couperi	Eastern indigo snake	T	T
Alligator mississippiensis	American alligator	TSA	TSA
Pituophis melanoleucus mugitis	Florida pine snake	N/A	T
Gopherus polyphemus	Gopher tortoise	N/A	T

Scientific Name	Common Name	Federal Status	State Status
Mammals			
Peromyscus polionotus niveiventris	Southeastern beach mouse	T	T
Trichechus manatus	West Indian manatee	T	N/A
Perimyotis subflavus	Tricolored bat	PE	SCC
Balaena glacialis	Right whale	E	E
Birds			
Caracara plancus audubonii	Crested caracara	T	T
Laterallus jamaicensis ssp. jamaicensis	Eastern black rail	T	T
Rostrhamus sociabilis plumbeus	Everglade snail kite	E	E
Charadrius melodus	Piping plover	T	T
*Calidris canutus rufa***	Rufa red knot	T	T
Aphelocoma coerulescens	Florida scrub-jay	T	T
Haematopus palliates	American oystercatcher	N/A	T
Rynchops niger	Black skimmer	N/A	T
Athene cunicularia floridana	Florida burrowing owl	N/A	T
Grus canadensis pratensis	Florida sandhill crane	N/A	T
Sterna antillarum	Least tern	N/A	T
Egretta caerula	Little blue heron	N/A	T
Egretta rufescens	Reddish egret	N/A	T
Platalea ajaja	Roseate spoonbill	N/A	T
Falco sparverius Paulus	Southeastern American kestrel	N/A	T
Egretta tricolor	Tricolored heron	N/A	T
Insects			
Danaus plexippus	Monarch butterfly	PT	N/A
Fish			
Pristis pectinatus	Smalltooth sawfish	E	E
Manta birostris	Giant manta ray	T	T
Plants			
Asclepias curtissii	Curtiss' milkweed	N/A	E
Chamaesyce cumulicola	Sand dune spurge	N/A	E
Cyperus pedunculatus	Beachstar	N/A	E
Celosia nitida	West Indian cock's comb	N/A	E
Glandularia maritima	Coastal mock vervain	N/A	E
Harrisia fragrans	Fragrant prickly-apple	E	E
Lantana depressa var. floridana	Lantana	N/A	E
Lechea cernua	Nodding pinweed	N/A	E
Lechea divaricata	Spreading pinweed	N/A	E
Nemastylis floridana	Celestial lily	N/A	E
Ophioglossum palmatum	Hand fern	N/A	E
Tephrosia angustissima var. curtissii	Curtiss' hoarypea	N/A	E
Tillandsia fasciculata var. densispica	Cardinal airplant	N/A	E
Tillandsia utriculata	Giant airplant	N/A	E
Argusia gnaphalodes	Sea lavender	N/A	T
Myrcianthes fragrans	Simpson's stopper	N/A	T
Opuntia stricta	Shell mound prickly-pear	N/A	T
Orthochilus ecristatus	Giant orchid	N/A	T
Pinguicula caerulea	Blueflower butterwort	N/A	T
Scaevola plumieri	Inkberry	N/A	T

Scientific Name	Common Name	Federal Status	State Status
Tillandsia balbisiana	Northern needleleaf	N/A	T
Encyclia tampensis	Florida butterfly orchid	N/A	CE
Epidendrum conopseum	Greenfly orchid	N/A	CE
Osmunda cinnamomea	Cinnamon fern	N/A	CE
Osmunda regalis	Royal fern	N/A	CE
Zamia integrifolia	Coontie	N/A	CE

*Indicates the species has designated critical habitat within project area.
**Indicates the species has proposed designated critical habitat within the project area.

Special status species that may occur in the Playalinda District and may be affected by the proposed alternatives include eight federally listed species: leatherback sea turtle (*Dermochelys coriacea*), hawksbill sea turtle (*Eretmochelys imbricata*), Kemp's ridley sea turtle (*Lepidochelys kempii*), green sea turtle (*Chelonia mydas*), loggerhead sea turtle (*Caretta caretta*), eastern indigo snake (*Drymarchon couperi)*, southeastern beach mouse (*Peromyscus polionotus niveiventris)*, and the rufa red knot (*Calidris canutus rufa)*. The other species identified within the park are not anticipated to be affected by the proposed alternatives because they neither utilize the habitat nor occur within the project boundaries. Additionally, the shorebirds identified in the above table utilizing the park are not anticipated to be impacted by the proposed alternatives as they would likely nest elsewhere in the park and any construction activities would be conducted outside of sea turtle and shorebird nesting seasons. The Playalinda District also includes designated critical habitat for the loggerhead sea turtle and proposed designated critical habitat for the green sea turtle and the rufa red knot. The NPS is currently consulting with the USFWS under Section 7 of the Endangered Species Act, which will be completed prior to a final agency decision. The eight special status species that may be affected by the project are described below.

Sea Turtles

Five species of sea turtles that are federally listed as threatened or endangered are documented to occur or have the potential to occur in the Playalinda District, including the leatherback sea turtle, hawksbill sea turtle, Kemp's ridley sea turtle, green sea turtle, and loggerhead sea turtle. The leatherback, hawksbill, and Kemp's ridley sea turtles are all listed as endangered, while the green and loggerhead sea turtles are listed as threatened. USFWS has jurisdiction over nesting sea turtles.

The park is a very important nesting site for four species of protected sea turtles (leatherback, Kemp's ridley, green, and loggerhead), with up to 10,000 to 18,000 nests being deposited on the 24 miles of undeveloped shoreline each year (NPS 2025). The NPS estimates that the park accounts for 10% of all sea turtle nesting in the state of Florida and has more sea turtle nesting sites than any other NPS site (NPS, Kneifl, pers. comm. 2026d). Since 1985, the park has monitored sea turtle nesting. Nesting season begins March 1 and runs through the end of November. Generally, peak nesting season occurs between June and July when over 250 nests may be deposited on park beaches each night.

The hawksbill sea turtle nests on scattered islands and shores throughout the Caribbean. They nest infrequently on Florida beaches, and the park has never documented a nesting hawksbill sea turtle on its 24 miles of beach.

Kemp's ridley sea turtles were listed as endangered in 1970. While their distribution extends in the Atlantic from Florida to New England, they are most commonly found and primarily nest in the Gulf of America (also known as the Gulf of Mexico) (NOAA 2026c). Since monitoring began in 1985, only 21 Kemp's sea turtle nests have been identified, as of the 2025 nesting season (Sadle 2025).

Leatherback sea turtles were listed as endangered in 1970. They are the largest species of sea turtles in the world and have a worldwide distribution (NOAA 2026c). Within the United States, they are known to nest in southeastern Florida, Culebra, Puerto Rico, and St. Croix. In 2025, a total of 42 leatherback sea turtle nests were identified (Sadle 2025).

Green sea turtles were listed as threatened in 1978, and in 2016, 11 distinct population segments (DPS) of green sea turtles were listed (NOAA 2026c). The North Atlantic DPS and its proposed critical habitat extend into the Playalinda District. Most green sea turtles spend the majority of their lives in coastal foraging grounds, which include shallow waters in both open coastlines and protected bays and lagoons. In 2025, 8,774 green sea turtle nests were identified; the previous year, 2024, had 1,801 green sea turtle nests identified during the nesting season (Sadle 2025; NPS 2026b).

Loggerhead sea turtles were listed as threatened in 1978. They are the most common species found in Florida (FWC 2026). In 2011, nine DPS were listed. The Northwest Atlantic Ocean DPS in the United States includes the coasts of Alabama, Florida, Georgia, South Carolina, and North Carolina (NOAA 2026c). Their critical habitat has been identified within the Playalinda District. In 2025, 4,450 and 2024, 5,571 loggerhead sea turtle nests were identified within the park (NPS, Kneifl, pers. comms. 2026d; NPS 2026b).

Eastern Indigo Snake

The eastern indigo snake is found within the coastal plains of Florida and Georgia (USFWS 2019). It is often found in dry sandy areas, such as high pine communities. However, it is also found in moister habitats such as pine flatwoods and tropical hammocks within the park. They utilize gopher tortoise burrows, as well as mammal burrows and old stumps. No eastern indigo snakes or burrows have been identified in the Playalinda District; however, the species is known to use other areas of the park for habitat and foraging.

Southeastern Beach Mouse

The southeastern beach mouse is the smallest white-footed mouse in Florida. Due to coastal development, its population is generally confined to the undeveloped lands near Cape Canaveral. The beach mouse is known to only occur on beaches in mature, sparsely vegetated sand dunes that are located just above the high-tide line (primary dunes) and the more densely vegetated dunes farther inland (secondary dunes) along the Florida Atlantic Coast from Volusia County

south to Martin County (Bird et al. 2002). The 24 miles of seashore in the park provides ideal habitat for the species. From 2010 to 2020, several agencies, including the NPS, Merritt Island National Wildlife Refuge, NASA, and CCSFS, performed targeted occupancy monitoring of the southeastern beach mouse (NPS 2025). The collected data show that the southeastern beach mouse does not use the eroding dune within the Playalinda District as habitat. In 2022, ten miles of shoreline and vegetation were leveled to a moonscape-type habitat due to Hurricanes Ian and Nicole (2022), leaving little vegetation and no dunes, reducing the southeastern beach mouse habitat within the park.

Rufa Red Knot

The rufa red knot is found in coastal habitats with large exposed intertidal sediments, such as tidal flats, tidal inlets, and sandy/muddy areas. The proposed critical habitat of the rufa red knot is located within the Playalinda District. The proposed critical habitat identified includes coastal habitats that can generally be characterized as sparsely vegetated coastal marine and estuarine habitats with large areas of exposed intertidal substrates. The beaches the rufa red knots utilize may be backed by dune fields, tidal waters, salt marsh, mangroves, or human development (USFWS 2021). According to NPS, there have only been a few documented occurrences of the rufa red knot migrating through and temporarily using the park as stopover habitat (NPS 2025).

Environmental Effects

As noted in the "Methods and Assumptions" section above, the following analyses address the adverse and beneficial impacts on special status species under NEPA standards for environmental consequences. A summary of the effect determinations under Section 7 of the Endangered Species Act is included at the end of the effects analysis of Alternative B.

Effects of Alternative A: No Action

Under Alternative A, the NPS would continue under its current management of the Playalinda District to preserve and enhance the natural and historic landscape features. As stated in the "Barrier Island Morphology" section above, high-water events such as storms and high tides would continue to cause overwash on the roadway and parking lots. While the NPS would continue to clear the sand as needed following an overwash event and would continue to manage the dune system to promote dune building processes (beach grass planting and installation of sand fencing), ongoing impacts on sea turtle nesting would also continue. The NPS has recorded instances where female sea turtles come ashore to lay eggs and end up crawling onto the road or parking lot. Additionally, disoriented hatchlings crawling inland have been observed, caused by the eroding dune insufficiently blocking the distant artificial lights. Prior to 2022, when Hurricanes Ian and Nicole leveled the dunes, this was considered a rare occurrence. In 2025, NPS rescued approximately 30 nesting females and hundreds of hatchlings from the roadway and marsh areas west of the road. Under Alternative A, these impacts on sea turtle species are expected to continue; however, there would be no impacts to other special status species.

Conclusion

In general, environmental trends affecting special status species include higher water levels, increased wave heights and wind speeds associated with intensified hurricane activity. Under Alternative A, ongoing sand clearing and subsequent dune nourishment would interfere with natural coastal processes intermittently (likely a few times a year), and projected changes in environmental conditions may increase the frequency of overwash and sand deposition on the road and parking lots, as described under "Barrier Island Morphology" above. An increased frequency in these events would worsen the ongoing adverse impacts on sea turtle species (laying eggs on sand-covered pavement; disoriented hatchlings). While the NPS efforts at dune stabilization using planting and sand fencing may provide short-term (seasonal) dune stabilization, these efforts would not be enough to prevent high-water events overtopping the dunes and washing sand onto the road. The NPS would continue to monitor sea turtle nests and rescue nesting females and hatchlings as needed to mitigate these adverse impacts on the species using the Playalinda District. Alternative A is not anticipated to result in impacts on other special status species as there is ample habitat throughout the Playalinda District. In conclusion, ongoing adverse impacts on sea turtle species are expected to continue under Alternative A as overwash and sand transport events continue or intensify based on environmental trends; however, the NPS would mitigate impacts through monitoring and rescue of individuals, and there are no adverse impacts anticipated on other special status species.

Effects of Alternative B: Storm Adaptive Management Plan

Storm Resilient Updates

Under Alternative B, the NPS would begin formal monitoring storm-related damage while continuing to clear sand off roads and installing sand fencing to allow dune plantings to take root and stabilize the dune, allowing it to naturally accrete. The NPS would also replace existing at-grade dune crossings with elevated boardwalks to allow natural processes to continue and protect dunes from human activity and trampling, reducing damage to vegetation. These actions would protect and improve natural habitats of special status species in the Playalinda District.

Additionally, under Alternative B, the NPS would improve drainage at all parking lots. The existing roadside drainage ditches would be cleared of accumulated sand and vegetation to improve drainage. Vegetation that would be cleared for these drainage improvements does not serve as habitat for any special status species within the Playalinda District; therefore, its removal would not result in any adverse impacts on these species. The base elevation of Parking Lots 8, 9, and 10 would also be raised above the trending average lagoon water levels and would be graded away from the dunes as they regularly experience standing water for multiple days after storms and high-water events. Any excess sand from these efforts would be available for dune nourishment.

Installation of the sand fence, dune crossings, and placement of sand on the dunes would occur outside of turtle nesting season (March 1 to November 30) to prevent impacts to the sea turtle nests and hatchlings. The shorebird nesting season overlaps with the turtle nesting season, allowing protection of shorebird nests and hatchlings during the same time-of-year restriction. If

sand needs to be removed from the road or roadside ditches during the sea turtle and shorebird nesting season, it would be stored in adjacent parking lots or areas previously designated for temporary sand handling. When the nesting season is over, the sand would be moved and contoured along dune segments that would benefit from reinforcement or on the landward side of the road in areas of previous overwash. The site-specific implementation areas would be monitored on a regular basis to prevent impacts on the special status species. Species-specific impacts under NEPA are discussed under a separate heading below; effects determinations under Section 7 of the Endangered Species Act is included at the end of the chapter.

Storm Damage Response

If condition-based triggers for divestment are met, the NPS would close the damaged areas to vehicular access and remove roads, parking lots, and restrooms in these locations. This would lead to a more natural landscape, and with visitor access shifting to a pedestrian trail, allow the dunes and seashore to maintain their natural state and wildlife to reclaim formerly disturbed areas. Species-specific impacts under NEPA are discussed below.

Species-Specific Impacts

Sea Turtles. The horizontal sand fencing on the fore dune would be installed prior to loggerhead sea turtle nesting season to prevent sea turtles from crawling over the dune and nesting where they could be easily washed out, and to avoid sea turtles from ending up on the roadway. While the fence may cause a sea turtle to falsely crawl or deposit their eggs in front of the fence, the turtle would be able to find a suitable location to deposit their eggs, rather than attempting to nest on the overwashed roadway and/or expending considerable energy in search of the ocean. The fencing would protect nesting turtles and hatchlings from becoming trapped along the roadway requiring rescue and reducing the need for multiple staff to rescue the turtles. In 2025, park staff rescued approximately 30 nesting females and hundreds of hatchlings from the roadway and marsh areas west of the road (NPS 2025). Additionally, fencing would discourage visitors from entering the sensitive dune habitat and causing further erosion and trampling of dune vegetation, preventing its growth.

Work conducted within the parking lots and condition-based divestment areas is not anticipated to impact sea turtles, as they are developed areas and are not suitable habitat for sea turtles. As stated above, sand placement on the dunes and construction of the dune crossing would occur outside of turtle nesting season (March 1 to November 30) to prevent disruption to the sea turtles and hatchlings.

It is anticipated that Alternative B may result in some negative impacts on the federally listed sea turtles known to use the Playalinda District (leatherback, Kemp’s ridley, green, and loggerhead), such as the horizontal sand fencing causing a false crawl or egg deposit in front of the fence, as discussed above. However, time-of-year restrictions for sea turtle nesting would be adhered to, minimizing the adverse impacts under NEPA. Additionally, the park performs daily sea turtle monitoring during turtle nesting season, and nests are marked and monitored for success.

Because the hawksbill sea turtle has not been observed using the Playalinda District for nesting, there is no anticipated impact on that species.

Eastern Indigo Snake. The eastern indigo snake has been identified using the park as habitat for foraging and nesting; however, individuals have not been identified within the Playalinda District. During work on the parking lots, roadside ditches, and the removal of the condition-based divestment areas, if any eastern indigo snakes are present, they would be disturbed by noise and the presence of construction equipment and activities; however, it is anticipated that the snake would avoid the area during these times as there is ample habitat elsewhere in the Playalinda District. It is anticipated that Alternative B would have negative impacts (under NEPA) to the eastern indigo snake during these activities if any individuals are present, but those impacts would be temporary and only last the duration of construction. To further reduce potential impacts on the species, the NPS would follow the Standard Protection Measures for the Eastern Indigo Snake during implementation of any improvements under Alternative B (USFWS 2024).

Southeastern Beach Mouse. Past monitoring of the park shows that the mice do not utilize eroded or continually washed-out and rebuilt dunes. Therefore, work on the parking lots, roadside ditches, and removal of the condition-based divestment areas would not impact their habitat. Individuals of the species are also likely to avoid areas under active construction or repairs as there is ample habitat elsewhere within the Playalinda District. In areas where dune crossings are raised, and park infrastructure is removed, habitat suitable for the southeastern beach mouse would be restored, allowing the species to reinhabit those areas and providing an overall benefit to the species.

Rufa Red Knot. Although the rufa red knot has proposed critical habitat overlapping with the Playalinda District, occurrences of the species migrating through and using the area are rare. It is anticipated that the bird would avoid the area during any construction activities due to the presence of vehicles and noise disturbance and use similar habitat outside of the proposed project area. The placement of sand back onto the dunes and the installation of sand fencing and dune crossings are anticipated to improve the habitat and ultimately benefit the proposed critical habitat. In addition, construction would occur outside of the shorebird nesting season. It is anticipated that Alternative B would not result in adverse impacts under NEPA on the rufa red knot or its proposed critical habitat.

Conclusion (NEPA)

In summary, near-term storm resilient updates under Alternative B such as installation of sand fencing and installation of elevated boardwalks would allow dune plantings to take root and stabilize the dunes, which would improve natural dune habitats. Storm damage response actions would allow the natural barrier island processes to continue once divestment triggers are reached and sand clearing/movement ceases, which would provide improved habitat for special status species that use the Playalinda District. Storm damage response actions would further improve the natural habitat for special status species because human-made infrastructure would be removed, allowing wildlife to reclaim these formerly disturbed areas. While the majority of the actions proposed under Alternative B would be beneficial for special status species, the installation of

horizontal sand fencing may result in sea turtle species using the Playalinda District (leatherback, Kemp's ridley, green, and loggerhead) to falsely crawl or deposit their eggs in front of the fence. However, the fence would prevent turtles from nesting on the overwashed roadway and protect hatchlings from becoming trapped along the roadway, which would be an improvement over current trends, in which hundreds of hatchlings needed rescue from the roadway in 2025.

Construction and demolition activities could disturb individuals of the special status species if any are present within the active area due to the noise and presence of equipment and workers; however, these temporary (likely lasting between weeks and months) impacts would be minimized through time-of-year restrictions that avoid activities during the nesting seasons of sea turtles and shorebirds. For the eastern indigo snake, the southeastern beach mouse, and the rufa red knot, the mobility of individuals and the availability of ample habitat elsewhere in the park make it very likely that individuals would avoid areas under active construction, thus minimizing any potential impact on these species. After construction/demolition activities are completed, the continuation of natural processes and restoration of quality habitat would result in an overall benefit for these species, even if some individuals are disturbed during construction.

Conclusion (Endangered Species Act, Section 7)

Concurrently with preparation of this EA, the NPS initiated informal consultation with the USFWS Service pursuant to the requirements of Section 7 of the Endangered Species Act. The NPS considered the above-described impacts on special status species under NEPA as part of their effects determinations under Section 7; however, an adverse impact under NEPA may differ from an adverse effect determination under Section 7, which uses three determinations categories. These determinations categories are based on the USFWS and NOAA's National Marine Fisheries Service guidance for implementing Section 7 consultation (1998) and are as follows:

- *No effect*: The appropriate conclusion when the action agency determines its proposed action would not affect a listed species or designated critical habitat.
- *May affect, not likely to adversely affect*: The appropriate conclusion when effects on listed species are expected to be discountable, insignificant, or completely beneficial. Beneficial effects are contemporaneous favorable effects without any adverse effects to the species. Insignificant effects relate to the size of the impact and should never reach the scale where take occurs. Discountable effects are those extremely unlikely to occur. Based on best judgment, a person would not: (1) be able to meaningfully measure, detect, or evaluate insignificant effects; or (2) expect discountable effects to occur.
- *May affect, likely to adversely affect*: The appropriate finding in a biological assessment (or conclusion during consultation) if an adverse effect to listed species may occur as a direct or indirect result of the proposed action or its interrelated or interdependent actions, and the effect is not discountable, insignificant, or beneficial (see definition of *may affect, not likely to adversely affect*). In the event the overall effect of the proposed action is beneficial to the listed species but is also likely to cause some adverse effects, then the proposed action is likely to adversely affect the listed species. If incidental take is anticipated to occur as a result of the proposed action, a likely to adversely affect determination should be made.

After considering the potential effects on special status species under Section 7 of the Endangered Species Act, the NPS believes that the proposed plan would result in a determination of *may affect, not likely to adversely affect* for six federally listed species: the loggerhead, Kemp's ridley, leatherback, and green sea turtles as well as the eastern indigo snake and southeastern beach mouse. Two additional federally listed species that have the potential to occur within the project: the hawksbill sea turtle and the rufa red knot. The plan would have *no effect* on these two federally listed species.

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APPENDIX A: CONSULTATION AND COORDINATION

The NPS places a high priority on giving the public an opportunity to comment on the proposed action. The NPS also conducted consultation and coordination with federal, state, and local agencies, and American Indian tribes to refine the alternatives and identify issues and/or concerns related to environmental impact topics. This section summarizes the public involvement, and agency consultation and coordination that occurred during planning.

PUBLIC INVOLVEMENT

On February 11, 2026, the NPS issued a press release notifying the public about the project, the comment period, and public meetings. The comment period lasted 30 days, through March 13, 2026. During this comment period, the NPS shared information about the purpose of and need for the project as well as potential issues and management strategies.

The NPS held three public meetings during the comment period: one virtual and two in person. The virtual public meeting was held on February 26, 2026. The first in-person public meeting was held at the New Smyrna Beach Regional Library on March 2, 2026, and the second at the Titusville Public Library on March 4, 2026. At the meetings, NPS provided information about the project and received questions from members of the public. A total of 9 individuals were present at the virtual meeting; 3 attended the first in-person meeting at New Smyrna Beach Regional Library, and 20 attended the second in-person meeting at Titusville Public Library. At the meetings, the NPS encouraged participants to submit formal comments. During the open comment period, the NPS received 44 pieces of correspondence.

AGENCY COORDINATION

Section 7 of the Endangered Species Act

To comply with Section 7 of the Endangered Species Act, the NPS evaluated the project areas to determine the likelihood of special status species occurring within the project area. As discussed in Chapter 3, there are eight federally listed species that may occur in the Playalinda District: leatherback sea turtle, hawksbill sea turtle, Kemp's ridley sea turtle, green sea turtle, loggerhead sea turtle, eastern indigo snake, southeastern beach mouse, and the rufa red knot. The NPS then identified potential impacts on these federally listed species (as discussed in Chapter 3) and applied Endangered Species Act determination categories based on the US Fish and Wildlife Service and the National Oceanic and Atmospheric Administration's National Marine Fisheries Service guidance for implementing Section 7 consultation (USFWS 1998). These categories are as follows:

- *No effect*: The appropriate conclusion when the action agency determines its proposed action would not affect a listed species or designated critical habitat.
- *May affect, not likely to adversely affect*: The appropriate conclusion when effects on listed species are expected to be discountable, insignificant, or completely beneficial. Beneficial effects are contemporaneous favorable effects without any adverse effects to the species. Insignificant effects relate to the size of the impact and should never reach

the scale where take occurs. Discountable effects are those extremely unlikely to occur. Based on best judgment, a person would not: (1) be able to meaningfully measure, detect, or evaluate insignificant effects; or (2) expect discountable effects to occur.

- *May affect, likely to adversely affect*: The appropriate conclusion if an adverse effect to listed species may occur as a direct or indirect result of the proposed action or its interrelated or interdependent actions, and the effect is not discountable, insignificant, or beneficial (see definition of may affect, not likely to adversely affect). In the event the overall effect of the proposed action is beneficial to the listed species but is also likely to cause some adverse effects, then the proposed action is likely to adversely affect the listed species. If incidental take is anticipated to occur as a result of the proposed action, a likely to adversely affect determination should be made.

Based on the anticipated impacts described in Chapter 3, the NPS believes that the proposed plan *may affect, not likely to adversely affect* six federally listed species: the loggerhead, Kemp's ridley, leatherback, and green sea turtles as well as the eastern indigo snake and southeastern beach mouse. The plan would have *no effect* on two federally listed species: the hawksbill sea turtle and the rufa red knot. The NPS has initiated informal consultation with the US Fish and Wildlife Service pursuant to the requirements of the Endangered Species Act and NPS management policies.

Section 106 of The National Historic Preservation Act

To comply with Section 106 of the National Historic Preservation Act, the NPS evaluated the project areas to identify any known or potential historic or archeological resources. As described in Chapter 1, Playalinda District has been the subject of archeological surveys, with a few known sites identified within the northern stretch; however, none of the known sites would be affected by the actions in the proposed plan. Formal consultation is being conducted concurrently with the preparation of this Environmental Assessment. This process includes coordination with the Florida State Historic Preservation Office (SHPO) and other consulting parties to identify historic properties, assess potential effects, and resolve any adverse impacts. The NPS initiated consultation with the SHPO, Tribes, and other consulting parties via letter on June 12, 2026. No comments were received by the NPS as of the date of this EA release. The NPS submitted this EA and a Section 106 Assessment of Effect to the SHPO, Tribes, and other consulting parties and requested their review and comment.

TRIBAL COORDINATION

During the planning and compliance processes, the NPS consulted with the following culturally affiliated tribal nations:

- Seminole Tribe of Florida
- Seminole Nation of Oklahoma
- Miccosukee Tribe of Indians of Florida

APPENDIX B. ALTERNATIVES CONSIDERED BUT DISMISSED FROM FURTHER ANALYSIS

INTERIM STRUCTURAL STRATEGIES FOR SPECIFIC ROAD SECTIONS

The NPS considered installing short-term measures to reduce sand accumulation and/or protect the road's pavement as a component of the storm adaptive management plan. These options (described in the subsections below) would be *interim* management strategies to preserve vehicle access to the parking lots north of Parking Lot 8 by addressing the portion of the road between Parking Lots 8 and 9 that regularly experiences sand accumulation from overwash since 2022. As part of the storm adaptive management plan, this interim management strategy would be removed if (1) damage to the road and/or parking lots reaches a condition-based trigger for permanent closure to public vehicles or (2) the structure is no longer serving its original purpose (protecting the road and easing NPS operational burden on clearing the road), likely due to failure of the structure or possibly due to other changing conditions.

The NPS spent considerable effort reviewing options for protecting this area, acknowledging that if a good option could be identified, it could also be implemented elsewhere. Ultimately, as options were laid out as preliminary concepts by engineers on the planning team, it became apparent that concepts suited to this environment would require substantial disturbance of the coastal morphology and its associated ecosystem for both installation and removal (see preliminary options below). Due to the extensive level of natural resource impacts associated with these options and the lack of operational improvement over continued sand clearing alone, the NPS dismissed it from further consideration.

Protective Barriers

During early planning phases, the NPS investigated short-term options for attempting to stabilize sand in this area long enough for vegetation to reestablish and function to rebuild the dune. A 2025 memo titled *Short-Term Planning to Address Sand and Flooding on Roadway* identified back-dune barriers (i.e., man-made walls) as the preferred strategy to minimize flooding, given that the NPS planned to push overwash sand 10 feet seaward from the edge of pavement. This memo also noted the importance of pairing further development of this idea with long-term planning for Playalinda District as a whole.

During development of the Playalinda District Storm Adaptive Management Plan, the NPS consulted with a coastal engineer to further develop the idea of a temporary back-dune barrier or other interim protection measure. The team initially reviewed a proposal for a concrete wall as a back-dune barrier; however, the team agreed that the initial anchoring was insufficient to keep the wall upright. A more secure anchoring would be a permanent secant wall (which is a continuous wall of pilings driven deep into the ground, often tens of feet deep), which was not consistent with the idea of being able to remove this temporary protection measure and would have been subject to high levels of erosion (likely more than 10 feet of beach elevation) during storms. The team noted that seawalls are inconsistent with maintaining natural coastal processes due to the need for significant amounts of sand to be imported into the system to replace sand scoured away by high reflection energy during storms.

The team explored concepts that would provide the approximate height of the existing dune crest, approximately 10 feet (North American Vertical Datum of 1988 [NAVD88]). The new, evolved preferred concept for a back-dune barrier was a semi-permeable stone barrier. The stone barrier would comprise of up to approximately 1,720 linear feet of stone-based defensive structure (such as rock gabions or similar) with a potential structural width of approximately 30 feet at its below-grade base to support an overall height of roughly 15 feet (the anticipated rock crest elevation would be just over 11 feet above NAVD88). This height would mimic the existing dune crest here and at adjacent dunes immediately to the north and south and would be designed to reduce direct wave overtopping impacts on the existing road surface, including localized sand transport. This rock structure would stand approximately 7 feet above the road surface and approximately 18 feet wide at same elevation as the road surface.

For installation, the NPS would likely need to excavate down to approximately -4 feet NAVD88 to install an appropriate foundation (such as filter fabric overlain with a marine mattress) for the 30-foot-wide base. From there, gabion baskets or sand-filled geotextile tubes or bags would be stacked in a pyramid-like shape, with a more gradual slope facing the ocean and a steeper slope facing the road, as shown in Figure B-1. After installation, this structure would function as a stabilized dune core with the excavated sand placed on the beach side of the dune mimicking a natural dune face.

This management strategy would retain the existing road at grade and along the existing alignment. However, because of the limited room available to construct an appropriate base for the structure between the road and the ocean, the road would be subject to closure of one or both lanes during construction. Some sand clearing would still be required. In those instances where sand overtops the stone barrier, the NPS would continue to clear sand in accordance with newly established standard operating procedures for sand movement under the storm adaptive management plan.

Due to the substantial interference with natural processes associated with this option, issues with constructability feasibility (lack of space to build), and the lack of operational improvement over continued sand clearing alone, the NPS dismissed it from further consideration.

Raised Road

In addition to considering a physical barrier along the seaward side of the road the NPS also considered raising this segment of road above high-water levels along the existing alignment by placing it on a series of box culverts placed perpendicular to the beach. The open box culvert configuration would be designed to allow sand overtopping the dune to pass beneath the raised road surface, facilitating natural dune migration within the barrier island system. This approach would apply to approximately 400-1,000 linear feet of roadway. The box culverts would be seated on an appropriate engineered foundation extending to approximately -4 feet NAVD88. It would require a trapezoidal construction excavation footprint extending approximately 36 feet on either side of the existing road alignment, roughly following the footprint of recent sand overwash. The culverts would extend vertically to approximately +11 feet NAVD88 with the roadbed installed on top, resulting in a finished road surface elevation of approximately 12 feet

NAVD88. This design would mimic the general profile of adjacent dune crests and would be intended to reduce direct wave overtopping impacts while maintaining vehicular access along the existing corridor.

Due to issues with constructability feasibility (limited availability of space to build), substantial impacts on natural resources for installation and removal, and the lack of operational improvement over continued sand clearing alone, the NPS dismissed it from further consideration.

ENGINEERED DUNE

The NPS considered installation of an engineered dune with a stabilized core to provide similar overtopping protection (through dune crest elevation) to the northern portion of the Playalinda District as is currently afforded by the natural dunes in the southern portion of the district. The dune crest along Parking Lots 1-6 is estimated at approximately 22 feet NAVD88. Dune crest elevation starts to drop north of Parking Lot 6, so the new dune would be installed from just north of Parking Lot 6 to north of Parking Lot 13, where it would taper down to the existing dunes at Klondike Beach. The planning team worked through developing this alternative in order to better understand impacts on the park's natural resources as well as on park operations, as described below.

Based on similar stabilization projects elsewhere on the Atlantic coast of Florida, the team assumes a concrete seawall (e.g., secant wall) would be buried within the dune to stabilize the dune location. This wall may be embedded to a depth of approximately 35 feet deep and rise to a height of approximately 14 feet NAVD88, similar to the design for the existing seawall along Flagler Beach, Florida; this assumes similar geotechnical conditions exist at the park. While such a wall effectively stabilizes the beach from retreating inland, the wave energy against that wall during storms (when exposed) causes substantial scouring of sand away from the seaward face and requires sand nourishment efforts to rebuild the dune around the wall after such events. Any sea turtle nests that may have been laid prior to the storm and had not yet hatched would be washed out.

Other stabilized cores could be considered; however, each would have impact-related trade-offs, and each would negatively impact wetlands. For instance, use of debris or large stones (rip rap) is unlikely to be a preferred core material due to the possibility of affecting sea turtles during nesting season. Geotextile tubes or sand-filled bags may degrade over time and introduce artificial material into the natural shoreline environment if repeatedly exposed by storms.

The natural back dune slopes along the southern Playalinda District dunes tend to be 1:7 slope. Constructing the new dune with this slope would require a larger footprint than is available along this narrow spit of land in some areas. The narrowest footprint for this dune would be accomplished using a 1V:3H slope. Figure B-1 below shows initial estimates for the width of the constructed dune, assuming it was constructed with the new toe of dune matching the existing toe of dune as of the 2024 LIDAR used for this exercise.

Figure B-1. Approximate dune widths given 1:3 and 1:7 slopes

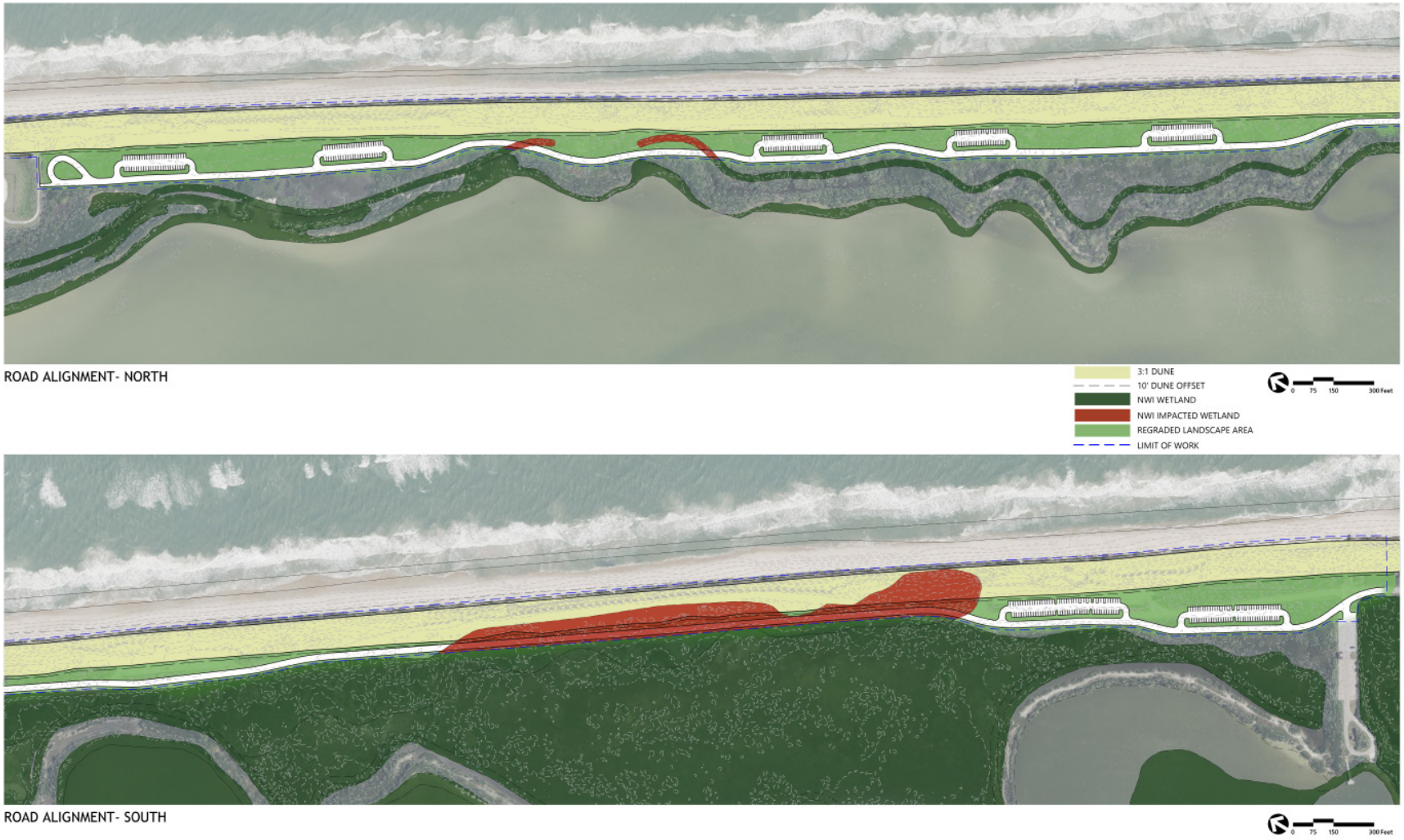
Source: 2024 USACE FEMA Topobathy Lidar: Post Hurricane Milton, FL

Even at its narrowest possible construction (using the 1:3 slope), the new dune would require the existing road and parking lots be relocated westward, where the land tends to slope gently down to Mosquito Lagoon. Therefore, relocating the roads and parking lots at their existing elevations (which are already problematic, in some cases) would require additional fill to establish the prism on which that infrastructure could be reconstructed. Based on preliminary estimates, approximately 33 acres would be disturbed to create the new dune and shift infrastructure behind it.

In addition to being part of Florida's longest undeveloped stretch of Atlantic shoreline, the Playalinda District includes many wetlands along the fringe of Mosquito Lagoon. Using modeled wetland locations from the US Fish and Wildlife Service's National Wetlands Inventory, the planning team laid out rough limits of disturbance to assess the amount of wetlands (as indicated by the National Wetlands Inventory) likely to be filled under this alternative. Layout assumptions included using the 1:3 shoreline, a 10-foot offset from the dune and any reestablished infrastructure, and some redesign of existing parking lots to avoid wetlands, improve safety, and maintain capacity. Based on this initial exercise, approximately 5 acres of wetlands would be filled to execute this alternative (see Figure B-2 below). This is likely an underestimate given the lack of site-specific ground-truthing (formal wetland delineation by a Professional Wetland Scientist) associated with the wetland data used.

Due to the extensive level of natural resource impacts and extraordinary cost associated with this alternative, the NPS dismissed it from further consideration.

Figure B-2. Engineered Dune Layout with Wetland Impacts



RAISE AND REALIGN THE ROAD

In addition to considering temporarily raising the road along the existing alignment (in conjunction with condition-based triggers for divestment), the NPS also considered permanently raising and realigning portions of the road along the beach at Playalinda District to reduce the chance that high-water events result in sand covering the road. Raising the road up on a berm and shifting it back from the ocean would require filling nearby wetlands to establish the road base. NPS policy requires that fill of wetlands be offset with wetland restoration. The NPS does not have restoration opportunities available that would fulfil the necessary requirements for mitigation. Raising the road on a low bridge may also have some wetland impacts, though it may allow for more natural barrier island processes to continue underneath. Both options would require substantial funding; therefore, these alternatives were considered but dismissed as economically infeasible.

INTRODUCING AN OFF-ROAD VEHICLE SYSTEM

The NPS considered the use of an off-road vehicle permitting system for continued public vehicular access in the northern portion of the Playalinda District, where lower dunes have resulted in increasing overwash of sand onto the existing road. The NPS dismissed this management strategy due to its potential for substantial adverse effects on the special status species that depend on the beach and other sandy habitats for survival. It would also impose a heavy administrative burden on park staff to establish, administer, and enforce such a system, as well as ensure visitor safety. For these reasons, the NPS dismissed this alternative because it may have too great an environmental impact, is operationally infeasible, and poses a risk to visitor safety.

FERRY ACCESS TO PLAYALINDA DISTRICT

The NPS considered providing ferry boat access to Playalinda District from Apollo District (including Seminole Rest). As the majority of land bordering Mosquito Lagoon is managed by the US Fish and Wildlife Service, the closest potential ferry launch would be in the NPS Apollo District. The long distance between the Apollo and Playalinda Districts, combined with the number of manatees using the lagoon (which require vessels to operate under a certain speed) would result in a long travel time and potential adverse impacts to manatees. Park staff expects that park visitors would not be willing to use alternate access with a long travel time, which would make operating the route economically infeasible. For these reasons, the NPS dismissed this alternative.

BRIDGE TO NORTHERN PLAYALINDA DISTRICT OVER MOSQUITO LAGOON

The NPS considered the possibility of coordinating with the US Fish and Wildlife Service to develop a new bridge that could provide access from the mainland, across Mosquito Lagoon, to Playalinda District from the north (via Parking Lot 13). Such a bridge would require footings installed in Mosquito Lagoon and may require roadway development in areas managed primarily by the US Fish and Wildlife Service. This alternative was dismissed due to economic infeasibility and the possibility of substantial adverse impacts on natural resources.

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APPENDIX C: SAND MANAGEMENT STANDARD OPERATING PROCEDURES

CANAVERAL NATIONAL SEASHORE
STANDARD OPERATING PROCEDURE

CANA-SOP Number 300-13 July 30, 2026

(Latest update)

_____

Superintendent

SUBJECT: SAND MANAGEMENT

Purpose and Background

The purpose of the Standard Operating Procedures (SOP) is to standardize sand management practices performed at Canaveral National Seashore (CANA) and to establish guidelines and procedures to protect imperiled species and ensure protection of natural and cultural resources. The goal of the SOP is to guide CANA Facilities Maintenance (FM), other National Park Service (NPS) staff, or contractors to conduct sand moving activities responsibly to protect park resources and infrastructure.

This sand management SOP for CANA includes the Playalinda and Apollo Districts. In CANA's enabling legislation, Congress instructed the NPS to preserve for public use and enjoyment the outstanding natural, historic, and recreational values of these areas, including wildlife and natural resources within the park. CANA staff have the responsibility of managing lands in a way that preserves and protects natural and cultural resources. Due to the nature of a barrier island ecosystem, sand management and cleanup activities of park facilities and infrastructure may be required to address damages from storm events, provide access for the public, as well as access for partner agencies (National Aeronautics and Space Administration [NASA] and Cape Canaveral Space Force Station [CCSFS]) to areas that are impacted by storm or high tide events. When addressing sand management issues, activities should be conducted in a balanced environmentally responsible manner.

Objectives

- Ensure the safety of personnel, volunteers, visitors, partners, and contractors.
- Minimize duration and extent of closures resulting from sand in roadways, parking lots, or other facilities that may result in loss of recreational opportunities and park revenue.
- Maintain safe access to the northern portion of the Playalinda District for partner facility needs.
- Protect imperiled species and their associated habitats.
- Ensure compliance with applicable laws, regulations, and agency policy.

General Sand Management Procedures

- When an event occurs such as a storm or high tide that deposits sand or debris on roadways, parking lots, or other facilities, CANA staff will do a safety assessment as soon as feasible to determine if an area should be closed. Employees are empowered to close any area that poses a threat to personnel, volunteers, visitors, partners and contractors. Supervisors and the Superintendent shall be notified immediately of any closures.
- Facilities Management and Resource Management (RM) will develop a coordinated sand management strategy identifying priority removal, placement areas, and resource concerns prior to commencing any sand management activities. The sand management strategy will be developed on a case- by- case basis. A thorough field site visit will be conducted to look at conditions, determine the needs of the project, and outline the best course of action. Any resource concerns will be addressed at this time, and if needed mitigation and avoidance measures will be implemented.
- FM staff will develop a Project Plan to execute the sand management strategy that will address:
    - Project Description and Location(s)
    - Methods of removal (staff, outside assistance, contract)
    - Resource needs (personnel, equipment, support)
    - Safety (Site Safety Plan, SPE, GAR, JHAs)
    - Cost estimate and funding availability
    - Resource protection requirements, permitted work areas, and restrictions.
    - Approved Equipment:
        - Frontend Loader
        - Excavator
        - Skid Steer or Track Loader
        - Walk-behind Track Loader
        - Dump truck
        - Tractor
        - Standard Pickup Truck
        - Broom Sweeper or Sweeper brush attachments
        - Front-mounted or trailer Blower
        - Utility Terrain Vehicle
        - All-Terrain Vehicle

- RM staff will provide monitoring, surveys, and biological oversight as needed.
- Interpretation and Fees staff will inform visitors of closure and impacts through press releases, social media and/or signage.
- If impacted, Merrit Island National Wildlife Refuge, NASA, and CCSFS must be notified and kept appraised of sand clearing progress.
- Superintendent or Law Enforcement will issue formal closure notice, if necessary.
- At the conclusion of sand moving, barricades and/or signage may be placed in disturbed areas to discourage driving, parking, or walking on dune areas.
- Seasonal definitions:
  - Shorebird nesting season (FWC): February 15 – September 1 (majority of nesting occurs in the Apollo District of the park)
  - Sea turtle nesting season (FWS): March 1 – October 31
  - Beach mice: present and potentially breeding year-round

Sand Management Outside Sea Turtle Season (November 1 – February 28)

This period allows for the most extensive sand management, including full dune restoration.

Authorized Activities

- Conduct dune rebuilding and reshaping to maintain a continuous dune line seaward of the existing roadway.
- Remove sand from roadways and return it to the same dune system or nearby beach or backshore habitat (previously affected by overwash) that are less than 10% vegetation.
- Use woody debris and/or sand fencing for dune reinforcement and/or rebuilding.
- Plant native dune plants to encourage dune restoration and/or rebuilding.
- Allow heavy equipment to operate directly on beach and dune areas as necessary.
- Utilize staff from CANA, other parks, Career Source Brevard, or contractors to conduct sand management activities.

Other Requirements

- Work areas for sand placement will be marked and denoted by park staff.
- Dune restoration and reconstruction will mimic adjacent dune height, width, and slope and the eastern dune toe will follow the general toe alignment in the vicinity to the extent possible.
- Grade roads and road shoulders to ground level without any subsurface excavation.
- Sand must not be transported offsite.
- Sand brought onsite for use in dune building will be similar in color, grain size, and mineral content to native dune sand.
- Only four-wheel drive vehicles will be allowed on the paved road that is covered in sand until sand clearing occurs.
- Sand may not be used to fill wetland areas.
- Dune plants introduced for dune stabilization, restoration, and/or rebuilding will be native species and local genotypes. Sand fencing may be installed to further stabilize the dune. Guidance and best management practices for conducting these activities can be found in the Natural Resources Conservation Service Native Plants for Coastal Dune Restoration,

the Florida Department of Environmental Protection Dune Plant Recommendations and Sand Fencing Guidelines.

Sand Management During Sea Turtle Season (March 1 – October 31)

Due to active nesting of both sea turtles and shorebirds, dune disturbance is not permitted during this period.

Restrictions

- No dune work or dune shaping is allowed.
- Activities must avoid impacts to nests, hatchlings, and breeding species.
- Mechanized vehicles must remain on paved surfaces or roadways, unless RM authorizes otherwise.

Permitted Roadway Activities

- Move sand off the road surface into adjacent parking lots for temporary stockpiling.
- Maintain emergency and partner access.

Placement Priorities

- Clear sand from roadways before parking lots to restore safe access.
- Clearing of the sand may be deferred and delayed until storm and king tide events have subsided.
- Clearing may also be delayed until low-visitation periods.

Safety Requirements

Safety Requirements

- Sand management operations involve heavy equipment, vehicle traffic, changing environmental conditions, and work in areas accessible to the public. The supervisor or project lead is responsible for ensuring activities are conducted in a manner that protects employees, volunteers, contractors, visitors, park resources, and partner agencies.
- Prior to commencing work, the supervisor or project lead shall conduct a pre-work safety briefing appropriate for the planned activities. At a minimum, the briefing shall address anticipated hazards, work assignments, communication methods, traffic control measures, weather conditions, emergency procedures, biological resource restrictions, and applicable resource protection requirements.

Work Planning and Equipment Safety

- Conduct a documented Job Hazard Analysis (JHA) or risk assessment, as appropriate for the scope of work, before beginning operations.
- Only trained, qualified, and authorized personnel may operate heavy equipment or mechanized vehicles.
- Perform and document required pre-use inspections of all equipment in accordance with manufacturer recommendations and park procedures. Equipment determined to be unsafe shall be removed from service until repaired.
- Maintain clear and effective communication among all personnel involved in the work, including staff, volunteers, contractors, and partner agencies, using radios, hand signals, or other established communication methods.

- Utilize spotters whenever equipment is backing, operating in areas with restricted visibility, or working in close proximity to personnel, vehicles, or members of the public.
- Suspend work whenever conditions become unsafe, including but not limited to lightning, severe weather, high winds, poor visibility, equipment failure, or other hazardous conditions.

Personal Protective Equipment

- Personnel shall wear appropriate personal protective equipment (PPE) for assigned duties, including, at a minimum:
- High-visibility safety vest or shirt when working in or adjacent to roadways or equipment operations.
- Sturdy work boots with slip-resistant soles appropriate for the assigned work.
- Protective toe footwear (steel or composite toe) shall be worn whenever employees are exposed to hazards from falling or rolling objects, heavy equipment, or other conditions identified through the JHA, risk assessment, manufacturer recommendations, or supervisor direction.
- Safety glasses when exposed to flying debris or other eye hazards.
- Work gloves appropriate for assigned tasks.
- Hearing protection when exposed to excessive noise.
- Additional PPE as identified through the JHA, risk assessment, manufacturer recommendations, or supervisor direction.

Traffic and Public Safety

- Close affected roadways and parking lots during active sand management activities as necessary to protect employees, volunteers, contractors, and visitors.
- Close adjacent beach areas and other affected public access areas as necessary to maintain a safe work zone during active sand management activities.
- Establish appropriate traffic control measures using barricades, cones, warning signs, flaggers, or other traffic control devices appropriate for the work being performed.
- Maintain emergency vehicle access whenever practical.
- Prevent unauthorized public access into active work zones until operations are complete and equipment has been secured.

Environmental and Occupational Health

- Conduct work in accordance with the park's Heat Illness Prevention Program during periods of elevated temperatures.
- Monitor weather conditions throughout the work period and adjust activities as necessary to protect personnel.
- Maintain spill prevention materials when fueling or servicing equipment in the field and immediately report and mitigate fuel or hydraulic fluid releases in accordance with park procedures.

Incident Reporting and Stop Work Authority

- Report all injuries, vehicle accidents, equipment damage, near misses, spills, and resource impacts in accordance with park reporting procedures.
- Every employee has the authority and responsibility to stop work whenever an imminent danger to personnel, visitors, natural resources, cultural resources, or property is

identified. Work may resume only after hazards have been evaluated and appropriate corrective actions have been implemented.

SOP Review and Updates

SOPs will be reviewed annually to incorporate data, evaluate effectiveness, adjust strategies, and ensure alignment with park goals and seasonal observations.

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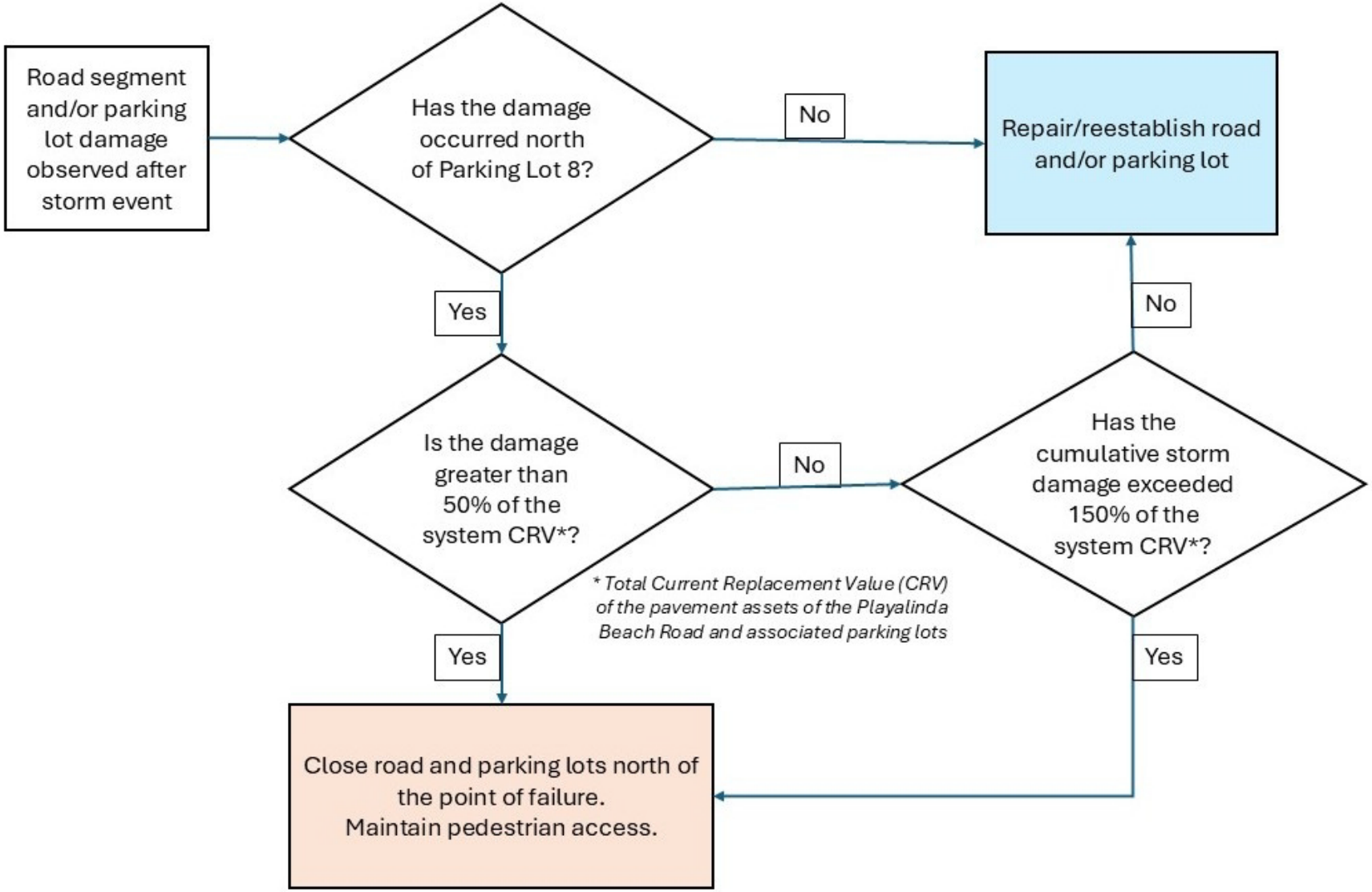
APPENDIX D. CONDITION-BASED TRIGGERS FOR DIVESTMENT FLOWCHART

CONDITION-BASED TRIGGERS FOR DIVESTMENT FLOWCHART



APPENDIX E: INDICATORS, THRESHOLDS, AND VISITOR CAPACITY

INTRODUCTION

This appendix provides additional information about the monitoring strategy as it relates to the Storm Adaptation Plan for Canaveral National Seashore. Monitoring is the process of routinely and systematically gathering information or making observations to assess the status of specific resource conditions and visitor experiences. Monitoring is an integral component of visitor use management, as it allows managers to objectively and effectively evaluate whether desired conditions are being achieved and maintained. Without monitoring, managers cannot determine whether their management strategies and actions are effective. Further, a well-planned monitoring strategy provides for transparency, communication, and potential cost savings through efficiencies and possibly cost sharing.

Data collected systematically through monitoring help demonstrate the effectiveness of current management strategies as well as the potential need for changes in management strategies over time. Monitoring shows how conditions change over time, including the rate and magnitude of change. In this way, monitoring provides a much richer and more complete picture to determine whether new management actions are needed to achieve and maintain desired conditions (IVUMC 2019).

INDICATORS AND THRESHOLDS

Monitoring is accomplished by selecting indicators that are used to track trends in resource and experiential conditions. Established thresholds clearly define when conditions are becoming unacceptable for the selected indicators, thus alerting managers that a change in management action(s) is required. Together, indicators and thresholds help managers monitor and evaluate the effectiveness of management actions in achieving and maintaining desired conditions.

Indicators. Indicators are specific resource or experiential attributes that can be measured to track changes in conditions so that progress toward achieving and maintaining desired conditions can be assessed. Indicators translate the broad description of desired conditions into measurable attributes that can be tracked over time to evaluate changes in conditions. Therefore, indicators correlate directly with desired conditions. In addition, indicators must be capable of being assessed objectively over time, so that managers can determine whether conditions have changed and, if so, how.

The interdisciplinary planning team considered the central issues driving the need for the plan and developed related indicators that would help ensure that the purpose of the plan is being achieved. The indicators described below were considered the most critical. The planning team also reviewed the experiences of other national park units with similar resource concerns to help identify meaningful indicators.

Thresholds. A threshold is the minimally acceptable condition associated with an indicator. Visitor activities inevitably cause changes in natural or cultural resource conditions or visitor experiences. Proactive management involves determining the acceptable level of change for selected indicators. Thresholds serve this role by establishing the point at which the effects of

visitor use on desired conditions are anticipated to become enough of a concern that a management action is needed to achieve and maintain desired conditions. In this role, thresholds serve as a stop sign or a "line in the sand."

The interdisciplinary team used past monitoring information, public input, field observations, professional judgment, best available science, and literature reviews to establish thresholds for each selected indicator based on desired conditions.

INDICATOR TOPIC: DUNE PROTECTION

Indicator: Observations of visitors out of bounds in dune areas

Threshold: Park staff do not observe instances of visitors out of bounds in the dune area during more than 10% of sampling events.

Rationale: This indicator addresses visitor use impacts that occur when people leave the open beach and enter dune areas in the Playalinda District. Dunes are a vital part of the barrier island ecosystem, which is a fundamental resource of Canaveral National Seashore; they protect the geological and biological systems to the west by reducing the impacts of storm surge and also provide habitat for a number of species. Dunes are in the Sensitive Resource Zone, which protects natural resources that are sensitive to or easily damaged by human use, such as the dune ridge between the Atlantic and Mosquito Zone. The park's general management plan states that within this zone the natural environment is managed to preserve and protect exceptional and critical ecosystems, habitats, and processes, and visitor access beyond designated trail corridors and established pathways is by permit only. Dune areas are closed to all foot, wheeled, and motorized traffic to preserve and protect the natural dune vegetation and formation.

The primary resource concern is to minimize trampling of dune vegetation and disturbance of the dune toe. Although boardwalks are provided to direct visitors to and from the beach, once visitors are on the beach, they may move onto the dunes or set beach equipment (towels, coolers, umbrellas, etc.) onto the dunes to find a place to rest, gather, or get away from busier parts of the beach - particularly in high-use areas where available dry beach width is limited. Dune vegetation is easily damaged by trampling and does not recover quickly once disturbed. Even small or repeated disturbances can reduce plant cover, weaken dune structure, and contribute to erosion over time. Because dunes play an important role in protecting inland areas and supporting native coastal ecosystems, minimizing unnecessary human disturbance is important for long-term resource protection.

This indicator provides a way to measure the frequency of human encroachment onto dunes. Occurrences would only be tracked for this indicator if any people are out of bounds in dune areas, which would equate to a minimum disturbance area of 30 square feet. The threshold allows for occasional, isolated instances of disturbance while ensuring that dune use does not become a common or accepted part of the beach recreation experience.

Monitoring: Monitoring of human violation of dune closures can coincide with regular patrols by law enforcement or other park staff or volunteers. Park staff would only track the number of times a group of two or more people is out of bounds in dune areas. Frequency of monitoring will be determined in the future.

Management Strategies:

- Continue to use the Superintendent Compendium to prohibit visitor access to dunes.
- Use signage to encourage visitors to stay off dunes.
- Install symbolic or physical barriers (e.g., fencing, rope lines, vegetation protection fencing) at dune toe interfaces where feasible.
- If barriers placed at the dune toe are insufficient, move the barriers away from the dune to create more of a buffer.
- Increase ranger presence or targeted patrols during peak summer periods at high-use areas.
- Implement focused visitor education campaigns regarding dune protection, including Leave No Trace messaging and outreach through park communications channels.
- Apply progressive enforcement actions, including warnings and citations, for repeat or egregious violations of dune closures.
- Plant vegetation in disturbed dune areas and place signage about dune restoration.

INDICATOR TOPIC: VISITOR USE AND EXPERIENCE

Indicator: Vehicles at one time in parking lots.

Threshold: Vehicles at one time do not exceed the design capacity of the parking lots more than 20% of sampling events.

Rationale: Free-flowing roads and parking areas allow access for emergency services, equipment, and improve the visitor experience. This indicator serves as a measure of visitors' ability to find parking at popular destinations.

Under current visitation and visitor use patterns, certain parking lots within Playalinda District fill to parking lot capacity during peak visitation days and special events. The parking lots that typically fill first include lots 12 and 13 (towards the north) and lots 1 through 3 (towards the south). The southern parking lots are likely to fill during launches, due to their proximity to the launch pads.

As stated in the park's general management plan, Foundation Document, and the Storm Adaptive Management Plan, Playalinda District is managed to offer an uncrowded, natural beach experience that allows visitors to have high-quality experiences. The park is managed to provide opportunities for visitors to experience an uncrowded and natural environment throughout the national seashore.

When parking lots are full and exceeding capacity, this indicates that visitation along the beach is likely concentrated in a manner that conflicts with an uncrowded setting. Therefore, by

monitoring the number of instances in which key parking areas exceed lot capacity, park staff will be informed if desired conditions for high-quality experiences are being met. In addition, when lots are full visitors may park along the roadside or create their own parking space, which can impact sensitive vegetation including the dune vegetation and wildlife.

Monitoring: Park staff will monitor all lots within the Playalinda District during a typical patrol. NPS staff will record each instance in which they observe a parking lot is full. For example, park staff would note the date, time, parking lot number, and denote "yes" or "no" if the parking lot was observed at capacity or beyond it. Sampling would be done randomly, but should include both weekdays and weekends, as well as various times of the day. If needed, park staff could identify "high priority" parking areas that would be monitored more frequently. Alternately, the park could use law enforcement records of parking citations to monitor instances of visitors presumably parking in areas outside of designated parking because those areas are full.

Management Strategies:

- Post signs indicating parking is full and that visitors should return at a later time.
- Provide real-time information regarding parking and access opportunities (such as text alerts/app updates).
- Special social media posts on wait times, parking lot filling, and bring your patience on busy holiday weekends and launch days.
- Provide a forecast for parking conditions.
- Explore opportunities to expand and/or restripe parking lots to accommodate more visitors in alignment with the identified visitor capacity.
- Explore opportunities to charge for a parking space in lieu of an entrance fee.

OTHER RELATED MONITORING

Reports of Visitor Use Conflict

Park staff anecdotally reported that they receive complaints from visitors regarding other visitors' behavior. While NPS seeks to minimize conflict among visitors, it is possible that certain strategies may increase the potential for conflict. For example, under Alternative B: Storm Adaptive Management Plan (Proposed Action), if NPS divests from infrastructure improvement and some of the parking areas are closed to visitation, this may direct visitors to other lots. Or, if parking areas are closed due to storm damage, visitor use of certain lots may increase in a manner that could result in conflict. Therefore, park staff will monitor instances of visitor use conflict (the number and type) on a rolling basis and annually review them to determine if any management strategies are needed to reduce conflict.

Number of Times Playalinda District Closes Due to Full Parking Lots

During peak visitation days, park staff temporarily close access (typically for less than 4 hours) due to the number of vehicles exceeding parking lot capacity. This may occur during launches or holidays with good weather such as Memorial Day Weekend or Labor Day Weekend. When this occurs, law enforcement rangers may turn visitors around or close the entrance gate. Park staff

identified the need to monitor the number of times in which the Playalinda District closes due to demand exceeding capacity (including the days and times) to inform long-term management strategies, recreational travel forecasting, and to provide real-time information to visitors. This information will be continually monitored and reviewed annually.

VISITOR CAPACITY ANALYSIS

Overview

This section provides additional information about the visitor capacity identification as it relates to the visitor use management framework for the Canaveral National Seashore Storm Adaptative Management Plan. For a full description of the Interagency Visitor Use Management Council (IVUMC) Framework and additional resources, please visit https://visitorusemanagement.nps.gov.

The Interagency Visitor Use Management Council defines visitor capacity as the maximum amounts and types of visitor use that an area can accommodate while achieving and maintaining the desired resource conditions and visitor experiences that are consistent with the purposes for which the area was established. By managing amounts and types of use, the National Park Service can help ensure that resources are protected and that visitors have the opportunity for a range of high-quality experiences. Visitor capacities will be used to inform and implement the management strategies selected as part of this plan.

Identifying visitor capacity is directed by legal mandates that require the National Park Service to identify visitor capacities and implementation commitments for all areas of a park unit per the National Parks and Recreation Act of 1978. The approach for identifying visitor capacities is based on the Interagency Visitor Use Management Council's Visitor Use Management Framework and Visitor Capacity Guidebook (IVUMC 2016), as well as other IVUMC supporting guidance.

The process for identifying visitor capacity follows four guidelines: (1) determine the analysis area, (2) review existing direction and knowledge, (3) identify the limiting attribute, and (4) identify visitor capacity and implementation strategies. This section of the plan outlines the considerations and processes used to identify visitor capacity for key destinations.

This analysis uses the best available information to make the decision for current management and to improve visitor access and experience. Should there be meaningful changes, such as those outlined below, park staff may reevaluate and update the visitor capacity.

The criteria that may warrant a reevaluation of capacity or updating strategies are as follows:

- Evidence that thresholds are being approached is present;
- Evidence that park conditions are trending away from desired conditions is present;
- The park has meaningful new knowledge or understanding of the relationship between visitor use and impacts on resources or visitor experiences; and
- Changes to the desired conditions have occurred.

Visitor Capacity Analysis Areas

Analysis areas are destinations where visitor use is concentrated and impacts on resources or visitor experiences are likely. Several studies have demonstrated that use of an area will impact many of the values for which the area was established. For these locations, a detailed analysis has been conducted to identify the appropriate level of use. Current use levels are informed by relevant studies and data, and the actions contained in this plan were considered as part of the visitor capacity identifications.

The interdisciplinary planning team identified two analysis areas for the Playalinda District: 1) Parking Lots 1–8, including Eddy Creek; and 2) Parking Lots 9–13. Where applicable, specific management strategies outlined in this plan that will be used to implement visitor capacities are included. Indicators will be monitored to ensure desired conditions and visitor capacities are met as described, and if associated thresholds are exceeded, adaptive management strategies will be implemented to ensure that desired conditions are maintained.

Methodological Considerations

Park managers must understand multiple inputs and use sound professional judgement to identify visitor capacities (IVUMC 2019). Resource inputs include sensitivity of the surrounding natural and cultural resources such as rare plants, cultural sites, and wildlife. Social inputs include crowding, safety, soundscape, conflict between visitor uses, wildlife-human conflict, trail conditions, and quality of view (IVUMC 2019). Monitoring of visitor use to understand if existing use levels and visitation patterns are achieving desired conditions for resource protection and visitor experience is an important component of identifying visitor capacity. This is often true across national park units, where the sensitivity of natural and cultural resources and wilderness can prevent parking lot expansion in some areas.

Park staff collect visitor use data, including traffic counts, yearly. Resource conditions are also monitored. Specifically at Canaveral National Seashore, a visitor use study was conducted in 2016 on behalf of the social science program to better understand how visitors access, use, and experience the park (NPS 2016). Results from this study such as visitor group size, average length of stay, and other visitor characteristics were used to inform the capacity analysis for the Playalinda District. In addition, park staff deploy vehicle counters, which collect hourly vehicle counts entering and exiting the park, at the entrance station to Playalinda District. Using a people-per-vehicle multiplier paired with typical duration of stay, NPS staff can estimate the number of visitors at one time within the district. Together, these data sets were used to inform the visitor capacity analysis.

Review of Existing Direction and Knowledge

During this step, the planning team reviewed existing direction and knowledge, including 1) applicable law and policy; 2) prior applicable planning and guidance; 3) existing conditions in the analysis area; 4) existing monitoring; and 5) existing management strategies and actions. An overview of visitor use issues and current use levels for each analysis area can be found on the following pages.

The General Management Plan (NPS 2014) identified zoning for the park and described desired conditions for visitor access and experience: "*Visitors entering the national seashore experience the relatively pristine natural setting of the national seashore and lagoon that are mostly free of unnecessary distractions. Opportunities for experiencing an uncrowded natural environment will be easily found throughout the national seashore. High visitor use levels might be encountered at visitor contact centers or at portals to the beach and lagoon, but emphasis will be placed on encouraging visitors to experience areas of the seashore that are relatively undeveloped*."

The areas within the Playalinda District fall within one of two zones, the Recreation Zone and the Sensitive Resource Zone (NPS 2014). The beach area itself falls within the Recreation Zone, while the dunes found between the roadway and beach are within the Sensitive Resource Zone. The zone summaries are described below (for more information, please reference the General Management Plan).

- Recreation Zone Summary: This zone is primarily used by visitors for active and passive recreational opportunities, most often associated with the surrounding waters. This zone includes some of the most heavily used areas of the national seashore.
- Sensitive Resource Zone Summary: This zone protects primarily natural resources that are sensitive to or easily damaged by human use, such as the dune ridge between the Atlantic and Mosquito Lagoon. Visitor access into this zone would be restricted to designated trail corridors. Access beyond designated trail corridors would be by special permit only.

Overall, visitation to the Playalinda District has remained relatively constant, with a slight increase, over the last 10 years (see Figure E-1). As anticipated, the Covid-19 pandemic during 2020 impacted overall visitation during that year as the park was closed to visitor access for two months. Between 2015 and 2025, April and May were typically the busiest visitation months (see Figure E-2) with monthly visitation being relatively low from October through January, likely due to colder temperatures that impact beach visitors. In addition, September is historically the most active months for hurricanes in Florida, meaning that storms and their associated impact may result in decreased visitation in the fall months as a result of temporary closures (Florida State University 2026).

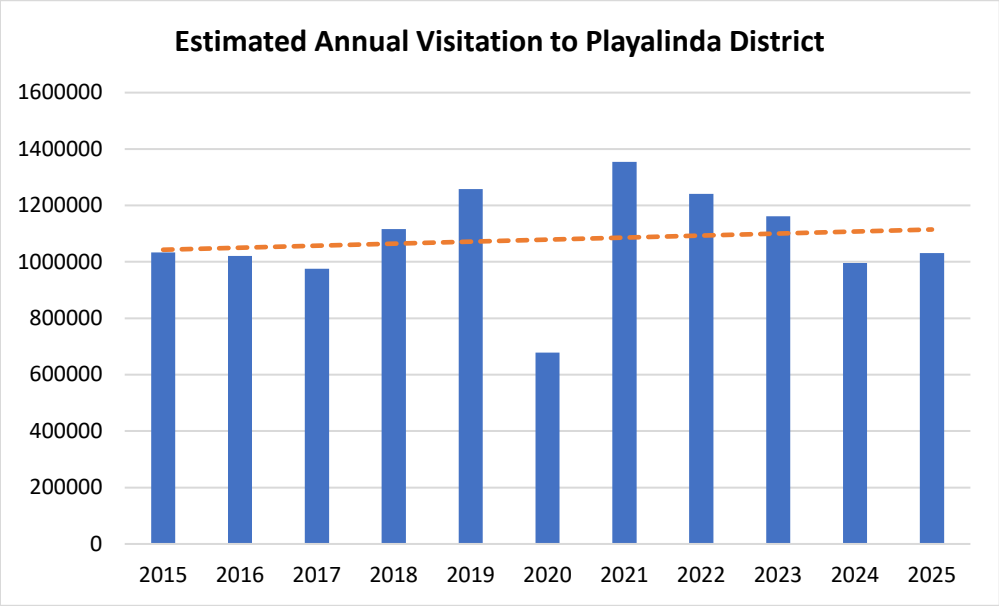


Figure E-1: Estimated annual visitation from 2015 through 2025 to Playalinda District (NPS 2026c)

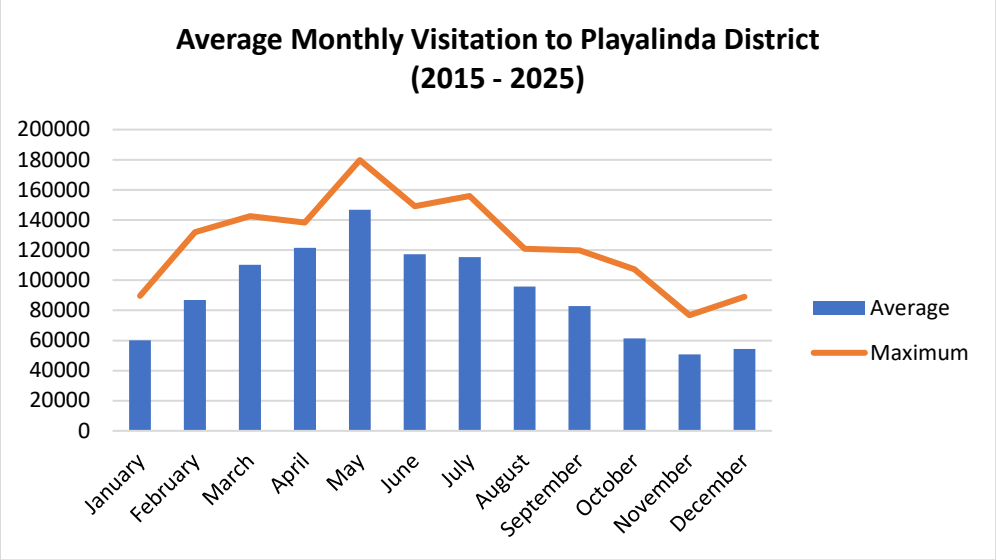


Figure E-2: Average and maximum monthly visitation observed from 2015 to 2025 (NPS 2026c)

Visitors arrive to the Playalinda District primarily by personal vehicle. In a visitor survey, 99% of respondents who visited Canaveral National Seashore indicated they used a personal vehicle to access the park (NPS 2017). In addition, data suggest that many visitors to the park are repeat visitors as 38% of respondents indicated they had visited the park 5 or more times within the previous year of their visit (NPS 2017).

According to the visitor survey, the primary activities that visitors participate in are sunbathing (20%) and swimming (20%). The survey also inquired about the most important reasons for visiting the park, with respondents suggesting spending time with friends and family (21%), view wildlife or natural scenery (19%), and relaxation (17%). Given this nature of visitation, visitor use patterns typically do not show much turnover of visitors along the beaches and dunes. Regarding the length of stay, approximately 34% spent 5 hours or more within the national seashore while only 5% spent less than an hour.

Overall, the park will occasionally prohibit visitor access to the seashore due to a severe weather event (e.g., hurricane or tropical storm). NASA's Kennedy Space Center may request that the park, or portions of the park, be closed due safety or security concerns for rocket launches. When the park does remain open for launches, visitors typically find a parking spot in advance of the launch and watch from the parking lot, beach, or on boardwalks that provide access to the beach. This type of recreation differs from the typical beachgoer as launch viewers often only stay for a short period of time and then depart the seashore after the launch. NPS staff did not identify a special event capacity for rocket launches at this time. While it is a different visitor experience, overall visitation numbers are relatively aligned with typical conditions due to safety precautions associated with rocket launch viewing. In the future, NPS staff may elect to identify a special event capacity.

IDENTIFY THE KEY ATTRIBUTE

Step three requires the identification of the key attribute, defined as the specific resource or experiential attribute(s) that most constrains the analysis area's ability to accommodate visitor use. The constraining attribute(s) may vary across the analysis area and is described under each key area.

Identify Visitor Capacity

To determine the appropriate amount and types of use at key areas, data were reviewed to understand current conditions compared to goals and objectives for the area. Annual visitation data collected by the National Park Service staff include levels of visitor use parkwide and by area. Park managers also collect data such as traffic counts, resource conditions, and other data that show trends in conditions to resources over the years. Where applicable, the person-per-vehicle multiplier can be used to help calculate capacity; however, the analysis focuses on desired conditions for resources and experiences along the beaches and dunes because the person-per-vehicle multiplier is subject to change.

Visitor Capacity Analysis: Parking Lots 8 and South

Review the Existing Direction and Knowledge.

This analysis area consists of Parking Lots 1 through 8, including Eddy Creek, and the associated beaches and dunes that they provide access to. This area is primarily used by family recreationists as well as rocket launch viewers. Parking Lots 1 through 3, which are closest to the Playalinda District Entrance Station, typically fill up first. On busy summer weekends, the lots

may start filling by late morning (10 – 11a.m.) and remain full through the afternoon. Table E-1 below presents the number of parking spaces available by lot.

TABLE E-1. NUMBER OF PARKING SPACES AND 90% CAPACITY OF PARKING AREAS WITHIN THE ANALYSIS AREA

Parking Lot	Number of Parking Spaces	90% Capacity of Parking
1	69	62
2	52	47
3	82	74
4	113	102
5	91	82
6	91	82
7	92	83
Eddy Creek	52	47
8	124	112
Total	**766**	**691**

While most of the parking areas are located along the east side of this analysis area to facilitate access to the beaches and dunes, Eddy Creek boat launch is located on the west side of the road, or the lagoon side of the analysis area. This is the only location in Playalinda that provides access to Mosquito Lagoon and is used by boaters, hunters, fisherman, and wildlife viewers. However, during peak visitation weekends beachgoers may use this parking area and then cross Beach Road to access the beach.

Based on data collected from vehicle counters during 2025, data suggests that on average, visitation to this analysis area is aligned with desired conditions for resource conditions and visitor experiences for the Recreation Zone and Sensitive Resource Zone. Park staff reported that they rarely receive comments from visitors that they feel crowded, cannot find a spot to recreate on the beach, or that their experience is degraded due to high visitation. This indicates that, overall, current visitor use patterns provide for uncrowded experiences and allow visitors to connect with resources, as articulated in the zone descriptions for the Recreation and Sensitive Resource Zones. Figure E-3 illustrates the differences in average visitation compared with peak visitation, such as that observed on a holiday weekend like Memorial Day Sunday (*note: this applies to the entire Playalinda District, not just this analysis area*).

To better understand the estimated number of people at one time within the analysis area, NPS staff analyzed the number of hourly entries to Playalinda District and used duration of stay data from the 2016 visitor use study (NPS 2017). This model allows park staff to estimate, within a given hour, the number of visitors present within the analysis area, the number of visitors accessing the area, and the number of visitors departing. Because the counter is located at the entrance station, NPS staff assumed 70% of visitors go to Parking Lots 8 and south because approximately 70% of the total parking capacity within Playalinda District is within this analysis area. Figure E-4 below illustrated the estimated people at one time across a summer 2025 average (6/1/2025 through 8/31/2025) compared to Memorial Day Sunday (May 25, 2025).

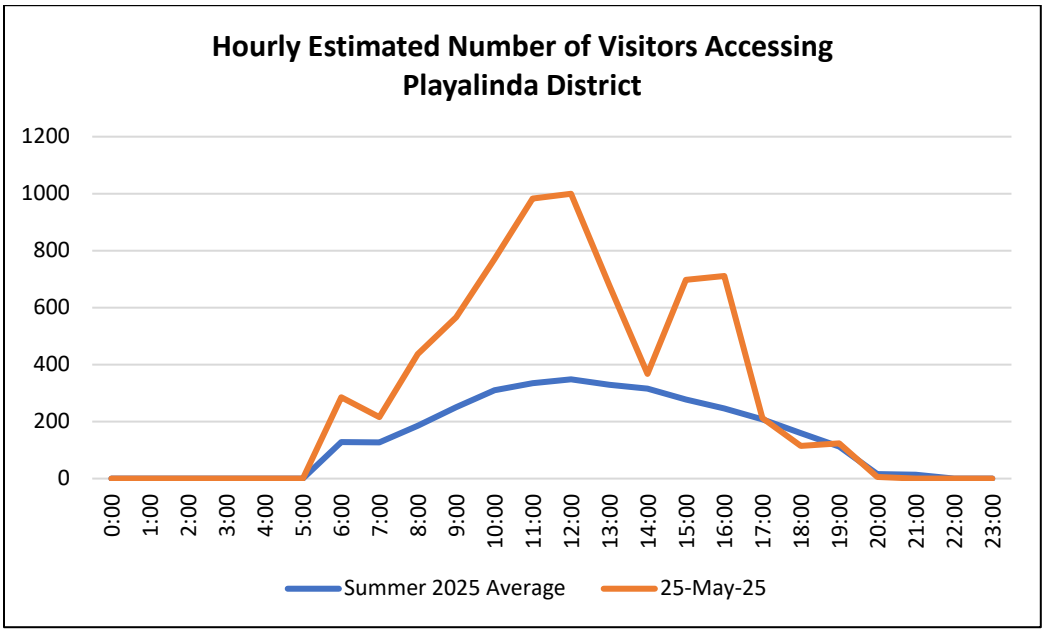


Figure E-3: Hourly estimated number of visitors accessing Playalinda District based on traffic counter data. The graph shows average hourly visitation for Summer 2025 (June 1, 2025, to August 31, 2025) and Memorial Day Sunday (May 25, 2025) for comparison.

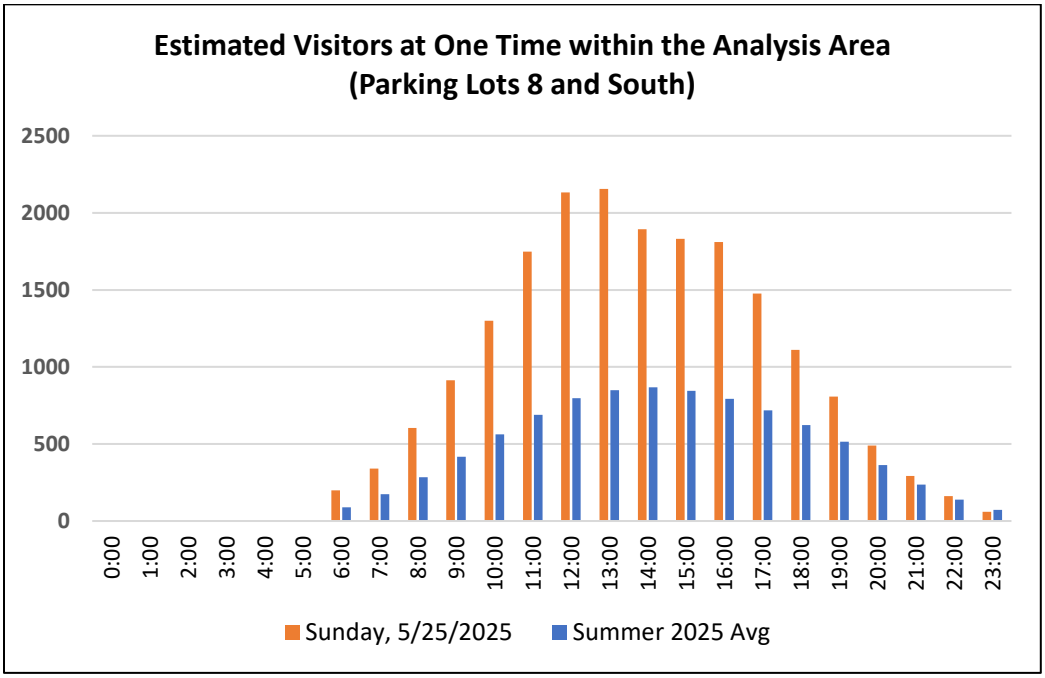


Figure E-4: Estimated visitors at one time within the analysis area during the summer 2025 average and Memorial Day Sunday. Please note that while the park closes at 8p.m. (20:00), the model is accounting for visitors who arrive earlier in the day and stay in the park.

Identify the Key Attribute.

The attribute that most constrains this area's ability to accommodate visitor use is the uncrowded, natural beach experience. The protection of dune vegetation and topography of the seashores, including tides that impact beach space, can also constrain visitor use particularly during storms.

The indicator that park staff will monitor to ensure that desired conditions for resources and experiences continue to be achieved and maintained is observations of visitors out of bounds in dune areas and vehicles at one time in parking lots.

Identify the Visitor Capacity.

Overall, park staff identified that current visitor use levels are aligned with desired conditions and that most visitors have opportunities for an uncrowded setting. Visitation could be increased, primarily on non-holiday weekends and during the weekdays, and desired conditions would be maintained. The proposed visitor capacity is 2,200 people at one time.

The data suggests that if NPS staff implement Alternative B and divest from infrastructure repairs, this analysis area (Parking Lots 8 and south) can likely accommodate current visitation seen throughout the entire Playalinda District on a typical visitation day. However, during rocket launches and peak visitation days, visitation levels may impact desired conditions for resource protection and experience. NPS staff will monitor the indicators described above to ensure desired conditions are maintained. During this monitoring, NPS may elect to moderately expand or re-stripe some of the parking areas within this analysis area.

Visitor Capacity Analysis: Parking Lots 9 and North

Review the Existing Direction and Knowledge.

This analysis area consists of Parking Lots 9 through 13 and the associated beaches and dunes that they provide access to. This analysis area differs from Parking Lots 8 and south for various reasons. First, the parking lots within this analysis area offer visitors access to the backcountry of Klondike Beach and its primitive experiences. Park staff currently manage access on a first-come, first-served basis and distribute up to 50 permits per day to hike to the backcountry. Second, the dunes within this analysis area are lower, meaning they are particularly susceptible to damage from storms, increasing water levels, and off-trail or off-road visitor use. NPS staff may temporarily close this area to vehicle access following storms when the road is not passable due to water levels or sand on the road.

Within this analysis area, Parking Lots 12 and 13 typically fill up with vehicles first and serve as the primary destination. The parking lots in this area are located closer to the lagoon due to the difference in topography and the dunes. When dune vegetation is lost, visitors walk on the dunes to access the beach, which may impact the resources and cause further resource damage. NPS staff would install temporary fencing and signage to discourage visitors from further impacting the dunes.

Parking Lots 11, 12, and 13 are located on the west side of the road, meaning that visitors need to cross Beach Road to access the beach. The dune crossovers are different within this area due to previous disturbance and include some boardwalk and some open areas.

Table E-2 below provides a summary of the estimated parking spaces for Parking Lots 9-13.

TABLE E-2. ESTIMATED NUMBER OF PARKING SPACES AND 90% CAPACITY OF PARKING AREAS WITHIN THIS ANALYSIS AREA.

Parking Lot	Estimated Number of Parking Spaces	90% Capacity of Parking
9	81	73
10	80	72
11	52	47
12	63	57
13	52	47
Total	**328**	**296**

Overall, visitation to this analysis area seems to be aligned with desired conditions for visitor experiences and resource protection. While park staff occasionally observe conflicts among visitor use groups, visitor use patterns within this analysis area typically result in an uncrowded beach experience. Park staff have not received many comments from visitors stating they feel crowded along the beach. However, given the sensitivity of the dunes, park staff have noted impacts to resources from inappropriate visitor behavior.

Similar to the analysis area: Parking Lots 8 and south, this area receives varying levels of visitation depending on the time of year, the weather, and weekday versus weekend visitation (see Figure E-3 above). NPS staff used the same methodology as presented for Parking Lots 8 and south to estimate the number of visitors at one time within this analysis area (see Figure E-5).

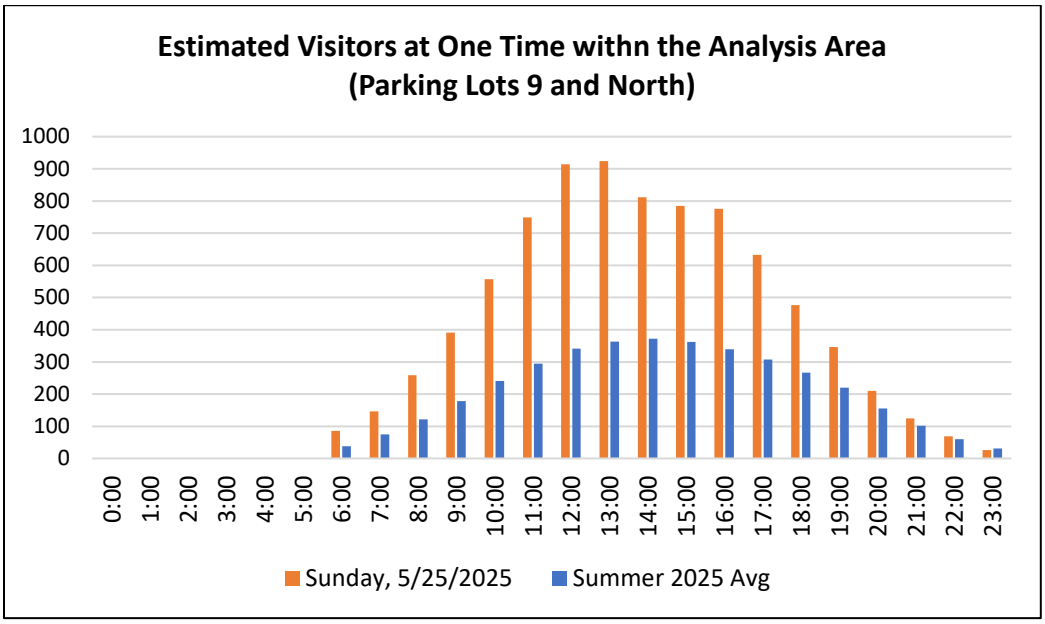


Figure E-5: Estimated visitors at one time within the analysis area during the summer 2025 average and Memorial Day Sunday. Please note that while the park closes at 8p.m. (20:00), the model is accounting for visitors who arrive earlier in the day and stay in the park.

Identify the Key Attribute.

The attribute that most constrains this area's ability to accommodate visitor use is the protection of the barrier island ecosystem and dune protection, which are fundamental resources and values of the park. This ecosystem is extremely diverse due to the transition zone between temperate and subtropical plants and animals that exist (NPS 2015). The topography of the seashores, including tides that impact beach space and access via the roadway, can also constrain visitor use particularly during storms.

The indicator that park staff will monitor to ensure that desired conditions for resources and experiences continue to be achieved and maintained is observations of visitors out of bounds in dune areas.

Identify the Visitor Capacity.

Overall, park staff identified that current visitor use levels are aligned with desired conditions and that most visitors have opportunities for an uncrowded setting. Visitation could be increased, primarily on non-holiday weekends and during the weekdays, and desired conditions would be maintained. The proposed visitor capacity is 850 people at one time.

As the nation's principal conservation agency, the Department of the Interior has responsibilities for most of our nationally owned public lands and natural resources. This includes fostering wise use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historic places, and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people. The department also promotes the goals of the Take Pride in America campaign by encouraging stewardship and citizen responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

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National Park Service
US Department of the Interior

Canaveral National Seashore
Florida