# FLORIDA DEPARTMENT OF Environmental Protection

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**Ron DeSantis**
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Lt. Governor

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## Memorandum

**TO:** James Parker
Office of Environmental Services
Division of State Lands

**FROM:** Daniel Alsentzer
Office of Park Planning
Division of Recreation and Parks

**SUBJECT:** Cayo Costa State Park
Ten Year Management Plan Update (Lease No. 3426)
Acquisition and Restoration Council (ARC) Public Hearing

**DATE:** July 1, 2020

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Attached for your convenience and use are five discs with the subject management plan update file. Contained on the discs are the ARC executive summary, the Division of State Lands checklist and a copy of the subject management plan update. This plan is being submitted for the Division of State Lands' compliance review and for review by ARC members at their October 2020 meeting.

An electronic version of the document is available on the DEP Park Planning Public Participation webpage at the following link: https://floridadep.gov/parks/parks-office-park-planning/documents/cayo-costa-state-park-052020-arc-draft-unit-management.

Please contact me by email at Daniel.Alsentzer@floridadep.gov if there are any questions related to this update.

Thank you for your assistance.

DA:dpd
Attachments

cc: Deborah Burr

# Cayo Costa State Park

## Acquisition and Restoration Council Draft Unit Management Plan

**STATE OF FLORIDA**
**DEPARTMENT OF ENVIRONMENTAL PROTECTION**

**Division of Recreation and Parks**
**July 2020**

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# LAND MANAGEMENT PLAN COMPLIANCE CHECKLIST

**→ Required for State-owned conservation lands over 160 acres ←**

Instructions for managers:
Complete each item and fill in the applicable correlating page numbers and/or appendix where the item can be found within the land management plan (LMP). If an item does not apply to the subject property, please describe that fact on a correlating page number of the LMP. Do not mark an "N/A" for any items below.

For more information, please visit the stewardship portion of the Division of State Lands' website at: http://www.dep.state.fl.us/lands/stewardship.htm.

## Section A: Acquisition Information Items

| Item # | Requirement | Statute/Rule | Page Numbers and/or Appendix |
|---|---|---|---|
| 1. | The common name of the property. | 18-2.018 & 18-2.021 | 1, App. 1 |
| 2. | The land acquisition program, if any, under which the property was acquired. | 18-2.018 & 18-2.021 | 1, App. 1 |
| 3. | Degree of title interest held by the Board, including reservations and encumbrances such as leases. | 18-2.021 | 1, App. 1 |
| 4. | The legal description and acreage of the property. | 18-2.018 & 18-2.021 | 1, App. 1 |
| 5. | A map showing the approximate location and boundaries of the property, and the location of any structures or improvements to the property. | 18-2.018 & 18-2.021 | 3, 5, 91 |
| 6. | An **assessment** as to whether the property, or any portion, should be declared surplus. *Provide Information regarding **assessment and analysis** in the plan, and provide **corresponding map**.* | 18-2.021 | 104-105 |
| 7. | Identification of other parcels of land within or immediately adjacent to the property that should be purchased because they are essential to management of the property. *Please clearly indicate parcels on a map.* | 18-2.021 | 104-105 |
| 8. | Identification of adjacent land uses that conflict with the planned use of the property, if any. | 18-2.021 | 85-86 |
| 9. | A statement of the purpose for which the lands were acquired, the projected use or uses as defined in 253.034 and the statutory authority for such use or uses. | 259.032(10) | 1, 7-8 |
| 10. | Proximity of property to other significant State, local or federal land or water resources. | 18-2.021 | 3, 5, 10, 84 |

## Section B: Use Items

| Item # | Requirement | Statute/Rule | Page Numbers and/or Appendix |
|---|---|---|---|
| 11. | The designated single use or multiple use management for the property, including use by other managing entities. | 18-2.018 & 18-2.021 | 1, App. 1 |
| 12. | A description of past and existing uses, including any unauthorized uses of the property. | 18-2.018 & 18-2.021 | 86-88 |
| 13. | A description of alternative or multiple uses of the property considered by the lessee and a statement detailing why such uses were not adopted. | 18-2.018 | 7, 88 |
| 14. | A description of the management responsibilities of each entity involved in the property's management and how such responsibilities will be coordinated. | 18-2.018 | 7-10 |
| 15. | Include a provision that requires that the managing agency consult with the Division of Historical Resources, Department of State before taking actions that may adversely affect archeological or historical resources. | 18-2.021 | 9, 54, 76, App. 7 |
| 16. | Analysis/description of other managing agencies and private land managers, if any, which could facilitate the restoration or management of the land. | 18-2.021 | 7-10 |

| | | | |
|---|---|---|---|
| 17. | A determination of the public uses and public access that would be consistent with the purposes for which the lands were acquired. | 259.032(10) | 88-89, 93-102 |
| 18. | A finding regarding whether each planned use complies with the 1981 State Lands Management Plan, particularly whether such uses represent "balanced public utilization," specific agency statutory authority and any other legislative or executive directives that constrain the use of such property. | 18-2.021 | 81, App. 8 |
| 19. | Letter of compliance from the local government stating that the LMP is in compliance with the Local Government Comprehensive Plan. | BOT requirement | App. 2, App. 9 |
| 20. | An assessment of the impact of planned uses on the renewable and non-renewable resources of the property, including soil and water resources, and a detailed description of the specific actions that will be taken to protect, enhance and conserve these resources and to compensate/mitigate damage caused by such uses, including a description of how the manager plans to control and prevent soil erosion and soil or water contamination. | 18-2.018 & 18-2.021 | 15-21 |
| 21. | *For managed areas larger than 1,000 acres, an analysis of the multiple-use potential of the property which shall include the potential of the property to generate revenues to enhance the management of the property provided that no lease, easement, or license for such revenue-generating use shall be entered into if the granting of such lease, easement or license would adversely affect the tax exemption of the interest on any revenue bonds issued to fund the acquisition of the affected lands from gross income for federal income tax purposes, pursuant to Internal Revenue Service regulations. | 18-2.021 & 253.036 | 7, 78, 88 |
| 22. | If the lead managing agency determines that timber resource management is not in conflict with the primary management objectives of the managed area, a component or section, prepared by a qualified professional forester, that assesses the feasibility of managing timber resources pursuant to section 253.036, F.S. | 18-021 | 78-79, App. 8 |
| 23. | A statement regarding incompatible use in reference to Ch. 253.034(10). | 253.034(10) | 2,7 |

*The following taken from 253.034(10) is not a land management plan requirement; however, it should be considered when developing a land management plan: The following additional uses of conservation lands acquired pursuant to the Florida Forever program and other state-funded conservation land purchase programs shall be authorized, upon a finding by the Board of Trustees, if they meet the criteria specified in paragraphs (a)-(e): water resource development projects, water supply development projects, storm-water management projects, linear facilities and sustainable agriculture and forestry. Such additional uses are authorized where: (a) Not inconsistent with the management plan for such lands; (b) Compatible with the natural ecosystem and resource values of such lands; (c) The proposed use is appropriately located on such lands and where due consideration is given to the use of other available lands; (d) The using entity reasonably compensates the titleholder for such use based upon an appropriate measure of value; and (e) The use is consistent with the public interest.

## Section C: Public Involvement Items

| Item # | Requirement | Statute/Rule | Page Numbers and/or Appendix |
|---|---|---|---|
| 24. | A statement concerning the extent of public involvement and local government participation in the development of the plan, if any. | 18-2.021 | 10 |
| 25. | The management prospectus required pursuant to paragraph (9)(d) shall be available to the public for a period of 30 days prior to the public hearing. | 259.032(10) | 10 |
| 26. | LMPs and LMP updates for parcels over 160 acres shall be developed with input from an advisory group who must conduct at least one public hearing within the county in which the parcel or project is located. *Include the advisory group members and their affiliations, as well as the date and location of the advisory group meeting.* | 259.032(10) | 10, App. 2 |
| 27. | Summary of comments and concerns expressed by the advisory group for parcels over 160 acres | 18-2.021 | App. 2 |
| 28. | During plan development, at least one public hearing shall be held in each affected county. Notice of such public hearing shall be posted on the parcel or project designated for management, advertised in a paper of general circulation, and announced at a scheduled meeting of the local governing body before the actual public hearing. *Include a copy of each County's advertisements and announcements (meeting minutes will suffice to indicate an announcement) in the management plan.* | 253.034(5) & 259.032(10) | 10, App. 2 |

| | | | |
|---|---|---|---|
| 29. | The manager shall consider the findings and recommendations of the land management review team in finalizing the required 10-year update of its management plan. *Include manager's replies to the team's findings and recommendations.* | 259.036 | 81, App. 2 |
| 30. | Summary of comments and concerns expressed by the management review team, if required by Section 259.036, F.S. | 18-2.021 | App. 8 |
| 31. | If manager is not in agreement with the management review team's findings and recommendations in finalizing the required 10-year update of its management plan, the managing agency should explain why they disagree with the findings or recommendations. | 259.036 | 81, App. 8 |

## Section D: Natural Resources

| Item # | Requirement | Statute/Rule | Page Numbers and/or Appendix |
|---|---|---|---|
| 32. | Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding soil types. *Use brief descriptions and include USDA maps when available.* | 18-2.021 | 19, 23, App. 4 |
| 33. | Insert FNAI based natural community maps when available. | ARC consensus | 23 |
| 34. | Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding outstanding native landscapes containing relatively unaltered flora, fauna, and geological conditions. | 18-2.021 | 15-53 |
| 35. | Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding unique natural features and/or resources including but not limited to virgin timber stands, scenic vistas, natural rivers and streams, coral reefs, natural springs, caverns, and large sinkholes. | 18-2.018 & 18-2.021 | 15-53 |
| 36. | Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding beaches and dunes. | 18-2.021 | 23, 22-35 |
| 37. | Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding mineral resources, such as oil, gas and phosphate, etc. | 18-2.018 & 18-2.021 | 17 |
| 38. | Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding fish and wildlife, both game and non-game, and their habitat. | 18-2.018 & 18-2.021 | 27-59 |
| 39. | Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding State and Federally listed endangered or threatened species and their habitat. | 18-2.021 | 37-46 |
| 40. | The identification or resources on the property that are listed in the Natural Areas Inventory. *Include letter from FNAI or consultant where appropriate.* | 18-2.021 | 22-35 |
| 41. | Specific description of how the managing agency plans to identify, locate, protect, and preserve or otherwise use fragile, nonrenewable natural and cultural resources. | 259.032(10) | 67-80 |
| 42. | Habitat Restoration and Improvement | 259.032(10) & 253.034(5) ↓ | |
| 42-A. | Describe management needs, problems and a desired outcome and the key management activities necessary to achieve the enhancement, protection and preservation of restored habitats and enhance the natural, historical and archeological resources and their values for which the lands were acquired. | | 67-80 |
| 42-B. | Provide a detailed description of both short (2-year planning period) and long-term (10-year planning period) management goals, and a priority schedule based on the purposes for which the lands were acquired and include a timeline for completion. | | 67-80, 111-114 |
| 42-C. | The associated measurable objectives to achieve the goals. | | 67-80, 111-114 |
| 42-D. | The related activities that are to be performed to meet the land management objectives and their associated measures. *Include fire management plans - they can be in plan body or an appendix.* | | 67-80, 111-114 |

| | | | |
|---|---|---|---|
| 42-E. | A detailed expense and manpower budget in order to provide a management tool that facilitates development of performance measures, including recommendations for cost-effective methods of accomplishing those activities. | | 111-114 |
| 43. | ***Quantitative data description of the land regarding an inventory of forest and other natural resources and associated acreage. *See footnote.* | 253.034(5) | 23, 78 |
| 44. | Sustainable Forest Management, including implementation of prescribed fire management | 18-2.021, 253.034(5) & 259.032(10) ↓ | |
| 44-A. | Management needs, problems and a desired outcome (see requirement for # 42-A). | | 21-35, 68-70 |
| 44-B. | Detailed description of both short and long-term management goals (see requirement for # 42-B). | | 68-70, 111-114 |
| 44-C. | Measurable objectives (see requirement for #42-C). | | 68-70, 111-114 |
| 44-D. | Related activities (see requirement for #42-D). | | 68-70, 111-114 |
| 44-E. | Budgets (see requirement for #42-E). | | 111-114 |
| 45. | Imperiled species, habitat maintenance, enhancement, restoration, or population restoration | 259.032(10) & 253.034(5) ↓ | |
| 45-A. | Management needs, problems and a desired outcome (see requirement for # 42-A). | | 37-46, 71-74 |
| 45-B. | Detailed description of both short and long-term management goals (see requirement for # 42-B). | | 71-74, 111-114 |
| 45-C. | Measurable objectives (see requirement for #42-C). | | 71-74, 111-114 |
| 45-D. | Related activities (see requirement for #42-D). | | 71-74, 111-114 |
| 45-E. | Budgets (see requirement for #42-E). | | 111-114 |
| 46. | ***Quantitative data description of the land regarding an inventory of exotic and invasive plants and associated acreage. *See footnote.* | 253.034(5) | 47-50, 74-75 |
| 47. | Place the Arthropod Control Plan in an appendix. If one does not exist, provide a statement as to what arrangement exists between the local mosquito control district and the management unit. | BOT requirement via lease language | 79 |
| 48. | Exotic and invasive species maintenance and control | 259.032(10) & 253.034(5) ↓ | |
| 48-A. | Management needs, problems and a desired outcome (see requirement for # 42-A). | | 47-50, 74-75 |
| 48-B. | Detailed description of both short and long-term management goals (see requirement for # 42-B). | | 47-50, 74-75 |
| 48-C. | Measurable objectives (see requirement for #42-C). | | 47-50, 74-75 |
| 48-D. | Related activities (see requirement for #42-D). | | 47-50, 74-75 |
| 48-E. | Budgets (see requirement for #42-E). | | 111-114 |

## Section E: Water Resources

| Item # | Requirement | Statute/Rule | Page Numbers and/or Appendix |
|---|---|---|---|
| 49. | A statement as to whether the property is within and/or adjacent to an aquatic preserve or a designated area of critical state concern or an area under study for such designation. *If yes, provide a list of the appropriate managing agencies that have been notified of the proposed plan.* | 18-2.018 & 18-2.021 | 10 |
| 50. | Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding water resources, including water classification for each water body and the identification of any such water body that is designated as an Outstanding Florida Water under Rule 62-302.700, F.A.C. | 18-2.021 | 23 |
| 51. | Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding swamps, marshes, and other wetlands. | 18-2.021 | 21-35 |
| 52. | ***Quantitative description of the land regarding an inventory of hydrological features and associated acreage. *See footnote.* | 253.034(5) | 23 |

| | | | |
|---|---|---|---|
| 53. | Hydrological Preservation and Restoration | 259.032(10) & 253.034(5) ↓ | |
| 53-A. | Management needs, problems and a desired outcome (see requirement for # 42-A). | | 18-21 |
| 53-B. | Detailed description of both short and long-term management goals (see requirement for # 42-B). | | 67-68, 111-114 |
| 53-C. | Measurable objectives (see requirement for #42-C). | | 67-68, 111-114 |
| 53-D. | Related activities (see requirement for #42-D). | | 67-68, 111-114 |
| 53-E. | Budgets (see requirement for #42-E). | | 111-114 |

## Section F: Historical, Archeological, and Cultural Resources

| Item # | Requirement | Statute/Rule | Page Numbers and/or Appendix |
|---|---|---|---|
| 54. | **Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding archeological and historical resources. *Include maps of all cultural resources except Native American sites, unless such sites are major points of interest that are open to public visitation.* | 18-2.018, 18-2.021 & per DHR's request | 54-64 |
| 55. | ***Quantitative data description of the land regarding an inventory of significant land, cultural or historical features and associated acreage. | 253.034(5) | 54-64 |
| 56. | A description of actions the agency plans to take to locate and identify unknown resources such as surveys of unknown archeological and historical resources. | 18-2.021 | 76-77 |
| 57. | Cultural and Historical Resources | 259.032(10) & 253.034(5) ↓ | |
| 57-A. | Management needs, problems and a desired outcome (see requirement for # 42-A). | | 76-77 |
| 57-B. | Detailed description of both short and long-term management goals (see requirement for # 42-B). | | 76-77, 111-114 |
| 57-C. | Measurable objectives (see requirement for #42-C). | | 76-77, 111-114 |
| 57-D. | Related activities (see requirement for #42-D). | | 76-77, 111-114 |
| 57-E. | Budgets (see requirement for #42-E). | | 111-114 |

**While maps of Native American sites should not be included in the body of the management plan, the DSL urges each managing agency to provide such information to the Division of Historical Resources for inclusion in their proprietary database. This information should be available for access to new managers to assist them in developing, implementing and coordinating their management activities.

## Section G: Facilities (Infrastructure, Access, Recreation)

| Item # | Requirement | Statute/Rule | Page Numbers and/or Appendix |
|---|---|---|---|
| 58. | ***Quantitative data description of the land regarding an inventory of infrastructure and associated acreage. *See footnote.* | 253.034(5) | 86-91 |
| 59. | Capital Facilities and Infrastructure | 259.032(10) & 253.034(5) ↓ | |
| 59-A. | Management needs, problems and a desired outcome (see requirement for # 42-A). | | 93-102 |
| 59-B. | Detailed description of both short and long-term management goals (see requirement for # 42-B). | | 93-102, 111-114 |
| 59-C. | Measurable objectives (see requirement for #42-C). | | 93-102, 111-114 |

| | | | |
|---|---|---|---|
| 59-D. | Related activities (see requirement for #42-D). | | 93-102, 111-114 |
| 59-E. | Budgets (see requirement for #42-E). | | 111-114 |
| 60. | *** Quantitative data description of the land regarding an inventory of recreational facilities and associated acreage. | 253.034(5) | 90-91 |
| 61. | Public Access and Recreational Opportunities | 259.032(10) & 253.034(5) ↓ | |
| 61-A. | Management needs, problems and a desired outcome (see requirement for # 42-A). | | 93-102, 111-114 |
| 61-B. | Detailed description of both short and long-term management goals (see requirement for # 42-B). | | 93-102, 111-114 |
| 61-C. | Measurable objectives (see requirement for #42-C). | | 93-102, 111-114 |
| 61-D. | Related activities (see requirement for #42-D). | | 93-102, 111-114 |
| 61-E. | Budgets (see requirement for #42-E). | | 111-114 |

## Section H: Other/Managing Agency Tools

| Item # | Requirement | Statute/Rule | Page Numbers and/or Appendix |
|---|---|---|---|
| 62. | Place this LMP Compliance Checklist at the front of the plan. | ARC and managing agency consensus | Front |
| 63. | Place the Executive Summary at the front of the LMP. Include a physical description of the land. | ARC and 253.034(5) | Front |
| 64. | If this LMP is a 10-year update, note the accomplishments since the drafting of the last LMP set forth in an organized (categories or bullets) format. | ARC consensus | 1109-110 |
| 65. | Key management activities necessary to achieve the desired outcomes regarding other appropriate resource management. | 259.032(10) | 93-102, 111-114 |
| 66. | Summary budget for the scheduled land management activities of the LMP including any potential fees anticipated from public or private entities for projects to offset adverse impacts to imperiled species or such habitat, which fees shall be used to restore, manage, enhance, repopulate, or acquire imperiled species habitat for lands that have or are anticipated to have imperiled species or such habitat onsite. The summary budget shall be prepared in such a manner that it facilitates computing an aggregate of land management costs for all state-managed lands using the categories described in s. 259.037(3) which are resource management, administration, support, capital improvements, recreation visitor services, and law enforcement activities. | 253.034(5) | 111-1114 |
| 67. | Cost estimate for conducting other management activities which would enhance the natural resource value or public recreation value for which the lands were acquired, include recommendations for cost-effective methods in accomplishing those activities. | 259.032(10) | 111-114 |
| 68. | A statement of gross income generated, net income and expenses. | 18-2.018 | 88, 93-94 |

*** = The referenced inventories shall be of such detail that objective measures and benchmarks can be established for each tract of land and monitored during the lifetime of the plan. All quantitative data collected shall be aggregated, standardized, collected, and presented in an electronic format to allow for uniform management reporting and analysis. The information collected by the DEP pursuant to s. 253.0325(2) shall be available to the land manager and his or her assignee.

# Cayo Costa State Park
## Executive Summary

**Lead Agency:** Department of Environmental Protection
Division of Recreation and Parks

**Common Name of Property:** Cayo Costa State Park

**Location:** Lee County

**Acreage:** 2,643.9 Acres

**Acreage Breakdown**

| Natural Communities | Acres |
|---|---|
| Beach Dune | 167.75 |
| Coastal Berm | 80.08 |
| Coastal Grassland | 155.25 |
| Coastal Interdunal Swale | 2.69 |
| Coastal Strand | 198.75 |
| Depression Marsh | 189.44 |
| Maritime Hammock | 234.20 |
| Mesic Flatwoods | 40.82 |
| Mangrove Swamp | 116.84 |
| Marine Unconsolidated Substrate | 31.05 |
| Shell Mound | 0.24 |
| Canal/Ditch | 29.97 |
| Developed | 9.82 |

**Lease / Management Agreement Number:** 3426

**Use:** Single Use

### Management Responsibilities

**Agency:** Dept. of Environmental Protection, Division of Recreation and Parks

**Responsibility:** Public Outdoor Recreation and Conservation

**Designated Land Use:** Public outdoor recreation and conservation is the designated single use of the property.

**Sublease:** None

**Encumbrances:** None

## Location and Public Access

Cayo Costa State Park is located on the outer barrier islands of Charlotte Harbor in Lee County. Access to Cayo Costa is by boat, traveling south either from Boca Grande or west from the park landbase on Pine Island. The park protects and provides public recreational access to the largest undisturbed barrier island in southwest Florida, with over nine miles of coastline providing for ample resource-based activities within the state park, such as swimming, snorkeling, boating, fishing, as well as hiking.

## Unique Resource Features

**Natural:** Situated along a chain of two distinct barrier islands between Boca Grande, Captiva, and Redfish passes, the park protects diverse and ecologically significant natural communities, including extensive tracts of marine tidal marsh, beach dune, coastal grassland, and maritime hammock. Remarkable natural features protected on these islands form the habitat for a broad range of flora and fauna, including the imperiled piping plover, Wilson's plover, least tern, gopher tortoise, American loggerhead, West coast beach sunflower, and shell mound prickly-pear cactus.

**Archaeological/Historic:** The cultural history of the island is likewise significant, with the park preserving eight prehistoric and six historic sites, including Weeden Island and Caloosahatchee period aboriginal midden sites and an early 20th century military quarantine station.

## Management Goals, Objectives, and Actions

Measurable objectives and actions have been identified for each of the DRP management goals for Cayo Costa State Park. Please refer to the Implementation Schedule and Cost Estimates in the Implementation Component of this plan for a consolidated spreadsheet of the recommended actions, measures of progress, target year for completion, and estimated costs to fulfill these management goals and objectives.

While the DRP utilizes the 10-year management plan to serve as the basic statement of policy and future direction for each park, various project-specific annual work plans provide more detailed guidance for DRP staff to accomplish many of the resource management goals and objectives of the park. Where such detailed planning is appropriate to the character and scale of the park's natural resources, annual work plans are developed for prescribed fire, exotic plants, and imperiled species management programs. Natural communities and hydrological restoration projects are guided by annual or long-term work plans, depending on the scale and multitude of phases involved.

Goals, objectives, and actions identified in this management plan will serve as the basis for developing annual work plans for the park. Since the plan is based on conditions that exist at the time of plan development, annual work

plans will provide the flexibility needed to adapt to future conditions during the 10-year management planning cycle. Priority schedules and cost estimates may also be amended to reflect changing conditions.

Work plans provide the DRP with crucial flexibility in its efforts to generate and implement adaptive resource management practices in the state park system. Such work plans are reviewed and updated annually. Through annual updates, the resource management strategies are regularly evaluated to determine their effectiveness. Longitudinal data collected is used to refine techniques, methodologies, and strategies, and ensures that prescribed management actions for each park are monitored and reported as required by Chapters 253.034 and 259.037, Florida Statutes.

## Natural Resource Management

### Hydrological Management

**Goal: Protect water quality and quantity in the park, restore hydrology to the extent feasible and maintain the restored condition.**

- *Objective: Conduct/obtain an assessment of the park's hydrological restoration needs.*
    - Action 1 Determine long-term sustainability of fresh groundwater for park use
    - Action 2 Determine effects of sea level rise on the freshwater lens
    - Action 3 Continue to conduct groundwater quality testing

### Natural Communities Management

**Goal: Restore and maintain the natural communities/habitats of the park.**

- *Objective: Within 10 years, have 49 acres of the park maintained within the optimum fire return interval.*
    - Action 1 Update annual burn plan to show pyric communities
    - Action 2 Manage areas for wildfire/fuel suppression

## Imperiled Species Management

**Goal: Maintain, improve, or restore imperiled species populations and habitats in the park.**

- *Objective: Update baseline imperiled species occurrence inventory lists for plants and animals.*
- *Objective: Monitor and document 10 selected imperiled animal species in the park.*
    - Action 1 Implement monitoring protocols for 10 imperiled animal species including loggerhead sea turtles, green sea turtles, piping plovers, red knots, American oystercatchers, least terns, snowy plovers, Wilson's plovers, black skimmers, and eastern indigo snakes
    - Action 2 Complete all required FWC survey protocols for imperiled sea turtles and nesting shorebirds/seabirds
    - Action 3 By 2025, resurvey/replicate line transect distance sampling protocols to estimate the gopher tortoise population on the island and look for changes
- *Objective: Monitor impacts on shorebird and sea turtle nesting by terrestrial nuisance species in the park.*
- *Objective: Monitor and document 7 selected imperiled plant species in the park.*
    - Action 1 Develop monitoring protocols for 5 selected imperiled plant species including Sanibel shrubverbena, cardinal airplant, giant airplant, Florida mayten, and West Indian cock's-comb
    - Action 2 Implement monitoring protocols for 5 imperiled plant species including those listed in Action 1 above and joewood
    - Action 3 Develop and implement an annual survey for the federally listed west coast prickly apple cactus

## Exotic Species Management

**Goal: Remove exotic and invasive plants and animals from the park and conduct needed maintenance control.**

- *Objective: Annually treat 123 acres of exotic plant species in the park.*
    - Action 1 Annually develop/update exotic plant management work plan in DRP databases
    - Action 2 Implement annual work plan by treating 123 infested (approximately 275 gross) acres in the park, annually, and continuing maintenance and follow-up treatments as needed
- *Objective: Implement control measures on six nuisance and exotic animal species in the park.*
    - Action 1 Continue to trap exotic animals in house and report removal to the district office quarterly
    - Action 2 Apply for outside funding to hire an OPS trapper for nuisance animal removal during sea turtle nesting season
    - Action 3 Continue contract trapping to remove exotic/nuisance animals

## Cultural Resource Management

**Cultural Resource Management**
**Goal: Protect, preserve, and maintain the cultural resources of the park.**

- Objective: Assess and evaluate all recorded cultural resources in the park.
    - Action 1 Annually complete 24 assessments/evaluations of known archaeological sites, historic structures, and historic cemeteries and develop and implement a monitoring program
    - Action 2 Complete Florida Master Site File reports for all identified historic buildings on Cayo Costa. Prioritize stabilization, restoration, and rehabilitation projects
    - Action 3 Develop a plan for monitoring and managing archaeological and historical sites and materials that are susceptible to coastal erosion
- *Objective: Compile reliable documentation for all recorded historic and archaeological resources.*
    - Action 1 Ensure all known historic structures and archaeological sites are recorded or updated in the Florida Master Site File
    - Action 2 Conduct an archaeological reconnaissance survey for three priority areas identified by the predictive model or other previous studies
    - Action 3 Develop and adopt a scope of collections statement

## Optimum Boundary

**Acquisition Needs/Acreage:** The optimum boundary for Cayo Costa State Park includes all remaining unimproved private and county lands on Cayo Costa and remaining unimproved private parcels on the central and southern portions of North Captiva Island that are contiguous with existing park boundary. Benefits of these acquisitions would include resource protection and enhanced access for management. On Cayo Costa proper, acquisition of numerous inholdings would close management gaps between portions of the park, providing greater range of shoreline and interior trail access for recreational and interpretive opportunities. If all remaining unimproved parcels are acquired, segments of platted road rights of way through the north part of Cayo Costa may additionally be transferred to park management.

The inland lagoon located near the beach access use area on the Gulf side at the widest portion of Cayo Costa is included within the optimum boundary for resource management and protection purposes. The formation of the lagoon occurred within the past 40 years as a result of sand accretion patterns. Except for one private outparcel on the southeast shore, the lagoon waters are surrounded by uplands and dry shoreline managed by the park. The one-mile-long and .25-mile-wide lagoon covers approximately 102 acres and maintains

an average 10-foot depth. Imperiled shorebird and wading species frequently use tidally exposed mudflats and beach shoreline along the lagoon for foraging and resting perennially. Lagoon waters and shoreline are also significant for loggerhead and green sea turtle nesting.

Sovereign submerged lands also of interest include multiple areas of consolidated substrate hardbottom, located within the nearshore zone of southwestern Cayo Costa proper, approximately 300 feet seaward from the Gulf beach (roughly on latitude with Pejuan Point). Management interests include both the protection of marine resource and assurance of visitor safety. Management of the sovereign submerged lands located 25 feet seaward of the mean high waterline, along the Gulf shorelines of both Cayo Costa and North Captiva, is also proposed for resource protection.

**Surplus Lands/Acreage:** No lands are considered surplus to the management or conservation needs of Cayo Costa State Park

## Conceptual Land Use Plan

### Land Use and Recreation Goals

New recreation opportunities and facilities improvements have been proposed that are appropriate for this park and consistent with the DRP mission. These include:

- Pelican Bay dock renovations/expansion and installation of moorings to maximize visitor access to the park
- Site redesign and visitor center construction in Pelican Bay Use Area
- Stabilization, drainage, and wayfinding improvements for tram road across Cayo Costa
- Construction of 10 small shade/picnic pavilions at Gulf Beach Access/Use Area within vicinity of new restroom facility
- Renovation/replacement of small primitive cabins, restroom replacements, landscape enhancements, and development of a designated group campsite in the park camping area
- Designate the existing dock on the southern portion of Cayo Costa for support purposes only, alleviating visitor use impacts
- Solar electric upgrades for support and visitor services on Cayo Costa
- Renovation/replacement or removal of the cottages at Jug Creek

## Public Involvement

The DRP provided an opportunity for public input by conducting a public workshop and an advisory group meeting to present the draft management plan to the public. These meetings were held on Tuesday, March 20 and Wednesday, March 21, 2018, respectively. Meeting notices were published in the Florida Administrative Register, March 9, 2018, Volume 44, Issue 48, included on the Department Internet Calendar, posted in clear view at the park, and promoted locally. The purpose of the advisory group meeting is to provide the advisory group members an opportunity to discuss the draft management plan.

# INTRODUCTION

Cayo Costa State Park is located on a barrier island complex fronting Charlotte Harbor in Lee County, Florida (see Vicinity Map). Access to Cayo Costa is by water, traveling south either from Boca Grande or west from Pine Island (see Reference Map). The Vicinity Map also reflects significant land and water resources existing near the park.

Cayo Costa State Park was initially acquired by the State of Florida on September 7, 1976 with funds from Environmentally Endangered Lands Bonds Proceeds. Subsequent acquisitions have been funded through Preservation 2000 and Florida Forever programs. Currently, the park comprises 2,643.9 acres. The Board of Trustees of the Internal Improvement Trust Fund (Trustees) holds fee simple title to the park and on February 25, 1986, the Trustees leased (Lease Number 3426) the property to DRP under a 50-year lease. The current lease will expire on February 24, 2036.

Cayo Costa State Park is designated single-use to provide public outdoor recreation and other park-related uses. There are no legislative or executive directives that constrain the use of this property (see Appendix 1).

## Purpose and Significance of the Park

The purpose of Cayo Costa State Park is to protect, maintain, and preserve the unique subtropical island of Cayo Costa acquired through the environmentally Endangered Lands and Save our Coast programs, which were established to protect Florida's unique and irreplaceable lands for conservation purposes.

### Park Significance

- The park protects and provides public recreational access to the largest undisturbed barrier island in southwest Florida, with over nine miles of coastline providing for ample resource-based activities within the state park, such as swimming, snorkeling, boating, fishing, as well as hiking.
- Situated along a chain of two distinct barrier islands between Boca Grande, Captiva, and Redfish passes, the park protects diverse and ecologically significant natural communities, including extensive tracts of marine tidal marsh, beach dune, coastal grassland, and maritime hammock.
- The park protects habitat for a broad range of flora and fauna, including the imperiled piping plover, Wilson's plover, least tern, gopher tortoise, American loggerhead, West coast beach sunflower, and shell mound prickly-pear.
- The park preserves and interprets the island's cultural history at eight prehistoric and six historic sites, including Weeden Island and Caloosahatchee period aboriginal midden sites and an early 20$^{th}$ century military quarantine station.

Cayo Costa is classified as a state park in the DRP unit classification system. In the management of a state park, balance is sought between the goals of maintaining and enhancing natural conditions and providing various recreational opportunities. Natural resource management activities are aimed at management of natural systems. Development in the park is directed toward providing public access to and within the park, and providing recreation facilities, in a reasonable balance, that are both convenient and safe. Program emphasis is on interpretation of the natural, aesthetic, and educational attributes of the park.

## Purpose and Scope of the Plan

This plan serves as the basic statement of policy and direction for the management of Cayo Costa State Park as a unit of the Florida State Park System. It identifies the goals, objectives, actions, and criteria or standards that guide each aspect of park administration, and sets forth the specific measures that will be implemented to meet management objectives and provide balanced public utilization. The plan is intended to meet the requirements of Sections 253.034 and 259.032, Florida Statutes, Chapter 18-2, Florida Administrative Code, and is intended to be consistent with the State Lands Management Plan. With approval, this management plan will replace the 2005 approved plan.

The plan consists of three interrelated components: Resource Management Component, Land Use Component, and Implementation Component.

The Resource Management Component provides a detailed inventory and assessment of the natural and cultural resources of the park. Resource management needs and issues are identified, and measurable management objectives are established for each of the park's management goals and resource types. This component provides guidance on the application of such measures as prescribed burning, exotic species removal, imperiled species management, cultural resource management and restoration of natural conditions.

The Land Use Component is the recreational resource allocation plan for the park. Based on considerations such as access, population, adjacent land uses, the natural and cultural resources of the park, and current public uses and existing development, measurable objectives are set to achieve the desired allocation of the physical space of the park. These objectives identify use areas and propose the types of facilities and programs as well as the volume of public use to be provided.

The Implementation Component consolidates the measurable objectives and actions for each of the park's management goals. An implementation schedule and cost estimates are included for each objective and action. Included in this table are (1) measures that will be used to evaluate the DRP's implementation progress, (2) timeframes for completing actions and objectives, and (3) estimated costs to complete each action and objective.


Legend
Park Boundary
Interstates
FDOT US Routes
FDOT State Routes
FDOT Local Roads
Conservation and Recreation Lands
Federal Managed Lands
State Managed Lands
Local Managed Lands
Private Managed Lands
Aquatic Preserves
Land Use
Developed
Undeveloped
Sources: Florida Natural Areas Inventory, 2015
Florida Land Use Covers and Forms Classification System, 2004
SARASOTA CO.
CHARLOTTE COUNTY
LEE COUNTY
LEE CO.
Murdock
Tippecanoe Environmental Park
Harbour Heights
Port Charlotte
Charlotte Harbor
Englewood
Myakka State Forest
MYAKKA RIVER
PEACE RIVER
Charlotte Harbor Preserve State Park
Charlotte Beach
Solana
Punta Gorda
Manasota Key
Grove City
Charlotte Park
Rotonda
Stump Pass Beach State Park
Thornton Creek Preserve
Don Pedro Island State Park
Placida
Alligator Creek
Charlotte Harbor Preserve State Park
Lemon Bay Aquatic Preserve
Cape Haze Aquatic Preserve
Charlotte Flatwoods Environmental Park
Cayo Pelau Preserve
Charlotte Harbor Buffer Preserve
Yucca Pens Unit
Gasparilla Sound - Charlotte Harbor Aquatic Preserve
Gasparilla Island State Park
Bocilla Preserve
Bokeelia
Yellow Fever Creek Preserve
Matlacha Pass Aquatic Preserve
Smokehouse Bay Preserve
Carver Preserve
Pineland
GULF OF MEXICO
Matlacha
Four Mile Cove Ecological Preserve
Cayo Costa State Park
Pine Island Nat'l Wildlife Refuge
Charlotte Harbor Preserve State Park
Charlotte Harbor Buffer Preserve
Buttonwood Preserve
Pine Island Preserve at Matlacha Pass
Pine Island Sound Aquatic Preserve
Cape Coral
Caloosahatchee River
Pine Island Flatwoods Preserve
Deep Lagoon Preserve
Captiva
Matlacha Pass Aquatic Preserve
Punta Rassa
Iona
Matlacha Pass Nat'l Wildlife Refuge
Bunche Beach Preserve
Saint James City
San Carlos Bay
Estero Bay Preserve State Park
J.N. Ding Darling Nat'l Wildlife Refuge
777
776
771
765
41
75
17
78
865
CAYO COSTA STATE PARK
N
0 1.25 2.5 5 Miles
Florida Department of Environmental Protection
Division of Recreation and Parks
VICINITY MAP


CAYO COSTA STATE PARK

N

0 0.5 1 2 Miles

Florida Department of Environmental Protection
Division of Recreation and Parks
Date of aerial; 2011

REFERENCE MAP

All development and resource alterations proposed in this plan are subject to the granting of appropriate permits, easements, licenses, and other required legal instruments. Approval of the management plan does not constitute an exemption from complying with the appropriate local, state, or federal agencies. This plan is also intended to meet the requirements for beach and shore preservation, as defined in Chapter 161, Florida Statutes, and Chapters 62B-33, 62B-36 and 62R-49, Florida Administrative Code.

In the development of this plan, the potential of the park to accommodate secondary management purposes was analyzed. These secondary purposes were considered within the context of the statutory responsibilities of the DRP and the resource needs and values of the park. This analysis considered all natural and cultural resources, management needs, aesthetic values, visitation and visitor experiences. For this park, it was determined that no secondary purposes could be accommodated in a manner that would not interfere with the primary purpose of resource-based outdoor recreation and conservation. Uses such as water resource development projects, water supply projects, stormwater management projects, linear facilities, and sustainable agriculture and forestry (other than those forest management activities specifically identified in this plan) are not consistent with this plan.

The potential for generating revenue to enhance management was also analyzed. Visitor fees and charges are the principal source of revenue generated by the park. It was determined that multiple-use management activities would not be appropriate as a means of generating revenues for land management. Instead, techniques such as entrance fees, concessions, and similar measures will be employed on a case-by-case basis as a means of supplementing park management funding.

The DRP may provide the services and facilities outlined in this plan either with its own funds and staff or through an outsourcing contract. Private contractors may provide assistance with natural resource management and restoration activities or a concessionaire may provide services to park visitors in order to enhance the visitor experience. For example, a concessionaire could be authorized to sell merchandise and refreshments and to rent recreational equipment for use in the park. A concessionaire may also be authorized to provide specialized services, such as interpretive tours or overnight accommodations when the required capital investment exceeds that which the DRP can elect to incur. Decisions regarding outsourcing, private sector contracting, use of concessionaires, etc. are made on a case-by-case basis in accordance with the policies set forth in the DRP Operations Manual (OM).

## Management Program Overview

### Management Authority and Responsibility

In accordance with Chapter 258, Florida Statutes and Chapter 62D-2, Florida Administrative Code, the Division of Recreation and Parks (DRP) is charged with the responsibility of developing and operating Florida's recreation and parks system. These are administered in accordance with the following policy:

*It shall be the policy of the Division of Recreation and Parks to promote the state park system for the use, enjoyment, and benefit of the people of Florida and visitors; to acquire typical portions of the original domain of the state which will be accessible to all of the people, and of such character as to emblemize the state's natural values; conserve these natural values for all time; administer the development, use and maintenance of these lands and render such public service in so doing, in such a manner as to enable the people of Florida and visitors to enjoy these values without depleting them; to contribute materially to the development of a strong mental, moral, and physical fiber in the people; to provide for perpetual preservation of historic sites and memorials of statewide significance and interpretation of their history to the people; to contribute to the tourist appeal of Florida.*

The Board of Trustees of the Internal Improvement Trust Fund (Trustees) has granted management authority of certain sovereign submerged lands to the DRP under Management Agreement MA 68-086 (as amended January 19, 1988). The management area includes a 400-foot zone from the edge of mean high water where a park boundary borders sovereign submerged lands fronting beaches, bays, estuarine areas, rivers, or streams. Where emergent wetland vegetation exists, the zone extends waterward 400 feet beyond the vegetation. The agreement is intended to provide additional protection to resources of the park and nearshore areas and to provide authority to manage activities that could adversely affect public recreational uses.

Many operating procedures are standardized system-wide and are set by internal direction. These procedures are outlined in the OM that covers such areas as personnel management, uniforms and personal appearance, training, signage, communications, fiscal procedures, interpretation, concessions, public use regulations, resource management, law enforcement, protection, safety, and facilities maintenance.

## Park Management Goals

The following park goals express the long-term intent of the DRP in managing the state park:

- Provide administrative support for all park functions.
- Protect water quality and quantity in the park, restore hydrology to the extent feasible, and maintain the restored condition.
- Restore and maintain the natural communities/habitats of the park.
- Maintain, improve, or restore imperiled species populations and habitats in the park.
- Remove exotic and invasive plants and animals from the park and conduct necessary maintenance-control.
- Protect, preserve, and maintain the cultural resources of the park.
- Provide public access and recreational opportunities in the park.
- Develop and maintain the capital facilities and infrastructure necessary to meet the goals and objectives of this management plan.

## Management Coordination

The park is managed in accordance with all applicable laws and administrative rules. Agencies having a major or direct role in the management of the park are identified in this plan.

The DRP is an administrative unit of the Florida Department of Environmental Protection (DEP). The Florida Department of Agriculture and Consumer Services (FDACS), Florida Forest Service (FFS), assists DRP staff in the development of wildfire emergency plans and provides the authorization required for prescribed burning. The Florida Fish and Wildlife Conservation Commission (FWC) assists staff in the enforcement of state laws pertaining to wildlife, freshwater fish and other aquatic life existing within the park. In addition, the FWC aids DRP with wildlife management programs, including imperiled species management. The Florida Department of State (FDOS), Division of Historical Resources (DHR) assists staff to ensure protection of archaeological and historic sites. The DEP, Office of Resilience and Coastal Protection (RCP) aids staff in aquatic preserves management. The DEP, Bureau of Beaches and Coastal Systems aids staff in planning and construction activities seaward of the Coastal Construction Control Line (CCCL). In addition, the Bureau of Beaches and Coastal Systems aids staff in the development of erosion control projects.

## Public Participation

DRP provided an opportunity for public input by conducting a public workshop and an advisory group meeting to present the draft management plan to the public. These meetings were held on Tuesday, March 20 and Wednesday, March 21, 2018, respectively. Meeting notices were published in the Florida Administrative Register, March 9, 2018, Volume 44, Issue 48, included on the Department Internet Calendar, posted in clear view at Cayo Costa State Park and other units of the Gasparilla Island Administration, and promoted locally. The purpose of the advisory group meeting is to provide advisory group members a formal opportunity to discuss the draft management plan (see Appendix 2).

## Other Designations

Cayo Costa State Park is not within an Area of Critical State Concern as defined in Section 380.05, Florida Statutes, and is not presently under study for such designation. The park is a component of the Florida Greenways and Trails System, administered by the DRP, Office of Greenways and Trails.

All waters within the park have been designated as Outstanding Florida Waters, pursuant to Chapter 62-302, Florida Administrative Code. Surface waters in this park are also classified as Class III waters by the Department. This primary portion of the unit is adjacent to the Pine Island Sound Aquatic Preserve and Gasparilla Sound-Charlotte Harbor Aquatic Preserve as designated under the Florida Aquatic Preserve Act of 1975 (Section 258.35, Florida Statutes). Matlacha Pass Aquatic Preserve is located on the east side of Pine Island and borders the park landbase at Jug Creek.

# RESOURCE MANAGEMENT COMPONENT

## Introduction

The Florida Department of Environmental Protection (DEP), Division of Recreation and Parks (DRP) in accordance with Chapter 258, Florida Statutes, has implemented resource management programs for preserving for all time the representative examples of natural and cultural resources of statewide significance under its administration. This component of the plan describes the natural and cultural resources of the park and identifies the methods that will be used to manage them. Management measures expressed in this plan are consistent with the overall DRP mission in natural systems management. Cited references are contained in Appendix 3.

The DRP philosophy of resource management is natural systems management. Primary emphasis is placed on restoring and maintaining, to the degree possible, the natural processes that shaped the structure, function, and species composition of Florida's diverse natural communities as they occurred in the original domain. Single species management for imperiled species is appropriate in state parks when the maintenance, recovery, or restoration of a species or population is complicated due to constraints associated with long-term restoration efforts, unnaturally high mortality, or insufficient habitat. Single species management should complement the maintenance and restoration of natural processes and should not imperil other native species or compromise park values.

The management goal of the DRP for cultural resources is to preserve sites and objects that represent Florida's cultural periods and significant historic events or persons. This goal often entails active measures to stabilize, reconstruct or restore resources, or to rehabilitate resources for compatible public use.

Because park units are often components of larger ecosystems, their proper management can be affected by conditions and events that occur beyond park boundaries. Ecosystem management is implemented through a resource management evaluation program that assesses resource conditions, evaluates management activities, refines management actions, and reviews local comprehensive plans and development permit applications for park and broad ecosystem impacts.

## Management Zones

The entire park is partitioned into 40 management zones that delineate the intended boundaries of site-specific management activities (see Management Zones Map). Shapes and sizes of zones may be based on natural community types, relationships to burn zones, and locations of existing roads and natural fire breaks. It is important to note that all burn zones are management zones; however, not all management zones include fire-dependent natural communities. The following table lists all management zones in the park with respective zone acreages.

| Cayo Costa State Park Management Zones | | | |
|---|---|---|---|
| **Management Zone** | **Acreage** | **Managed with Prescribed Fire** | **Contains Known Cultural Resources** |
| CC-01 | 239.13 | Y | Y |
| CC-02 | 194.71 | N | N |
| CC-03 | 69.90 | N | N |
| CC-04 | 148.61 | N | Y |
| CC-05A | 125.39 | N | N |
| CC-05B | 43.56 | N | N |
| CC-06 | 386.41 | N | N |
| CC-07 | 256.39 | N | Y |
| CC-08 | 233.06 | N | Y |
| CC-09A | 313.66 | N | N |
| CC-09B | 5.07 | N | N |
| CC-10A | 11.51 | N | N |
| CC-10B | 4.2 | N | N |
| CC-10C | 101.05 | N | Y |
| CC-10D | 5.73 | N | N |
| CC-10E | 0.69 | N | N |
| CC-10F | 0.75 | N | N |
| CC-10G | 0.82 | N | N |
| CC-10H | 0.34 | N | N |
| CC-10I | 1.93 | N | N |
| CC-10J | 0.26 | N | N |
| CC-11 | 125.83 | N | Y |
| CC-12 | 7.80 | N | Y |
| CC-NC1A | 0.28 | N | N |
| CC-NC1B | 0.32 | N | N |
| CC-NC2 | 64.82 | N | N |
| CC-NC3 | 283.95 | N | Y |
| CC-NC4A | 0.24 | N | Y |
| CC-NC4B | 0.32 | N | N |
| CC-NC4C | 4.04 | N | Y |
| CC-NC4D | 28.02 | N | Y |
| CC-NC5A | 0.96 | N | N |
| CC-NC5B | 1.55 | N | N |
| CC-NC5C | 2.74 | N | N |
| CC-NC5D | 0.14 | N | N |
| CC-NC5E | 1.03 | N | N |
| CC-NC5F | 0.94 | N | N |
| CC-NC5G | 0.86 | N | N |
| CC-NC5H | 0.29 | N | N |
| CC-NC5I | 3.76 | N | N |


CAYO COSTA STATE PARK

N

0 0.25 0.5 1 Miles

Florida Department of Environmental Protection
Division of Recreation and Parks
Date of aerial; 2011

MANAGEMENT ZONES MAP

## RESOURCE DESCRIPTION AND ASSESSMENT

### Natural Resources

## Topography

Cayo Costa

Naturally occurring fluctuations in elevation on Cayo Costa vary from mean sea level (msl) to 10 feet above msl. One pre-Columbian mound, Old Ware Mound, represents the highest elevation on the island at about 16 feet above msl. Topographic relief on the island was created by wind and waves depositing sediment in ridges along the seaward face of the island. These ridges, which extend parallel along the west side of the island, are tallest and most pronounced directly adjacent to the Gulf of Mexico. As the ridges are replaced and weathered over time, they become shorter and leveled. This creates a gently undulating ridge-swale topography found only on the west side of the island. On the east side of the island, fluctuations in topography were created by either sedimentation from the bay or overwash events that occurred during major storms. Recently, the loss of shoreline vegetation and overwash events caused by hurricanes and tropical storms has eroded the northeastern corner of the island, which resulted in accretion at the park's docking facility. Changes in shoreline topography on these barrier islands occur sporadically and are exacerbated by strong storms, long open fetches, and consistent boat wakes.

North Captiva

Topography at North Captiva Island is extremely similar to Cayo Costa. The same forces that shaped Cayo Costa also shaped North Captiva. Smaller and narrower than Cayo Costa, most of the park portion of North Captiva is less than 6 feet above msl, with the maximum elevation reaching only 10 feet above msl. The northern extent of the island on the Gulf side closely matches the undulating ridges found on Cayo Costa. The Gulf side of the narrower south end of the island is known as Redfish Shores. This area experiences frequent erosion and has sections where mangroves are exposed to the high wave energies of the Gulf. In 2004, Hurricane Charley breached the middle of the island creating "Charley's Pass", separating the south from the north end of the island for five years until sand filled reaccreted. South of Redfish Shores is Redfish Pass, which formed during a hurricane in 1921 and continually separates North Captiva from Captiva Island.

Punta Blanca

The topography of Punta Blanca, a small island east of Cayo Costa, is mostly low-level ridges reaching 3 feet above msl. An area on the southern spit of the island reaches eight feet above msl, and was historically used as a family house site as early as 1935. The island was originally formed as a part of Cayo Costa as recently as 1868. Since this time, the inlet known as Pelican Pass that separates Punta Blanca and Cayo Costa has widened, separating the two islands from one other by the waters of Pelican Bay.

Jug Creek

The Jug Creek parcel is located on the north end of Pine Island, with a topography that is generally flat and low-lying topography, reaching only three feet above msl. This thin strip of property has been dredged to six feet below msl in the past for boat access to Pelican Sound. Dredging has resulted in a slightly raised spoil pile extending parallel to the west side of the canal, supporting a variety of mangrove and fern species.

## Geology

Cayo Costa, North Captiva, and Punta Blanca rest on a foundation of limestone. The upper layer of this limestone originates from a Pleistocene series of sedimentary deposits called the Anastasia formation, mainly composed of coquinoidal limestone, sand and clay. These islands are part of a barrier island chain which includes Gasparilla Island to the north and Captiva and Sanibel to the south. Collectively, these land masses form a buffer that protects the Charlotte Harbor estuarine system, isolating it from some effects of storm-generated waves in the Gulf of Mexico.

The islands of Cayo Costa and North Captiva are both approximately 3,100 years old (Stapor et al. 1991). Radiocarbon dating of shells from sediment cores has aged all ridges on both islands and explains the topographic origins. The beach ridge sets at Cayo Costa and North Captiva indicate a history of alternating sediment deposition and erosion, plausibly the result of three major fluctuations in sea level: (1) sea level rise until about 2,000 years ago, (2) sea level fall between 1,700 and 1,100 years ago, and (3) rise in sea level from 1,100 years ago to present day. The ridges were formed from a change in the level of surrounding waters, with a constant amount of wave energy. This contradicts the original hypothesis developed by Stanley Herwitz in his book, The Natural History of Cayo Costa (1977). Herwitz' hypothesis suggests that there was one single fall of sea levels from the late Pleistocene. Herwitz also notes that the landform known as Johnson Shoals, located on the Gulf side of the island, was shaped by a hurricane in 1930. Recent technology has now shown that this prominent shoal existed throughout the entire 3000-year history of the island (Stapor et al. 1991).

Major geomorphic changes have occurred on Cayo Costa and associated parcels in the last 150 years. The size and location of Johnson Shoals located just off the coast of the widest section of Cayo Costa drives the accretion and erosion on the island. With increased shoaling, the southern section of the island is starved of sediment. This widens the north section of the island and diminishes the southern section. The occurrence of inland water bodies is attributed to historical coastline locations, which were driven by sea levels and the occurrence of large storm events. As barrier islands, constant shifts in shoreline locations and overall morphology are expected.

## Soils

The soils found on Cayo Costa consist of undifferentiated sand with a varying mixture of shell fragments. Some areas also contain marl and peat properties, especially on the east side of the islands. The 1984 Soil Survey of Lee County, Florida (Henderson 1984) describes seven soil types within Cayo Costa and associated parcels (see Appendix 4). The main sandy soils include Canaveral fine sand, beaches, and Captiva fine sand. All of these soil types are found on the western side and central areas of Cayo Costa and North Captiva.

On the eastern shore of Cayo Costa, North Captiva, and throughout Punta Blanca, Wulfert muck and Kesson fine sand are the dominant soil types. These soils types are poor-draining and frequently yield mangrove swamps. The surface of the soil is a dark organic muck with underlying sand and shell.

Jug Creek and the southern tip of Punta Blanca show evidence of massive soil disruption in the form of earth movement. This disturbed soil is likely from nearby dredging projects and early attempts to raise the existing topography for coastal development. Since this soil movement, native vegetation has returned, though sparse, within these areas due to the loss of the native seed bank and high compaction.

There are no unique erosion problems except those associated with the dynamics of a sandy coastline. Accretion has occurred previously within the canal at Jug Creek, and the service boat dock at Cayo Costa impairing boat access and fuel transportation to the island. Coastal Engineers reported in 2004 that Hurricane Charley caused vegetative loss on the northeastern tip of the island, thereby freeing large amounts of sandy soil to flow south, eventually filling in the staff's access point. In 2007 and 2016, both locations were dredged to five feet below msl to improve park staff access. To maintain normal park operations, both of these access canals will require maintenance dredging as sediment accretes in the future.

Currently, no beach nourishment or other erosion mitigation projects are proposed for Cayo Costa or associated parcels. If extensive erosion occurs, the DRP will coordinate with Lee County to ameliorate the loss of soil. Beach nourishment would be preferred over any type of engineered stabilization (e.g., seawall, jetties, breakwaters, etc.). The DRP will coordinate with the aquatic preserve to potentially build living shorelines on the northeastern shoreline to slow the net flow of sand into the service boat canal.

## Minerals

Research has not been conducted on minerals at Cayo Costa State Park. No mineral deposits of commercial value are known to exist within the park boundaries.

## Hydrology

Cayo Costa and North Captiva both have a shallow freshwater lens with potable groundwater. The capacity for this source to supply water to the park, and existing private residences over a long term is unknown. Currently, the park extracts on average 828 gallons of water per day, with a maximum extraction of 1,880 gallons per single day. Drawing freshwater from a shallow lens directly adjacent to open ocean will eventually lead to salinization of all shallow wells. The effect of groundwater withdrawal on surface water quality is not known.

Due to a shallow water table and the lack of sheet flow over the island, the drainage of surface water is slow. Precipitation is readily absorbed into the sandy soils, but once the sediment is saturated, surface water accumulates. Slow underground seepage mixed with high humidity and a slow evaporation rate leaves standing surface water throughout the park. Park trails and campground areas will accumulate water after heavy rainfall events. There are ten areas on Cayo Costa and two areas on North Captiva that perennially hold water.

Of the 10 water features located on Cayo Costa, three are not properly located within the park boundaries, as they are part of the surface tidal inlets that connect them to Pine Island Sound, which is under the management of the Pine Island Sound Aquatic Preserve. This includes Old Place Hole (management zone CC-01), Murdock's Lagoon (management zone CC-08) and the Primo Point tidal pool complex (management zone CC-06). These three water bodies are designated as Class II Waters by DEP and generally maintain salinities that are indistinguishable from the average salinity of Pine Island Sound.

Two water bodies known as the Egret Ponds (management zone CC-01) exchange water with Pine Island Sound through subterranean tidal seepage, which maintains the two ponds at consistent depths and salinities, regardless of seasonal rainfall variations. Lack of surface water exchange with the sound, defaults management remains to the DRP. Both Egret Ponds are designated as Florida Class III Waters.

Another water body known as the Pejuan Tidal Pool, found on the southernmost point of Cayo Costa (management zone CC-10C), is salty due to seawater inundation occurring during extreme high tides or large storm events. This large pool of water has an elevated salinity from the surrounding seawater (up to 50 parts per thousand) due to its lack of regular tidal flushing. The water exhibits extremely low visibility and a murky brown color due to tannins and suspended particulates.

One body of water remains as a relic of historic geology, known as the inland mangrove pond (management zone CC-06). During the geologic formation of Cayo Costa over the past 3,000 years, spits of land became interconnected as global sea levels decreased. These spits of land became linked through sediment movement and sea subsidence. Where saltwater became trapped, a large volume of salt was deposited as the water evaporated. Now, without connection to the surrounding bay or Gulf, the salinity remains around 20 parts per thousand, allowing mangroves to


CAYO COSTA STATE PARK

N

0 0.25 0.5 1 Mile

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Date of aerial; 2011

SOILS MAP

persist over competing freshwater species. This inland pocket of mangroves will continue to persist until the salinity balance is countered by rainwater accrual.

Fresh bodies of water are also found at Cayo Costa, including Alligator Marsh (management zone CC-06), Sellar's Marsh (management zone CC-07), and Hogs Pond (management zone CC-05A). Alligator Marsh is the most extensive, covering approximately 18 acres during the summer months. Water levels of all three are closely correlated to rainfall on the island. During the driest months of the year, all are reduced to either a surface film of water, or a soggy substrate. Herwitz (1977) observed that these freshwater bodies are simply low-lying zones of saturation in contact with the unconfined aquifer. These fresh bodies of water are also designated as Class III water by DEP.

North Captiva contains two bodies of water located on the surface of the island; one in management zone CC-NC3, and another in management zone CC-NC2. Both bodies are saline and become inundated with saltwater during large storm events. The water body located in management zone CC-NC2 is located less than 20 meters from the Gulf of Mexico and is frequently inundated with seawater. Salinities of these waters fluctuate slightly, but generally remain near 35 parts per thousand. A body of freshwater is located on North Captiva but not within the park boundary.

Jug Creek has significantly altered hydrology due to the dredging of the canal. As the canal was created, a spoil berm was deposited along the west side of the canal, causing major changes in water flow though the mangrove swamp. Extreme high tides and storm events allow saltwater to flow over the berm and into the lower mangrove swamp area. As the water subsides, saltwater is trapped along with large volume of detritus that is carried in with the water. Carving gaps in the spoil berm would alleviate extreme salinities found on the west side of the canal, but might adversely affect the dredged area. Management measures should include research to determine how partial or complete removal of the berm would impede access to Jug Creek.

## Natural Communities

This section of the management plan describes and assesses each of the natural communities found in the state park. It also describes of the desired future condition (DFC) of each natural community and identifies the actions that will be required to bring the community to its desired future condition. Specific management objectives and actions for natural community management, exotic species management, imperiled species management, and population restoration are discussed in the Resource Management Program section of this component.

The system of classifying natural communities employed in this plan was developed by the Florida Natural Areas Inventory (FNAI 2010). The premise of this system is that physical factors such as climate, geology, soil, hydrology, and fire frequency generally determine the species composition of an area, and that areas that are similar with respect to those factors will tend to have natural communities with similar species compositions. Obvious differences in species composition can occur,

however, despite similar physical conditions. In other instances, physical factors are substantially different, yet the species compositions are quite similar. For example, coastal strand and scrub – two communities with similar species compositions – generally have quite different climatic environments, and these necessitate different management programs. Some physical influences, such as fire frequency, may vary from the FNAI descriptions for certain natural communities in this plan.

When a natural community within a park reaches the desired future condition, it is considered to be in a maintenance condition. Required actions for sustaining the maintenance condition of a natural community may include maintaining optimal fire return intervals for fire dependent communities, ongoing control of non-native plant and animal species, maintaining natural hydrological functions (including historic water flows and water quality), preserving biodiversity and vegetative structure, protecting viable populations of plant and animal species (including those that are imperiled or endemic), and preserving intact ecotones that link natural communities across the landscape.

Cayo Costa State Park contains 11 distinct natural communities and two altered landcover types (see Natural Communities Map). A list of known plants and animals occurring in the park is contained in Appendix 5.

**Beach Dune**

*Desired Future Condition:* Beach dune is a coastal mound or ridge of unconsolidated sediments found along shorelines with high energy waves. Vegetation consists of herbaceous dune forming grass species such as sea oats (*Uniola paniculata*) and railroad vine (*Ipomea pes-caprae* spp. *brasiliensis*). Other species include coastal sea rocket (*Cakile lanceolata*), seashore paspalum (*Paspalum vaginatum*), baybean (*Canavalia rosea*), and bitter panicgrass (*Panicum amarum*). Shrubs such as the state threatened inkberry (*Scaevola plumieri*) are scattered within the herbaceous vegetation. This community at Cayo Costa is mainly comprised of wind-deposited foredune and wave-deposited upper beach, with dunes reaching a maximum height of eight feet above msl. This ephemeral community is constantly shifting due to accretion and erosion of the local sediment budget. Vegetation found here is halophytic and can withstand recurrent changes associated with occasional burial and exposure.

*Description and assessment:* Beach dune at Cayo Costa is located mostly along the west coast of the island, creating an almost continuous line along the Gulf's edge. A small patch of mangrove swamp divides the beach dune near the southern tip of the island. There is also a disconnected section of beach dune on the east side of the island facing Pine Island Sound. On North Captiva, beach dune is found along the west coast of the island facing the Gulf of Mexico in patches. Coastal erosion has fragmented this community by exposing areas of coastal strand to the high wave energies of the Gulf. It is expected that more areas of beach dune communities will develop as vegetation from coastal strand declines from salt and wave exposure.

## Legend

- BD - Beach Dune 167.75 ac.
- CB - Coastal Berm 80.08 ac.
- CG - Coastal Grassland 462.78 ac.
- CIS - Coastal Interdunal Swale 41.68 ac.
- CS - Coastal Strand 438.57 ac.
- DM - Depression Marsh 28.59 ac.
- MAH - Maritime Hammock 573.01 ac.
- MF - Mesic Flatwoods 62.76 ac.
- MS - Mangrove Swamp 701.01 ac.
- MUS - Marine Unconsolidated Substrate 86.60 ac.
- SHM - Shell Mound 9.56 ac.
- CD - Canal/Ditch 1.44 ac.
- DV - Developed 16.91 ac.
- UNC - Unmapped 0.35 ac.

# CAYO COSTA STATE PARK

# NATURAL COMMUNITIES MAP

N

0 0.25 0.5 1 Mile

Florida Department of Environmental Protection
Division of Recreation and Parks
Date of aerial; 2013

The beach dune community type found at Cayo Costa and North Captiva closely matches the FNAI description and qualify as exemplary sites in the FNAI Guide to the Natural Communities of Florida (2010). The community variation listed for tropical regions of the western peninsula include species such as the baybean, inkberry, bay cedar (*Suriana maritima*), and west coast dune sunflower (*Helianthus deblis* ssp. *vestitus*). Each of these plants are commonly found within the beach dune community on both Cayo Costa and North Captiva. Some of the animals that utilize the beach dune community at Cayo Costa and North Captiva include coachwhips (*Masticophis flagellum*), nesting shorebirds, and sea turtles, including the state threatened loggerhead sea turtle (*Caretta caretta*) and federally threatened green sea turtle (*Chelonia mydas*), which deposit eggs within the beach dune community each year between May and October.

Areas of beach dune community at Cayo Costa and North Captiva are in excellent condition. Low occurrence of exotic plants matched with limited beach driving help maintain this community in its natural state. Natural coastal erosion processes will constantly alter the beach dune, resulting in iterative acreage fluctuations. New beach dunes, however, will form as the communities shift with changing sea levels and increased erosion patterns.

*General Management Measures:* General management of beach dune at Cayo Costa and North Captiva includes monitoring for exotic invasive plant species and removing them as necessary. A past effort to remove Australian pine (*Casuarina equisetifolia*) was successful in nearly exterminating the population. As saplings begin to grow, park staff should make every effort to uproot the trees while small to avoid another future large removal event. Beach naupaka (*Scaevola taccada*) is another exotic-invasive plant that can outcompete its native relative, the state threatened inkberry. Monitoring and early removal should be prioritized.

Proposed walkways that would intersect the beach dune community should be constructed as either elevated boardwalks or switchback paths to avoid sand from blowing out past the foredunes. As vegetation in the back dune cannot withstand the salt spray and sand burial, perpendicular walkways can indirectly result in damages to plants on the back sides of dunes.

**Coastal Berm**

*Desired Future Condition:* Coastal berm habitat on Cayo Costa is found along the seaward and landward edges of the mangroves. Coastal berm here consists of a mixture of tropical herbs, shrubs, and trees and is defined by its substrate of coarse, calcareous, storm-deposited sediment forming long narrow ridges that parallel the shore. Tree species include cabbage palm (*Sabal palmetto*), gumbo limbo (*Bursera simaruba*), and seagrape (*Coccoloba uvifera*). Characteristic tall shrub and short tree species may include Spanish stopper (*Eugenia foetida*) and white indigoberry (*Randia aculeata*), while short shrubs and herbs may include broad-leaf spiderlily (*Hymenocallis latifolia*), buttonsage (*Lantana involucrata*), and rougeplant (*Rivina humilis*). More seaward berms or those more recently affected by storm deposition support a suite of plants similar to beaches, including shoreline sea purslane (*Sesuvium portulacastrum*), saltgrass (*Distichlis spicata*), and

seashore dropseed (*Sporobolus virginicus*), along with dense shrub thickets with buttonwood (*Conocarpus erectus*), black mangrove (*Avicennia germinans*), red mangrove (*Rhizophora mangle*), white mangrove (*Laguncularia racemosa*), and bushy seaside oxeye (*Borrichia frutescens*). While this natural community is similar to coastal strand in appearance, the main difference is held with the substrate.

*Description and assessment:* Coastal berm can be found in patches on Cayo Costa, North Captiva and Punta Blanca. Locations where wind and waves have deposited coastal berms show evidence of historical storms, and seem to exist along the east side of the island and in 45-degree north-facing strips along the southern half of the island. This is due to the creation and constant movement and shifting that occurs along barrier islands. Coastal berm on North Captiva is distributed in patches within the mangrove swamp along the east side of the island. These berm areas have a slightly higher elevation compared to the surrounding mangrove swamp, which allows for diverse vegetation types other than mangroves.

Characterisitic plant species found within the coastal berm on Cayo Costa and North Captiva include gumbo limbo, seagrape, white indigoberry, bay cedar, and buttonsage. Rare plant species found within the coastal berm community on Cayo Costa include the state threatened joewood (*Jacquinia keyensis*).

The areas of coastal berm on Cayo Costa and associated islands are in good condition. Feral hogs (*Sus scrofa*) were previously known to root within the coastal berm at Cayo Costa, causing soil disturbance, but have since been eradicated from the island. Some exotic plants including beach naupaka, Australian pine, Brazilian pepper (*Schinus terebinthifolius*), coconut palm (*Cocos nucifera*), and Senegal date palm (*Phoenix reclinata*) have invaded this natural community. With continued removal of these plants, the condition of the coastal berm will improve. Surrounding land use on Pine Island consists of landscaping/ornamental plant and fruit tree production. Proximity of these exotic seed sources to the park make continued occurrence of the plants on the islands probable.

*General Management Measures:* Management activities routinely occurring within the coastal berm communities on Cayo Costa and associated islands include invasive exotic plant and animal control. All areas of coastal berm should be surveyed annually to identify areas containing Brazilian pepper and Australian pine while they are small enough to be uprooted. Every effort should be made to continue to monitor and remove exotic vegetation. In addition, these areas should be surveyed annually and monitored for rare plant species.

**Coastal Grassland**

*Desired Future Condition:* Coastal grassland is predominantly an herbaceous community, occupying the flatter and drier portions of the transition zone between the primary beach dunes and the natural communities dominated by woody species (such as coastal strand or maritime hammock). With the exception of over wash from severe storms, it will be a relatively stable community compared to the dynamic primary dunes. Characteristic plant species include bluestem grasses (*Andropogon* spp. and *Schizachyrium* spp.), camphorweed (*Heterotheca*

*subaxillaris*) and ear-leaf greenbriar (*Smilax auriculata*). Other common species include sea oats, bitter panicgrass, and saltmeadow cordgrass (*Spartina patens*). In older, more stable barrier islands fronting the Pine Island Sound, such as Cayo Costa and North Captiva, coastal grassland includes a unique species known as hairy gramma grass (*Bouteloua hirsuta*), which is typically found in Texas and on the western high plains (Küchler 1964).

*Description and assessment:* The coastal grassland community at Cayo Costa and North Captiva includes a mixture of species such as sea oats, bluestem grasses, and saltmeadow cordgrass that transition into open areas further inland where hairy gramma grass persists as a dominate ground cover. Areas of coastal strand are interspersed among the grasslands, containing cabbage palms, cocoa plum (*Chrysobalanus icaco*), snowberry (*Chiococca alba*), saw palmetto (*Serenoa repens*), and the state threatened joewood. This mosaic of grassland and coastal strand also contains open bare patches of sand frequently inhabited by gopher tortoises (*Gopherus polyphemus*) and coachwhip snakes. Rare animal species found in this community include the federally protected Eastern indigo snake (*Drymarchon couperi*).

The coastal grassland communities at Cayo Costa and North Captiva are typically located behind the primary dune in the over wash plain parallel to the beach and longitudinally over half the length of the island. This community is bisected by six park trails/roads that pass through the grassland, and two staff residences. Currently, the coastal grassland is in excellent condition at Cayo Costa and some portions are gradually succeeding to coastal strand and maritime hammock. Periodic disturbances to the coastal grassland communities at Cayo Costa and North Captiva include large storm events. As storms pass through, they remove large vegetation and deposit saline water, negatively impacting normal coastal strand and hammock species. This allows the salt-tolerant grasses to bounce back and dominate the landscape, rebuilding the coastal grassland community.

On North Captiva, much of the previously mapped grassland areas at the northeast end of the park have now succeeded to coastal strand. Despite decrease in acreage of grassland patches that still exist within the park boundary, the remaining coastal grassland is in excellent condition with minimal exotic plant coverage.

*General Management Measures:* Management activities that routinely occur within coastal grassland include exotic-invasive species control. All areas of coastal grassland should be surveyed yearly to identify areas with Brazilian pepper and Australian pine while specimens are small enough to be hand pulled. Every effort should be made to continue monitoring and removing exotic vegetation. These areas should be surveyed annually and monitored for rare plant species.

If new roads or developments are proposed for either Cayo Costa or North Captiva, the coastal grassland should be avoided. The grassland community found on these islands is identified as an exemplary site in the FNAI Guide to the Natural Communities of Florida (2010) with minimal disturbance, and every effort should be made to maintain this status.

**Coastal Interdunal Swale**

*Desired Future Condition:* Coastal interdunal swale is a variable community which occurs as marshes, moist grasslands, dense shrublands, or damp flats which occur in strips between successive dune ridges that develop as beach building occurs seaward (accretion). Dominant plant species may be quite variable and a function of local hydrology, saltwater occurrence, and the age of the swale. On Cayo Costa, the interdunal swale occurs as moist grasslands with shallow wet areas including a diverse mixture of herbs, including southern umbrella sedge (*Fuirena scirpoidea*), *Cyperus sp*., seashore paspalum, bluestem grasses, and cordgrass (*Spartina sp*.). Shrubby areas may contain wax myrtle (*Myrica cerifera*) and buttonwood. Hurricanes and tropical storms can flood the swales with saltwater after which are recolonized with salt-tolerant species like saltgrass.

*Description and assessment:* Coastal interdunal swale exists on both Cayo Costa and North Captiva as marshes and moist grasslands in linear depressions that parallel the beach within the coastal grassland communities behind the primary beach dune. These areas are differentiated from the beach dune and coastal grassland communities in that they lack species such as sea oats, and tend to be wetter, holding water longer than surrounding areas. Dominant plant species include broomsedges, wax myrtle, seashore paspalum, cordgrasses, and buttonwood. Older coastal interdunal swales along the middle and east sides of the island have long since succeeded to coastal grassland, coastal strand, maritime hammock, and linear depression marshes as accretion continues to build the west side of the island.

The coastal interdunal swale community type found on Cayo Costa and North Captiva closely matches the FNAI description and is identified as an exemplary site in the FNAI Guide to the Natural Communities of Florida (2010). Coastal interdunal swale communities at Cayo Costa and North Captiva are in excellent condition with minimal exotic plant coverage.

*General Management Measures:* Management activities that routinely occur within the coastal interdunal swale community includes exotic plant and animal control. Every effort should be made to continue to monitor and remove exotic vegetation.

**Coastal Strand**

*Desired Future Condition:* Coastal strand can be characterized as a community of stabilized, wind-deposited coastal dunes that are thickly vegetated with evergreen salt-tolerant shrubs. It is an eco-tonal community that will generally lie between the beach dune and maritime hammock or tidal swamp. Coastal strand dunes will contain deep, well-drained sands that are generally quite stable but become susceptible to severe damage if the vegetation is significantly disturbed. Tropical coastal strand species prevalent on Cayo Costa and North Captiva include sea grape, myrsine (*Myrsine cubana*), buttonsage, yellow necklace pod (*Sophora tomentosa* var. *truncata*), coco plum, white indigoberry, snowberry, and numerous others. Smooth domed canopies will develop as the taller vegetation is pruned by the windblown salt spray that kills the outer buds.

*Description and assessment:* Large acreage of coastal strand is located on both Cayo Costa and North Captiva behind the primary beach dune, interspersed within the coastal grasslands, and positioned between the coastal grassland and maritime hammock. Coastal strand normally acts as an ecotone from beach dune to maritime hammock, but the geological formation of these islands has created coastal grassland more inland from the existing strand. Within the coastal strand are pockets and small strips of grassland understory, creating a fluctuating mosaic of strand and grassland throughout both of the islands.

The coastal strand community type found on Cayo Costa and North Captiva closely matches the FNAI description and is identified as an exemplary site in the FNAI Guide to the Natural Communities of Florida (2010). Coastal strand found on Cayo Costa and North Captiva is characterized by the prevalence of tropical species, with sea grapes and cabbage palms dominating the vegetative cover, and other tropical shrubs, such as myrsine and buttonsage, flanking in areas with abundant sun exposure. Even though cabbage palms and wax myrtle are common throughout this community, the pyric nature and natural fire frequency of tropical coastal strand is still unresolved (FNAI 2010).

On both islands, the coastal strand is currently in excellent condition. Very few exotics are present in this community and imperiled plants and animals thrive in these areas. High numbers of active gopher tortoise burrows can be found within this community, along with large populations of the state threatened joewood and state endangered Sanibel shrubverbena (*Lantana depressa* var. *sanibelensis*). Federally threatened Eastern indigo snakes are also known to utilize the coastal strand habitat on Cayo Costa and North Captiva. As recently as 2005, a federally endangered west coast prickly apple cactus (*Harrisia aboriginum*) was documented within the coastal strand on Cayo Costa. Following tropical storms and hurricanes later that same year, the cacti has not been documented on Cayo Costa or North Captiva; however, all coastal strand and maritime hammock communities on Cayo Costa and North Captiva are considered potential habitat for this endangered cactus.

*General Management Measures:* While the reduction of dangerous wildfire fuel is vital, the ecological value of burning coastal strand at North Captiva and Cayo Costa is not supported. For this particular plan, coastal strand will not be identified as a pyric community unless other evidence is presented that justifies the need for ecological burning. Prescribed burns with the intent of reducing fuels should be considered in coastal strand on both Cayo Costa and North Captiva when fuel levels are deemed high.

Management activities that routinely occur within coastal strand on Cayo Costa and North Captiva include invasive exotic plant and animal control. All areas of coastal strand should be surveyed yearly to identify areas with Brazilian pepper and Australian pine while small enough to be hand pulled out of the ground. Every effort should be made to continue to monitor and remove exotic vegetation. In addition, these areas should be surveyed annually and monitored for rare plant species.

**Maritime Hammock**

*Desired Future Condition:* Maritime hammock is a coastal evergreen hardwood forest occurring on stabilized coastal dunes at varying distances from the shore. On Cayo Costa and North Captiva, canopy species typically consist of live oak (*Quercus virginiana*), seagrape, gumbo limbo, strangler fig (*Ficus aurea*), and cabbage palm. For maritime hammock communities, the canopy will typically be a dense, closed canopy with a distinct understory. The understory species may consist of saw palmetto, wax myrtle, myrsine, wild coffee (*Psychotria nervosa*), snowberry, coralbean (*Erythrina herbacea*), and marlberry (*Ardisia escallonioides*). Herbaceous groundcover is typically very sparse or absent. Many vine species persist in this community, including poison ivy (*Toxicodendron radicans*), ear-leaf greenbriar, and Virginia creeper (*Parthenocissus quinquefolia*).

*Description and assessment:* Maritime hammock is the most extensive community on Cayo Costa, covering most of the island's east side. North Captiva contains this community in patches on the west side of the island, and in a continuous strip on the east side adjacent to the mangrove swamp. Open sandy spaces are rare when this habitat is undisturbed, and organic material consisting of leaf litter dominates the groundcover. Buildup of organic material contributes to moisture retention. A nearly complete canopy cover of cabbage palms and live oak reduces the range of temperature fluctuations during the day and night in this community.

The maritime hammock throughout Cayo Costa closely matches the FNAI description and is identified as an exemplary site in the FNAI Guide to the Natural Communities of Florida (2010). Aside from the characteristic live oak and cabbage palm, additional plant species found in this community on Cayo Costa and North Captiva include gumbo limbo, strangler fig, myrsine, white stopper (*Eugenia axillaris*), wild coffee, wild lime (*Zanthoxylum fagara*), and coralbean. A large variety of ferns are supported in the maritime hammock, including whisk fern (*Psilotum nudum*), marsh fern (*Thelypteris palustris* var. *pubescens*), and resurrection fern (*Pleopeltis michauxiana*). Aerial bromeliads are prevalent in this community, including the imperiled banded airplant (*Tillandsia flexuosa*) and giant airplant (*Tillandsia utriculata*). Maritime hammock on Cayo Costa and North Captiva is also considered habitat for several other rare plant species, including the state endangered West Indian cock's-comb (*Celosia nitida*) and the federally endangered west coast prickly apple cactus.

Condition of maritime hammock at Cayo Costa is excellent. Extensive rooting from feral hogs had previously disrupted large sections of hammock, especially adjacent to park trails. Rooting destroys the native vegetation and allows exotic plants openings to become established. Also, native communities of fungi and insects are displaced by this physical manipulation of the soil. Feral hogs are no longer present on the island and areas where rooting had previously occurred are gradually healing with vegetation regrowth. Exotic plants are minimally present in this community, namely Brazilian pepper, carrotwood (*Cupaniopsis anacardioides*), and bowstring hemp (*Dracaena hyacinthoides*). Focused efforts in exotic removal have taken place, including a full-island treatment of all Florida Exotic Pest Plant Council (FLEPPC) Category I and II exotic invasive plant species in 2019, the work of two

AmeriCorps workers in 2014, and the continued assistance from other park volunteers whose primary responsibilities include the chemical treatment of bowstring hemp and Brazilian pepper regrowth within the maritime hammock.

*General Management Measures:* Management activities that routinely occur within maritime hammock at Cayo Costa and North Captiva include invasive exotic plant and animal control. All areas of maritime hammock should be surveyed yearly to identify areas with Brazilian pepper and Australian pine while they are small enough to be uprooted by hand. Every effort should be made to continue monitoring and removing exotic vegetation. Additionally, these areas should be surveyed annually and monitored for rare plant species.

The maritime hammock on Cayo Costa has been subject to occasional fire, either through intentional prescribed fires, by accidental visitor or resident ignitions, or naturally by lightning strike. FNAI describes maritime hammock as a non-pyric community type that rarely experiences fire (FNAI 2010). With the exception of management zone CC-01, which contains mesic flatwoods surrounded by areas of maritime hammock, the maritime hammock for this plan will be managed as non-pyric with no prescribed fires for ecological reasons. Areas that are ignited naturally or by human interaction should be extinguished as quickly as possible to prevent the fire from spreading to other areas and to avoid the destruction of private property.

**Mesic Flatwoods**

*Desired Future Condition:* Mesic flatwoods community is characterized by an open canopy of tall slash pines (*Pinus elliottii*) and a dense, ground layer of low shrubs, grasses and forbs. Saw palmetto will generally be present but not overly dominant. Other shrub species include cocoa plum and bluestem grasses. This community has minimal topographic relief, and the soils contain a hardpan layer within a few feet of the surface which impedes percolation. Due to these factors, water can saturate the sandy surface soils for extended periods during the wet season but lengthy droughts also commonly occur during the dry season. The Optimal Fire Return Interval for this community is 2-4 years.

*Description and assessment:* The mesic flatwoods community found on Cayo Costa is very different than what is observed on the mainland. This natural community is in discontinuous patches within the interior northern half of the island. The flatwoods occur locally within the maritime hammock, typically near a site of historical human disturbance, giving the appearance that the community is more related to human activity than to the island's physiography or successional pattern. The formation of these flatwoods correlates to the passage of major hurricanes, with these large storms opening up attractive areas for human development within the hammock.

The main difference between the mesic flatwoods and maritime hammock is the lack of woody species and reduced herbaceous groundcover due to pine needle droppings. The flatwoods have minimal snowberry, indigoberry, coral bean, and myrsine understory when compared to those typically found in the hammock.

Common ground cover in the mesic flatwoods includes saw palmetto, coastal ground cherry (*Physalis angustifolia*), shell mound prickly pear (*Opuntia stricta*), and flat leaf flatsedge (*Cyperus planifolius*). Exotic plants occasionally found within this community on Cayo Costa include Brazillian pepper and cogongrass (*Imperata cylindrica*).

Mesic flatwoods in the park are in good condition, but not contiguously distributed. Only a portion of the mesic flatwoods is currently managed with prescribed fire as several patches of flatwoods are surrounded by non-pyric community types and others are located near outparcels containing private homes. Managing small areas of this pyric community embedded in an otherwise non-pyric area limits the feasibility of applying prescribed fire. Lack of regular fire also degrades the quality of this community. Lightning strike fires occur, but with less frequency than on the mainland.

*General Management Measures:* Management activities that routinely occur within the mesic flatwoods on Cayo Costa includes invasive exotic plant and animal control. Every effort should be made to continue to monitor and remove exotic vegetation. On the mainland, mesic flatwoods are a pyric community that burns frequently. The largest pockets of flatwoods north of the main road will continue to be ecologically maintained with prescribed fire (approximately 49 acres); however, it should also be monitored for pine mortality and groundcover response. Due to the location of mesic flatwoods and frequent association with cultural sites, future trails and developments should be avoided in this community.

**Shell Mound**

*Desired Future Condition*: Shell mounds are characterized as small hills in coastal areas composed entirely of shells (clams, oysters, whelks) that were discarded by generations of Native Americans. This aggregation of shells created a habitat that was attractive to calciphilic plants. These hills of shell are often surrounded by mangrove swamp, indicating that sea levels were much lower at the time these mounds were created. Undisturbed mounds support diverse hardwood forests with tropical vegetation including white stopper, Florida swamp privet (*Forestiera segregata*), strangler fig, and gumbo limbo. Mangroves may also be present around the bases of shell mounds, along with herbaceous species including sea purslane and saltwort (*Batis maritima*). A few imperiled species are uniquely found within the shell mound natural community, including West Indian cock's-comb.

*Description and assessment:* The shell mounds on Cayo Costa and North Captiva are in fair condition. The shell mound communities on North Captiva are not entirely contained within park boundaries. Because the mounds offer topographic relief, they were targeted for early private residential construction. Two large mounds on Cayo Costa, Faulkner Mound and Mark Pardo Shellworks, have private homes on their highest points. This makes natural community management very difficult due to the matrix of park and non-park property. Due to the construction of homes, walkways, and fencing, some mounds on Cayo Costa are physically altered. The associated vegetation still persists, but only in small patches away from public use areas.

The shell mounds on both Cayo Costa and North Captiva harbor tropical hardwood species including gumbo limbo, strangler fig, and Florida swamp privet. Red, black, and white mangroves, along with buttonwood fringe the mounds with patches of herbaceous groundcover. Imperiled species found among the shell mound communities at Cayo Costa include the state threatened shell mound prickly pear, state threatened triangle cactus (*Acanthocereus tetragonus*), state endangered West Indian cock's-comb, and federally endangered west coast prickly apple cactus.

*General Management Measures:* Management activities that routinely occur on the shell mounds on Cayo Costa and North Captiva includes monitoring for invasive exotic plants and removing them as necessary. The West Indian cock's-comb is found among this community, and every effort should be made to leave these plants undisturbed. Exotic plant removal should be conducted with minimal impact to the subsurface. In addition, these areas should be surveyed annually and monitored for rare plant species.

Looting of the shell mounds for artifacts has occurred in the past, causing disturbances to both the mound and associated vegetation. Shell mounds should be visited as frequently as possible by park staff to deter visitors from physically manipulating these sites.

**Depression Marsh**

*Desired Future Condition:* Depression marsh is characterized as containing low emergent herbaceous and shrub species which will be dominant over most of the area. Trees will be few and will occur primarily in the interior portions of the community. There will be little accumulation of grassy fuels due to frequent burning; one can often see the soil surface through the vegetation when the community is not inundated. Dominant vegetation in basin marsh and depression marsh at Cayo Costa includes panic grasses (*Panicum* spp.), Jamaica swamp sawgrass (*Cladium jamaicense*), *Cyperus* sp., and coastalplain willow (*Salix caroliniana*). The Optimal Fire Return Interval for this community is 2-10 years depending on fire frequency of adjacent communities.

*Description and assessment:* The depression marshes found on Cayo Costa do not match the FNAI description as some are linear rather than circular and originated from saline remnants of old coastal interdunal swale systems. As the island width expanded during formation, continued leaching of salts from the substrate resulted in more hydric conditions. This hydric succession favors freshwater flora and fauna. The dominant defining species now present includes coastal plain willow and panic grasses.

Currently, the depression marshes on Cayo Costa are in good condition. Exotic plants such as Brazilian pepper and bowstring hemp are present in and around the marsh boundaries. Also, there was hog damage in and around all of the depression marshes that is slowly recovering post-eradication.

*General Management Measures:* Management activities that occur in the depression marsh communities on Cayo Costa include monitoring for invasive exotic plants and removing them as necessary. Every effort should be made to maintain control of Brazilian Pepper and bowstring hemp.

Depression marshes at Cayo Costa will be maintained as non-pyric, being surrounded by other non-pyric communities, such as maritime hammock and mangrove swamp, with some located near outparcels that contain private homes.

**Mangrove Swamp**

*Desired Future Condition:* Mangrove swamp is typically characterized as a dense forest occurring along relatively flat, low wave energy, marine and estuarine shorelines. Dominant overstory will include red mangrove, black mangrove, white mangrove, and buttonwood. These four species may occur either in mixed stands or often in differentiated, monospecific zones based on varying degrees of tidal influence, salinity levels, and types of substrate. Red mangroves will typically dominate the deepest water, followed by black mangrove in the intermediate zone, and white mangroves and buttonwood in the highest, least tidally influenced zone. Mangroves will typically occur in dense stands (with little to no understory) but may be sparse, particularly in upper tidal reaches where salt marsh species predominate. When present on Cayo Costa and associated islands, shrub species include seaside oxeye and vines including gray nicker (*Guilandina bonduc*), coinvine (*Dalbergia ecastaphyllum*), and herbaceous species such as saltwort, perennial glasswort (*Sarcocornia perennis*), and giant leather fern (*Acrostichum danaeifolium*). Soils are typically anaerobic and saturated with brackish water at all times, becoming inundated at high tide. Mangrove swamps will occur on a wide variety of soils, ranging from sands and mud to solid limestone rock. In older mangrove swamps containing red mangroves, a layer of peat may accumulate over the soil from decaying plant material (primarily red and black mangrove roots).

*Description and assessment:* The mangrove swamp found at Cayo Costa, North Captiva, Punta Blanca, and Jug Creek are in excellent condition. Occasional exotic plants can be found interspersed among the mangrove swamp, but no areas are monocultures of invasive species. Carrotwood and Brazilian pepper are the typical exotic species found in this natural community. Mangrove swamp is expanding on the east sides of both Cayo Costa and North Captiva as more mangroves recruit adjacent to the existing swamp.

*General Management Measures:* Management activities that routinely occur in the mangrove swamp communities includes monitoring and removal of invasive exotic plant species. Exotic removal should be a continuous process to maintain this natural community. Boats tying lines to mangrove branches should be discouraged. Illegal trimming of mangroves on state park property has previously been documented and brought to the attention of the Pine Island Sound Aquatic Preserve. Quarterly surveys by boat should be conducted along the east side of the islands to monitor mangrove health on state park property.

**Marine Unconsolidated Substrate**

*Desired Future Condition:* Marine unconsolidated substrate consists of expansive unvegetated, open areas of mineral based substrate composed of shell, coral, and sand (sand beaches). The presence of natural marine debris, or wrack, is considered desirable as it greatly enhances nutrient cycling and the food web. Desired conditions include preventing soil compaction, dredging activities, and disturbances such as the accumulation of pollutants.

*Description and assessment:* The marine unconsolidated substrate at Cayo Costa and North Captiva is in excellent condition. Natural beach erosion and accretion occurs constantly within this community. The acreage and shape of the substrate changes daily based on the speed and location of the long shore current. On the west side of the islands, this community consists mainly of open sandy beaches seaward of the beach dune. Along the east side of the islands, this community includes sandy shorelines flanking the mangroves and mud flats exposed at low tides. At the widest point of the island along the west side, an inland saltwater lagoon occasionally overflows its banks creating a channel through the marine unconsolidated substrate to the Gulf of Mexico. Significant erosion and storm events as recently as 2015 resulted in the opening of the lagoon to the Gulf of Mexico. Beach raking does not occur on these islands; therefore, the beach wrack community is kept natural. This community provides important nesting habitat for imperiled species, including imperiled green and loggerhead sea turtles, and migrating shorebirds. All-terrain vehicles (ATVs) are used on the beaches for sea turtle nesting surveys, with driving limited to those lower beach areas near or below the high-tide line not utilized by shorebirds and sea turtles in accordance with FWC best management practices.

*General Management Measures:* Management activities that routinely occur in the marine unconsolidated substrate on Cayo Costa and North Captiva includes invasive exotic plant and animal control. The beach community should be monitored annually for erosion and accretion to better assess habitat loss/gain for shorebirds and sea turtles, and to limit the amount of human interference in the form of beach nourishment or hard stabilizations. Beach raking should not be conducted on Cayo Costa or North Captiva to preserve the wrack line and minimize impacts to nesting shorebirds and sea turtles. Natural resource protection should be balanced with recreational use by including signage around sea turtle nests, signage prohibiting pets on the beach, and posting barriers to prevent trespassing within shorebird nesting areas.

Driving on this natural community should be limited to necessary management activities and in accordance with FWC best management practices to avoid conflicts with beach nesting species.

### Developed

*Desired Future Condition:* Developed areas within the park will be managed to minimize the effect of the developed areas on adjacent natural areas. Priority invasive plant species (FLEPPC Category I and II species) will be removed from all developed areas. Other management measures include proper stormwater management and development guidelines that are compatible with prescribed fire management in adjacent natural areas.

*Description and assessment:* Developed areas of Cayo Costa and Jug Creek are in generally good condition, including tent campsites, small primitive cabins, restroom facilities, ranger station, maintenance shop, three staff residences, and water treatment tank. Multiple areas are regularly mowed to reduce the encroachment of grasses and vegetation.

Jug Creek contains an infestation of exotic plants within the cottage area that require herbicidal and mechanical treatment. No other developed areas of the park have issues with exotic plants.

*General Management Measures:* Management activities for developed areas in the park routinely includes invasive exotic plant and animal control. Developed areas should be maintained such that the vegetative cover contains 5% or less exotic plant species.

Proposed landscaping for developed areas of the park should include only native plants found within their proper ranges. No offsite native plant should be introduced to the park if there is no historical record of it inhabiting the park in the past. Ornamental landscapes statewide often install the east coast variety (*Helianthus debilis*) for landscaping, but it is important to ensure that only the native west coast variety is planted in the park.

### Canal

*Desired Future Condition:* The canal area within the park will be managed to minimize the effect of the canal on adjacent natural areas. The depth will be maintained at 5 feet to allow for the passage of the crew boat.

*Description and assessment:* The canal area is located at Jug Creek, and is in good condition. The dredged canal at Jug Creek is the only access to the mainland for the island parks. Over the years, the canal has been filling in and becoming too shallow for the park boats to enter. In 2016, the canal was dredged to maintain boat access for park staff but sediment substantially reaccreted only one year later. Without canal access, the island parks will not be able to transport staff, fuel, and other operational resources to the islands.

*General Management Measures:* Depth in Jug Creek is monitored weekly to ensure access for the crew boat and the canal is dredged by permit. The canal should be maintenance dredged to keep the depth at or below 5 feet deep for boat access.

## Imperiled Species

Imperiled species are those that are (1) tracked by FNAI as critically imperiled (G1, S1) or imperiled (G2, S2); or (2) listed by the U.S. Fish and Wildlife Service (USFWS), Florida Fish and Wildlife Conservation Commission (FWC) or the Florida Department of Agriculture and Consumer Services (FDACS) as endangered, threatened, or of special concern.

The DRP strives to maintain healthy populations of imperiled plant and animal species primarily by implementing effective management of natural systems. Single species management is appropriate in state parks when the maintenance, recovery, or restoration of a species or population is complicated due to constraints associated with long-term restoration efforts, unnaturally high mortality, or insufficient habitat. Single species management should be compatible with the maintenance and restoration of natural processes, and should not imperil other native species or seriously compromise park values.

In the management planning process, DRP staff consulted with staff of FWC Imperiled Species Management/regional biologist and other federal, state, and local agencies for assistance in developing imperiled animal species management objectives and actions. Likewise, for imperiled plant species, DRP staff consulted with FDACS. Data collected by the USFWS, FWC, FDACS, and FNAI as part of ongoing research/monitoring programs will be reviewed by the DRP periodically to inform management of decisions that may affect imperiled species at the park.

Cayo Costa is vital to the existence and reproduction of many imperiled species since much of Florida's coastal habitats have been altered. Cayo Costa and associated islands provide undisturbed beach communities that offer breeding, nesting, resting, and feeding grounds for many protected plants and animals.

Imperiled sea turtles frequently nest on the beaches of Cayo Costa and North Captiva. State-threatened loggerhead sea turtles are the most common, with over 300 nests laid in 2013, 2014, and 2016. Federally threatened green sea turtles lay between four and 18 nests on Cayo Costa each year. Green sea turtles appear to follow a biannual trend of high/low nesting numbers with the four nests being the lowest number observed in the past five years and 18 the highest. Kemp's ridley (*Lepidochelys kempii*) sea turtles have also observed within park boundaries. In accordance with FWC protocol, park staff and volunteers survey the beach daily, identifying new nests, locating eggs, and erecting boundary markers with signage. Nests are excavated three days after hatching occurs or 70 days from the date when eggs are first deposited. All nests are documented and recorded, including those lost to tidal inundation, erosion, or depredation. Depredation by nuisance animals such as raccoons, armadillos, and coyotes is currently a significant issue for nesting sea turtles on these islands. Morning surveyors locate the clutch and place 3x3-foot self-releasing screens over the nests deter depredation. Screens are secured in place with four tent stakes and buried 2-3 inches below sand surface in accordance with FWC protocols. Screen and stakes are removed at the time of nest excavation.

No structural lighting or electricity exists in the sparse development along the Gulf beach on Cayo Costa. If development is planned along any segment of beach, all lights will conform to standards preventing adult and hatchling disorientation. All exterior lighting would incorporate turtle-friendly lighting and conform to the FWC Marine Turtle Lighting Guidelines. Disorientation events attributed to artificial light sources and area sky-glow near the park are reported to FWC and Lee County.

Nesting seabirds and shorebirds are also monitored at Cayo Costa and North Captiva in accordance with FWC and DEP Shorebird and Seabird Management standards. Bird species known to nest on Cayo Costa include snowy plovers (*Charadrius nivosus*), least terns (*Sternula antillarum*), Wilson's plovers (*Charadrius wilsonia*), black skimmers (*Rynchops niger*), and American oystercatchers (*Haematopus palliatus*). Areas parkwide should be posted for nesting and resting birds, regardless of visitor use. Timing, size, and enforcement of closed areas for beach nesting and resting shorebirds and sea turtles are critical to their effectiveness. Posting significant wildlife habitat in advance of seasonal occupation (pre-posting) can make the difference between occupied and unused nesting sites. Providing sufficient buffers to ensure that disturbances do not result in abandonment is critical. In areas of intense recreation activity, outreach and enforcement must accompany posting efforts. The DRP will continue to coordinate with FWC on enforcement and protection measures for critical shorebird and sea turtle nesting and resting areas.

The DRP will seek a balanced approach to minimize visitor impacts to shorebirds and the park's sensitive coastal habitats, while managing resource-based recreational activities. In collaboration with FWC, other government agencies, local non-governmental organizations, park staff will identify and delineate habitats and educate the public about shorebird protection. Management decisions will be informed by analysis of data on habitat use in the park during prior nesting seasons. This analysis will suggest areas of importance where focused management actions are needed. These actions will typically include:

- Demarcating potential shorebird habitat by enclosing the perimeter of the habitat and buffer area with appropriate fencing and signage
- Encouraging and focusing visitor activities in areas less suitable for shorebird nesting habitat
- Monitoring during nesting season to identify/protect new breeding sites
- Providing interpretive and educational outreach to the public prior to and during nesting season to encourage visitor use that protects shorebirds and habitat
- Pre-posting when breeding sites are used multiple consecutive years
- Demarcating new protected areas and expanding or initiating interpretive programs when new breeding sites are indicated
- Coordinating with FWC and local law enforcement agencies to ensure compliance with park rules and shorebird protections, as needed, including to enforce existing rules addressing dogs on park beaches

As needed, DRP staff or volunteers will provide onsite interpretation to educate visitors about the stewardship of imperiled shorebird habitat and identify suitable recreation sites. Such outreach programs will commence prior to nesting seasons and prior to placing limits on access to designated use areas. Pre-posting the identified habitat areas combined with early public notification regarding the park's shorebird protection program will improve visitor compliance with park rules and promote broad-based public stewardship of shorebird nesting, resting, and foraging habitats in the park. For more information and details of monitoring protocols, the DRP has developed a separate shorebird and seabird management plan.

Cayo Costa and North Captiva are important resting and feeding areas for migrating and wintering shorebirds. Species currently experiencing population declines such as the red knot (*Calidris canutus rufa*) and piping plover (*Charadrius melodus*) will be monitored within the state park. All parks, including Cayo Costa and North Captiva, will participate in FWC's winter shorebird survey to accurately capture how many birds are using Florida beaches for wintering and resting. All parks will also participate in the International Piping Plover census coordinated by United States Geological Survey (USGS) every five years. The last census was conducted in 2016. When important resting and feeding areas are identified at these parks, proper signage and protection will be erected.

Though no longer listed as imperiled, southern bald eagles are noted here because of the FWC guidelines for activities near eagle nests during the October 1 through May 15 nesting season (FWC 2008). Special precautions are taken near active bald eagle nests, including buffers, to prevent disturbance. Precautions are also taken to protect osprey nests that can be found in pine snags at the park.

Eastern indigo snakes are currently being researched on both North Captiva and Cayo Costa by the Sanibel Captiva Conservation Foundation (SCCF). This ongoing research involves a population study of the genetic differences between mainland indigo snakes and the Pine Island barrier island populations. Snakes that are captured by SCCF biologists are measured and marked using a scale clip technique and PIT tag to identify individuals from the population. Despite optimal habitat in both locations, indigo snakes have not been captured to date on Cayo Costa and have rarely been captured within the park boundaries on North Captiva (pers. comm. with Chris Lechowicz, Director SCCF). One previous management concern for these imperiled snakes on Cayo Costa was the feral hog presence throughout the island. Feral hogs are no longer of concern to indigo snake populations as they have been eradicated from the island as of 2019. These imperiled snakes are normally found in developed areas, on park trails, around resident houses and the shop area. Annual reports on these research findings are submitted to the DRP.

Lee County is among the most important counties for manatees on the west coast of Florida. Although a majority of manatee activity occurs in the southern half of Pine Island Sound, manatees frequently move north along the outskirts of North Captiva and Cayo Costa. Locations frequented by manatee include Pelican Bay, adjacent to the northeastern shore of Cayo Costa, and Safety Harbor within North Captiva. Manatees also frequent Hook's Canal, located slightly outside of the park

boundary near management zone CC-06. Manatees are so frequent in both Pelican Bay and Safety Harbor that a comprehensive Manatee Protection Plan has been completed for the area. From April 1 through November 15, both waterbodies are designated slow speed zones to protect manatees from boats during the warmer months. A manatee awareness sign has been posted at the main park boat dock to inform visitors of manatees in the surrounding waters.

Both Cayo Costa and North Captiva support dense populations of gopher tortoises within the coastal strand and coastal grassland natural communities. In 2015, Cayo Costa State Park was identified as one of 35 priority Florida state conservation lands to be included in a gopher tortoise population assessment. This study, completed by staff from the Joseph W. Jones Ecological Research Center, determined the density, age class, and health of the tortoises, providing rankings for survey sites based on population evaluation and habitat suitability (Smith 2016). Calculated density of tortoises per hectare surveyed on Cayo Costa was 2.095 with an abundance of 343 gopher tortoises for the 163.5 hectares surveyed on the island (Smith 2016). Habitat at Cayo Costa was determined to be of high quality with a likelihood of viable gopher tortoise populations (Smith 2016). The study also found that gopher tortoise population manipulation/augmentation is not necessary on Cayo Costa, but the sites require continued management to maintain the existing population and habitat quality (Smith 2016).

Punta Blanca also protects gopher tortoises located on the southern end of the island, where the topography allows coastal berm to persist. Due to the short stature of the dominant grass species on Cayo Costa and North Captiva, hairy gramma grass, burning is unnecessary for gopher tortoise habitat. Both coastal strand and coastal grassland remain consistently open and low enough for unencumbered movement and foraging. DRP will monitor for decreases in the population of gopher tortoises and consult with FWC on data trends.

Imperiled plant species are managed through the upkeep of the park's natural communities. Twelve imperiled plant species are currently found on Cayo Costa and North Captiva. Additionally, the west coast prickly apple cactus was historically found on Cayo Costa. Several imperiled plant species listed in the park's previous approved management plan (December 9, 2005) have been removed from this list as they have not been observed or vouchered in the park. All imperiled plant species are monitored once every three years for population health. Annual visits document continued persistence of species on both Cayo Costa and North Captiva.

On January 21, 2015, the USFWS announced a proposal to designate critical habitat for the federally protected west coast prickly-apple cactus. This plan identifies potential habitat for the endangered cactus, along with areas to be surveyed and potential sites for relocation. All upland natural communities at Cayo Costa and North Captiva are designated as potential critical habitat to protect the west coast prickly apple cactus. District and park staff will work with USFWS to identify potential habitat and survey for the presence of cacti, determining whether the state park would be suitable as a protected recipient site for augmentation, introduction, or reintroduction.

State threatened joewood and state endangered Sanibel shrubverbena are abundant within the coastal strand on both Cayo Costa and North Captiva. Cayo Costa is near the northernmost limit for joewood, with most of joewood in Florida existing in the Keys. Both joewood and Sanibel shrubverbena are located within the coastal grassland and coastal strand on North Captiva and Cayo Costa, along with state-threatened shell mound prickly-pear (*Opuntia stricta*). Other species, including west coast dune sunflower and state threatened inkberry, are found parkwide within beach dune community.

Some imperiled plant species are associated specifically with the Indian shell mounds and middens found on Cayo Costa and North Captiva. Plants such as West Indian cock's-comb prefer this calcium enriched natural community. Also, due to the higher topography and location adjacent to mangrove swamps, Florida mayten (*Tricerma phyllanthoides*) can also be found around the shell middens and mounds.

Bromeliads are found throughout the mangrove swamps and maritime hammock. Major threats to these imperiled species are hydrological and salinity changes due to sea level rise. As water levels rise and strong storms become more frequent, host trees for these plants found in the maritime hammock may be damaged by saltwater. The DRP will monitor the impacts of sea level rise to these imperiled plant species and coordinate with FDACS and local botanical gardens to preserve genetic material if needed.

The following table contains a list of all known imperiled species within the park and identifies their status as defined by various entities. It also identifies the types of management actions that are currently being taken by DRP staff or other entities, and identifies the current level of monitoring effort. Codes used under the column headings for management actions and monitoring levels are defined below the table. Explanations for federal and state status as well as FNAI global and state rank are provided in Appendix 6.

| Imperiled Species Inventory | | | | | | |
|---|---|---|---|---|---|---|
| **Common and Scientific Name** | **Imperiled Species Status** | | | | **Management Actions** | **Monitoring Level** |
| | **FWC** | **USFWS** | **FDACS** | **FNAI** | | |
| **PLANTS** | | | | | | |
| Triangle Cactus *Acanthocereus tetragonus* | | | LT | | 2 | Tier 1 |
| West Indian cock's-comb *Celosia nitida* | | | LE | | 2,10 | Tier 2 |
| Coastal dune sandmat *Euphorbia cumulicola* | | | LE | G2, S2 | 2 | Tier 2 |
| West coast prickly apple cactus *Harrisia aboriginum* | | LE | LE | G1,S1 | 2,3,10 | Tier 2 |
| West coast dune sunflower *Helianthus debilis* subsp *vestitus* | | | | G5T2,S2 | 2 | Tier 1 |
| Spiked crested coralroot *Hexalectris spicata* | | | LE | | 2, 10 | Tier 1 |
| Joewood *Jacquinia keyensis* | | | LT | G4,S3 | 2 | Tier 1 |
| Sanibel shrubverbena *Lantana depressa* var. *sanibelensis* | | | LE | G2T1, S1 | 2 | Tier 2 |
| Shell mound prickly-pear *Opuntia stricta* | | | LT | | 2 | Tier 1 |
| Inkberry *Scaevola plumieri* | | | LT | | 2 | Tier 1 |

| Imperiled Species Inventory | | | | | | |
|---|---|---|---|---|---|---|
| **Common and Scientific Name** | **Imperiled Species Status** | | | | **Management Actions** | **Monitoring Level** |
| | **FWC** | **USFWS** | **FDACS** | **FNAI** | | |
| Northern needleleaf *Tillandsia balbisiana* | | | LT | | 2 | Tier 1 |
| Cardinal airplant; Common wild-pine *Tillandsia fasciculata* | | | LE | | 2 | Tier 1 |
| Twisted airplant; Banded airplant *Tillandsia flexuosa* | | | LT | G5,S3 | 2 | Tier 1 |
| Giant airplant; Giant wild-pine *Tillandsia utriculata* | | | LE | | 2 | Tier 1 |
| Florida mayten *Tricerma phyllanthoides* | | | LT | | 2 | Tier 1 |
| **REPTILES** | | | | | | |
| American alligator *Alligator mississippiensis* | FT (S/A) | SAT | | G5,S4 | 13 | Tier1 |
| Atlantic loggerhead *Caretta caretta* | FT | LT | | G3,S3 | 2,8,10,13 | Tier 3 |
| Green turtle *Chelonia mydas* | FT | LT | | G3,S2 | 2,8,10,13 | Tier 3 |
| American crocodile *Crocodylus acutus* | FT | LT | | G2, S2 | 13 | Tier 1 |
| Eastern indigo snake *Drymarchon couperi* | FT | LT | | G3,S3 | 2,10,13 | Tier 1 |

| Imperiled Species Inventory | | | | | | |
|---|---|---|---|---|---|---|
| **Common and Scientific Name** | **Imperiled Species Status** | | | | **Management Actions** | **Monitoring Level** |
| | **FWC** | **USFWS** | **FDACS** | **FNAI** | | |
| Gopher tortoise *Gopherus polyphemus* | ST | C | | G3,S3 | 2,8,10,13 | Tier 2 |
| Kemp's ridley *Lepiodochelys kempii* | FE | LE | | G1,S1 | 2,8,10,13 | Tier 3 |
| **BIRDS** | | | | | | |
| Florida burrowing owl *Athene cunicularia floridana* | ST | | | G4T3, S3 | 2,13 | Tier 3 |
| Short-Tailed hawk *Buteo brachyurus* | | | | G4G5, S1 | 2,13 | Tier 1 |
| Red Knot *Calidris canutus rufa* | FT | LT | | G4T2, S2N | 2,8,10,13 | Tier 2 |
| Piping plover *Charadrius melodus* | FT | LT | | G3, S2 | 2,8,10,13 | Tier 2 |
| Snowy plover *Charadrius nivosus* | ST | | | G3,S1 | 2,8,10,13 | Tier 3 |
| Wilson's plover *Charadrius wilsonia* | | | | G5,S2 | 2,8,10,13 | Tier 3 |
| Little blue heron *Egretta caerulea* | ST | | | G5,S4 | 2,8,10,13 | Tier 1 |
| Reddish egret *Egretta rufescens* | ST | | | G4, S2 | 2,8,10,13 | Tier 1 |
| Tri-colored heron *Egretta tricolor* | ST | | | G5,S4 | 2,8,10,13 | Tier 1 |

| Imperiled Species Inventory | | | | | | |
|---|---|---|---|---|---|---|
| **Common and Scientific Name** | **Imperiled Species Status** | | | | **Management Actions** | **Monitoring Level** |
| | **FWC** | **USFWS** | **FDACS** | **FNAI** | | |
| Swallow-tailed kite *Elanoides forficatus* | | | | G5,S2 | 2,13 | Tier 1 |
| Merlin *Falco columbaris* | | | | G5, S2 | 2,13 | Tier 1 |
| Peregrine falcon *Falco peregrinus* | | | | G4, S2 | 2,13 | Tier 1 |
| Magnificent frigatebird *Fregata magnificens* | | | | G5, S1 | 13 | Tier 1 |
| Gull-billed tern *Gelochelidon nilotica* | | | | G5, S2 | 13 | Tier 2 |
| American oystercatcher *Haematopus palliates* | ST | | | G5, S2 | 2,8,10,13 | Tier 3 |
| Worm-eating warbler *Helmitheros vermivorum* | | | | G5, S1 | 2,8,10,13 | Tier 1 |
| Caspian tern *Hydroprogne caspia* | | | | G5, S2 | 2,8,10,13 | Tier 2 |
| Wood stork *Mycteria americana* | FT | LT | | G4, S2 | 2,8,10,13 | Tier 1 |
| Roseate spoonbill *Platalea ajaja* | ST | | | G5, S2 | 2,8,10,13 | Tier 1 |
| American avocet *Recurvirostra americana* | | | | G5, S2 | 10,13 | Tier 1 |
| Black skimmer *Rynchops niger* | ST | | | G5, S3 | 2,8,10,11, 13 | Tier 3 |

| Imperiled Species Inventory | | | | | | |
|---|---|---|---|---|---|---|
| **Common and Scientific Name** | **Imperiled Species Status** | | | | **Management Actions** | **Monitoring Level** |
| | **FWC** | **USFWS** | **FDACS** | **FNAI** | | |
| Least tern *Sternula antillarum* | ST | | | G4, S3 | 2,8,10,11, 13 | Tier 3 |
| Sandwich tern *Thalasseus sandvicensis* | | | | G5, S2 | 2,8,10,13 | Tier 2 |
| **MAMMALS** | | | | | | |
| Florida manatee *Trichechus manatus latirostris* | FT | LT | | G2, S2 | 10,13 | Tier 1 |

**Management Actions:**

1. Prescribed Fire
2. Exotic Plant Removal
3. Population Translocation/Augmentation/Restocking
4. Hydrological Maintenance/Restoration
5. Nest Boxes/Artificial Cavities
6. Hardwood Removal
7. Mechanical Treatment
8. Predator Control
9. Erosion Control
10. Protection from Visitor Impacts (establish buffers/law enforcement)
11. Decoys (shorebirds)
12. Vegetation Planting
13. Outreach and Education
14. Other

**Monitoring Level:**

Tier 1. Non-Targeted Observation/Documentation: includes documentation of species presence through casual/passive observation during routine park activities (i.e. not conducting species-specific searches). Documentation may be in the form of Wildlife Observation Forms, or other district specific methods used to communicate observations.

Tier 2. Targeted Presence/Absence: includes monitoring methods/activities that are specifically intended to document presence/absence of a particular species or suite of species.

Tier 3. Population Estimate/Index: an approximation of the true population size or population index based on a widely accepted method of sampling.

Tier 4. Population Census: A complete count of an entire population with demographic analysis, including mortality, reproduction, emigration, and immigration.

Tier 5. Other: may include habitat assessments for a particular species or suite of species or any other specific methods used as indicators to gather information about a particular species.

Detailed management goals, objectives, and actions for imperiled species in this park are discussed in the Resource Management Program section of this component and the Implementation Component of this plan.

## Exotic and Nuisance Species

Exotic species are plants or animals not native to Florida. Invasive exotic species are able to out-compete, displace or destroy native species and their habitats, often because they have been released from the natural controls of their native range, such as diseases, predatory insects, etc. If left unchecked, invasive exotic plants and animals alter the character, productivity and conservation values of the natural areas they invade. In addition to control management, preventive measures are essential. Prevention measures include: decontaminating equipment before entering and leaving the park, or even a treatment area within the park; controlling non-FLEPPC, non-native plants that show invasive tendencies in the park and reporting these to FLEPPC; monitoring all landscaping work to prevent non-native plants from being maintained, spread or introduced to the park.

Early Detection and Rapid Response (EDRR) programs are being developed on the federal and state levels. A Weed Risk Assessment is now available through the USDA Animal and Plant Health Inspection Service (APHIS) and the University of Florida's Institute of Food and Agricultural Sciences (IFAS); this tool estimates the invasiveness potential of an exotic species before it becomes the management problem that make it a FLEPPC Category I or II species. FNAI is now working with FWC and all of Florida's Cooperative Invasive Species Management Areas (CISMA) to determine the species that are local threats, and to provide identification information and treatment assistance. Good management practice would include staying current with the local CISMA's EDRR list. By working with this CISMA, park staff can obtain information on invasive species currently threatening their area to assist with identification and quick removal upon detection in the park.

Invasive plant data and management actions are currently tracked through the state's Natural Resources Tracking System (NRTS). Surveys are implemented throughout the park and results are entered in NRTS; per the current protocol, survey data for any portion of the park should never be more than two years old. As treatment work is completed in any one project period, the data is entered in NRTS. NRTS also provides a tool for creating Annual Treatment Plans.

Exotic animal species include non-native wildlife species, free ranging domesticated pets or livestock, and feral animals. Because of the negative impacts to natural systems attributed to exotic animals, the DRP actively removes exotic animals from state parks, with priority being given to those species causing the greatest ecological damage.

In some cases, native wildlife may also pose management problems or nuisances within state parks. A nuisance animal is an individual native animal whose presence or activities create special management problems. Examples of animal species from which nuisance cases may arise include venomous snakes or raccoons and alligators that are in public areas. Nuisance animals are dealt with on a case-by-case basis in accordance with the DRP nuisance and exotic animal removal standard.

Detailed management goals, objectives, and actions for management of exotic-invasive plants and nuisance animals are discussed in the Resource Management Program section of this component.

Significant exotic plant control has been conducted by DRP staff, volunteers, and contractors throughout Cayo Costa, North Captiva, Punta Blanca, and Jug Creek. Most recently, the park received funding in 2018 from the Division to complete a full island treatment on Cayo Costa and Punta Blanca for all FLEPPC Category I and II listed invasive exotic plant species. This project covered over 1,400 acres of uplands and was completed over a six-month period in 2019. Additional contracted work in 2018 provided through FWC Invasive Plant Management contracts targeted a 247-acre section of the park not included in the larger full island treatment. Both efforts targeted Brazillian pepper, Australian pine, Australian umbrella tree (*Schefflera actinophylla*), cogon grass, beach naupaka, and white lead tree, with the full island treatment also targeting additional FLEPPC I and II species such as bowstring hemp, sisal hemp (*Agave sisalana*), carrotwood, Washington palm (*Washingtonia robusta*), Senegal date palm (*Phoenix reclinata*), and rosary pea, among others.

The most visible exotic tree, the Australian pine, has a long history on these islands. As of 2014, almost all adult Australian pine trees have been killed on Cayo Costa and North Captiva, with the exception of trees found on outparcels and private properties outside of the park boundary. There is an extensive seedbank that still exists within the park. Over the past 20 years, park staff has made strides in eliminating the majority of the Australian pines found at all of the island parks. This most recent exotic treatment effort removed all of the regrowth Australian pines as well as trees that were growing in portions of the park owned by Lee County. In 2018, Lee County gave the Florida Park Service management authority over several parcels owned by the County, which allows park staff to more effectively target invasive exotic plants and animals.

Brazilian pepper is the most prevalent exotic plant found on all of the island parks. The displacement of native vegetation by Brazilian pepper has been extensive in the past, but mechanical treatment along with herbicide has reduced the coverage of this plant. Locating and treating Brazilian pepper is often difficult due to the inaccessibility of its infestations. With the amount of Brazilian pepper that has been located and treated on the island, the island most likely contains an extensive seed bank. Post-treatment surveys and retreatment efforts will be necessary parkwide over the next three years to identify areas of resprouting Brazilian pepper.

While AmeriCorps members had previously worked with Brazilian pepper, their main focus in 2014 was on bowstring hemp. This herbaceous exotic has infested areas of maritime hammock in management zone CC-01. AmeriCorps members studied effective mixtures of herbicides to remove this species as regrowth from roots may occur, but it was not strong enough to eradicate the plant. This most recent full-island treatment completed in 2019 targeted those areas of bowstring hemp in zones CC-01 and CC-04, ultimately eliminating the plant from the area.

Unfortunately, regrowth from the viable root system emerged rapidly post-treatment in all locations despite chemical applications.

Small areas of beach naupaka are present in the park along the beach dune system of Cayo Costa, North Captiva, and Punta Blanca. This species was fully treated on Cayo Costa and Punta Blanca in 2019, but new occurrences are plausible given its salt tolerant seeds that spread easily by maritime currents. These exotic plants closely resemble and outcompete their native counterparts, the state-threatened inkberry. The native imperiled inkberry is easily differentiated from the exotic beach naupaka by the leaves (shape and texture) as well as the black-colored fruit produced in late summer and fall. To avoid confusion with native inkberry, staff typically work with biologists to positively identify non-native species.

Other exotics found on Cayo Costa and associated islands are thinly dispersed, due largely to a recent successful full-island treatment effort. Limited access to North Captiva, however, results in a prevalence of exotic plant species in this remote and separate portion of the park. The district has prepared a three-year plan to ensure that the entire park, including North Captiva, is comprehensively surveyed for exotic plants to monitor for new species occurrences and regrowth post-treatments. Areas on Cayo Costa with known extensive seed banks have been selected for retreatment in the next year to ensure that regrowth is monitored and treated immediately.

Of greater concern to park and district staff is the arrival of new exotic plant species to the islands from offsite. While birds, mammals, and wind can bring seeds of exotics to the islands, humans can also act as vessels for plant dispersal. To avoid the dispersal of exotics, the DRP does not allow firewood or any potted plants to be imported to the island. Waste collected from visiting boats is also not allowed in park trash receptacles, as raccoons frequently raid these trash and could potentially spread exotic plant seeds across the island. This also limits potential pests and pathogens that could be introduced to the islands from the mainland and other outside locations.

Exotic plants are accompanied on these islands by exotic or nuisance animals, such as feral hogs, coyotes, and raccoons. Until 2019, feral hogs were the most significant exotic animal presence in the park. Feral hogs were reportedly originally released on Cayo Costa in the 1800s by resident fisherman, who used them as a food source. Since that time, the hogs had been increasing in population, destroying native vegetation, and causing physical damage to multiple historic and cultural sites located in the park. Contracted trappers have been used in the past to remove hogs from Cayo Costa, and park staff have previously been hired to focus on this effort. Even with this consistent trapping, hog populations remain high. In 2015, Cayo Costa State Park was selected by FPS, USFWS, and USDA to be the focus of a wild hog eradication effort scheduled for 2016-2017. This eradication effort took place over a year and included the removal of 126 feral hogs by USDA. The project and follow-up surveys to ensure eradication were completed in 2018.

Black spiny-tailed iguana (*Ctenosaura similis*) commonly found on nearby Boca Grande, has been observed with increased frequency on Cayo Costa, usually near gopher tortoise burrows. These reptiles have been spotted as far south as management zone CC-06 by district staff, but it is likely that they have spread throughout the island. Black spiny-tailed iguanas have not been observed on North Captiva, Punta Blanca, or at Jug Creek. DRP is currently implementing trapping efforts and coordinating with FWC on a removal strategy for Cayo Costa.

Racoons and coyotes have become nuisance species on Cayo Costa and North Captiva, depredating shorebird and sea turtle nests. Coyotes have been observed swimming from Gasparilla Island to Cayo Costa, and from Cayo Costa to North Captiva. Both raccoons and coyotes can destroy multiple turtle nests in one night, and have impacted the overall hatching success on Cayo Costa and North Captiva in recent years. To combat depredation of sea turtle eggs, park staff and volunteers place an FWC-approved self-releasing metal screen over the clutch of eggs to prevent the predators from reaching the egg clutch. Unfortunately, many of the nests are depredated overnight, before the surveyors arrive in the morning and have a chance to place the screen on it. With assistance from the Sea Turtle Conservancy, trapping efforts have taken place in the past on Cayo Costa for coyotes and raccoons to reduce nest depredation and boost sea turtle hatching success. In 2015, this effort also included the removal of several wild hogs by park staff and contractors, as the hogs had also begun depredating sea turtle nests. In 2017 and 2018, wild hog eradication efforts were taking place on the island but beach-focused predator control measures targeting coyotes and raccoons were not conducted prior to turtle nesting season, resulting in a high rate of nest depredation (~60% in 2017). In 2019, beach-specific predator control efforts were completed by USDA throughout the season, which resulted in a decrease in overall nest depredation (~41% depredated). A multi-year predator removal strategy needs to be developed with a dedicated funding source to improve sea turtle and shorebird nesting success on Cayo Costa.

The following table contains a list of the FLEPPC Category I and II invasive, exotic plant species found within the park (FLEPPC, 2011). The table also identifies relative distribution for each species and the management zones in which they are known to occur. An explanation of the codes is provided below the table. For an inventory of all exotic species found within the park, see Appendix 5.

| Inventory of FLEPPC Category I and II Exotic Plant Species | | | |
|---|---|---|---|
| **Common and Scientific Name** | **FLEPPC Category** | **Distribution** | **Management Zone (s)** |
| **PLANTS** | | | |
| Rosary Pea<br>*Abrus precatorius* | I | 1 | CC-01, CC-04, CC-06 |
| Earleaf acacia<br>*Acacia auriculiformis* | I | 1 | CC-06 |
| Australian Pine<br>*Casuarina equisetifolia* | I | 1 | CC-02, CC-03, CC-05A, CC-05B, CC-10C, CC-11 |
| | | 2 | CC-NC2, CC-NC3, CC-NC4C, CC-NC4D, CC-NC5C, CC-NC5F, CC-NC5I |
| Carrotwood<br>*Cupaniopsis anacardioides* | I | 1 | CC-04, CC-11 |
| Indian laurel<br>*Ficus micropcarpa* | I | 1 | CC-01, CC-04, CC-06 |
| Cogongrass<br>*Imperata cylindrica* | I | 1 | CC-01, CC-07 |
| Punk tree<br>*Melaleuca quinquenervia* | I | 1 | CC-01, CC-12 |
| Rose natalgrass<br>*Melinis repens* | I | 1 | CC-03 |
| Guava<br>*Psidium guajava* | I | 1 | CC-06 |
| Beach naupaka<br>*Scaevola taccada* | I | 1 | CC-01, CC-02, CC-03, CC-04, CC-05A, CC-05B, CC08, CC-09A, CC-10A-10J, CC-11 |
| | | 2 | CC-NC2, CC-NC4C, CC-NC4D |
| Australian umbrella tree<br>*Schefflera actinophylla* | I | 1 | CC-03, CC-04, CC-06, CC-07 |

| Inventory of FLEPPC Category I and II Exotic Plant Species | | | |
|---|---|---|---|
| **Common and Scientific Name** | **FLEPPC Category** | **Distribution** | **Management Zone (s)** |
| Brazilian pepper<br>*Schinus terebinthifolia* | I | 1 | CC-01, CC-02, CC-03, CC-04, CC-05A, CC-06, CC-07, CC-08, CC-09A, CC-09B, CC-10A – 10J, CC-11, CC-12 |
| | | 2 | CC-NC2, CC-NC3, CC-NC4, CC-NC4D, CC-NC5C, CC-NC5F, CC-NC5I |
| | | 3 | , CC-NC2, CC-NC3, CC-NC4, CC-NC4D, CC-NC5C, CC-NC5F, CC-NC5I, |
| | | | |
| | | | |
| American evergreen<br>*Syngonium podophyllum* | I | 1 | CC-12 |
| Portia tree<br>*Thespesia populnea* | I | 1 | CC-04, CC-05A, CC-11, CC-12 |
| Caesarweed<br>*Urena lobata* | I | 1 | CC-01, CC-04 |
| Sisal hemp<br>*Agave sisalana* | II | 1 | CC-02, CC-05A, CC-05B, CC-08, CC-09A |
| Madagascar rubbervine<br>*Cryptostegia madagascariensis* | II | 1 | CC-01 |
| Coconut palm<br>*Cocos nucifera* | II | 1 | CC-07, CC-09A |
| Durban crowfoot grass<br>*Dactyloctenium aegyptium* | II | 2 | CC-02, CC-04, |

| Inventory of FLEPPC Category I and II Exotic Plant Species | | | |
|---|---|---|---|
| **Common and Scientific Name** | **FLEPPC Category** | **Distribution** | **Management Zone (s)** |
| Bowstring hemp<br>*Dracaena hyacinthoides* | II | 2 | CC-01, CC-04 |
| Council tree<br>*Ficus altissima* | II | 1 | CC-02, CC-04 |
| White leadtree<br>*Leucaena leucocephala* | II | 1 | CC-01, CC-04, CC-07, CC-11, CC-12 |
| Balsampear<br>*Momordica charantia* | II | 1 | CC-05A, CC-06 |
| Senegal date palm<br>*Phoenix reclinata* | II | 1 | CC-06 |
| Creeping Oxeye<br>*Sphagneticola trilobata* | II | 1 | CC-01, CC-06, CC-NC4D |
| Australian Almond<br>*Terminalia muelleri* | II | 1 | CC-12 |
| Jamacian feverplant<br>*Tribulus cistoides* | II | 1 | CC-12 |
| Washington fan palm<br>*Washingtonia robusta* | II | 1 | CC-01, CC-06, CC-12 |

**Distribution Categories:**

0 No current infestation: All known sites have been treated and no plants are currently evident.

1 Single plant or clump: One individual plant or one small clump of a single species.

2 Scattered plants or clumps: Multiple individual plants or small clumps of a single species scattered within the gross area infested.

3 Scattered dense patches: Dense patches of a single species scattered within the gross area infested.

4 Dominant cover: Multiple plants or clumps of a single species that occupy a majority of the gross area infested.

5 Dense monoculture: Generally, a dense stand of a single dominant species that not only occupies more than a majority of the gross area infested, but also covers/excludes other plants.

6 Linearly scattered: Plants or clumps of a single species generally scattered along a linear feature, such as a road, trail, property line, ditch, ridge, slough, etc. within the gross area infested.

## Special Natural Features

Cayo Costa is the largest, undisturbed barrier island in southwest Florida.

## Cultural Resources

This section addresses the cultural resources present in the park that may include archaeological sites, historic buildings and structures, cultural landscapes and collections. The Florida Department of State (FDOS) maintains the master inventory of such resources through the Florida Master Site File (FMSF). State law requires that all state agencies locate, inventory and evaluate cultural resources that appear to be eligible for listing in the National Register of Historic Places. Appendix 7 contains the FDOS, Division of Historical Resources (DHR) management procedures for archaeological and historical sites and properties on state-owned or controlled properties; the criteria used for evaluating eligibility for listing in the National Register of Historic Places, and the Secretary of Interior's definitions for the various preservation treatments (restoration, rehabilitation, stabilization and preservation). For the purposes of this plan, significant archaeological site, significant structure and significant landscape means those cultural resources listed or eligible for listing in the National Register of Historic Places. The terms archaeological site, historic structure, or historic landscape refer to all resources that will become 50 years old during the term of this plan.

### Condition Assessment

Evaluating the condition of cultural resources is accomplished using a three-part evaluation scale, expressed as good, fair, and poor. These terms describe the present condition, rather than comparing what exists to the ideal condition. Good describes a condition of structural stability and physical wholeness, where no obvious deterioration other than normal occurs. Fair describes a condition in which there is a discernible decline in condition between inspections, and the wholeness or physical integrity is and continues to be threatened by factors other than normal wear. A fair assessment is usually a cause for concern. Poor describes an unstable condition where there is palpable, accelerating decline, and physical integrity is being compromised quickly. A resource in poor condition suffers obvious declines in physical integrity from year to year. A poor condition suggests immediate action is needed to reestablish physical stability.

### Level of Significance

Applying the criteria for listing in the National Register of Historic Places involves the use of contexts as well as an evaluation of integrity of the site. A cultural resource's significance derives from its historical, architectural, ethnographic, or archaeological context. Evaluation of cultural resources will result in a designation of NRL (National Register or National Landmark Listed or located in an NR district), NR (National Register eligible), NE (not evaluated), or NS (not significant) as indicated in the table at the end of this section.

There are no criteria for determining the significance of collections or archival material. Usually, significance of a collection is based on what or whom it may represent. For instance, a collection of furniture from a single family and a particular era in connection with a significant historic site would be considered

highly significant. In the same way, a high-quality collection of artifacts from a significant archaeological site would be of important significance. A large herbarium collected from a specific park over many decades could be valuable to resource management efforts. Archival records are most significant as a research source. Any records depicting critical events in the park's history, including construction and resource management efforts, would all be significant.

The following is a summary of the FMSF inventory, including the evaluations of significance.

## Prehistoric and Historic Archaeological Sites

*Desired future condition:* All significant archaeological sites within the park that represent Florida's cultural periods or significant historic events or persons are preserved in good condition in perpetuity, protected from physical threats and interpreted to the public.

*Description:* Cayo Costa State Park contains 13 archaeological sites and two historic cemeteries recorded in the Florida Master Site File (FMSF). Fourteen of these recorded sites are on Cayo Costa, and two are on North Captiva. Other sites, including a home site and former boat works site, have been identified on Punta Blanca.

There are seven archaeological sites containing prehistoric components found on Cayo Costa and one on North Captiva, including two large shell mounds, one shellworks and four shell middens. One of these sites, Mark Pardo Shellworks (LL01606), was listed on the National Register of Historic Places (NRHP) in 1996. Very little is known about these sites or the prehistoric people that occupied these islands. Six of the seven sites were recorded based on surface inspection alone, with little to no additional investigation. Consequently, the dimensions, composition, cultural affiliation, and date of construction and use for these sites remains largely unknown. The only exception is the Mark Pardo Shellworks, which was investigated more intensely in order to be placed on the NRHP. The investigation of this shellworks has led to the conclusion that this site is definitively associated with the Caloosahatchee.

Cayo Costa's aboriginal cultural resources lie within the Caloosahatchee Region, as described in the Archaeological Resources of Caloosahatchee Region Multiple Properties NRHP registration form. This region, centered on the estuarine systems of Charlotte Harbor, has supported human populations from the Paleo-Indian period (circa 11,500 B.C.E.) to the present. The majority of recorded aboriginal sites in the region are coastal shell middens that have been ascribed to the Caloosahatchee Culture, 500 B.C.E. to 1750 C.E. The Caloosahatchee and the historic period Calusa people are believed to have been large, sedentary coastal-dwelling populations with complex societies. These societies utilized the rich marine and estuarine resources for a diverse and abundant food source. Middens, mounds, and shellworks on both North Captiva and Cayo Costa fit the site type models for the Caloosahatchee Region.

Foster Bay Midden (LL00733) is a shell midden located on North Captiva. The midden covers an elongated area that stretches over state and private property. Pottery fragment evidence indicates that this midden is associated with the Glades culture, which existed in the area from 1000 B.C.E. to C.E. 1700.

Old Ware Mound (LL00086) is a shell mound located on Cayo. The survey of the mound, which was part of the park's predictive model study completed by Alliance for Integrated Spatial Technologies (AIST) at the University of South Florida (USF) in 2013, allowed researchers to update the spatial expanse of the site in the FMSF based on elevation measurements and visual ground-truthing. This shell mound and associated borrow pits are of unknown cultural affiliation and temporal period. This site is difficult to access due to extensive vegetation, and is currently not incorporated into the park's trail system.

Faulkner Mound (LL00087) is a shell mound located on Cayo Costa. This prehistoric mound is associated with Weeden Island culture 450-1000 C.E. Historically, the mound covered approximately 1.5 acres, although current reports delineate the mound covering only a third of an acre.

No Name (LL1413) is a site found on Cayo Costa. The cultural affiliation and temporal period of the site is unknown. This site was recorded in association with Faulkner Mound as being a mound.

Clark #1 (LL00702) and Clark #2 (LL00703) are shell middens located on Cayo Costa. These sites were initially assessed and recorded in 1983 and are of unknown cultural affiliation and temporal period.

Clark #3 (LL00704) is a shell midden located on Cayo Costa. This prehistoric site lies underneath two historic town sites, the Padilla Settlement (LL00701) and Burroughs Ranch (LL01494). This site is commonly visited as it exists under a heavily used park trail. This trail was most likely a continuation of the paths used by the Padilla settlement.

Mark Pardo Shellworks (LL1606) is a shellworks location and a shell midden found on Cayo Costa. Currently, it is believed that this site is associated with the Caloosahatchee IIA-IV cultural phases (500-1500 C.E.). The east, west, and south sides of the site are bounded by the high tide line and the north side by a residential development. The site consists of two distinct components; linear shell deposits that parallel the shoreline adjacent to a mangrove swamp, and a black dirt shell midden just inland from the shellworks. The shell deposits, which primarily contain large lightning whelk and horse conchs, range up to 1.5 meters above the ground and cover approximately 30 acres. The midden contains rich black dirt which indicates a living area, and a variety of shells including oyster, clam, conch, and lightning whelk. These two components within the shellworks site may represent two different occupation periods. Current hypotheses include that the shellworks represents a protective seawall, or the remains of a shellfish harvesting/shell tool production area. A third site component may exist beneath the

submerged sediment within the mangrove swamp community. This portion of the site may have been occupied when sea levels were historically lower in this area. Alternatively, submerged materials may have been deposited directly into the water by Native Americans. The Mark Pardo Shellworks site was listed on the National Register of Historic Places in 1996 because of its outstanding preservation, abundance of ecofacts (biological artifact not altered by humans, but which may be indicative of human occupation) and artifacts, and potential to yield information about the Paleo-environments and Caloosahatchee habitation sites on southwest Florida barrier islands.

There are seven historic sites recorded on Cayo Costa and one on North Captiva. These include two cemeteries, a homestead, school, remnants of two fishing villages, and a U.S military and maritime related site.

A number of different historic cultural groups inhabited Charlotte Harbor and its coastal islands. Many of these cultures overlapped in time, attracted to the islands by ancestral ties, rich natural resources, deep water passages, isolation, and proximity to Cuba and the Caribbean. When the Spanish arrived in Charlotte Harbor in the 16th century, the area was occupied by the native Calusa people. With Spanish efforts focused on north Florida, Charlotte Harbor was used as a convenient rendezvous and trading point. By the mid-18th century, Spaniards began to establish fishing ranchos on the coastal islands, and by the 1830s European-Americans did as well. In 1848, the U.S. military utilized the northern end of Cayo Costa and the southern end of nearby Gasparilla Island as a military reservation. By the early 20th century, Cayo Costa hosted a quarantine station/marine hospital, three pilots' houses, a post office, dock, and at least two fishing villages. Following modern developments such as new industries, improved transportation, school redistricting, and state acquisition, much of Cayo Costa is now a state park.

Pioneer Cemetery (LL00699) is a historic cemetery on Cayo Costa. This site was created in the early 20th century by the residents of the fishing ranchos on the island. Harbor pilot Captain Peter Nelson, who died in 1919, is buried here. He moved to Lee County in 1887 from Denmark when the shipping industry in the area was flourishing due to cattle and phosphate exports. This site includes shell-bordered graves surrounded by a wooden fence with rock tombstones.

Quarantine Station (LL00700A) is a historic military site located on Cayo Costa. This site, created in the early 20th century, is the former location of a U.S. military quarantine station and three ship pilothouses. The quarantine station was relocated to Cayo Costa from Gasparilla Island in 1904, and was in operation on the island until 1925. The site consists of masonry building material scattered over approximately two acres. A submerged brick concentration located by DHR archaeologist in 1992 may be remnants of the middle of the three pilothouses. This site is located directly on the shoreline and receives consistent wave action.

Padilla Settlement (LL00701) is a 19th and 20th century historic American settlement (1821-present). This site is the former location of a Spanish fishing village that was founded by Tariva "Pappy" Padilla before the Civil War. The Padilla family and other

Spanish fishermen lived in wood plank and palmetto thatch houses on the northern end of the island. The U.S. military classified them as squatters and required them to relocate to the middle of the island.

Foster Bay Homestead (LL00734) is a historic house site dating from 1821-present, found on North Captiva. This site consists of the structural remains of an early 20th century house and dock. Items such as window frames, glass, and a piston water pump were recorded at this site.

Padilla Cemetery (LL01493) is a late 19th century - early 20th century cemetery. This cemetery is associated with the Padilla settlement (LL00701 and contains the graves of Tariva “Pappy” Padilla, his wife and at least one child who were buried in the 1930s. An estimated 30 Cuban fishermen, who died during a 1910 hurricane, may be buried at this site. There are two distinct ledges covered with limestone rock and maritime hammock vegetation. Coquina rocks were used as headstones within the cemetery, which covers approximately 17.5 meters squared. As of 2005, 95% of this cemetery was reported to be eroded into Pelican Bay.

Burroughs Ranch (LL01494) is a historic town site from the mid-19th century on Cayo Costa. This site is the former location of a fishing homesite established in 1859. Maps from the mid-19th century depict two medium buildings and four smaller buildings within the homesite.

A portion of the Cayo Costa School (LL02647) site is within park boundaries on Cayo Costa. The school was used from 1911 to approximately 1923 when a new school was constructed on Punta Blanca. The site was recorded in 2015 and consists of building and foundation remains and a water well.

In 2013, the Alliance for Integrated Spatial Technologies (AIST) at the University of South Florida were contracted as part of a DRP Districts 4 and 5 project to perform predictive modeling of cultural resource potential in state parks. During this project, aerial LiDAR data was used to refine maps showing the complex surface elevations of the park (Collins 2013). Fieldwork was also conducted to survey with sub-meter instrumentation and GPS camera equipment to ground truth previously recorded sites, and potential new sites. The analysis of LiDAR and ground truthing assisted in correcting the boundaries for two previously recorded sites, Old Ware Mound and Faulkner Mound.

The archaeological sensitivity model created from this research found that of the 2,392 acres within Cayo Costa State Park, 1,672 acres (70% of the park) is considered highly sensitive for cultural resources. The other 30% is considered to have a low sensitivity for cultural resources. With the corrected locations for Old Ware Mound and Faulkner Mound, 93% of the recorded sites fall within the high sensitivity area. The researchers predict that the missing 7% are mapped incorrectly in the FMSF, and that ideally 100% of all identified and not identified sites will fall within the areas marked as having high cultural sensitivity; however, this hypothesis has not been tested or validated

*Condition Assessment:* Of the 13 archaeological sites and two historical cemeteries identified in this management plan for Cayo Costa, nine are in good condition, two are in fair condition, two are in poor condition, and two have not been evaluated. The main factors threatening all of the sites on Cayo Costa and associated islands include coastal erosion, damage from exotic invasive species (plant and animal), ground disturbance from visitors, and private development.

A common theme of disturbance on these islands is coastal erosion. All sites located next to either the Gulf of Mexico or Pelican Sound suffer from erosion. These sites are impacted by tidal action, rising sea levels, storm surge and consistent boat wakes. This loss of coastal sediment is undercutting prehistoric shell middens and mounds, stripping stabilizing soil off site surfaces, and exposing artifacts and human remains. Preventing site loss due to erosion is difficult, and sometimes impossible. The addition of hard stabilization materials would only exacerbate erosion around the structure. With increasing sea levels predicted, many of the coastal sites will be submerged.

Two sites experiencing extensive shoreline erosion are the Quarantine Station and the Padilla Cemetery. The locations of these sites directly adjacent to the water make them vulnerable to wind and waves. Almost all of the remnants of the Quarantine Station have been lost due to wave energy breaking away deteriorated wood and concrete. The Padilla cemetery has almost certainly been entirely lost to shoreline retreat. Rocks used as headstones for the cemetery were previously found scattered around the shoreline near the grave sites

Exotic animals and plants may also deteriorate prehistoric and historic sites within Cayo Costa. Wild hogs have previously rooted up massive areas foraging for the roots and young shoots of plants, which disturbs the soils associated with the shell mounds and middens, as well as the stratification of artifacts found at all cultural sites. Destruction of artifacts and ecofacts has also been widely documented by hogs during their search for food. The recent eradication of wild hogs from the island will help prevent further degradation of archaeological sites on Cayo Costa. Exotic plants, such as Brazilian pepper and bowstring hemp, have also diminished the quality of many cultural sites at the park. The full-island invasive exotic plant treatment effort completed in 2019 included these cultural sites throughout the island, with vegetation treated in place to avoid disturbance of the subsurface. The Clark #3 shell midden is an area with constant bowstring hemp exotic cover. Some ground disturbance has occurred onsite through manual removal of these plants by park staff and volunteers in previous treatment efforts. Contractors also hand-pulled vegetation and treated the area with herbicide; however, months later sprouts of bowstring hemp have been observed throughout the area.

Excessive foot and vehicle traffic, disturbances associated with development, vandalism, and past looting are also sources of cultural site disturbance at Cayo Costa and North Captiva. Designated trails have been established since its induction as a state park. Some of the existing trails were very likely used by early settlers of the island, which predictably intersect many of the prehistoric and historical sites. Disruption from foot traffic and vehicle traffic is kept to a minimum and only DRP

staff are authorized to use motorized vehicles within the park. Additional roads created by private residents within the boundary of the state park have resulted in impacts to cultural sites, including the Mark Pardo Shellworks.

Disturbance associated with development can be seen at all sites adjacent to private property on the islands. Faulkner Mound is a shell midden site in fair condition due to alterations made by home construction. Also, Foster Bay Midden is in fair condition due to trenching that occurred for underground utilities. All of the sites sharing property with private landowners will be damaged to some degree by the activities on the private property.

The last significant disturbance at Cayo Costa and associated islands involved vandalism and looting. In the past, looting was a recurrent issue for all sites within Charlotte Harbor. Stories of pirates and renegades inspired searches for buried treasure and sunken gold coins. Many sites were pitted in unsuccessful search efforts. Looting and vandalism are now uncommon as the rumors of treasure were discredited. Past damage at many of the cultural sites has been covered from slumping, weathering, and vegetation growth. If future looting is observed at any of the sites, staff from DHR's Public Lands Archaeology program (PLA) are available to conduct archaeological damage assessments.

*General Management Measures:* Management measures for the different types of cultural resources at Cayo Costa are relatively similar. The historic sites, along with the shell middens and mounds (earthworks), should be preserved and protected as much as possible. The ultimate goal of cultural site management at Cayo Costa is continuous sustainable vegetative cover that requires minimum maintenance or manipulation. Park staff should maintain sites so that there is no clear evidence of disturbance—environmental or human—that would result in erosion or loss of terrain features. The three fundamentals to preservation include:

1. Establish and/or perpetuate continuous vegetative cover to stabilize and protect the soil from weather and human contact that may cause erosion
2. Eliminate recreational or maintenance-related interventions that may disrupt the vegetative cover or forest floor
3. Minimize destructive natural disturbances, such as tree windthrow, burrowing animals, and exotic plant growth

Vegetation currently covering all sites adequately shields them, rendering a thick duff layer and deflecting rainfall and wind. This vegetative cover, which frequently consists of shell mound, coastal strand, or maritime hammock species, conceals sites from common view. Obscurity protects these sites from most visitor impacts.

Many of the cultural resources on the northern section of Cayo Costa are found adjacent to established trails used by visitors and park staff. No new trails should be established around existing cultural sites, and extensive surveys should be completed if new trails are proposed elsewhere on the islands. Additionally, exotic plants, specifically bowstring hemp and Brazilian pepper, should be treated on the existing sites.

Large trees are found on some historic sites and shell mounds within the park. If these trees become larger than 12 inches in diameter at breast height, DRP staff should evaluate removal as large trees can topple during hurricanes, unearthing sediment and artifacts that become entangled in the roots. DHR will be consulted prior to tree removal on any sites at Cayo Costa. In addition, any ground disturbances, including land clearing on the uplands and sub-surface activities occurring seaward of the mean high water line, out to the 400-foot sovereign submerged lands boundary, is subject to DHR consultation and review.

Other cultural sites, including the Pioneer Cemetery, are maintained for interpretive value. The Pioneer Cemetery site is kept free from vegetation and is surrounded by a wooden fence. Shell bordered grave sites and headstones are maintained by park staff and volunteers to maintain an up kept appearance. This site should be maintained in its current stable condition. If any changes are planned or observed within or near the site, DHR should be contacted.

Sites such as the Padilla Cemetery, Quarantine Station, and Captiva Pass are so eroded that minimal preservation action can be taken. Previously, vegetation was planted around the Padilla Cemetery in an attempt to stabilize the area. Without changing the direction and intensity of wave energy in that area, plantings will not be effective at sediment stabilization. With seagrass prominent in all coastal waters surrounding Cayo Costa and North Captiva, stabilization or restoration measures are not feasible offshore. DHR should be contacted if substantial artifacts are unearthed at these sites by shoreline erosion.

DRP staff should be vigilant of vandalism and looting at all cultural sites on Cayo Costa and North Captiva. Monthly inspections of cultural sites in locations highly accessible to visitors should maintain active management presence to deter looters. If looting or vandalism is witnessed, staff must inform FWC or local law enforcement, and contact DHR for further guidance. All cultural sites will be monitored annually in accordance with DHR guidelines.

## Historic Structures

*Desired future condition:* All significant historic structures and landscapes that represent Florida's cultural periods or significant historic events or persons are preserved in good condition in perpetuity, protected from physical threats, and interpreted to the public.

*Description:* Jug Creek contains nine historic structures within the state park boundary. Multiple structures on Cayo Costa have also reached the 50-year time period, with all but one of the structures constructed in 1965, and one bathhouse constructed in 1979. A majority of the structures (12) are primitive cabins found within the campground that are rented to park visitors and campers. Three other structures are bathhouses located within the campground, and four of the structures are used for storage or housing generators. A water tower was also erected in 1965 for storing pumped ground water. The remaining structures are residences occupied by park staff. Eight of the Jug Creek structures were erected

between 1940-1950, and one structure between 1910-1930. All park structures on Cayo Costa are actively utilized for either staff or visitor purposes. All historic structures found at Jug Creek and on Cayo Costa are representative of housing used throughout southwest Florida during the 20th century. These structures have not yet been evaluated and documented within the FMSF. The park will coordinate with BNCR to accomplish this task over the planning period.

Shady Nooks (LL00979, LL01852, LL01853, LL01854, LL01855, LL01856, LL01857, LL01858, LL01859) are all considered vernacular type structures built circa 1940 at Jug Creek. This type of structure is derived from vernacular housing types of the upland south, which were built with log frames. Many of these buildings feature wrap-around porches that are covered by flared continuations of the main roofs. Entry points are slightly offset and the kitchens extend from the rears of the buildings. Each of these structures was used in association with rental cottages.

All of the Shady Nook structures are important examples of Florida vernacular architecture, and contribute significantly to the character of Bokeelia and Pine Island. The Shady Nook Cottages are considered contributing structures in the Bookelia Historic District, designated by Lee County on February 5, 1990.

All other recorded historic structures were from between 1965-1979, and are utilized for housing resident park employees, holding park equipment such as tools and generators, or for visitor services. Three residences are found on the island, two for park rangers and one for the park management. Two structures house the diesel-powered generators that supply all of the electricity to the park. A single structure acts as the shop for the park, which is used for holding tools, signs, and charging equipment for battery operated vehicles. Another structure associated with the shop acts as storage for various fire equipment, proper protection equipment, and chemicals that are used for treating exotic vegetation. Three structures are bathhouses for island visitors and campers. Cabins within the campground comprise the majority of the historic structures. These 12 small primitive cabins, all single room structures, are located near the western shore of Cayo Costa and are rented to overnight visitors. One historic utility structure in the interior of the island is a water tower that was erected in 1965, used to hold water pumped from the subterranean freshwater lens. The current potable water system no longer requires a tower.

*Condition Assessment:* All historic structures found on Cayo Costa are in good condition. Structures at Jug Creek are currently in poor condition and not considered accessible. Currently, there are no immediate threats to any of the structures. All structures are vulnerable to hurricane damage due to their barrier island location. Park staff should be cautious of large storm events and document any damage sustained to any structures.

Wildfires pose an additional threat to historic structure. All structures are surrounded by mineral fire lines, but large canopy fires could still inflict damage. Termites could also potentially cause damage to wooden structures on the island. Monitoring and treatment are needed.

The historic water tower (BL 127027) was erected in 1965 by landowners prior to park acquisition. This tower retained pumped groundwater and distributed it to all other facilities. With new technology, this tower is no longer needed. Unused and offering minimal to no historical value, the tower is considered a risk to nearby equipment. Removal of this tower may be advisable.

*General Management Measures:* Management for all historic structures at Cayo Costa include general maintenance. All buildings are inspected for structural damage monthly and painted on an as-needed basis. Buildings utilized by park visitors are cleaned daily and managed for accessibility. Structures that are not enclosed, such as the maintenance and storage areas, are organized for efficiency.

Inspections for termite and other pest damages should take place annually, especially for historic wooden structures. After large disturbance events such as tropical storms and hurricanes, the DRP will assess damages to all structures, and consult with DHR.

No rehabilitation, restoration, or stabilization is currently identified for structures on Cayo Costa. All structures are to be preserved in their current conditions and maintained for visitor and staff use. Historic structures at Jug Creek should be evaluated by a preservation architect due to their current condition. Options for future disposition will be considered in consultation with Lee County and other stakeholders.

## Collections

*Desired future condition:* All historic, natural history and archaeological objects within the park that represent Florida's cultural periods, significant historic events or persons, or natural history specimens are preserved in good condition in perpetuity, protected from physical threats and interpreted to the public.

*Description:* All park collections are held on Cayo Costa proper within the climate-controlled ranger station. Almost all of the collections are biological representations of animals that can be found within the state park. This includes loggerhead sea turtle carapace, skull, and bones; gopher tortoise; box turtle; cooter turtle shells; and manatee, dolphin, wild hog, alligator, and pelican bones. All sea turtle, manatee, dolphin, pelican and alligator collections were found washed ashore on the Gulf-facing beach of Cayo Costa. All other items were found within the state park while surveying and treating for exotic plants. No collections are from live animal dispatches. All specimens were collected by authorized staff under salvage permits issued to the DRP by FWC and USFWS.

The only item within the collections at Cayo Costa not representative of the biological components of the park is a women's belt made from sea turtle leather. This belt, which is representative of what a fisherman would have worn while working on the island in the early 1900s, is on loan from FWC.

All specimens within the collections at Cayo Costa are used to interpret the natural resources found on the islands. Preserved imperiled species specimens are used in multiple ranger walks and guided tours to interpret how natural communities are vital for the continued existence of sea turtles, manatees, and birds.

*Condition Assessment:* All specimens found in the collections at Cayo Costa are in good condition. There are currently no threats to the collection, or to the building in which they are housed.

Currently the ranger station in which the collections are kept is in good condition with air conditioning and routine pest control. Even in the event of electrical failure, all collections would remain in good condition. All items are contained inside secure glass cases for viewing and the building is locked when not occupied by staff.

*Level of Significance:* The biological collections, including animal bones, shells, and a turtle skin belt on loan from FWC, are significant to the park because they provide interpretation opportunities to park visitors and represent why the land is vital to the existence of multiple imperiled species.

*General Management Measures:* A scope of collections statement should be completed for the park, as well as a collection management assessment. All collections are cataloged in PastPerfect and 10% of the collections should be inventoried annually. All items within the collections should maintain their labels with appropriate item numbers.

Detailed management goals, objectives, and actions for the management of cultural resources in this park are discussed in the Cultural Resource Management Program section of this component. The following table contains the name, reference number, culture or period, and brief description of all cultural sites within the park that are listed in the FMSF. The table also summarizes the level of significance, existing condition, and recommended management treatment of each site. An explanation of the codes is provided below the table.

| Cultural Sites Listed in the Florida Master Site File | | | | | |
|---|---|---|---|---|---|
| **Site Name and FMSF #** | **Culture/Period** | **Description** | **Significance** | **Condition** | **Treatment** |
| LL00086 Old Ware Mound | Prehistoric | Archaeological Site | NE | G | P |
| LL00087 Faulkner Mound | Historic; Prehistoric; Weeden Island, 450-1000 C.E. | Archaeological Site | NE | F | P |
| LL00699 Pioneer Cemetery | | Historic Cemetery | NE | G | P |
| LL00700A Quarantine Station | Twentieth century American, 1900-present | Archaeological Site | NE | P | P |
| LL00701 Padilla Settlement | Nineteenth century American, 1821-1899; Twentieth century American, 1900-present | Archaeological Site | NE | G | P |
| LL00702 Clark 1 | Prehistoric | Archaeological Site | NE | G | P |
| LL00703 Clark 2 | Prehistoric | Archaeological Site | NE | G | P |
| LL00704 Clark 3 | Prehistoric | Archaeological Site | NE | G | P |
| LL00733 Foster Bay Midden | Glades, 1000 B.C.E.-1700 C.E. | Archaeological Site | NE | F | P |
| LL00734 Foster Bay Homestead | Nineteenth century American, 1821-1899; Twentieth century American, 1900-present | Archaeological Site | NE | G | P |
| LL00979 Shady Nook | c1940 | Historic Structure | NE | G | P |
| LL01413 NN | Unknown | Archaeological Site | NE | NE | P |
| LL01493 Padilla Cemetery | Nineteenth century, American, 1821-1899 | Historic Cemetery | NE | P | N/A |

| Cultural Sites Listed in the Florida Master Site File | | | | | |
|---|---|---|---|---|---|
| **Site Name and FMSF #** | **Culture/Period** | **Description** | **Significance** | **Condition** | **Treatment** |
| LL01494 Burroughs Ranch | Nineteenth century American, 1821-1899 | Archaeological Site | NE | G | P |
| LL01606 Mark Pardo Shellworks | Other | Archaeological Site | NRL | G | P |
| LL01852 Shady Nook | c1940 | Historic Structure | NE | G | P |
| LL01853 Shady Nook | c1940 | Historic Structure | NE | G | P |
| LL01854 Shady Nook | c1940 | Historic Structure | NE | G | P |
| LL01855 Shady Nook | c1940 | Historic Structure | NE | G | P |
| LL01856 Shady Nook | c1940 | Historic Structure | NE | G | P |
| LL01857 Shady Nook | c1940 | Historic Structure | NE | G | P |
| LL01858 Shady Nook | c1940 | Historic Structure | NE | G | P |
| LL01859 Shady Nook | c1940 | Historic Structure | NE | G | P |
| LL2647 Cayo Costa School | 1911-1923 | Archaeological Site | NE | NE | P |

**Significance:**

| | |
|---|---|
| NRL | National Register Listed |
| NR | National Register Eligible |
| NE | Not Evaluated |
| NS | Not Significant |

**Condition:**

| | |
|---|---|
| G | Good |
| F | Fair |
| P | Poor |
| NA | Not Accessible |
| NE | Not Evaluated |

**Recommended Treatment:**

| | |
|---|---|
| RS | Restoration |
| RH | Rehabilitation |
| ST | Stabilization |
| P | Preservation |
| R | Removal |
| N/A | Not Applicable |

## RESOURCE MANAGEMENT PROGRAM

### Management Goals, Objectives, and Actions

Measurable objectives and actions have been identified for each of the DRP's management goals for Cayo Costa, North Captiva and Jug Creek. Please refer to the Implementation Schedule and Cost Estimates in the Implementation Component of this plan for a consolidated spreadsheet of the recommended actions, measures of progress, target year for completion and estimated costs to fulfill the management goals and objectives of this park.

While the DRP utilizes the ten-year management plan to serve as the basic statement of policy and future direction for each park, a number of annual work plans provide more specific guidance for DRP staff to accomplish many of the resource management goals and objectives of the park. Where such detailed planning is appropriate to the character and scale of the park's natural resources, annual work plans are developed for prescribed fire management, exotic plant management and imperiled species management. Annual or longer- term work plans are developed for natural community restoration and hydrological restoration. The work plans provide the DRP with crucial flexibility in its efforts to generate and implement adaptive resource management practices in the state park system.

The work plans are reviewed and updated annually. Through this process, the DRP's resource management strategies are systematically evaluated to determine their effectiveness. The process and the information collected is used to refine techniques, methodologies and strategies, and ensures that each park's prescribed management actions are monitored and reported as required by Sections 253.034 and 259.037, Florida Statutes.

The goals, objectives and actions identified in this management plan will serve as the basis for developing annual work plans for the park. The ten-year management plan is based on conditions that exist at the time the plan is developed. The annual work plans provide the flexibility needed to adapt to future conditions as they change during the ten-year management planning cycle. As the park's annual work plans are implemented through the ten-year cycle, it may become necessary to adjust the management plan's priority schedules and cost estimates to reflect these changing conditions.

### Natural Resource Management

#### Hydrological Management

**Goal: Protect water quality and quantity in the park, restore hydrology to the extent feasible, and maintain the restored condition.**

The natural hydrology of most state parks has been impaired prior to acquisition to one degree or another. Florida's native habitats are precisely adapted to natural drainage patterns and seasonal water level fluctuations, and variations in these

factors frequently determine the types of natural communities that occur on a particular site. Even minor changes to natural hydrology can result in the loss of plant and animal species from a landscape. Restoring state park lands to original natural conditions often depends on returning natural hydrological processes and conditions to the park. This is done primarily by filling or plugging ditches, removing obstructions to surface water "sheet flow," installing culverts or low-water crossings on roads, and installing water control structures to manage water levels.

***Objective: Conduct/obtain an assessment of the park's hydrological needs.***

| | |
|---|---|
| Action 1 | Determine long-term sustainability of fresh groundwater for park use |
| Action 2 | Determine effects of sea level rise on the freshwater lens |
| Action 3 | Continue to conduct groundwater quality testing |

Bodies of water on Cayo Costa and North Captiva are seasonal and essentially unaffected by human activities. With no impacts to surface water and no impervious roads or parking areas on Cayo Costa, North Captiva, or Punta Blanca, effort should be directed to the sustainability of visitor and staff consumption of the fresh groundwater supply. Currently, the park pumps water from the freshwater lens, treats it for potability, and supplies it to the shop, residences, restrooms, and camping area. More predictive data on the longevity of this water supply is needed. As saltwater intrusion occurs, deeper wells or other potable water treatment methods may be recommended.

## Natural Communities Management

**Goal: Restore and maintain the natural communities/habitats of the park.**

The DRP practices natural systems management. In most cases, this entails returning fire to its natural role in fire-dependent natural communities. Other methods to implement this goal include large-scale restoration projects as well as smaller scale natural communities' improvements. Following are the natural community management objectives and actions recommended for the state park.

*Prescribed Fire Management:* Prescribed fire is used to mimic natural lightning-set fires, which are one of the primary natural forces that shaped Florida's ecosystem. Prescribed burning increases the abundance and health of many wildlife species. A large number of Florida's imperiled species of plants and animals are dependent on periodic fire for their continued existence. Fire-dependent natural communities gradually accumulate flammable vegetation; therefore, prescribed fire reduces wildfire hazards by reducing these wild land fuels.

All prescribed burns in the Florida state park system are conducted with authorization from the FDACS, Florida Forest Service (FFS). Wildfire suppression activities in the park are coordinated with the FFS.

***Objective A: Within 10 years, have 49 acres of the park maintained within the optimum fire return interval.***

Action 1 Update annual burn plan to show pyric communities
Action 2 Manage areas for wildfire/fuel suppression

Prescribed fire is planned for each burn zone on the appropriate interval. The park's burn plan is updated annually because fire management is a dynamic process. To provide adaptive responses to changing conditions, fire management requires careful planning based on annual and very specific burn objectives. Each annual burn plan is developed to support and implement the broader objectives and actions outlined in this ten-year management plan.

In order to track fire management activities, the DRP maintains a statewide burn database. The database allows staff to track various aspects of each park's fire management program including individual burn zone histories and fire return intervals, staff training and experience, backlog, etc. The database is also used for annual burn planning which allows the DRP to document fire management goals and objectives on an annual basis. Each quarter the database is updated and reports are produced that track progress towards meeting annual burn objectives.

Fire at Cayo Costa has been a source of debate for many years. There are 90 acres of pyric natural communities (mesic flatwoods and depression marsh) within Cayo Costa, all of which are intermixed with non-pyric communities including maritime hammock and mangrove swamp. Historically, within the park, only one management zone (CC-01) has been treated with prescribed fire. This zone contains 44 acres of mesic flatwoods and four acres of depression marsh. The majority of the natural community within this zone consists of maritime hammock (approximately 100 acres). The depression marshes and flatwoods are not adjacent to each other, and much of the maritime hammock is being burned during these prescriptions. The other 37 acres of pyric natural communities on Cayo Costa are not managed with prescribed fire. These areas include patches of mesic flatwoods and a large depression marsh (approximately 20 acres) in management zone CC-06 that are surrounded by maritime hammock and mangrove swamp in the southern section of the island. Many of the patches of pyric natural communities are adjacent to privately owned outparcels.

Since its founding as a state park, Cayo Costa has had four prescribed burns. Two burns were conducted in 1990, totaling 60 acres. One burn was conducted in 2004, totaling 84 acres. The most recent burn was conducted in 2010, totaling 56 acres.

While hurricanes and tropical storms are the main causes of ecological disturbance on Cayo Costa and North Captiva, lightning strikes and wildfires do occasionally occur. To minimize the occurrence of dangerous wildfires, prescribed fires can be conducted to reduce vegetation fuel levels. In the event of large fuel accumulation, prescribed fire should be utilized. DRP will be cognizant of fuel loads found on Cayo Costa and apply prescribed fire as needed to reduce the risk of catastrophic wildfires.

*Natural Community Restoration:* In some cases, the reintroduction and maintenance of natural processes is not enough to reach the desired future conditions for natural communities in the park, and active restoration programs are required. Restoration of altered natural communities to healthy, fully functioning natural landscapes often requires substantial efforts that may include mechanical treatment of vegetation or soils and reintroduction or augmentation of native plants and animals. For the purposes of this management plan, restoration is defined as the process of assisting the recovery and natural functioning of degraded natural communities to desired future condition, including the re-establishment of biodiversity, ecological processes, vegetation structure and physical characters.

Examples that would qualify as natural community restoration, requiring annual restoration plans, include large mitigation projects, large-scale hardwood removal and timbering activities, roller-chopping, and other large-scale vegetative modifications. The key distinction is that restoration projects entail actions beyond management activities routinely done as standard operating procedures such as mowing, reintroduction of fire as a natural process, spot treatments of exotic plants, and small-scale vegetation management.

Following are the natural community/habitat restoration and maintenance actions recommended to create the desired future conditions.

***Objective B: Conduct habitat/natural community restoration activities on 0 acres of natural communities.***

There are currently no natural communities requiring habitat restoration parkwide, including Cayo Costa, North Captiva, Punta Blanca, and Jug Creek.

*Natural Community Improvement:* Improvements are similar to restoration but on a smaller, less intense scale. This typically includes small-scale vegetative management activities or minor habitat manipulation. Following are the natural community/habitat improvement actions recommended at the park.

***Objective C: Conduct natural community/habitat improvement activities on 0 acres of natural communities.***

There are currently no natural communities needing habitat improvement at Cayo Costa, North Captiva, Punta Blanca, or Jug creek. In the past, areas of Cayo Costa were designated as spoil pile on the northeastern side of the island in management zone CC-01. Since the last management plan, this area, along with other designated spoil piles, became vegetated with coastal strand natural communities. With natural plant cover, and no issues with hydrological flow, these areas are no longer classified as disturbed.

## Imperiled Species Management

### Goal: Maintain, improve, or restore imperiled species populations and habitats in the park.

The DRP strives to maintain and restore viable populations of imperiled plant and animal species primarily by implementing effective management of natural systems. Single species management is appropriate in state parks when the maintenance, recovery or restoration of a species or population is complicated due to constraints associated with long-term restoration efforts, unnaturally high mortality or insufficient habitat. Single species management should be compatible with the maintenance and restoration of natural processes, without imperiling other native species or compromising park values.

In the preparation of this management plan, DRP staff consulted with staff of the FWC Imperiled Species Management program or regional biologist and other appropriate federal, state, and local agencies for assistance in developing imperiled animal species management objectives and actions. Likewise, for imperiled plant species, DRP staff consulted with FDACS. Data collected by the USFWS, FWC, FDACS, and FNAI as part of their ongoing research and monitoring programs will be reviewed by DRP staff periodically to inform management of decisions that may have an impact on imperiled species at the park.

Ongoing inventory and monitoring of imperiled species in the state park system is necessary to meet the agency mission. Long-term monitoring is also essential to ensure the effectiveness of resource management programs. Monitoring efforts must be prioritized so that the data collected provides information that can be used to improve or confirm the effectiveness of management actions on conservation priorities. Monitoring must be conducted at a level to provide the data necessary to make informed decisions. Not all imperiled species require intensive monitoring efforts on regular intervasl. Priority may be given to those species that can provide valuable data to guide adaptive management practices. Those species selected for specific management actions and those that will provide management guidance through regular monitoring are addressed in the objectives below.

#### *Objective A: Develop/Update baseline imperiled species occurrence inventory lists for plants and animals.*

As of 2020, 14 state or federally listed imperiled plant species and 20 state or federally listed imperiled animal species are known to occur within the park. Surveys for sea turtle nesting, shorebird nesting, and invasive plants allow the opportunity for detailed observations in the field. Staff are trained to document imperiled species occurrence as well as record characteristics of unfamiliar species for identification. Collected data are communicated to the DRP District 4 biology office, FDACS, FNAI, and FWC. Currently, all imperiled species are monitored either through recommended FWC survey protocols, or through species observations from qualified park staff, volunteers, and district biologists.

***Objective B: Monitor and document 10 selected imperiled animal species in the park.***

| | |
|---|---|
| Action 1 | Implement monitoring protocols for 10 imperiled animal species including loggerhead sea turtles, green sea turtles, piping plovers, red knots, American oystercatchers, least terns, snowy plovers, Wilson's plovers, black skimmers, and eastern indigo snakes |
| Action 2 | Complete all required FWC survey protocols for imperiled sea turtles and nesting shorebirds/seabirds |
| Action 3 | By 2025, resurvey/replicate line transect distance sampling protocols to estimate the gopher tortoise population on the island and look for changes |

FPS staff coordinates targeted surveys of nine of the 10 imperiled species known to occur in the park in cooperation with Audubon Society of Florida, Florida Shorebird Alliance, and FWC. Monitoring and reporting protocols have been established for each of these species by FWC. Population, nesting occurrence and nesting productivity data are collected from May 1 to October 31, for green and loggerhead sea turtles. Sea turtle mortality data is collected year-round using the FWC Sea Turtle Stranding and Salvage Network stranding report forms. American oystercatcher, Wilson's plover, snowy plover, least tern, and black skimmer populations, nesting occurrence, and nest productivity data are collected during six statewide surveys coordinated by FWC from March to August. Though no longer imperiled, osprey and bald eagle nesting occurrence and productivity data are collected during spring nesting season in cooperation with Audubon of Florida and FWC. Piping plover and red knot population and migration information is collected during two statewide surveys in the winter. Monitoring protocols are already established by FWC for all imperiled animal species found at Cayo Costa and associated islands.

The gopher tortoise population study completed in 2015 by staff from the Joseph W. Jones Ecological Research Center provides the park with an excellent baseline for tortoise numbers and population strength. The results from the completed survey will assist park and district staff in documentation of shifts in population numbers. District staff received additional training by the Joseph R. Jones Ecological Research Center and will be able to replicate the line transect distance sampling techniques used during the 2015 population study for future assessments of tortoise populations, which should be completed every ten years. The next survey should be conducted by 2025. Park and district staff will contact and work with FWC if decreases in population numbers are identified.

Eastern indigo snake population assessment research at Cayo Costa and North Captive being conducted by the Sanibel Captiva Conservation Foundation is ongoing. The goal of this research is to obtain valuable baseline data on eastern indigo snake populations on the barrier islands through measurements, tagging, and genetic analysis. Sightings of eastern indigo snakes at Cayo Costa and North Captiva are reported by park and district staff to the Sanibel-Captiva Conservation Foundation to assist them with locating snakes for this ongoing population study.

### *Objective C: Monitor impacts on shorebird and sea turtle nesting by terrestrial nuisance species in the park.*

Predation critically threatens many rare species (Hecht and Nickerson, 1999), with the deleterious impacts of predation losses compounded by habitat loss (Reynolds and Tapper, 1996). In Florida, nesting beaches have been substantially altered by urbanization and development, leaving few beaches isolated from development, thereby severely reducing the amount of habitat suitable for successful nesting by sea turtles and shorebirds (e.g., Rogers et al., 1995). At the same time, predators are found along many beaches where nesting could otherwise succeed. Nest predation can have severe impacts on reproductive success for sea turtles and shorebirds (Engeman et al. 2010).

Current protocols for nesting surveys include data collection on the presence of terrestrial predators. Staff and volunteers are trained to observe and document predator tracks near shorebird nesting habitat, shorebird nest sites, and sea turtle nest sites and false crawls. In accordance with FWC guidelines and permit conditions, self-releasing cages and screens are installed over sea turtle nests by park staff on Cayo Costa and North Captiva to discourage depredation by nuisance mammal species.

Dogs brought by visitors to the park introduce significant and challenging impacts on shorebird nesting success. Remoteness of the islands prevents the level of visitor activity oversight afforded at other parks. Protocols that staff and volunteers use to document the presence of nuisance species near nesting areas also include documentation of the presence of dogs. Evidence of dogs is typically observed during every sea turtle and shorebird nesting survey conducted on the islands. Signage on each of the islands clearly describes the DRP policy on pets, however, evidence of non-compliance persists. The current approach to reducing this impact to shorebird nesting depends on multiple partners including law enforcement personnel. Park staff maintains signage and educates visitors on policies when dogs are encountered in areas of the park where prohibited. Florida administrative code 62D-2.014(13) includes enforceable language on the presence of pets in restricted areas. This code is enforced by FWC Law Enforcement at state parks. Park staff will continue to coordinate with FWC Law Enforcement to increase enforcement on Cayo Costa and North Captiva. Continued monitoring will evaluate the effectiveness of the current approach; however, off-leash dogs will continue to threaten the nesting success of several imperiled species found on the islands, including the American oystercatcher, least tern, snowy plover, and Wilson's plover.

### *Objective D: Monitor and document 7 selected imperiled plant species in the park.*

| | |
|---|---|
| Action 1 | Develop monitoring protocols for 5 selected imperiled plant species including Sanibel shrubverbena, cardinal airplant, giant airplant, Florida mayten, and West Indian cock's-comb |
| Action 2 | Implement monitoring protocols for 5 imperiled plant species including those listed in Action 1 above and joewood |
| Action 3 | Develop and implement an annual survey for the federally listed west coast prickly apple cactus |

Seven plant species have been chosen for survey at Cayo Costa, North Captiva, and Jug Creek. They include joewood, which is already monitored yearly, along with Sanibel shrubverbena, Florida mayten, cardinal airplant, giant airplant, and West Indian's cock's-comb, which need monitoring protocols implemented. The monitoring protocol for the six new plant species will mimic the current method for joewood. This includes annual inspections of current known plant populations, and a parkwide population mapping survey every three to five years. This allows park and district staff the ability to monitor long-term changes in imperiled plant species population numbers. Surveys for these plants will be conducted collaboratively with DRP staff and members of the local native plant society or comparable organization.

West coast prickly apple cactus, was historically found on Cayo Costa. After hurricane Charley in 2004, the cactus has not been observed on any of the islands; not an indication that cactus is absent, rather that it is not currently identified. With dense poison ivy laden maritime hammock, surveys for the cactus are difficult and time consuming.

Under the federal endangered listing for this cactus, all maritime hammock and coastal strand in Jug Creek, Punta Blanca, Cayo Costa, and North Captiva are now considered critical habitat, with potential use as relocation sites for this cactus. Researchers from Marie Selby Gardens are currently growing ex situ populations of the west coast prickly apple cactus at the botanical gardens and planning to survey the park as a potential reintroduction site for this endangered species.

## Exotic Species Management

### Goal: Remove exotic and invasive plants and animals from the park and conduct needed maintenance control.

The DRP actively removes invasive exotic species from state parks, with priority being given to those causing the ecological damage. Removal techniques may include mechanical treatment, herbicides or biocontrol agents.

***Objective A: Annually treat 123 acres of exotic plant species in the park.***

| | |
|---|---|
| Action 1 | Annually develop/update exotic plant management work plan in DRP databases |
| Action 2 | Implement annual work plan by treating 123 infested (approximately 275 gross) acres in the park, annually, and continuing maintenance and follow-up treatments as needed |

Park staff and volunteers at Cayo Costa State Park typically treat 30–50 infested acres annually. To eliminate exotic plants at the park, a constant effort is needed to treat regrowth and to identify new exotic invasive plant species as they occur.

At areas such as Jug Creek and North Captiva, private property adjacent to park property act as seed sources for many exotic plants. To truly eliminate these exotics, park staff should attempt to educate residents about non-natives, and offer the names of native species that work as natural landscaping.

Follow up treatments should include visits to treatment areas 6-8 weeks after the use of herbicide to assess plant die off rates. Areas where trees are cut down should be cleared of remaining wood or left in such a manner that re-rooting will not occur. Monitoring of each natural community should be conducted annually to assess the progress and spread of various exotics. Areas that have historically been infested with exotics or difficult to treat, such as the bowstring hemp populations in management zone CC-01 and CC-04, should be visited monthly to identify regrowth after treatment.

As a follow-up to the 2019 full-island exotic treatment, the DRP has developed a three-year monitoring and treatment plan for the entirety of Cayo Costa proper. The three-year monitoring plan is organized by responsible parties (i.e., staff, volunteers, and contractors) conducting retreatment in specific management zones, targeting regrowth from extensive seed banks at the park. The DRP will also continue to pursue contracts with FWC Invasive Plant Program and other sources.

***Objective B: Implement control measures on 3 exotic/nuisance animal species in the park.***

| | |
|---|---|
| Action 1 | Continue to trap exotic animals in house and report removal to the district office quarterly |
| Action 2 | Apply for outside funding to hire an OPS trapper for nuisance animal removal during sea turtle nesting season |
| Action 3 | Continue contract trapping to remove exotic/nuisance animals |

Previously, the park trapped exotic wild hogs, racoons, and coyotes with available staff, including an OPS staff member whose responsibility was to remove hogs. In 2016, USDA was contracted by FPS to eradicate wild hogs on Cayo Costa. This hog eradication effort was completed in 2019 and included the removal of over 126 hogs. Additional animals that will need to be included in future exotic animal trapping efforts include black spiny-tailed iguanas, which are rapidly spreading throughout the island.

In 2014 and 2015, the sea turtle conservancy provided funding to contract USDA wildlife services to remove nuisance coastal predators, primarily coyotes and raccoons, to reduce the depredation on sea turtle nests. This trapping effort has been helpful in reducing predation rates of turtle nests at Cayo Costa. Outside grant funding should continue to be pursued whenever available for exotic animal removal at the park.

## Cultural Resource Management

Cultural resources are individually unique, and collectively, very challenging for the public land manager whose goal is to preserve and protect them in perpetuity. The DRP will implement the following goals, objectives, and actions, as funding becomes available, to preserve the cultural resources found in Cayo Costa State Park.

**Goal: Protect, preserve, and maintain the cultural resources of the park.**
The management of cultural resources is often complicated because these resources are irreplaceable and extremely vulnerable to disturbances. The advice of historical and archaeological experts is required in this effort. All activities related to land clearing, ground disturbing activities, major repairs or additions to historic structures listed or eligible for listing in the National Register of Historic Places must be submitted to the FDOS, Division of Historical Resources (DHR) for review and comment prior to undertaking the proposed project. Recommendations may include, but are not limited to concurrence with the project as submitted, pre-testing of the project site by a certified archaeological monitor, cultural resource assessment survey by a qualified professional archaeologist, modifications to the proposed project to avoid or mitigate potential adverse effect. In addition, any demolition or substantial alteration to any historic structure or resource must be submitted to the DHR for consultation and the DRP must demonstrate that there is no feasible alternative to removal and must provide a strategy for documentation or salvage of the resource. Florida law further requires that DRP consider the reuse of historic buildings in the park in lieu of new construction and must undertake a cost comparison of new development versus rehabilitation of a building before electing to construct a new or replacement building. This comparison must be accomplished with the assistance of the DHR.

***Objective A: Assess and evaluate 24 of 24 recorded cultural resources in the park.***

| | |
|---|---|
| Action 1 | Annually complete 24 assessments/evaluations of known archaeological sites, historic structures, and historic cemeteries and develop and implement a monitoring program |
| Action 2 | Complete Florida Master Site File reports for all identified historic buildings on Cayo Costa. Prioritize stabilization, restoration, and rehabilitation projects |
| Action 3 | Develop a plan for monitoring and managing archaeological and historical sites and materials that are susceptible to coastal erosion |

All known cultural sites within the park should be assessed and evaluated annually. A majority of the sites can be found along major trails that are visited daily, therefore most of this effort will be spent traveling to inaccessible sites in the southern half of Cayo Costa and on North Captiva. Such assessments should include an examination of each site with a discussion of any threats to the site's condition such as natural erosion, vehicular damage, bicycle or pedestrian tracks, looting, construction, firebreak disking, animal activity, plant or root invasion, or other factors that might cause deterioration of the site. These assessments should include photographs of the site, and short qualitative descriptions.

A regular monitoring plan must be developed for the sites located on the southern half of Cayo Costa, and all sites on North Captiva and Punta Blanca. With this monitoring, exotic vegetation should be treated and all visible disturbances should be recorded. Most of the preservation associated with cultural resources on the islands is centered on management of exotic vegetation, nuisance/exotic animals, and visitor impacts.

The historic structures at Jug Creek should be evaluated by a preservation architect. Future options for disposition will be considered in consultation with Lee County, DHR, and other stakeholders.

Several cultural sites on Cayo Costa are located directly on the shoreline and are susceptible to tidal inundation and erosion with two locations having experienced significant shoreline erosion in recent history. To better evaluate and protect cultural resources from coastal erosion, DHR has recommended that the park work with the Florida Public Archaeology Network (FPAN), which has an active monitoring program in place. Underwater archaeological monitoring resources are also available through DHR and the Estero Bay Aquatic Preserve.

***Objective B: Compile reliable documentation for all recorded historic and archaeological resources.***

| | |
|---|---|
| Action 1 | Ensure all known historic structures and archaeological sites are recorded or updated in the Florida Master Site File |
| Action 2 | Conduct an archaeological reconnaissance survey for three priority areas identified by the predictive model or other previous studies |
| Action 3 | Develop and adopt a scope of collections statement |

Currently, major work is needed on identifying cultural sites on Punta Blanca and entering them into the FMSF. Also, historic structures used within Cayo Costa, such as the cabins in the campground, have recently become 50 years old and need to be recorded in the FMSF as well. Park and district staff will coordinate with BNCR to accomplish this task.

A complete predictive model was prepared in 2013 by the Alliance for Integrated Spatial Technologies (AIST) at the University of South Florida for locating areas that have a higher probability of containing archaeological sites at the state park. With a majority of the park being considered high sensitivity (70%), more work is needed in locating other potential cultural sited within park property. Cultural Resource Assessment Surveys (CRAS), also known as Phase I, Archaeological Reconnaissance surveys should be completed in three priority areas at the park identified by the predictive model.

Cayo Costa will develop and adopt a scope of collections. With many different types of objects seemingly appropriate for display at the park, staff will discern pertinent items and refine the collections to prevent irrelevant items from accumulating. Staff will work with the collections manager to create and customize a scope of collections that represents Cayo Costa and associated islands.

## Special Management Considerations

### Timber Management Analysis

Chapters 253 and 259, Florida Statutes, require land management plans for units greater than 1,000 acres to contain analysis of the multiple-use potentials and the feasibility of generating revenues to enhance the management of the unitl, unless the lead agency determines that timber resource management conflicts with the primary management objectives of the unit. The long-term management goal for forest communities in Florida state parks is to maintain or reestablish old-growth characteristics to the extent practicable, with the exception of those communities specifically managed as early successional per FNAI.

Feasibility of managing/harvesting timber at Cayo Costa State Park during the period covered by this management plan was considered in the context of the statutory responsibilities governing the DRP and an analysis of the park-specific resource needs and values. As a state park, Cayo Costa is designated for single use. As such, timber management is only permitted as a method of natural community restoration and maintenance rather than as an ongoing extractive activity utilized by other forest-managing entities implementing multiple-use management. DRP has contracted with a private sector, professional forest management firm to complete this timber assessment, F4 Tech.

Cayo Costa is a multi-island park accessible only by boat. Affirmed by extensive groundtruthing and analysis of aerial imagery as of April 2019, the only potential upland areas for revenue generation and parcel enhancement through timber management are mesic flatwoods, totaling 63 acres. The DRP identifies 23 mesic flatwoods stands occurring within four named management zones in the park: CC-01 (44 acres), CC-02 (6 acres), CC-04 (1 acre), CC-06 (7 acres), and one unnamed/unmapped management zone (5 acres). These mesic flatwoods stands are between 0.02 to 22.50 acres in size and only three stands are > 6 acres (represent 38 of the 63 mesic flatwoods acres). There will likely be no scheduled timber management activities in the historically hardwood-dominated or wetland natural community types of this park, e.g., maritime hammock. In appropriate circumstances, timber management may include the harvesting and removal of overstory exotic-invasive trees. Note that any natural community acreage changes and treatments occurring after April 2019 are not reflected in this analysis.

In a different geographic setting, some of the larger mesic flatwood stands could be candidates for conventional timber management. For these remote islands, however, operations would be prohibitively expensive and fiscally unwise, requiring barge transportation of timber harvesting, skidding, loading, and cargo equipment to/from the islands to conduct timber sales. Additionally, no timber markets are local to Cayo Costa State Park. Lacking a market, harvested timber products would not generate revenue but, would instead represent additional costs related to disposal. Based on these logistical factors, it was concluded that timber management and attendant actions are neither needed nor viable for restoring and maintaining the forested natural communities of Cayo Costa State Park.

During this planning period, active management of all forested natural communities could be necessary and conditionally appropriate in the wake of potential natural disturbances including hurricanes, droughts, insect/pathogen infestations, and exotic-invasive species outbreaks adversely affecting forest resources and ecosystem conditions on the islands.

## Arthropod Control Plan

All DRP lands are designated as "environmentally sensitive and biologically highly productive" in accordance with Ch. 388 and Ch. 388.4111 Florida Statutes (F.S.). If a local mosquito control district proposes a treatment plan, the DRP works with the local mosquito control district to achieve consensus. DRP does not authorize new physical alterations of marshes through ditching or water control structures. Mosquito control plans temporarily may be set aside under declared threats to public or animal health under Ch. 388.45, F.S., or during a Gubernatorial Emergency Declaration.

All state parks located in Lee County hold arthropod control agreements with the Lee County Mosquito Control District.

## Coastal/Beach Management

The DRP manages over 100 miles of sandy beach, which represents one-eighth of Florida's total sandy beach shoreline. Approximately one-quarter of Florida's state parks are beach-oriented parks and account for more than 60 percent of statewide park visitation. The management and maintenance of beaches and their associated systems and processes is complicated by the presence of inlets and various structures (jetties, groins, breakwaters) all along the coast. As a result, beach restoration and nourishment have become increasingly necessary and costly procedures for protecting valuable infrastructure. Beach and inlet management practices affect beaches for long distances on either side of a particular project. DRP staff needs to be aware of and participate in the planning, design, and implementation of these projects to ensure that park resources and recreational use are adequately considered and protected.

The two islands of Cayo Costa and North Captiva each have 7.5 miles and 2.5 miles of beach respectively within the park boundary. No areas of beach are currently identified as critically eroded. With minimal infrastructure to protect along the sandy coastlines, these islands can accrete, erode, and migrate according to natural processes. The dynamic nature of this barrier island system is highly evident and remains unaltered by hard stabilizations or beach nourishment.

A consolidated substrate hardbottom site was identified in 2014, located 300 feet off the southwest shoreline of Cayo Costa. This hard-consolidated substrate is colonized by a variety of sponges, ascidians, and soft corals that support a multitude of tropical marine fish. This site is considered a significant natural marine resource for future addition to the park boundary, giving this submerged feature optimal protections, i.e., demarcation of protected area boundaries with buoys,

managing boat anchorages, enforcing prohibitions of live takes, and guarding swimmers and snorkelers from boat traffic. Several other sites of consolidated substrate hardbottom also appear within the nearshore zone along the southern portion of the island. Research on the size and species compositions of these features is ongoing and planned. Preliminary findings indicate that the features are ephemeral due to tidal action and shifts in longshore transport. The following special management objectives for this dynamic coastal environment are recommended.

***Objective: Survey and map identified areas of consolidated substrate to determine size, species composition, and seasonality to determine best protection measures.***

Collaboration is needed with other DEP staff, including the aquatic preserve, and external agencies to determine best methods for mapping the nearshore unconsolidated substrate within the 400' management boundary of the park. This will assist in determining how to best protect the natural community, including whether it should be added to the optimum boundary or continue to be managed through the sovereign submerged lands agreement.

***Objective: Continue to assist federal, state, and local agencies with active monitoring of erosion and accretion cycles and assessment of beach and shoreline conditions following natural disasters.***

While Cayo Costa and North Captiva are not currently identified for any type of stabilization or nourishment, DRP staff will collaborate with outside agencies to ensure the continued preservation of these islands. The DRP routinely records changes to the beach profile and will alert the county if erosion and shoreline loss become egregious. Photo points for longitudinal study have been located at the main visitor access to the beach adjacent to the campground. These will be used to compare the beach habitat pre and post large storm events.

## Sea Level Rise

Sea level rise is currently under study and will be addressed by the DRP as data is interpreted. The DRP will consider existing research and predictive models in coordination with other DEP programs and federal, state, and local partners. The DRP will continue to observe and document the intermittent and permanent changes to the park shorelines, natural features, imperiled species populations, and cultural resources. This ongoing data collection and analysis will inform the DRP's adaptive management response to future coastal conditions.

All coastal and barrier island features associated with Cayo Costa State Park will be affected by changes in sea level. The islands have been geologically and topographically formed by changes in sea levels over a 3,000-year duration. As mean sea level changes, distributions of natural communities will correspondingly shift. Additionally, as sea level rises, the freshwater lens of the park may become saline, altering an essential freshwater source for the flora and fauna of the park.

## Resource Management Schedule

A broad schedule is provided in the Implementation Component of this plan for prioritization of all management activities that must be conducted to maintain the park for the purposes for which the lands were acquired and to enhance the resource values.

## Land Management Review

Section 259.036, Florida Statutes, established land management review teams to determine whether conservation, preservation, and recreation lands titled in the name of the Board of Trustees are being managed for the purposes for which they were acquired and in accordance with their approved land management plans. The DRP has considered the recommendations of the land management review team and developed the objectives and actions stated in this plan accordingly.

Cayo Costa State Park was subject to land management reviews on March 10, 2010, May 6, 2015, and February 13, 2020. The review team made the following determinations:

- The land is being managed for the purpose for which it was acquired.
- Ongoing management practices, including current forms of public access, complied with the management plan for this unit.

# LAND USE COMPONENT

## Introduction

Land use planning and park development decisions for the state park system are based on the dual responsibilities of the Florida Department of Environmental Protection (DEP), Division of Recreation and Parks (DRP). These responsibilities are to preserve representative examples of original natural Florida and its cultural resources, and to provide resource-based recreation and interpretation opportunities for Florida's citizens and visitors.

The process for park planning and design begins with baseline analyses of the natural and cultural resources and then proceeds through the creation of a conceptual land use plan that culminates in the actual design and construction of park facilities. Input to the plan is provided by experts in natural sciences, archaeology, history, engineering, and park operations and management. Additional input is received through public workshops and other stakeholder engagement.

A brief inventory of the external conditions and recreational potential of the park unit is provided, accounting for existing public uses, facilities, special requirements on use, and environmental conditions. The conceptual land use plan describes all significant infrastructural needs, improvements, renovations, relocations, and new construction proposed by general DRP consensus achieved through the park planning process. This component concludes with assessments of park-specific recreational carrying capacity and optimum management boundaries.

## External Conditions

Assessment of the conditions that exist beyond the boundaries of the unit can identify any special development obstacles or unique opportunities because of the unit's unique setting or environment. This also provides an opportunity to deal systematically with various planning issues such as location, regional demographics, adjacent land uses and park interaction with other facilities.

Cayo Costa State Park is located within Lee County, about 22 miles west of Fort Myers, 42 miles northwest of Naples, and 53 miles southeast of Sarasota in the southwest part of the state. Approximately 854,000 people live within 30 miles of the park.

According to the U.S. Census Data (2015), approximately 13% of residents in Lee County identify as black, Hispanic or Latino, or another minority group. Nearly half (45%) of residents in Lee County can be described as youth or seniors (U.S. Census 2010). Fifty-nine percent of the population in Lee County is of working age (16 to 65) (U.S. Census Bureau 2010). Lee County’s per capita personal income was $42,243 in 2015, just below the statewide average of $42,737 (U.S. Bureau of Economic Analysis 2019).

A high concentration of state and federal conservation lands offer significant opportunities for outdoor resource-based recreation within a 15-mile radius of Cayo Costa State Park. Charlotte Harbor Preserve State Park and Estero Bay Preserve State Park offer cycling, boating, paddling, fishing, hiking, and wildlife viewing. Stump Pass Beach State Park, Don Pedro Island State Park, and Gasparilla Island State Park offer swimming, beach access, fishing, hiking, snorkeling, and wildlife viewing. The Charlotte Harbor Aquatic Preserves, maintained by DEP, surrounds several preserves in the area. Recreational opportunities offered at these sites include activities such as birding, paddling, boating, and fishing. Managed by the Florida Forest Service, Myakka State Forest provides paddling, fishing, hiking, bicycling, equestrian activities, wildlife viewing, hunting, and camping. The U.S. Fish and Wildlife Service manages several wildlife refuges as components of the J.N. “Ding” Darling Complex. These refuges offer activities such as wildlife viewing, hiking, paddling, boating, and fishing. Public access opportunities differ at each refuge. Pine Island National Wildlife Refuge, for example, does not facilitate public access to the islands to limit disturbance of shoreline and wetland vegetation and nesting bird and turtle species.

Several Lee and Charlotte county parks and preserves are located in the vicinity of the park, offering resource-based recreation opportunities compatible with the Cayo Costa State Park experience – paddling, hiking, and wildlife observation: Tippecanoe Environmental Park, Four Mile Cove Ecological Preserve, Deep Lagoon Preserve, Carver Preserve, Cayo Pelau Preserve, Charlotte Flatwoods Environmental Park, Pine Island Flatwoods Preserve, and Yellow Fever Creek Preserve.

Cayo Costa State Park is located in the Southwest Vacation Region, including Manatee, Sarasota, Charlotte, Lee, Collier, DeSoto, Glades, and Hendry counties (Visit Florida 2019). According to the 2019 Florida Visitor Survey, approximately 9.6% of domestic visitors to Florida visited this region. Roughly 95% of visitors to the region traveled to the Southwest for leisure purposes. The top activities for domestic visitors were beach/waterfront, followed by culinary experiences and visiting friends or relatives. Winter was the most popular travel season followed closely by spring. Most visitors traveled by non-air (62%), reporting an average of 5.4 nights and spending an average of $140 per person per day including transportation (Visit Florida 2019).

Florida’s Statewide Comprehensive Outdoor Recreation Plan (SCORP) indicates that participation rates in this region for saltwater beach activities, saltwater (boat and non-boat) fishing, saltwater boat-ramp use, freshwater non-boat fishing, canoeing and kayaking, visiting archaeological and historic sites, wildlife viewing, cycling, hiking, picnicking, and camping are higher than the state average with demand for additional facilities increasing through 2020 (FDEP 2019).

## Existing Use of Adjacent Lands

The land adjacent to Cayo Costa State Park is occupied with residential and commercial areas. Pine Island, to the east of the island, consists primarily of residential areas interspersed with small commercial areas. Commercial operations on the island include multiple marinas, fishing charters, and seafood wholesalers among others. Portions of the islands are agricultural, particularly for mango groves. Several small preserves protect the natural character of the island, including Baxley Preserve and Pine Islands Flatwoods Preserve. Many of the small keys within Pine Island Sound consist primarily of undevelopable mangrove swamp, with the exception of residential development on Useppa Island.

Across Pine Island Sound and Matlacha Pass, Cape Coral is a master planned residential community on the mainland located adjacent to Fort Myers.

North of Cayo Costa is Gasparilla Island, which hosts a mix of land uses. Gasparilla Island consists of residential and commercial use with a historic town center. On the southern tip of the island, directly across Boca Grande Pass from Cayo Costa, is Gasparilla Island State Park, featuring beach access and a historic lighthouse complex. Most of the island is designated by Lee County as *central urban*, and the rest of the island is primarily marked as various forms of conservation lands.

North Captiva Island contains parcels that are part of Cayo Costa State Park as well as private residential parcels. The northern tip of the island is a private residential area. Park property is interspersed among private parcels on North Captiva.

## Planned Use of Adjacent Lands

Lee County planning and zoning designations surrounding the park vary considerably among the many islands and miles of mainland coastline. North Captiva Island to the south of the park carries multiple land use designations., including *outer island* and *conservation upland and wetland*, which allows for low-density development with minimal existing or planned infrastructure. To the south, designations are for low-density residential, specifically *outlying suburban*. Southeast Captiva has a mixture of *wetland*, *conservation wetland*, *conservation upland*, and *outer island*. To the north, Gasparilla Island is designated predominantly as *urban community* which is intended for mixed use development (Lee Plan 2010).

Pine Island to the east of the park has wetlands and conservation wetlands along both the east and west coast of the island. Central and north central areas of Pine Island are *coastal rural*, allowing low-density rural residential development. South central Pine Island is designated *outlying suburban* for low-density residential. Along the southern shoreline of Pine Island, low to medium density residential development is allowed (Lee Plan 2010).

Along the mainland coast of Lee County, the predominant designations are *wetland*, *conservation wetland*, and *low-to-mid density residential development* (Lee Plan 2010).

Lee County is a member of the Southwest Florida Regional Planning Council. It is expected that Lee County will increase by 500,000 people by 2045, nearly doubling its population (BEBR 2015) raising the county population above 1.1 million residents.

## Property Analysis

Effective planning requires a thorough understanding of the park-specific natural and cultural resources. This section describes the resource characteristics and existing uses of the property. The unit's recreation resource elements are examined to identify the opportunities and constraints they present for recreational development. Past and present uses are assessed for their effects on the property, compatibility with the site, and relation to the unit's classification.

### Recreational Resource Elements

This section assesses the recreational resource elements found in the park, those physical qualities that, either singly or in certain combinations, can support various resource-based recreation activities. Breaking down the property into such elements provides a means for measuring the property's capacity to support potential recreational activities. This process also analyzes the existing spatial factors that either favor or limit the provision of each activity.

#### Land Area

Cayo Costa State Park represents the largest tract of publicly owned land along the Charlotte Harbor chain of barrier islands. Cayo Costa and North Captiva are narrow elongated islands with low, rolling topographic profiles and irregular configurations. The north-south orientation of the islands parallels the mainland of Lee County. Punta Blanca Island is a small mangrove-dominated island on the bay side of Cayo Costa Island. The island of Cayo Costa proper provides opportunities for land-based recreation such as hiking, biking, and camping.

#### Water Area

Most park visitors arrive by ferry service. Pelican Bay, between Cayo Costa Punta Blanca, provides a refuge during prevailing winds and is a popular anchorage for boaters. From the park, visitors can access the open waters of the Gulf and protected waters of the greater Charlotte Harbor estuary for paddling, swimming, and fishing.

### Shoreline
The park boundary encompasses approximately 10 miles of Gulf shoreline. The high-energy Gulf beaches stretching along Cayo Costa and North Captiva are the most popular natural feature of the park and the focal point for many of the recreational opportunities, such as swimming, fishing, sunbathing, and shell collecting. Apart from the north and south ends of Cayo Costa, where currents are frequently strong, and in areas where severe shoreline erosion has occurred, the Gulf beaches provide safe swimming conditions. Much of the park shoreline is remote, requiring personal watercraft or hiking for access.

### Natural Scenery
The state park contains areas of exceptional natural beauty. White sand beaches, open coastal grasslands, and shaded maritime hammocks yield scenery distinctive of the Gulf barrier island environment.

### Significant Habitat
The park supports an assemblage of plants, animals and other features exemplifying natural conditions on the Charlotte Harbor chain of barrier islands. The numerous and diverse natural communities of the park are especially attractive to visitors who appreciate nature and solitude. Conditions for wildlife viewing are ideal, particularly for those seeking abundant birdlife. Estuarine waters within the narrow coves of the islands also harbor marine mammals.

### Natural Features
As a barrier island formation, Cayo Costa itself is a remarkable natural feature, characterized by minimal development and large areas of dune, hammock, and wetland natural communities.

### Archaeological and Historic Features
The park contains cultural sites associated with Calusa mound building, early Spanish arrivals, a late 19th century quarantine station, and an early 20th century fishing community. Park history and remnant cultural sites present unique opportunities for interpretation.

## Assessment of Use

All legal boundaries, significant natural features, structures, facilities, roads, and trails existing in the unit are delineated on the base map (see Base Map). Specific uses made of the unit are briefly described in the following sections.

### Past Uses
The island's past is defined by the significance of its geography, and namely, the water resources surrounding the island. The island was prehistorically home to the Calusa Indians before European settlers arrived on Cayo Costa in search of marine and timber resources. European use of the island increased during the 1800s. Fishermen, in particular, established fishing camps where seafood products were prepared for export primarily to Cuba. In the later 1800s, the U.S. utilized the island as a barrier to the mainland port, operating an immigration quarantine station, primarily to screen travelers for yellow fever

and malaria. Fishing was the dominant industry on the island, and by the 1900s, approximately 20 fishing families occupied Cayo Costa. During World War II, the U.S. Air Force used Cayo Costa as a target range for Tampa-area training exercises. Prior state acquisition, the island was managed as a park by Lee County.

The cottages at Jug Creek are designated historic structures under the Bokeelia Historic District. Four of the cottages were constructed during the 1930s. Two of the cottages were relocated to Jug Creek from Fort Myers in the 1930s. Historically, the cottages were used as fishing lodges for vacationers.

**Future Land Use and Zoning of the Park**

The DRP works with local governments to establish designations that both provide consistency between comprehensive plans/zoning codes and permit typical state park uses and facilities necessary for the provision of resource-based recreation.

Future land use designations for Cayo Costa State Park in the Lee County Comprehensive Plan are primarily for *conservation upland* and *conservation wetland*. Portions of the island are designated as *outer island*. These land uses are compatible with existing and planned park activities. The minimal development allowances associated with the *outer island* designation should not constrain current or planned park usage.

**Current Recreational Use and Visitor Programs**

Cayo Costa State Park offers a wide variety of resource-based recreational opportunities including beach access, cycling, hiking, camping (overnight boat slips, tent camping, and primitive cabins), paddling, swimming, snorkeling, shoreline fishing, shelling, wildlife viewing, and interpretive tours. Interpretive themes cover both natural and cultural resources of the island, with interpretive information available at the Pelican Bay ranger station. Existing concession services are operated through Captiva Cruises and authorized subcontractors, which offer ferry transit to the park from multiple locations.

Cayo Costa State Park offers various recreational and interpretive opportunities. The park is part of the Great Florida Birding and Wildlife Trail. Visitors also make use of the island setting to host public or private events. The Barrier Island Parks Society and Friends of Cayo Costa State Park host an annual park celebration event, which is open to the public.

Cayo Costa State Park recorded 160,407 visitors in FY 2018/2019. By DRP estimates, the FY 2018/2019 visitors contributed over $14.8 million in direct economic impact, the equivalent of adding 208 jobs to the local economy (FDEP 2019).

**Other Uses**

No uses, other than outdoor resource-based recreation and interpretation, are designated at Cayo Costa State Park.

### Protected Zones

A protected zone is an area of high sensitivity or outstanding character from which most types of development are excluded as a protective measure. Generally, facilities requiring extensive land alteration or resulting in intensive resource use, such as parking lots, camping areas, shops or maintenance areas, are not permitted in protected zones. Facilities with minimal resource impacts, such as trails, interpretive signs, and boardwalks are generally allowed. All decisions involving the use of protected zones are made on a case-by-case basis after careful site planning and alternatives analysis.

At Cayo Costa State Park, all wetlands and floodplain as well as maritime hammock, beach dune, mangrove swamp, and known imperiled species habitat have been designated as protected zones.

## Existing Facilities

The park consists of three main areas – Cayo Costa, North Captiva Island, and a small landbase at Jug Creek. Access to Cayo Costa and North Captiva Island is only by boat. Most visitors to the park visit Cayo Costa proper and arrive by ferry service provided by the park's concessionaire. Two docks offer facilitated boat access to Cayo Costa – the main park docks on Pelican Bay and another dock near the south end of the island, which was reserved for authorized ferry boats as of 2016. Ferry service is not provided to and no visitor amenities exist on the North Captiva portion of the park. Visitors accessing North Captiva Island by private boat may explore the park beach and interior hiking trails. Waters south of Pelican Bay are generally shallow with widespread seagrass beds and challenging for larger vessels to navigate outside of marked channels.

The Jug Creek landbase contains six historic cottages, a facility for storage and laundry, boat ramp, and dock. Until 2017, the cottages were used for overnight visitor accommodation and the dock/ramp was available for use by cabin guests for bay access. The dock, which is currently used only for park support, was repaired in 2016. The storage/laundry building is in poor condition and only used by park staff and the concessionaire for storage. Condition of the cottages and storage/laundry building is poor, with all structures requiring extensive repair. All cottages were closed for evaluation of potential redevelopment.

Primary access to the island of Cayo Costa is through Pelican Bay, where most of the park's facilities are located. Visitor amenities include a boat dock, waiting shelter, interpretive kiosks, and small restroom building. A small ranger station and store are also located at Pelican Bay, providing information, ice, and other essentials for visitors. Overnight docking is permitted for boat campers. The park does not collect entrance fees at the ranger station. Instead, an honor box for fee collection is located at the Pelican Bay visitor dock.

Accessible from Pelican Bay, the Gulf Beach Use Area offers visitors a variety of recreational opportunities, including various beach activities, picnicking, and hiking into the scenic island interior. One restroom building with outdoor showers for day use is situated at the landward end of the main access path to the open Gulf beach. The site offers two small picnic pavilions.

The camping area, located near the Gulf Beach Use Area, offers 30 tent sites and 12 single-room cabins in a semi-primitive environment. Each site and cabin includes a picnic table, ground grill, and access to potable water. Electricity is not available at any site or cabin. The area is characterized by an open sunny landscape and proximity to the Gulf beach. Tent sites and cabins are separated on opposite sides of the main beach access path. Restroom facilities, equipped with cold showers and flush toilets, are located on the cabin side within short walking distance from the cabins and moderate distance from the tent sites. Tent campers also utilize the day use restroom of the Gulf Beach Use Area

Tram service across Cayo Costa is available daily from 10 a.m. to 4 p.m. to transport visitors and gear for both day and overnight uses. Outside of the tram operating hours, visitors are responsible for portaging gear in and out. The Pelican Bay docks are located approximately one mile down unpaved park road from the Gulf beach access and camping area. Visitors enjoy both walking and cycling on the shared use road. Designated hiking trails exist primarily on the northern half of Cayo Costa and along North Captiva's western side. Hiking trails offer opportunities to access several alternative segments of beach along the Cayo Costa shoreline. Beach access points, other than the Gulf Beach Use Area, do not offer shelter or other visitor amenities.

Support facilities are located adjacent to the Pelican Bay Use Area, including numerous operational facilities for the park – support dock, maintenance shop, pole barn, small office, and residence for the assistant park manager. Electricity for the shop is generated by solar panels.

## Recreation Facilities

**Pelican Bay Use Area**
Boat Dock
Waiting Shelter
Store
Ranger Station
Restroom (1)
Interpretive Kiosks
Tram Road (1 mile)

**Gulf Beach Use Area**
Restroom (1)
Picnic Pavilions (2)

**Camping Area**
Tent Sites (30)
Cabins (12)
Campfire Circles (3)
Restrooms (2)

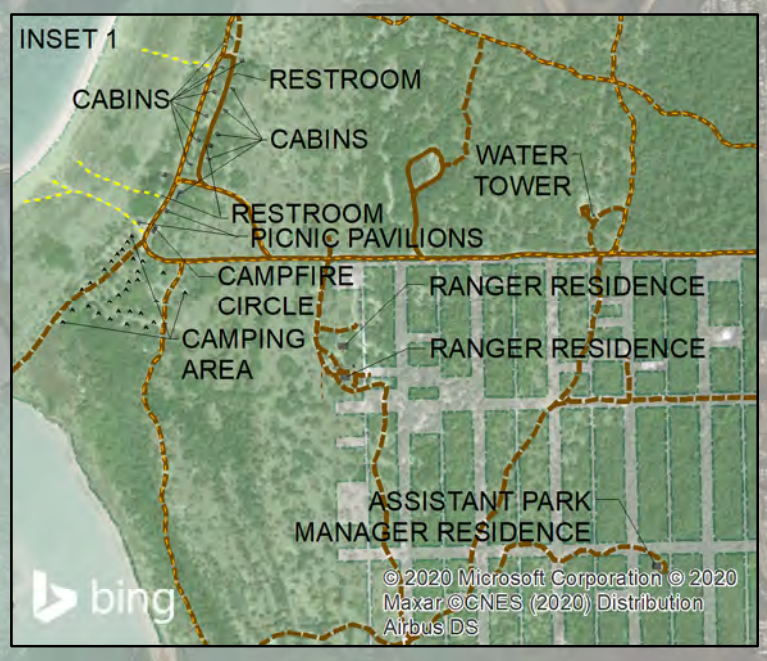
**Jug Creek Landbase**
Cottages and Storage (7)
Dock
Boat Ramp

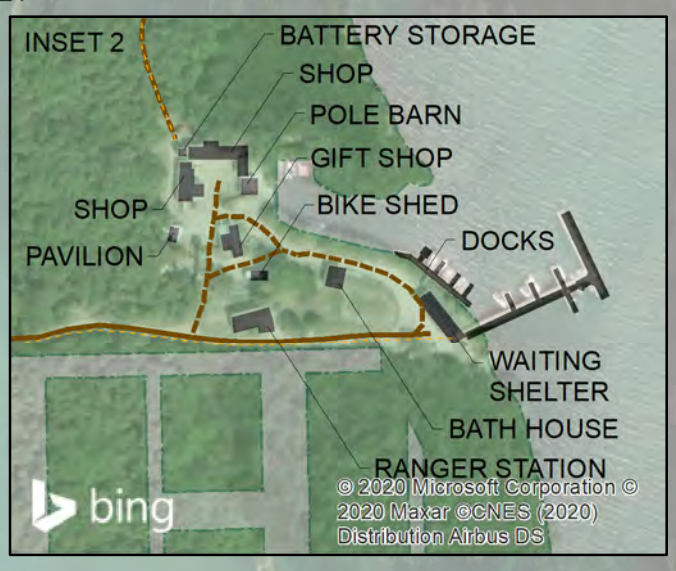
## Support Facilities

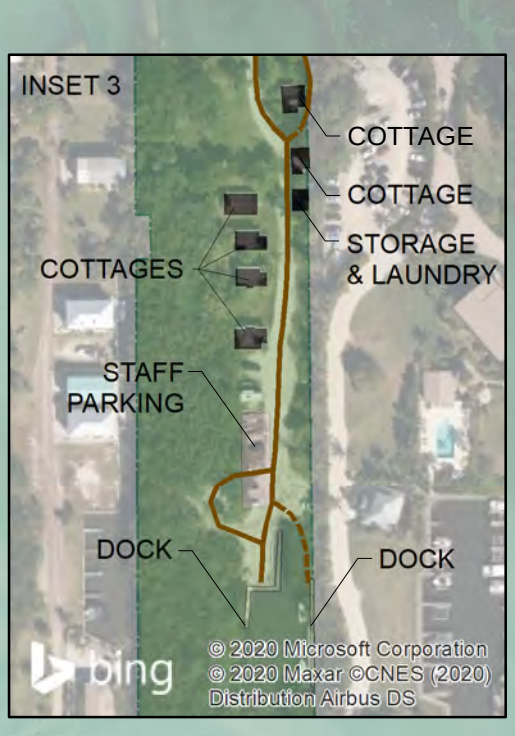
**Pelican Bay Support Area**
Maintenance Shop
Pole Barns (2)
Support Dock

**Jug Creek Landbase**
Dock and Boat Ramp
Storage Building

CEMETERY TRAIL
QUARANTINE TRAIL
SCRUB TRAIL
PINELANDS TRAIL
MAIN DOCK & RANGER STATION
GULF BEACH TRAIL
CABINS & CAMPING AREA
Pelican Pass
PUNTA BLANCA ISLAND
INSET 2
Murdock Point
INSET 1
Pelican Bay
MONDONGO ISLAND
Primo Bay
PRIMO ISLAND
BIRD KEY
MIDDLE KEY
USEPPA ISLAND
CAYO COSTA ISLAND
Murdock Bayou
Platt Point
CABBAGE KEY
PINE ISLAND SOUND
The Narrows
DOCK
Pejuan Cove
Pejuan Point
GULF OF MEXICO
Captiva Pass
Safety Harbor
Foster Point
Foster Bay
North Captiva Island
South Banks
Redfish Pass
Captiva Shoal
Jug Creek Shoal
JUG CREEK COTTAGES & CREW BOAT LAUNCH
BOKEELIA ISLAND
Back Bay
INSET 3
PART ISLAND
Orange Pass
COON KEY
BLACK KEY
Pine Island National Wildlife Refuge
Pine Island Sound Aquatic Preserve




## Legend

- Park Boundary
- Park Road Stabilized
- Park Road Unstabilized
- Walkways
- Hiking Trail
- Hiking/Biking Trail
- Camping Sites
- Structures

bing

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CAYO COSTA STATE PARK

N

0 0.25 0.5 1 Mile

Florida Department of Environmental Protection
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Date of aerial; 2011

BASE MAP

## Conceptual Land Use Plan

The following narrative represents the current conceptual land use proposal for this park. The conceptual land use plan is the long-term, optimal development plan for the park, based on current conditions and knowledge of the park's resources, landscape and social setting (see Conceptual Land Use Plan). The conceptual land use plan is modified or amended, as new information becomes available regarding the park's natural and cultural resources or trends in recreational uses, in order to adapt to changing conditions. Additionally, the acquisition of new parkland may provide opportunities for alternative or expanded land uses. The DRP develops a detailed development plan for the park and a site plan for specific facilities based on this conceptual land use plan, as funding becomes available.

During development of the conceptual land use plan, the DRP assessed the potential impact of proposed uses or development on park resources and applied that analysis to determine the future physical plan of the park as well as the scale and character of proposed development. Potential resource impacts are also identified and assessed as part of the site planning process once funding is available for facility development. At that stage, design elements (such as existing topography and vegetation, sewage disposal, and stormwater management) and design constraints (such as imperiled species or cultural site locations) are investigated in greater detail. Municipal sewer connections, advanced wastewater treatment or best available technology systems are applied for on-site sewage disposal. Impervious surfaces are minimized to the greatest extent feasible to limit the need for stormwater conveyance/retention systems, and all facilities are designed and constructed using best management practices to limit and avoid resource impacts. Federal, state, and local permit and regulatory requirements are addressed during facility development., including design of all new park facilities consistent with the universal access requirements of the Americans with Disabilities Act (ADA). After new facilities are constructed, conditions are monitored to ensure that resource impacts remain within acceptable limits.

### Potential Uses

#### Public Access and Recreational Opportunities

**Goal: Provide public access and recreational opportunities in the park.**

The existing recreational activities and programs of this state park are appropriate to the natural and cultural resources contained in the park and should be continued. New and improved activities and programs are also recommended and discussed below.

***Objective: Maintain the park's current recreational carrying capacity of 3,892 users per day*.**

The park will continue to offer visitors the opportunity to camp, hike, fish, swim, picnic, boat/paddle, and view wildlife among other activities. Interpretive exhibits parkwide will continue to be offered to the public. The ability of the park to operate effectively with current visitation levels will be increased.

***Objective: Expand the park's recreational carrying capacity by 848 users per day.***

Providing more facilities in the Gulf Beach Use Area, including additional picnic pavilions, will allow for accommodation of more day visitors. Establishing a group campsite will improve and increase overnight accommodation for large groups. At Jug Creek, restoration or replacement of the cabins could reintroduce the former overnight capacity of the park landbase. The proposed visitor center at Pelican Bay will also provide additional interpretive opportunities and space for focused activities. Additional pavilions along the Gulf beach will offer new spaces for visitor use within an existing beach access area. Parkwide, general improvements to existing facilities will also have the potential to attract more visitors and enhance the level of recreational service offered by the park.

***Objective: Continue to provide the current interpretive, educational, and recreational programs on a regular basis.***

Currently, the park offers a wide variety of active and passive interpretive programs. Active programs are offered for small and large tour groups, including guided ranger hikes, field presentations, and educational excursions, utilizing walkable segments of shoreline and interior nature trails. Availability is typically December through June to provide opportunities during peak visitation season.

***Objective: Develop new interpretive, educational, and recreational programs.***

Recommended improvements and expansions may entail collaboration with the park concessionaire. New programs may include use of kayaks or paddleboards to guide visitors along the complex shoreline contours and waterways of the multiple park islands.

## Proposed Facilities

### Capital Facilities and Infrastructure

**Goal: Develop and maintain the capital facilities and infrastructure necessary to implement the recommendations of the management plan.**

The existing facilities of this state park are appropriate to the natural and cultural resources contained in the park and should be maintained. New construction is recommended to improve the quality and safety of the recreational opportunities, improve the protection of park resources, and increase efficiency of park operations. The following is a summary of facility improvements, renovations, and new construction planned for Cayo Costa State Park.

PAGE 2

PUNTA BLANEA ISLAND

CAYO COSTA

INSET

Jug Creek Landbase
Renovate/Replace Cottages

INSET

GULF OF MEXICO

Captiva Pass

NORTH CAPTIVA ISLAND

**Legend**

Park Boundary

Proposed Facilities



CAYO COSTA STATE PARK

N

0 0.25 0.5 1 Miles

Florida Department of Environmental Protection
Division of Recreation and Parks
Date of aerial; 2011

CONCEPTUAL LAND USE PLAN

**Legend**

- Park Boundary
- Campsites
- Cabins
- Proposed Facilities
- Proposed Development Area
- Tram Road

GULF OF MEXICO

**Cabin Area**
Renovate/Replace Cabins
Replace Restrooms
Enhance Landscape

**Gulf Beach Access**
Construct Small Picnic Pavilions
Replace Day Use Restroom

**Tent Area**
Develop Group Camp
Enhance Landscape

**Tram Road**
Stabilize Road
Improve Drainage

INSET

0 50 100 200 Feet

**Support Area**
Replace Shop Structures
Renovate Dock

**Pelican Bay Boat Docks**
Replace Pilings
Extend/Add Slips
Install Moorings

**Pelican Bay Use Area**
Site Redesign/Masterplan
Construct Visitor Center



CAYO COSTA STATE PARK

N

0 250 500 1,000 Feet

Florida Department of Environmental Protection
Division of Recreation and Parks
Date of aerial: 2011

CONCEPTUAL LAND USE PLAN - PAGE 2

***Objective: Maintain all public and support facilities in the park.***

All capital facilities, road, and trails within the park will be kept in proper condition through the routine work of DRP staff, volunteers, and/or contractors.

***Objective: Improve/repair visitor use and staff support facilities.***

Major repair projects for park facilities may be accomplished within the 10-year term of this management plan, pending available funding. These include the modification of existing park facilities to comply with the Americans with Disabilities Act, a top priority for all facilities maintained by DRP. The following discussion of other recommended improvements and repairs are organized by use area within the park.

**Pelican Bay Use Area**

The dock pilings are in need of repair/replacement to continue safe and reliable use of the main access point into the park. Additionally, renovation of the dock should entail lengthening existing boat slips and expansion to include additional boat slips to accommodate increased visitation by private boat. Adjacently, installation of well-organized and permitted mooring buoys would also assist with boating capacity.

The ranger station and supply store area will be replaced by a new visitor center, serving interpretive, administrative, and basic hospitality functions. Off-grade design is anticipated. With construction of a new visitor center, the restroom building currently located at this site will be removed, with replacement restrooms being located inside the visitor center. Footprint of the new construction should remain generally within the footprint of the existing multi-structure complex. As dock improvements, shop relocation, restroom removal, and visitor center construction are conducted, a comprehensive redesign of the Pelican Bay Use Area is needed to ensure space efficiency, optimal connectivity, and storm resilience. Master planning may guide scaling and various design elements.

**Pelican Bay Support Area**

The dock located in the support area requires extensive repair and renovation. A boathouse should be constructed to separate the park support boats from the visitor use area and protect vessels from damaging weather conditions.

The existing shop has recently undergone repairs and additions, including solar panels for the enhancement of efficient park operations, however, replacement of the shop buildings is ultimately recommended. Location of replacement structures is recommended adjacent to the northwest corner of the existing shop footprint. Replacement structures should consolidate building spaces and functions to reduce the large footprint of the existing shop facilities. Small climate-controlled space may be considered within the shop as needed and feasible to better support staff in the typically warm and humid weather conditions of the island. The recommended location and design should moderately reduce the vulnerability of the shop to storm surge and flooding, while retaining the support assets within practical reach of the dock facilities and park office. The perimeter around the shop should be aesthetically

enhanced to create a visual and auditory buffer between the shop and Pelican Bay Use Area. Tree and shrub installations are recommended for this purpose. If further site analysis finds that shop replacement is infeasible at this priority location, two alternatives are proposed.

Potential alternative sites for replacement of the shop include either the Old Water Tower Site or the dredge spoil/burn site. A sheltered interior site would be significantly less vulnerable to storm impacts and tidal changes, offering space for volunteer tent sites. If relocated within the interior of the island, discontinuation of the existing shop would allow the current waterfront site to be repurposed for visitor amenities or partial restoration/landscape enhancement, which are to be addressed through site-specific planning. Docks at Pelican Bay may be continued for support purposes as the alternative shop locations would not be waterfront and the main park access docks of Pelican Bay should be reserved for visitors.

**Tram Road**

The east-west oriented tram road extending between Pelican Bay and the Gulf Beach Use Area should be improved to provide ease of access by tram service vehicles and walking or cycling. Road improvements should repair and stabilize the road, but not reduce its permeability. Alleviating drainage issues should be a priority. Wayfinding and interpretive signage may be added or modified as needed to improve the visitor experience as a shared use path for exploring and traversing the island.

**Gulf Beach Use Area**

To provide additional shelter and convenience for beach visitors, a row of 10 small shade/picnic pavilions should be constructed along the inland periphery of the beach. The row of pavilions should extend perpendicular to the beach access path, with five pavilions to each side of the path, such that users will enjoy generally unobstructed views over the Gulf. Potential layout may compare to beachside picnic pavilions at Gasparilla Island and Bald Point state parks.

Other improvements to the beach use area should include bathhouse replacement. Planned replacement design is for an off-grade structure, located adjacent to the north side of the existing restroom. One additional small shade pavilion is recommended within the footprint of the former bathhouse.

**Camping Area**

The cabins in this area of the park are in fair to good condition. As needed, improvements and renovations should be made. Recently, park staff added new composite siding and screens to all 12 of the cabins. Future modifications to be implemented in the next 10 years include comfort amenities to encourage year-round use, such as non-electric heat fans, but improvements should maintain the primitive character of the cabin experience. If complete replacement of the cabins becomes necessary, fully screened cabins are recommended as an alternative design. Screened designs may be comparable to the cabins located along the Suwannee River Wilderness Paddling Trail, offering superior ventilation for visitors, durability, and simplified maintenance requirements for staff.

The two restroom facilities in the cabin area should be replaced to meet ADA accessibility standards as well as current building codes. Ongoing native landscaping and natural community restoration between the cabin sites and the tent campground should continue to maximize viewshed buffering and park-quality aesthetics.

Adjacent to the tent campground, a group campsite should be established specifically to accommodate the large groups that are increasingly visiting the island. One medium-sized pavilion should be constructed in the group camp as a cooking and scout activity shelter. The group camp will not require another restroom as the site will share the existing restroom near the tent campground.

**South Dock / Southern Gulf Beach Access**

In 2016, the existing bayside dock located near the south end of Cayo Costa was designated for concession boats. Visitor use impacts to the natural communities and shorebird/sea turtle nesting habitat have occurred on the beach side of the trail extending from the south dock, indicating the need for closure of this site for facilitated direct public access. The dock and trail will be maintained for park support purposes only. As permitted in other remote areas of the park, this southern portion of the park will remain accessible for visitors by hiking or other authorized means from the Gulf, such as self-guided boating or paddling. Reduced visitation at this site is expected to result in gradual recovery of the observed impacts. Due to resource impact concerns (i.e., seagrass beds and mangrove swamp) and poor navigability of the shallow waters along this segment of the island, alternative locations for a southern concession dock and beach access trail were determined infeasible. As additional parcels are acquired, depth conditions change, and new navigational information becomes available, alternative access points may be evaluated. Concession ferry access will continue to be facilitated through the docks at Pelican Bay.

**Parkwide Utilities**

Electrical utilities on the island should be upgraded as the Pelican Bay Use Area and shop undergo improvements. Island facilities currently operate on combustion engine generators and a supplemental 20kw solar system. The solar system is limited to an eight-hour energy supply, which frequently defaults to the generators. By increasing the solar capacity to 100kw, the park's existing and new facilities on the island could be completely supplied by solar and provide increased reliability.

**Jug Creek Landbase**

The historic Jug Creek cottages are in poor condition and not suitable for visitor accommodation. For the site to be fully operational, the cottages would need to undergo extensive renovations or be altogether replaced. Removal of the cottages and replacement with new structures may be considered as an alternative to renovating the current cottages. The Bokeelia Historic District is under jurisdiction of Lee County. Removal of the cottages would require approval by Lee County as well as the Division of Historical Resources. To make this decision on the cottages, a historic structures report detailing the condition

of the cottages and their historical significance must be conducted and thoroughly assessed. If any cottages are ultimately removed, new structures could be planned and constructed in the historical style of the original Jug Creek cottages. The historic cottages should be recorded in detail and interpreted prior to any removal efforts. Pending the findings of historic structures study, a potential recommendation may be to preserve at least one original cottage for interpretation. Public use of the Jug Creek dock and ramp could resume when cottages are again available for rental. Pending improvement of site conditions, the Jug Creek landbase may also be considered for a reliably available basic primitive campsite to support through-paddlers of the Calusa Blueway and Florida Circumnavigational Saltwater Paddling Trail.

Alternative options for the Jug Creek site would be to remediate the structures in poor condition and maintain the area primarily or exclusively for operational support purposes. Decisional factors must include the costs of cottage rental operations, staffing limitations, compatibility with daily park operations at the landbase, and sustained navigability of Jug Creek for recreational purposes.

## Facilities Development

Preliminary cost estimates for these recommended facilities and improvements are provided in the 10-Year Implementation Schedule and Cost Estimates Table located in the Implementation Component of this plan. These cost estimates are based on the most cost-effective construction standards available at this time. The preliminary estimates are provided to assist DRP in budgeting future park improvements and may be revised as more information is collected through the planning and design processes. New facilities and improvements to existing facilities recommended by the plan include:

**Pelican Bay Use Area**

**Visitor/Ferry Dock**
replace pilings
extend/add boat slips
install boat moorings

**Visitor Center**
construct multipurpose visitor center

**Pelican Bay Support Area**

**Support Dock**
renovate dock
construct boathouse

**Shop Building**
replace existing shop

**Old Water Tower Site**
new shop site alternative

**South Dock**
designate for support purposes

**Tram Road**
improve road surfacing/drainage
enhance interpretation/wayfinding

**Gulf Beach Use Area**
construct shade/picnic pavilions
replace restroom

**Camping Area**
renovate/replace cabins
replace restrooms
enhance landscape
develop group campsite

**Parkwide Utilities**
upgrade solar electric capacity

**Jug Creek Landbase**
restore, replace, or remove cottages
designate primitive paddling campsite

## Recreational Carrying Capacity

Carrying capacity is an estimate of the maximum number of users a recreation resource or facility can accommodate, while still providing a high-quality recreational experience and preserving the natural values of the site. Assessments of carrying capacity include the land and water requirements for each recreational and interpretive activity, e.g., 60 linear feet of shoreline per angler or 200 square feet of beach per person for general beach activities such as swimming and sunbathing. Each use area offers unique sizes and physical characteristics, such that total carrying capacities vary from one park to another.

Estimated recreational carrying capacity is a preliminary measure of the number of users the unit could accommodate after proposed development concepts are implemented.

| **Recreational Carrying Capacity** | | | | | | |
|---|---|---|---|---|---|---|
| | **Existing Capacity** | | **Proposed Additional Capacity** | | **Estimated Recreational Capacity** | |
| **Facility / Activity** | **One Time** | **Daily** | **One Time** | **Daily** | **One Time** | **Daily** |
| **Gulf Beach** | | | | | | |
| Swimming/ Beach Activities | 1,590 | 2,760 | | | 1,590 | 2,760 |
| Shoreline Fishing | 210 | 420 | | | 210 | 420 |
| Picnicking | 32 | 64 | 88 | 176 | 120 | 240 |
| **Trails** | | | | | | |
| Hiking/ Cycling | 72 | 288 | | | 72 | 288 |
| **Pelican Bay** | | | | | | |
| Visitor Center | | | 150 | 600 | 150 | 600 |
| Boat Camping | 48 | 48 | | | 48 | 48 |
| **Island Camping Area** | | | | | | |
| Tent Camping | 240 | 240 | | | 240 | 240 |
| Cabin Camping | 72 | 72 | | | 72 | 72 |
| Group Camping | | | 30 | 30 | 30 | 30 |
| **Jug Creek Landbase** | | | | | | |
| Cabin Stay | | | 42 | 42 | 42 | 42 |
| **Total** | **2,264** | **3,892** | **310** | **848** | **2,574** | **4,740** |

## Optimum Boundary

The optimum boundary map reflects lands considered desirable and significant for direct management by the DRP as part of the state park. These parcels may include public or privately owned land that would improve the continuity of existing parklands, provide the most efficient boundary configuration, improve access to the park, provide additional natural and cultural resource protection, or allow for future expansion of recreational activities. Parcels that are potentially surplus to the management needs of DRP are also identified. As additional needs are identified through park use, development, and research, and as land uses on adjacent properties change, modification of the optimum boundary for the park may be necessary.

Identification of parcels on the optimum boundary map is intended solely for planning purposes, not in connection with any regulatory action. Any party or governmental entity should not use a property's identification on the optimum boundary map to reduce or restrict the lawful rights of private landowners. Identification on the map does not empower or suggest that any government entity should impose additional or more restrictive environmental land use or zoning regulations. Identification should not be used as the basis for permit denial or imposition of permit conditions.

The optimum boundary for Cayo Costa State Park includes all remaining unimproved private and county lands on Cayo Costa and remaining unimproved private parcels on the central and southern portions of North Captiva Island that are contiguous with existing park boundary. Benefits of these acquisitions would include resource protection and enhanced access for management. On Cayo Costa proper, acquisition of numerous inholdings would close management gaps between portions of the park, providing greater range of shoreline and interior trail access for recreational and interpretive opportunities. If all remaining unimproved parcels are acquired, segments of platted road rights of way through the north part of Cayo Costa may additionally be transferred to park management.

The inland lagoon located near the beach access use area on the Gulf side at the widest portion of Cayo Costa is included within the optimum boundary for resource management and protection purposes. The formation of the lagoon occurred within the past 40 years as a result of sand accretion patterns. Except for one private outparcel on the southeast shore, the lagoon waters are surrounded by uplands and dry shoreline managed by the park. The one-mile-long and .25-mile-wide lagoon covers approximately 102 acres and maintains an average 10-foot depth. Imperiled shorebird and wading species frequently use tidally exposed mudflats and beach shoreline along the lagoon for foraging and resting perennially. Lagoon waters and shoreline are also significant for loggerhead and green sea turtle nesting.

Sovereign submerged lands also of interest include multiple areas of consolidated substrate hardbottom, located within the nearshore zone of

Murdock Point
Pelican Pass
PUNTA BLANCA ISLAND
Pelican Bay
Primo Bay
PRIMO ISLAND
BIRD KEY
MIDDLE KEY
CABBAGE KEY
Platt Point
CAYO COSTA ISLAND
The Narrows
Pejuan Cove
Pejuan Point
MONDONGO ISLAND
USEPPA ISLAND
PINE ISLAND SOUND
Jug Creek Shoal
BOKEELIA ISLAND
Back Bay
Little Bokeelia Bay
Big Jim Creek
PART ISLAND
Orange Pass
BLACK KEY
COON KEY
Wood Key
Little Wood Key
PINE ISLAND NATIONAL WILDLIFE REFUGE
Captiva Shoal
GULF OF MEXICO
Captiva Pass
Safety Harbor
Foster Point
Foster Bay
NORTH CAPTIVA ISLAND
South Banks
PINE ISLAND SOUND AQUATIC PRESERVE
Redfish Pass

**Legend**

Park Boundary

Optimum Boundary

bing



CAYO COSTA STATE PARK

N

0 0.25 0.5 1 Mile

Florida Department of Environmental Protection
Division of Recreation and Parks
Date of aerial; 2011

OPTIMUM BOUNDARY MAP

southwestern Cayo Costa proper, approximately 300 feet seaward from the Gulf beach (roughly on latitude with Pejuan Point). Management interests include both the protection of marine resource and assurance of visitor safety.

Management of the sovereign submerged lands located 25 feet seaward of the mean high waterline, along the Gulf shorelines of both Cayo Costa and North Captiva, is also proposed for resource protection.

No lands are considered surplus to the management or conservation needs of Cayo Costa State Park at this time.

## IMPLEMENTATION COMPONENT

The resource management and land use components of this management plan provide a thorough inventory of the park's natural, cultural and recreational resources, outlining the park's management needs and problems and recommending both short and long-term objectives and actions to meet those needs. The implementation component reports on the progress of the DRP toward achieving resource management, capital improvement, and operational goals and objectives since approval of the previous management plan for this park.

A compiled list is provided in the following spreadsheet, identifying all proposed goals, objectives, and actions for the next 10-year planning period with estimated costs and timeframes for completion.

## MANAGEMENT PROGRESS

Since approval of the previous management plan for Cayo Costa State Park in 2005, significant work has been accomplished and progress made towards meeting the DRP's management objectives for the park. These accomplishments fall chiefly within two of the five general categories that encompass the mission of the park and the DRP.

### Resource Management

Natural Resources

- Burned 246 acres (prescribed and wildfire)
- Treated 805 acres of exotic-invasive plants
- Removed 792 feral hogs, 968 racoons, 3 coyotes, 4 feral cats, 7 black spiny tailed iguanas, and 4 armadillos
- Documented 3,354 loggerhead (*Caretta caretta*) and 58 green (*Chelonia mydas*) sea turtle nests
- Surveyed all management zones of the park for exotic-invasive plants
- Tracked all prescribed fire, mechanical treatment, and exotic-invasive plant treatment and surveys in the statewide database
- Ongoing efforts to control exotic-invasive plant and animal species, update species lists, and monitor for imperiled species
- Conducted a gopher tortoise survey with population assessment for the park in collaboration with the Joseph W. Jones Ecological Research Center in 2015
- Collaborated with USDA for a successful feral hog removal and eradication effort in 2016

Cultural Resources

- Completed a predictive model for archaeological sites the park in 2013
- Trained/certified multiple staff in Archaeological Resource Management (ARM), with regular refresher trainings to remain current with best management practices

## MANAGEMENT PLAN IMPLEMENTATION

This management plan is written for a timeframe of 10 years, as required by Section 253.034, Florida Statutes. The 10-Year Implementation Schedule and Cost Estimates summarizes the management goals, objectives and actions that are recommended for implementation over this period, and beyond. Measures are identified for assessing progress toward completing each objective and action. A time frame for completing each objective and action is provided. Preliminary cost estimates for each action are provided and the estimated total costs to complete each objective are computed. Finally, all costs are consolidated under the following five standard land management categories: Resource Management, Administration and Support, Capital Improvements, Recreation and Visitor Services, and Law Enforcement.

Many of the actions identified in the plan can be implemented using existing staff and funding. Several continuing and new activities, however, with measurable quantity targets and projected completion dates are identified that cannot be completed during this planning period without additional resources allocated for these purposes. Recommended actions, time frames and cost estimates stated in this plan will guide the DRP's management decisions and associated budgeting for the next 10 years. It must be noted that these recommendations are based on the information that exists at the time the plan was prepared. A high degree of adaptability and flexibility must be built into this process to ensure that the DRP can adjust to changes in the availability of funds, refined understanding of the park's natural and cultural resources, and changes in statewide environmental affairs, priorities and policies.

Statewide priorities for all aspects of land management are evaluated each year as part of the process for developing the DRP's annual legislative budget requests. When preparing these annual requests, the DRP considers the needs and priorities of the entire state park system and the projected availability of funding from all sources during the upcoming fiscal year. In addition to annual legislative appropriations, the DRP pursues supplemental sources of funds and staff resources wherever attainable, including grants, volunteers, and partnerships with other entities. The ability of the DRP to accomplish the specific actions identified in the plan will be determined largely by the availability of funding, staff, and equipment for these purposes, which may vary annually. Consequently, the target schedules and estimated costs identified in the following table may require adjustment during the 10-year management planning cycle.

| **NOTE: THE DIVISION'S ABILITY TO COMPLETE THE OBJECTIVES OUTLINED BY THE MANAGEMENT PLAN IS CONTINGENT ON THE AVAILABILITY OF FUNDING AND OTHER RESOURCES FOR THESE PURPOSES.** | | | | |
|---|---|---|---|---|
| **Goal I: Provide administrative support for all park functions.** | | **Measure** | **Planning Period** | **Estimated Manpower and Expense Cost* (10-years)** |
| **Objective A** | **Continue routine administrative support at current levels.** | **Administrative support ongoing** | **C** | **$800,000** |
| **Objective B** | **Expand administrative support as new lands are acquired, new facilities are developed, or as other needs arise.** | **Administrative support expanded** | **LT** | **$110,000** |
| **Goal II: Protect water quality and quantity in the park, restore hydrology to the extent feasible, and maintain the restored conditions.** | | **Measure** | **Planning Period** | **Estimated Manpower and Expense Cost* (10-years)** |
| **Objective A** | **Conduct/obtain an assessment of the park's hydrological needs.** | **# Acres within proper hydrological functions** | **UFN** | **$71,500** |
| Action 1 | Determine long-term sustainability of fresh groundwater for park use | Strategy report developed | UFN | $25,000 |
| Action 2 | Determine effects of sea level rise on the freshawater lens | Plan developed/updated | UFN | $25,000 |
| Action 3 | Continue to conduct groundwater quality testing; especially after major storm events | # Tests completed | C | $21,500 |
| **Goal III: Restoreand maintain the natural communities/habitat of the park.** | | **Measure** | **Planning Period** | **Estimated Manpower and Expense Cost* (10-years)** |
| **Objective A** | **Within 10 years, have 49 acres of the park maintained within the optimum fire return interval.** | **# Acres within fire return interval target** | **C** | **$55,000** |
| Action 1 | Update annual burn plan to represent pyric communities | Plan updated | ST | $4,000 |
| Action 2 | Manage areas for wildfire/fuel suppression | Fuel load reduced / # Acres burned | C | $51,000 |

* 2020 Dollars
ST = actions within 2 years
LT = actions within 10 years
C = long term or short term actions that are continuous or cyclical
UFN = currently unfunded need

**NOTE: THE DIVISION'S ABILITY TO COMPLETE THE OBJECTIVES OUTLINED BY THE MANAGEMENT PLAN IS CONTINGENT ON THE AVAILABILITY OF FUNDING AND OTHER RESOURCES FOR THESE PURPOSES.**

| **Goal IV: Maintain, improve, or restore imperiled species populations and habitats in the park.** | | **Measure** | **Planning Period** | **Estimated Manpower and Expense Cost* (10-years)** |
|---|---|---|---|---|
| **Objective A** | **Develop/Update baseline imperiled species occurrence inventory lists for plants and animals.** | **List developed/updated** | **C** | **$6,360** |
| **Objective B** | **Monitor and document 10 selected imperiled animal species in the park.** | **# Species monitored** | **C** | **$331,400** |
| Action 1 | Implement monitoring protocols for 10 imperiled animal species including loggerhead sea turtles, green sea turtles, piping plovers, American oystercatchers, least terns, snowy plovers, Wilson's plovers, black skimmers, and eastern indigo snakes | # Protocols developed | ST | $111,400 |
| Action 2 | Complete all required FWC survey protocols for imperiled sea turtles and nesting shorebirds/seabirds | # Protocols completed | UFN | $200,000 |
| Action 3 | By 2025, resurvey/replicate line transect distance sampling protocols to estimate the gopher tortoise population on the island and look for changes | Population survey completed | UFN | $20,000 |
| **Objective C** | **Monitor impacts on shorebird and sea turtle nesting by terrestrial nuisance species in the park.** | **Impacts reported** | **C** | **$25,000** |
| **Objective D** | **Monitor and document 7 selected imperiled plant species in the park.** | **# Species monitored** | **UFN** | **$5,640** |
| Action 1 | Develop monitoring protocols for 4 imperiled plant species including the Sanibel shrubverbena, cardinal airplant, giant airplant, Florida mayten, and West Indian cock's-comb | # Protocols developed | UFN | $2,400 |
| Action 2 | Implement monitoring protocols for 5 imperiled plant species including those listed in Action 1 above and | # Species monitored | UFN | $1,620 |
| Action 3 | Develop and implement a yearly survey for the federally listed west coast prickly apple cactus | Protocol developed and # monitoring completed | UFN | $1,620 |

| **Goal V: Remove exotic and invasive plants and animals from the park and conduct needed maintenance control.** | | **Measure** | **Planning Period** | **Estimated Manpower and Expense Cost* (10-years)** |
|---|---|---|---|---|
| **Objective A** | **Annually treat 123 acres of exotic plant species in the park.** | **# Acres treated** | **C** | **$1,721,000** |
| Action 1 | Annually develop/update exotic plant management work plan | Plan developed/updated | C | $16,000 |
| Action 2 | Implement annual work plan by treating 123 infested acres (approximately 275 gross acres in park, annually, and continuing maintenance and follow-up treatments, as needed | Plan implemented | UFN | $1,705,000 |
| **Objective B** | **Implement control measures on 3 exotic and nuisance animal species in the park.** | **# Species for which control measures** | **UFN** | **$310,050** |
| Action 1 | Continue to trap exotic animals in house and report to the district office quarterly. | # exotic and nuisance | UFN | $110,050 |
| Action 2 | Apply for outside funding to hire an OPS trapper for nuisance animal removal during sea turtle nesting season | OPS position funded | UFN | $100,000 |
| Action 3 | Continue contract trapping to remove exotic/nuisance animals | # Contract trappers hired | UFN | $100,000 |

* 2020 Dollars
ST = actions within 2 years
LT = actions within 10 years
C = long term or short term actions that are continuous or cyclical
UFN = currently unfunded need

**NOTE: THE DIVISION'S ABILITY TO COMPLETE THE OBJECTIVES OUTLINED BY THE MANAGEMENT PLAN IS CONTINGENT ON THE AVAILABILITY OF FUNDING AND OTHER RESOURCES FOR THESE PURPOSES.**

| **Goal VI: Protect, preserve, and maintain the cultural resources of the park.** | | **Measure** | **Planning Period** | **Estimated Manpower and Expense Cost* (10-years)** |
|---|---|---|---|---|
| **Objective A** | **Assess and evaluate 24 of 24 recorded cultural resources in the park.** | **Documentation complete** | **C** | **$75,750** |
| Action 1 | Annually complete 24assessments/evaluations of 26 archaeological sites, and develop and implement monitoring program | # Assessments completed | C | $5,000 |
| Action 2 | Complete 24 Historic Structures Reports (HSR) for identified historic buildings. Prioritize stabilization, restoration, and rehabilitation projects | # HSR's completed | UFN | $70,750 |
| Action 3 | Develop a plan for monitoring and managing archaeological and historical sites and materials that are susceptible to coastal erosion | Plan developed | LT | $0 |
| **Objective B** | **Compile reliable documentation for all recorded historic and archaeological resources.** | **Documentation complete** | **C** | **$96,500** |
| Action 1 | Ensure all known sites are recorded or updated in the Florida Master Site File | # Sites recorded or updated | C | $4,200 |
| Action 2 | Conduct Level 1 archaeological survey for 3 priority areas identified by other previous study | # Archeological surveys | UFN | $90,000 |
| Action 3 | Develop and adopt a Scope of Collections Statement | Scope of Collections | UFN | $2,300 |
| **Goal VII: Provide public access and recreational opportunities in the park.** | | **Measure** | **Planning Period** | **Estimated Manpower and Expense Cost* (10-years)** |
| **Objective A** | **Maintain the park's current recreational carrying capacity of 3,892 users per day.** | **# Recreation/visitor opportunities per day** | **C** | **$55,000** |
| **Objective B** | **Expand the park's recreational carrying capacity by 848 users per day.** | **# Recreation/visitor opportunities per day** | **LT** | **$10,000** |
| **Objective C** | **Continue to provide the current repertoire of 5 interpretive, educational, and recreational programs on a regular basis.** | **# Interpretive/education programs** | **C** | **$20,000** |
| **Objective D** | **Develop new interpretive, educational, and recreational programs.** | **# Interpretive/education programs** | **ST** | **$10,000** |
| **Goal VIII: Develop and maintain the capital facilities and infrastructure necessary to meet the goals and objectives of this management plan.** | | **Measure** | **Planning Period** | **Estimated Manpower and Expense Cost* (10-years)** |
| **Objective A** | **Maintain all public and support facilities in the park.** | **Facilities maintained** | **C** | **$45,000** |
| **Objective B** | **Continue to implement the park's transition plan to ensure facilities are accessible in accordance with the American with Disabilities Act of 1990.** | **Plan implemented** | **LT** | **$10,000** |
| **Objective C** | **Improve/repair visitor use and staff support facilities (8 facilities and 1 miles of road).** | **# Facilities/Miles of Trail/Miles of Road** | **LT** | **$500,000** |
| **Objective D** | **Expand maintenance activities as existing facilities are improved and new facilities are developed.** | **Facilities maintained** | **LT** | **$15,000** |

* 2020 Dollars
ST = actions within 2 years
LT = actions within 10 years
C = long term or short term actions that are continuous or cyclical
UFN = currently unfunded need

**Cayo Costa State Park**
**10-Year Implementation Schedule and Cost Estimates**
**Sheet 4 of 4**

**NOTE: THE DIVISION'S ABILITY TO COMPLETE THE OBJECTIVES OUTLINED BY THE MANAGEMENT PLAN IS CONTINGENT ON THE AVAILABILITY OF FUNDING AND OTHER RESOURCES FOR THESE PURPOSES.**

**Summary of Estimated Costs**

| Management Categories | | Total Estimated Manpower and Expense Cost* (10-years) |
|---|---|---|
| Resource Management | | **$2,698,200** |
| Administration and Support | | **$910,000** |
| Capital Improvements | | **$570,000** |
| Recreation Visitor Services | | **$95,000** |
| Law Enforcement Activities[1] | | **n.a.** |
| | **1**Law enforcement activities in Florida State Parks are conducted by the FWC Division of Law Enforcement and by local law enforcement agencies. | |

* 2020 Dollars
ST = actions within 2 years
LT = actions within 10 years
C = long term or short term actions that are continuous or cyclical
UFN = currently unfunded need

# Appendix 1—Acquisition History

| Land Acqusition Report | |
|---|---|
| **Park Name** | Cayo Costa State Park |
| **Date Updated** | 5/1/2020 (includes parcels formerly owned by Lee County) |
| **County** | Lee County, Florida |
| **Trustees Lease Number** | Trustees Lease No. 3426 |
| **Current Park Size** | 2643.9 acres |
| | |
| **Purpose of Acquisition** | The State of Florida acquired Cayo Costa State Park for recreational purposes. |

**Acquisition History (includes only acquisitions of parcels 10 acres or greater)**

| Parcel Name /Parcel DM-ID | Date Acquired | Initial Seller | Initial Purchaser | Acreage | Instrument Type |
|---|---|---|---|---|---|
| DMID3662 | 12/21/1976 | North Captiva Company | The Board of Trustees of the Internal Improvement Trust Fund of the State of Florida (Trustees) | 130.134 | Warranty Deed |
| DMID3780 | 8/22/1984 | Lee County | Trustees | 130.672 | County Deed |
| DMID3664 | 12/10/1976 | John Lehr Individually and as Trustee | Trustees | 110.898 | Warranty Deed |
| DMID3779 | 8/15/1984 | Lee County, Florida | Trustees | 87.914 | County Deed |
| DMID3665 | 12/15/1976 | Cayo Costa Land, Inc. | Trustees | 79.52 | Indenture |
| DMID3648 | 12/18/1976 | Georgia L. Webster Allyson Sue Bixler Mary Lynn Bixler | Trustees | 78.361 | Warranty Deed |
| DMID349939 | 12/31/1998 | Edison Community College Foundation, Inc. and Goodwill Industries of Southwest | Trustees | 75.044 | Warranty Deed |

| | | | | | |
|---|---|---|---|---|---|
| | | Florida, Inc. | | | |
| DMID3670 | 12/17/1976 | Robert M. Taylor<br>Individually and as Trustees | Trustees | 67.518 | Indenture |
| DMID3677 | 4/4/1978 | Thompson S. Baker | Trustees | 63.059 | Warranty Deed |
| DMID3663 | 10/14/1976 | Edythe M. Garten<br>and<br>Clyde H. Wilson | The Board of Trustees of the Internal Improvement Trust Fund of the State of Florida (Trustees) | 40.417 | Warranty Deed |
| DMID3649 | 1/28/1977 | John William Pocock<br>and<br>his wife<br>Elizabeth S. Pocock | Trustees | 35.255 | Warranty Deed |
| DMID3688 | 9/9/1980 | Cayo Costa Land, Inc. | Trustees | 35.244 | Indenture |
| DMID47 | 9/9/1980 | Cayo Costa Land, Inc. | Trustees | 33.229 | Indenture |
| DMID3636 | 11/23/2017 | Addison B. Miller<br>Robert M. Christianson<br>and<br>Alfred D. Petersen, as Trustees | Trustees | 30.769 | Indenture |
| DMID6832 | 10/7/1976 | Meldon L. Glenn | Trustees | 27.19 | Warranty Deed |
| DMID3647 | 3/10/1977 | Goergia L. Webster<br>Allyson Sue Bixler<br>and<br>Mary Lynn Bixler | Trustees | 24.229 | Indenture |
| DMID3680 | 4/5/1978 | Charles J. Dahdah<br>and<br>Wilson M. Biggers, individually<br>and as Trustees | Trustees | 22.798 | Warranty Deed |
| DMID3722 | 1/27/1983 | Safety Harbor Corporation | Trustees | 20.982 | Warranty Deed |

| | | | | | |
|---|---|---|---|---|---|
| DMID15272 | 7/23/1997 | George Diercks | Trustees | 16.777 | Warranty Deed |
| DMID3671 | 11/23/1976 | Addison B. Miller<br>Robert M. Christianson<br>and<br>Alfred D. Petersen | Trustees | 13.777 | Indenture |
| DMID3686 | 5/10/1978 | Douglas Bathey<br>and<br>his wife<br>Mercy Bathey | Trustees | 16.12 | Warranty Deed |
| DMID15274 | 5/26/1998 | The Diocese of Venice | Trustees | 12.454 | Warranty Deed |
| DMID3646 | 10/26/1977 | Travis A. Gresham<br>and<br>his wife<br>Frances H. Gresham | Trustees | 12.106 | Warranty Deed |
| DMID3657 | 9/7/1976 | Nelson P. Rose<br>and<br>his wife<br>Elizabeth H. Rose | State of Florida | 11.95 | Warranty Deed |
| DMID3656 | 9/7/1976 | Nelson P. Rose<br>and<br>his wife<br>Elizabeth H. Rose | State of Florida | 11.423 | Warranty Deed |
| DMID3676 | 4/20/1978 | Cayo Costa Land, Inc. | The Board of Trustees of the Internal Improvement Trust Fund of the State of Florida (Trustees) | 10.683 | Indenture |
| DMID3655 | 10/15/1976 | Peggy B. Kling | Trustees | 10.58 | Indenture |

| | | | | | |
|---|---|---|---|---|---|
| DMID3659 | 9/7/1976 | Joseph G. Fogg<br>and<br>his wife<br>Elizabeth T. Fogg | State of Florida | 10.214 | Warranty Deed |

## Management Lease

| Parcel Name or Lease Number | Date Leased | Initial Lessor | Initial Lessee | Current Term | Expiration Date |
|---|---|---|---|---|---|
| Lease No. 3426 | 2/25/1986 | The Board of Trustees of the Internal Improvement Trust Fund of the State of Florida | The State of Florida Department of Natural Resources for the use and benefit of the Division of Recreation and Parks | 50 (fifty) year | 2/24/2036 |
| | | | | | |

| Outstanding Issue | Type of Instrument | Brief Description of the Outstanding Issue | Term of the Outstanding Issue |
|---|---|---|---|
| The property will be used only for recreation and public purposes. | Federal Patent | *If control over the property is given to other entity or if the subject lands are not used for park purpose, title to the subject lands sill evert to back to the United States of America.* | Perpetual |
| Life estate | Warranty Deed | The deed is subject to a certain exclusive use of the subject property by the grantor for as long as at least one of the grantors alive. | Perpetual |

# Appendix 2—Advisory Group Members and Report

**Cayo Costa State Park**
**Advisory Group Members**

**Local Government Representatives**
Cecil Pendergrass, Commissioner
Lee County Board of Commissioners, District 2

Jack Tanner, Chairman
Lee County Soil and Water Conservation District

**Agency Representatives**
William Nash, Park Manager
Division of Recreation and Parks
Cayo Costa State Park

Michael Edwards, Senior Forester
Florida Forest Service, Region 4

Nancy Douglass, Regional Wildlife Biologist Florida Fish and Wildlife Conservation Commission, Southwest Region

Guy Carpenter, Law Enforcement Captain
Florida Fish and Wildlife Conservation Commission, Southwest Region

Heather Stafford, Southwest Florida Aquatic Preserves Manager
Florida Coastal Office

Jason O'Donoughue, Public Lands Archaeologist
Florida Department of State, Division of Historical Resources, Bureau of Archaeological Research

**Tourism Development Council Representative**
Tamara Pigott, Executive Director
Lee County Visitor and Convention Bureau

**Environmental and Conservation Representatives**
Eric Lindblad, Chief Executive Officer
Sanibel-Captiva Conservation Foundation

Dan Van Norman, President
Audubon of Southwest Florida

**Recreational User Representatives**
John Courtright, Trail Keeper
Florida Paddling Trails Association, Charlotte Harbor Region

Randall Johnson
local boating community member

**Adjacent Landowner**
Margi Nanny
adjacent landowner

Randy Crosby
adjacent landowner

**Citizen Support Organization Representative**
Sharon McKenzie, Executive Director
Barrier Island Parks Society

Elaine McLaughlin, Chair
Friends of Cayo Costa State Park

# Cayo Costa State Park
# Advisory Group Meeting Report

The advisory group meeting to review the proposed unit management plan (UMP) for Cayo Costa State Park was held on Pine Island, in the community of St. James City, at Fishers of Men Lutheran Church on Wednesday, March 21, 2018, at 9:00 am.

Morgan Parks represented the Florida Fish and Wildlife Conservation Commission (FWC). Arielle Taylor-Manges represented the Charlotte Harbor Aquatic Preserves. Cathy Olson Represented Lee County and was accompanied by Becky Sweigert. Cookie Brunner accompanied Elaine McLaughlin to represent the Friends of Cayo Costa State Park. Holly Burke and Krista Haynes represented the Barrier Island Parks Society. Nancy MacPhee represented the Lee County Visitor and Convention Bureau. Chris Lechowicz represented the Sanibel-Captiva Conservation Foundation. Lee County Soil and Water Conservation District was not in attendance. John Courtright of the Florida Paddling Trails Association and Sharon McKenzie of the Barrier Island Parks Society were not in attendance but participated in the general public meeting and submitted written comments. Jason O'Donoughue was not in attendance but submitted written comments. All other appointed advisory group members were present. Four members of the general public, not appointed to the advisory group, also observed the meeting. Attending Division of Recreation and Parks (DRP) staff members were Valinda Subic, Karen Rogers, William Nash, Robert Longo, and Daniel Alsentzer.

Mr. Alsentzer began the meeting by explaining the purpose of the advisory group and reviewing the meeting agenda. He provided a brief overview of the DRP's planning process and summarized public comments received during the public meeting as well as the written comments received from members not in attendance. William Nash provided a brief overview of park updates and daily operations. Karen Rogers provided a brief overview of the resource management plans for the park as proposed in the draft UMP. Mr. Alsentzer then asked each member of the advisory group to introduce themselves and express his or her comments on the draft plan.

After all members commented, advisory group members offered further remarks and questions. Next, members of the general public observing the meeting provided comments and asked questions to which DRP staff responded. Mr. Alsentzer described next steps for drafting the plan and the meeting was adjourned.

## Summary of Advisory Group Comments

**Morgan Parks (Florida Fish and Wildlife Conservation Commission)** noted that the state guidelines for bald eagle nest buffering were updated in 2017 and that the draft plan references the 2008 version. FWC's ability to provide assistance in surveying and demarcating eagle nesting areas has changed. Ms. Parks stated that the park's current and planned shorebird monitoring program on Cayo Costa is commendable but challenging work that should be supported by more volunteerism, including pre-posting and monitoring for predation. She stated that increased volunteer support on the island could significantly enhance the park's shorebird monitoring and protection.

**Guy Carpenter (FWC Law Enforcement)** affirmed the constant availability and willing support of FWC law enforcement in management of the island's safe visitation and resource protection.

**Arielle Taylor-Manges (Charlotte Harbor Aquatic Preserves)** briefly described the potential need for dock permitting if expanding or extending docks or dredging channels on the Charlotte Harbor side of the island, particularly where docks are located within the aquatic preserve. She noted the importance of routine water quality monitoring and septic tank inspections in the park and on adjacent lands. Ms. Manges noted the natural and cultural resource impacts that often occur in the aquatic preserve as a result of anchoring. She encouraged installation of mooring balls to mitigate anchor impacts on seagrasses and other marine resources. Regarding visitor management and carrying capacity studies, she stated that staff and volunteers with the aquatic preserve occasionally conduct boat counts. She recommends a partnership between the park and aquatic preserve to monitor boating patterns.

**Cathy Olson (Lee County Government)** commended the writing of the plan document. Ms. Olson referenced the management agreement with the Lee County properties on Cayo Costa, noting that the county owns lands on the island that are managed as park by the Florida Park Service as represented on the reference map in the plan introduction. She encouraged continuing to pursue the acquisition of private inholdings on the island to ensure contiguous conservation management. Ms. Olson recommended mentioning the Calusa Blueway in the plan as a recreation asset in the county.

**Margi Nanney (adjacent landowner)** recognized that developed private inholdings throughout the island pose ongoing management challenges for the park and questioned whether increased or widened access paths are permitted for new construction projects. Ms. Nanney recommended the use of mooring buoys versus anchoring to avoid seagrass scarring on Pelican Bay. She recommended that honor fee stations could be added to the park's various access points to ensure that revenue from visitation is sufficiently collected. Ms. Nanney suggested there could be a program for issuing boat decals for regular visitors arriving by private boat. She expressed the need for a redesign concept for the Nature & Heritage Center. Regarding natural resources, Ms. Nanney commented on significant wildlife observations, noting the presence of American crocodile and diamondback terrapin in Murdock Bayou. Regarding cultural resources, she emphasized the need for monitoring and preservation of the island's numerous archaeological sites, especially Faulkner Mound and stated these sites should be evaluated for state ownership as they are located outside of park boundaries. Ms. Nanney noted that several significant archaeological sites are currently privileged to have volunteer stewardship from conscientious private landowners. She detailed ongoing concerns over unsustainable public access patterns and private property encroachments at the south end of Cayo Costa via a concession-operated ferry service.

**Randy Crosby (adjacent landowner)** affirmed Ms. Nanney's position on the pros and cons of mooring buoys and docks, but questioned the plausibility of reducing anchoring and whether buoy mooring would successfully limit the anchorage along shore. Mr. Crosby noted that Pelican Bay is an aquatic preserve property that would need to be monitored carefully. He inquired about the management authority governing the submerged boundary in the park and best practices for monitoring visitor use and impacts in that aquatic space.

**Randall Johnson (boating community)** noted the park's challenges with providing its own electricity and cited his own company's use of alternative energy, noting that the return on investment was approximately to 15 years, but still an important investment. He noted the challenges that the park's solar system faces in the harsh coastal environment including wind and salt spray. He noted that solar power can be expensive and not long-lasting. Mr. Johnson inquired whether the land use proposals for Pelican Bay involves expansion of footprint or is limited to reconstruction of the existing dock structures, recommending expansion of the docking capacity. He stated that the Pelican Bay docks should offer a proportionate balance between commercial and recreational boats. He inquired about park rules for beaching boats and opportunities for boat mooring along the islands. Mr. Johnson also inquired about the methodologies for quantifying increases in visitation to the park. Mr. Johnson additionally explained that his desired park experience differs from a concession tour/tourist experience, based largely on his knowledge of the island and surrounding waters. He stated that for about one third to one half of his frequent visits, he can anchor on the Gulf side away from the masses, but the other times, he would like to be able to access bayside and not associate with the park experience of the masses. He acknowledged the challenges of managing the south dock for both commercial and private visitor uses. He recommended considering "backcountry permits" for park visitors that could be controlled from the ranger station to allow bayside access to small private boats or kayaks to the more remote areas. Mr. Johnson concluded by stating that Cayo Costa is a very large island on which people could spread out a more efficiently than is currently promoted.

**Michael Edwards (Florida Forest Service)** offered assistance for prescribed fire, forestry field work, and appropriate messaging for the public regarding fire. Mr. Edwards additionally offered assistance with timber assessments, which are statutorily required for large acreage park units and essential for Cayo Costa. Mr. Edwards advised that park managers cooperate with FFS when conducting prescribed burns in the 51 acres of pyric habitats – mesic flatwoods and depression marsh – specifically contacting the FFS Region 4 Wildfire Mitigation Team for assistance burning in wildland urban interface areas, which will assist with notifying the public the day of prescribed burns. Mr. Edwards stated that this park needs to have a timber assessment written to evaluate the potential and feasibility of managing timber resources for conservation and revenue generation purposes. He recommended the development of a reforestation or afforestation plan within the

management plan or as a supplemental plan. Mr. Edwards also suggested management of invasive species through a GIS database of infested and treated acres in the park. He continued by encouraging park staff to be involved with the local Cooperative Invasive Species Management Areas. Mr. Edwards recommended that park staff complete the most updated archeological resource management training. He recommended an update of the GIS database with the 26 archaeological sites and 24 historic structures at the park, along with a visit of each site every year and the use of permeable and semi-permeable construction materials for construction and maintenance of developments in the park to aid the hydrological cycle of the park. In further reference to hydrology, Mr. Edwards recommended an evaluation of the effects of hydrological restoration projects on the surrounding natural communities and encouraged mitigation of any adverse effects on trees and groundcover.

**Holly Burke (Barrier Island Parks Society)** stated the citizen support organization is in favor of a visitor center located in the Pelican Bay area of the park. She affirmed the interpretive and hospitality value to the public.

**Krista Haynes (Barrier Island Parks Society)** explained the purpose and value of the citizens support organization. She stated the importance of communicating visitation rates in the plan and offering county-specific data, not only broad, regional or statewide data. Ms. Haynes supported the proposed improvements at Pelican Bay, including construction of a new visitor center. She encouraged the use of the landbase at Jug Creek as a campsite along the Calusa Blueway. Ms. Haynes Recommended preservation studies for the historic cottages at Jug Creek as well as for other cultural features on the island. She recommended establishment of a beach ambassadors program similar to the program on Gasparilla Island State Park.

**Elaine McLaughlin (Friends of Cayo Costa State Park)** reiterated the purpose of the CSO and identified specific projects, including a vehicle repair lift, volunteer shelter, beach patrol vehicles for turtle nest monitoring, turtle adoption program fundraiser, and the production of a documentary film regarding cultural/oral history of Cayo Costa. Ms. McLaughlin stated she would like to include this documentary in the future interpretive facilities at the park and added the new building should not be described as “visitor center” but rather as the “Nature and Heritage Center”. She described the proposed architectural style and solar electric installations, including mention of a classroom and wrap around deck. Ms. McLaughlin described a need for park funding revenue sources including TDC funds for beach and shoreline improvements. Ms. McLaughlin advised the draft plan does not speak adequately to CSO volunteerism. She affirmed the CSO’s role in organizing, recruitment, and management of volunteers. She urged the park and fundraisers to consider additional volunteer training opportunities and a larger boat to transport volunteers safely to the island.

**Nancy MacPhee (Lee County Visitor & Convention Bureau)** commented on the high volume of tourism in Lee County and noted that Cayo Costa State Park was recorded as generating $1 million in economic activity for the county. Ms. MacPhee cited recognition and involvement from Lee County, stating the bureau could work on procuring funding for beach and shoreline improvements both past and future and for marketing and education. She encouraged including the Calusa Blueway and other paddling trails in the management plan. Ms. MacPhee also announced Lee County has a new relationship with the Sierra Club for organizing paddling trips from Cayo Costa to Koreshan. She suggested Jug Creek should serve primitive camping needs for through-paddlers of designated statewide and regional paddling trails. She explained that the tourism development council could fund restroom facilities and that they want to ensure the park has the resources it needs.

**Chris Lechowicz (Sanibel-Captiva Conservation Foundation)** noted ongoing challenges to imperiled species monitoring on Cayo Costa and North Captiva. Mr. Lechowicz stated that the foundation is searching for potential DRP staff or volunteers to conduct monitoring under the foundation's existing permit. He described the impacts of roads on Cayo Costa on the indigo snake population and emphasized the importance of this species for predation of nuisance rodents. He also emphasized the threat of hogs to the snake population on North Captiva Island and commended the USDA work to reduce this threat. Mr. Lechowicz urged the DRP to continue acquisition of inholdings within the park to ensure that expansive uninterrupted habitat is available for wildlife.

## Summary of Written Advisory Group Comments

**John Courtright (Florida Paddling Trails Association)** reviewed the plan, focusing on the park's recreational aspects, especially kayaking. Mr. Courtright listed the first goal as providing public access and recreational opportunities in the park, specifically mentioning geocaching as a potential activity, with over 70 million "found logs" and 200,000 new geocachers in Florida alone. The second stated goal was to expand the park's recreational carrying capacity by 848 users per day. He agreed that a group campsite would assist with the goal and detailed his own experience on the island as evidence. Mr. Courtright's third goal was developing new interpretive, educational, and recreational programs for park visitors such as a ranger or volunteer lead paddling excursions. The final stated goal was to consider improvement to the boat launch site for paddlecraft such as creating a small launch specifically for kayaks and other small paddlecraft or utilizing a mat material that forms to the contours of the natural terrain to stabilize the water access and prevent erosion rather than poured cement.

**Sharon McKenzie (Barrier Island Parks Society)** stated that while the plan discusses the potential for revenue growth through concessionaires, it does not address the potential for dedicated revenue growth through partnership with the citizen groups serving the parks; noting that while park fees and concessionaire revenue goes into the statewide Parks Trust Fund, the revenue generated by a CSO is reinvested in the specific park to which the volunteer group is attached. She encouraged the plan needs to specifically reference the two groups supporting Cayo Costa State Park. Ms. McKenzie stated that it would beneficial for the park plan to provide a statement about opportunities for capital revenue as well, noting that the Lee County Board of County Commissioners through the Tourist Development Council has provided tens of millions of dollars for capital improvement projects in the state parks located within Lee County boundaries, with Cayo Costa State Park having been the recipient of many recent capital and equipment grants – notably the Pelican Bay restroom facility, new Gulf side bathhouse currently in permitting, the truck and tram to haul visitors, and a beach maintenance vehicle. Ms. McKenzie stated that this is a major opportunity for support as the DRP looks to improve visitor amenities, natural and cultural protections, and programming within the park. Regarding natural resource management objectives in the draft plan, Ms. McKenzie recommended:

- purchasing a larger staff boat and motor to transport volunteers and staff from the land base on Pine Island to the park.
- an organized and regular recruitment, orientation and training of volunteers who can supplement the staffing at the park and provide opportunities for enhanced trail maintenance, exotics removal, visitor reception and services, educational programming, and revenue collection.
- an organized strategy for group volunteer work parties to deal with specific park management-identified projects that can be accomplished in one or two days with a larger workforce.

Ms. McKenzie commented that the plan does not specifically identify certain CSO partnerships for sea turtle nest protection, mentioning the annual turtle nest adoption program with all funds providing supplies for the staff and volunteers who locate, survey and protect the nests. Additionally, she identified that the CSO has purchased two Polaris vehicles to provide a better opportunity for nest monitoring and has recently approved the purchase of a tablet to track nests with the new upcoming, Florida Park Service nest monitoring app. She also stated that the CSO has provided gratitude gifts to the FGCU interns who work regularly on this project, although the plan does not specifically mention the partnership with FGCU for turtle nest monitoring and protection. Ms. McKenzie raised concerns that imperiled species monitoring in the park is overly dependent on state budgetary conditions. She recommended guaranteed minimum budgets for imperiled species monitoring and nuisance animal control be added. Regarding cultural resource management objectives in the draft plan, Ms. McKenzie recommended including goals related to protecting and promoting the history related to the pioneer fishing families who settled the island in the early 1800s; and that the Nature and Heritage Visitor

Center provide a museum area to interpret a history spanning from prehistoric indigenous to the modern periods. Regarding land use proposals in the draft plan, Ms. McKenzie was pleased to support:

- dock repair and improvement
- shop relocation and redesign of the entire welcome area at Pelican Bay
- new visitor center comprised of a ranger station, museum, gift shop, restroom facilities and classroom
- improvements to the tram road
- new picnic shelters
- new bathhouse to serve the Gulf side and campground, already funded and in development
- new group camping area and cooking pavilion
- utilities upgrading

She recommended numerous revisions:

- more comprehensive vision of the Nature & Heritage Visitor Center facility and grounds that includes Ranger Station; museum to house current and future collections; Camp Store/Gift Shop; multi-use classroom/rental space to accommodate at least 50 students; restroom facilities to include multiple stalls and baby changing station in each; wrap-around deck; ADA ramp; multiple outdoor shower/rinsing stations; interpretative native plant gardens
- reference to this structure consistently as the Nature & Heritage Visitor Center
- removal of all references to the square footage to allow for a creative facility design within the footprint of all buildings currently occupying the site
- that the architectural design should be in line with historical buildings similar to the fish houses or Florida style buildings of the pioneer fishing era
- that the Nature and Heritage Visitor Center should be constructed in an environmentally-conscious manner including use of solar energy
- enlargement of current Chiki hut for a group shelter/outdoor educational facility on the beach side, similar to the covered deck facility at Don Pedro Island State Park
- review of the Jug Creek land base use in keeping with historic preservation requirements, including a restroom with potable water, which is eligible for TDC funding and camping facility for those using the Calusa Blueway Paddling Trail similar to arrangements with Koreshan, Lovers Key, and other state parks
- that an area at the Jug Creek land base be designated for small events to enable Friends of Cayo Costa to raise awareness and public support for the park and its capital improvement projects
- that additional wayfinding signs are added throughout the park to enhance the visitor experience

**Jason O'Donoughue (Division of Historical Resources)** affirmed the inventory of the cultural resources in the park as thorough and well written, with some recommended revisions. Mr. O'Donoughue stated that the primary concern is the destruction of cultural resources by coastal erosion, strongly urging the development of a procedure to manage these degrading resources. He advised that the inventory of sites presented in the plan generally accords with the records of the Florida Master Site File (FMSF), with the only exception on page 60, where it is noted that 33 historic structures are recorded within Cayo Costa and Jug Creek. Mr. O'Donoughue advised updating Table 4 and the FMSF with the following records:

- 13 sites on Cayo Costa, not 14
- 7 prehistoric sites on Cayo Costa, not 6

Mr. O'Donoughue additionally commented on:

- misleading sentence on page 54 referring to multiple prehistoric sites found on Cayo Costa and North Captiva that were built by the Caloosahatchee, noting that only the Mark Pardo Shellworks site has been definitively associated with the Caloosahatchee
- statement on page 56 that the site would have been occupied when sea levels were historically lower in this area, should state that this portion of the site may have been occupied when sea levels were historically lower in this area, recognizing that submerged materials may have been deposited directly in the water by Native Americans
- statement on page 57 that researchers predict that the missing 7% are mapped incorrectly in the FMSF, asserts a hypothesis that has not been tested or validated
- notes on page 58 and elsewhere that coastal erosion is a significant factor impacting cultural resources. Mr. O'Donoughue suggests reaching out to the Florida Public Archaeology Network (FPAN), which has an active monitoring program for threatened coastal sites
- notes that vandalism and looting have been a problem in the past, advising that if such a problem should arise in the future, staff from DHR's Public Lands Archaeology program (PLA) are available to conduct archaeological damage assessments

Regarding the goal to protect, preserve, and maintain the cultural resources of the park, Mr. O'Donoughue noted an action under the objective to conduct a "level 1" archaeological survey of priority areas. He agreed that additional surveying is needed, but the language is not consistent with current cultural resource management terminology and is therefore unclear on its intended scope. He referred to DHR's cultural resource management standards and operations manual, which details the scope of archaeological fieldwork of varying intensities.

Mr. O'Donoughue noted that according to the plan, Cayo Costa State Park includes a 400-foot zone offshore from the mean high-water line or edge of vegetation. As such, he advised clarifying that ground disturbances and land clearing above or below the mean high-water line are subject to review by DHR. He additionally commented on the objective to assess and evaluate 26 of 26 recorded cultural resources in the park, stating that According to information in the plan, multiple sites are being lost or damaged as a result of coastal erosion. He advised developing a plan for managing archaeological and historic materials that are eroded along the shoreline as part of the assessment and evaluation of cultural resources in the park (e.g., record and collect, record and leave in place, note disturbances, etc.). He stated that both PLA and FPAN are available to assist with monitoring and recording erosion of coastal sites.

## Summary of Public Comments

**Denise Daggett** inquired about the size and carrying capacity of the proposed Nature and Heritage Center. She questioned whether the center will invite more visitors or just better organize existing visitation. Ms. Daggett commended the garden concept adjacent to the center and encouraged native Calusa gardening practices. She mentioned observations at Hook's Canal of injured or scarred manatees along with shorebird disturbances in lagoon associated with jet skis and other motorized watercraft. Ms. Daggett suggested that signage should be strategically placed and maintained and removed when out of season to exclude adversely impactful recreational activity. In surveying, she recommended using bicycles with wide tires or hiking on foot for surveys as an alternative to all-terrain vehicles, as four-wheeled motorized vehicles leave tracks on the beach, which disturb vegetation and potentially turtle nests, especially during high tides which requires driving higher on the shoreline. She recognized the challenges of monitoring along so many miles of soft and uneven sand, with occasionally limited dry beach. Ms. Daggett urged the DRP to recruit more trained volunteers to assist with the time-consuming and physically arduous monitoring.

**David Turkel** inquired about the park's revenue collection from visitors, noting that private boaters to the island appear to avoid paying admission. Mr. Turkel suggested a revised plan for management of the dock and visitation at the south end of the park. He stated that the park has neglected protection, preservation, and interpretation for the people of Florida, observing that the south dock is no longer available for boaters among the general public of Lee County. He recommended design and placement of signage on this dock with education on environmental stewardship topics such as shorebird and seat turtle protection, and seagrasses. He urged that the concession tours could do more to interpret wildlife protection. Mr. Turkel stated that the southern portion of Cayo Costa is at risk of erosion due to unauthorized, problematic footpaths across the dunescape, referencing a breach through North Captiva. He commented on the pressure on park resources in areas of the park where visitation should not be easily facilitated. He commented that the

Narrows are eroding, and the north end is accreting, which means that a balanced land use strategy is needed to protect the Narrows. He concluded by stating that the concession contract does not account for carrying capacity, but should be amended in the future to do so.

**Brian Holaway** stated that he attended the general public meeting and applauded the staff for conducting these meetings in a manner that allowed stakeholders to discuss concerns. He agreed with most of the comments made but advised that there has been a weighted amount of comments related to the south dock usage. Mr. Holaway advised that there were few general users of the south dock present or tourists to offer alternative perspectives. He emphasized managing the commercial operations of the south end of the island with balance, noting that many in attendance at the meetings have pushed for all commercial operations to take place at the north end of the island, but this shift would not to provide balance. He recognized and agreed with concerns related to the amount of commercial usage at the south dock, but countered that commercial boats have been operating successfully for almost 20 years at the south end prior to the change implemented in 2016. Mr. Holaway stated there are a few ways to continue operating a large commercial boat at the south end of the island, such as reverting to operations prior to the south end dock being used. He added that other ways to lessen the impact to the south end of the island would be to limit large boats at the south point to only landing five days per week and to only use the south end dock when weather does not allow to safe anchorage on the Gulf beach or bayside at the south end point. He further encouraged that special events such as wedding receptions or other events involving tents to only be conducted at the North end. Mr. Holaway also recommended installation of an honor fee station at the south end that the concessionaire would be responsible for collecting daily and remitting to the park. He recommended requiring in-kind stewardship services by the concessionaire and education of the concessionaire on topics such as sensitive vegetation, native plants, and shorebird nesting on the island and how to optimally manage flow of visitors on their trips to the south end. Mr. Turkel reminded the group that the large concession boat docking at the south end does have a restroom aboard for visitor use and provides shade and refreshments. He also admitted that when the boat is tied to the south dock, the restroom is less accessible and the boat is out of sight and that the bayside scenery is less appealing for many visitors uncomfortable due to insects.

## Staff Recommendations

- Corrections to the list of imperiled species and monitoring protocols were completed in the Resource Management Component of the plan.

- Revision to the Cultural Resources section under the Resource Management Component were made according to notes offered by the DHR.

- The Conceptual Land Use Plan was revised to revised to discontinue use of the south dock for public recreational access. This south dock will be repurposed for management and emergency purposes only. Recreational access by private boats and concession ferries will continue at Pelican Bay.

- The Conceptual Land Use Plan was revised to account for specific infrastructural and staff needs pertaining to support/maintenance facilities at Pelican Bay.

- Park boundary surveys will be conducted parkwide to ensure protection of natural and cultural resources, including parcel and road delineations.

Additional revisions were made throughout the document to address editorial corrections, consistency of spelling and notations, and other minor corrections.

## Notes on Composition of the Advisory Group

**Florida Statutes Chapter 259.032 Paragraph 10(b)** establishes a requirement that all state land management plans for properties greater than 160 acres will be reviewed by an advisory group:

"Individual management plans required by s. 253.034(5), for parcels over 160 acres, shall be developed with input from an advisory group. Members of this advisory group shall include, at a minimum, representatives of the lead land managing agency, co-managing entities, local private property owners, the appropriate soil and water conservation district, a local conservation organization, and a local elected official."

Advisory groups that are composed in compliance with these requirements complete the review of state park management plans. Additional members may be appointed to the groups, such as a representative of the park's Citizen Support Organization, representatives of the recreational activities that exist in or are planned for the park, or representatives of any agency with an ownership interest in the property. Special issues or conditions that require a broader representation for adequate review of the management plan may require the appointment of additional members. The DRP's intent in making these appointments is to create a group that represents a balanced cross-section of the park's stakeholders. Decisions on appointments are made on a case-by-case basis by Division of Recreation and Parks staff.

# Appendix 3—References Cited

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# Appendix 4—Soil Descriptions

**(2) Canaveral fine sand** - This is a near level, moderately well drained and intermittently somewhat poorly drained soil on low ridges. Slopes are smooth to slightly convex and range from 0 to 2 percent.

Typically, the surface layer is black and dark gray fine sand mixed with shell fragments and is about 15 inches thick. The underlying layers are light brownish gray and light gray fine sand mixed with shell fragments to a depth of 80 inches or more.

Included with this soil are small areas of Captiva and Kesson soils. Included soils generally make up less than 10 percent of any mapped areas.

In most years, under natural conditions, this soil has a water table depth of 18 to 40 inches for 2 to 6 months. The water table recedes to a depth of more than 40 inches during February through July. Available water capacity is very low. Natural fertility is low. Permeability is very rapid.

Natural vegetation consists of cabbage palm, seagrape, wild coffee, and an understory of vines and weeds.

**(5) Captiva fine sand** - This is nearly level, poorly drained soil in sloughs. Slopes are smooth to concave and range from 0 to 1 percent.

Typically, the surface layer is black fine sand about 6 inches thick. Underlying layers are fine sand mixed with shell fragments to a depth of 80 inches or more. The upper 9 inches are pale brown with light gray streaks, the next 11 inches are light gray with many pale brown mottles, the next 4 inches are light gray with about 30 percent multicolored shell fragments, and the lower 50 inches are light gray.

Small areas of Canaveral and Kesson soils are distributed within areas of this soil. Also included are scattered areas of Captiva fine sand that are ponded, containing soils that are similar to Captiva soils but consist of more than 35 percent multicolored shell fragments larger than 2 millimeters, between depths of 10 and 40 inches. Included soils make up about 5 to 10 percent of any mapped area.

During most years, under natural conditions, this soil has a water table within a depth of 10 inches for 1 to 2 months. The water table is at a depth of 10 to 40 inches for 10 months during most years. In some years, the soils are covered by standing water for several days.

Available water capacity is low. Permeability is very rapid.

Natural vegetation consists of cabbage palm, Brazilian pepper, sand cordgrass, leather fern, and wax myrtle.

**(22) Beaches** – Beaches consist of narrow strips of near level, mixed sand and shell fragments along the Gulf of Mexico. These areas are covered with saltwater during daily high tides.

The areas are subject to movement by the wind and tide and are bare of vegetation in most places. The only vegetation is salt-tolerant plants. Beaches are geographically associated with Canaveral soils.

Beaches are used intensively for recreation during the entire year. Homes, condominiums, beach cottages, and hotels are built on the fringes of beaches in many places.

**(23) Wulfert muck** - This is a near level, very poorly drained soil in broad tidal swamps. Slopes are smooth and range from 0 to 1 percent.

Typically, the surface layer is muck that is dark reddish brown to a depth of 12 inches and dark brown to a depth of 36 inches. Beneath the muck is gray fine sand with light gray streaks consisting of 10 percent shell fragments.

Included with this soil in mapping, and making up about 15 percent of the mapping unit, are small areas of Kesson soils and types similar to Wulfert soils, but with limestone at a depth of 20 to 40 inches.

Water table fluctuates with the tide. Areas are subject to tidal flooding. The available water capacity is high in the organic horizons and low in the horizons below. Natural fertility is medium. Permeability is rapid. Natural vegetation consists of American mangrove, black mangrove, and needlegrass.

**(24) Kesson fine sand** - This is a near level, very poorly drained soil in broad tidal swamps. Areas are subject to tidal flooding. Slopes are smooth and range from 0 to 1 percent.

Typically, the surface layer is about 6 inches of sand that contains shell fragments. The underlying layers are fine sand that contains shell fragments, and they extend to a depth of 80 inches or more. The upper 4 inches are pale brown, the next 3 inches are light brown, the next 25 inches are light gray with dark gray streaks, and the lower 42 inches are white.

Included with this soil in mapping are areas of Captiva and Wulfert soils and soils that have organic surface layers. Also included are soils that have loamy material throughout. Included soils make up about 10 to 15 percent of any mapped area.

Water table fluctuates with tidally and the available water capacity is low. Natural fertility is low. Permeability is rapid or moderately rapid.

Natural vegetation consists of black mangrove, batis, oxeye daisy, and American mangrove.

**(48) St. Augustine sand** - This is a near level, somewhat poorly drained, soil that was formed by earthmoving operations. Most areas are former sloughs and depressions or other low areas that have been filled with sandy material. Slopes are smooth to slightly convex and range from 0 to 2 percent.

This soil has no definite horizonation because of mixing during reworking of the fill material. Typically, the upper 30 inches consists of mixed very dark grayish brown, very dark gray, dark gray, and gray sand with a few lenses of silt loam; it is about 20 percent multicolored shell fragments less than 3 inches in diameter. Below this to a depth of 80 inches or more there is undisturbed fine sand. The upper 10 inches are dark grayish brown with about 15 percent multicolored shell fragments. The lower 40 inches is light gray with about 30 percent multicolored shell fragments.

Included with this soil in mapping are areas where the fill material is underlain by organic soils and other areas where the fill material is less than 20 inches thick. Also included are areas that contain lenses or pockets of organic material throughout the fill. In addition, there are small scattered areas where the fill material is more than 35 percent shells or shell fragments. Several areas with some urban development have been included.

The depth to the water table varies with the amount of fill material and the extent of artificial drainage. However, in most years, the water table is 24 to 36 inches below the surface of the fill material for 2-4 months. It is below a depth of 60 inches during extended dry periods.

Available water capacity is low. Permeability is estimated to be rapid. Natural fertility is low.

Most of the natural vegetation has been removed. The present vegetation consists of cabbage palm and various scattered weeds.

This soil is poorly suited to most plants unless topsoil is spread over the surface to form a suitable root zone.

This soil has severe limitations for most urban and recreational uses. The sandy nature of the fill material, high-water table, and rapid permeability can cause pollution of ground water in areas with septic tank adsorption fields.

This St. Augustine soil is in capability subclass VIIs.

# Appendix 5—Plant and Animal Species List

**Cayo Costa State Park**
**Plant and Animal Species List**

| Common Name | *Scientific Name* | Primary Habitat Codes (for imperiled species) |
|---|---|---|

## PTERIDOPHYTES

| | |
|---|---|
| Giant leather fern | *Acrostichum danaeifolium* |
| Sword fern; Wild Boston fern | *Nephrolepis exaltata* |
| Golden polypody | *Phlebodium aureum* |
| Resurrection fern | *Pleopeltis michauxiana* |
| Whisk fern | *Psilotum nudum* |
| Lacy bracken | *Pteridium aquilinum* var. *caudatum* |
| Tailed bracken | *Pteridium aquilinum* var. *pseudocaudatum* |
| Toothed midsorus fern; Swamp fern | *Telmatoblechnum serrulatum* |
| Widespread maiden fern; Southern shield fern | *Thelypteris kunthii* |
| Marsh fern | *Thelypteris palustris* var. *pubescens* |
| Shoestring fern | *Vittaria lineata* |
| Virginia chain fern | *Woodwardia virginica* |

## GYMNOSPERMS

| | |
|---|---|
| Slash pine | *Pinus elliottii* |
| Florida arrowroot; coontie | *Zamia integrifolia* |

## ANGIOSPERMS

### Monocots

| | |
|---|---|
| False sisal | *Agave decipiens* |
| Sisal hemp* | *Agave sisalana* |
| Bushy bluestem | *Andropogon glomeratus* var. *pumilus* |
| Broomsedge bluestem | *Andropogon virginicus var. decipiens* |
| Tall threeawn | *Aristida patula* |
| Sprenger's asparagus-fern* | *Asparagus aethiopicus* |
| Common carpetgrass | *Axonopus fissifolius* |
| Hairy gramma | *Bouteloua hirsuta* |
| Watergrass* | *Bulbostylis barbata* |
| Coastal sandbur | *Cenchrus spinifex* |
| Jamaica swamp sawgrass | *Cladium jamaicense* |
| Coconut palm* | *Cocos nucifera* |
| Beaked panicum | *Coleataenia anceps* |
| Whitemouth dayflower | *Commelina erecta* |
| String-lily; Seven sisters | *Crinum americanum* |
| Bermudagrass* | *Cynodon dactylon* |
| Poorland flatsedge | *Cyperus compressus* |
| Swamp flatsedge | *Cyperus ligularis* |
| Pine-barren flatsedge | *Cyperus ovatus* |

*** Non-native Species**

| Common Name | *Scientific Name* | Primary Habitat Codes (for imperiled species) |
|---|---|---|
| Flat leaf flatsedge | *Cyperus planifolius* | |
| Many spike flatsedge | *Cyperus polystachyos* | |
| Fourangle flatsedge | *Cyperus tetragonus* | |
| Durban crowfootgrass* | *Dactyloctenium aegyptium* | |
| Needleleaf witchgrass | *Dichanthelium aciculare* | |
| Cypress witchgrass | *Dichanthelium dichotomum* | |
| Hemlock witchgrass | *Dichanthelium portoricense* | |
| Southern crabgrass | *Digitaria ciliaris* | |
| Slender crabgrass; Shaggy crabgrass | *Digitaria filiformis* var. *filiformis* | |
| Saltgrass | *Distichlis spicata* | |
| Bowstring hemp; Mother-in-law's tongue* | *Dracaena hyacinthoides* | |
| Indian goosegrass* | *Eleusine indica* | |
| Tampa butterfly orchid | *Encyclia tampensis* | |
| Gophertail lovegrass | *Eragrostis ciliaris* | |
| Pinewoods fingergrass | *Eustachys petraea* | |
| Carolina fimbry | *Fimbristylis caroliniana* | |
| Hurricanegrass | *Fimbristylis cymosa* | |
| Marsh fimbry | *Fimbristylis spadicea* | |
| Southern umbrella sedge | *Fuirena scirpoidea* | |
| Spiked crested coralroot | *Hexalectris spicata* | *MAH* |
| Mangrove spiderlily | *Hymenocallis latifolia* | |
| Smallcane; Florida tibisee | *Lasiacis divaricata* | |
| Rose natalgrass* | *Melinis repens* | |
| Gulf hairawn muhly | *Muhlenbergia capillaris* var. *filipes* | |
| Monk orchid* | *Oeceoclades maculata* | |
| Bitter Panicgrass | *Panicum amarum* | |
| Switchgrass | *Panicum virgatum* | |
| Blue crowngrass | *Paspalum caespitosum* | |
| Bahiagrass* | *Paspalum notatum* | |
| Thin paspalum | *Paspalum setaceum* | |
| Seashore paspalum | *Paspalum vaginatum* | |
| Senegal date palm* | *Phoenix reclinata* | |
| Starrush whitetop | *Rhynchospora colorata* | |
| Gray's beaksedge | *Rhynchospora grayi* | |
| Southern beaksedge | *Rhynchospora microcarpa* | |
| Wigeon-grass | *Ruppia maritima* | |
| Cabbage palm | *Sabal palmetto* | |
| Broadleaf arrowhead; Duck potato; Common arrowhead | *Sagittaria latifolia* | |
| Tall nutgrass; Whip nutrush | *Scleria triglomerata* | |
| Saw-palmetto | *Serenoa repens* | |
| Shoreline seapurslane | *Sesuvium portulacastrum* | |
| Coastal foxtail; Coastal | | |

*** Non-native Species**

| Common Name | *Scientific Name* | Primary Habitat Codes (for imperiled species) |
|---|---|---|
| bristlegrass | *Setaria corrugata* | |
| Coral foxtail; Coral bristlegrass | *Setaria macrosperma* | |
| Knotroot foxtail; Yellow bristlegrass | *Setaria parviflora* | |
| Narrowleaf blue-eyed grass | *Sisyrinchium angustifolium* | |
| Ear-leaf greenbrier | *Smilax auriculata* | |
| Saw greenbrier | *Smilax bona-nox* | |
| Laurel greenbrier; bamboo vine | *Smilax laurifolia* | |
| Sand cordgrass | *Spartina bakeri* | |
| Saltmeadow cordgrass | *Spartina patens* | |
| Coral dropseed | *Sporobolus domingensis* | |
| Smutgrass* | *Sporobolus indicus* | |
| Seashore dropseed | *Sporobolus virginicus* | |
| St. Augustinegrass | *Stenotaphrum secundatum* | |
| American evergreen* | *Syngonium podophyllum* | |
| Manateegrass | *Syringodium filiforme* | |
| Turtlegrass | *Thalassia testudinum* | |
| Northern needleleaf | *Tillandsia balbisiana* | MS, MAH |
| Cardinal airplant; Common wild-pine | *Tillandsia fasciculata* | MS, MAH |
| Twisted airplant; Banded airplant | *Tillandsia flexuosa* | MS, MAH |
| Potbelly airplant | *Tillandsia paucifolia* | |
| Ballmoss | *Tillandsia recurvata* | |
| Southern needleleaf | *Tillandsia setacea* | |
| Spanish moss | *Tillandsia usneoides* | |
| Giant airplant; Giant wild-pine | *Tillandsia utriculata* | MS, MAH |
| Purple queen* | *Tradescantia pallida* | |
| Purple sandgrass | *Triplasis purpurea* | |
| Eastern gamagrass; Fakahatcheegrass | *Tripsacum dactyloides* | |
| Southern cattail | *Typha domingensis* | |
| Sea oats | *Uniola paniculata* | |
| Tropical signalgrass | *Urochloa distachya* | |
| Washington fan palm* | *Washingtonia robusta* | |
| Elliot's yellow-eyed grass | *Xyris elliottii* | |
| Spanish bayonet | *Yucca aloifolia* | |
| Manila templegrass* | *Zoysia matrella* | |

*** Non-native Species**

| Common Name | *Scientific Name* | Primary Habitat Codes (for imperiled species) |
|---|---|---|

## DICOTS

| | | |
|---|---|---|
| Rosary pea* | *Abrus precatorius* | |
| Earleaf Acacia* | *Acacia auriculiformis* | |
| Triangle Cactus | *Acanthocereus tetragonus* | SHM, MAH |
| Devil's horsewhip | *Achyranthes aspera* var. pubescens | |
| Beach false foxglove | *Agalinis fasciculata* | |
| Seminole false foxglove | *Agalinis filifolia* | |
| Saltmarsh false foxglove | *Agalinis maritima* var. *grandiflora* | |
| Golden trumpet* | *Allamanda cathartica* | |
| Yellow joyweed | *Alternanthera flavescens* | |
| Alligatorweed* | *Alternanthera philoxeroides* | |
| Southern amaranth | *Amaranthus australis* | |
| Florida amaranth | *Amaranthus floridanus* | |
| Common ragweed | *Ambrosia artemisiifolia* | |
| Coastal ragweed | *Ambrosia hispida* | |
| Toothcups; Pink redstem | *Ammannia latifolia* | |
| Bastard false indigobush | *Amorpha fruticosa* | |
| Marlberry | *Ardisia escallonioides* | |
| Whorled milkweed | *Asclepias verticillata* | |
| Showy milkwort | *Asemeia violacea* | |
| Crested saltbush | *Atriplex pentandra* | |
| Black mangrove | *Avicennia germinans* | |
| Saltwater falsewillow | *Baccharis angustifolia* | |
| Groundsel tree; Sea myrtle | *Baccharis halimifolia* | |
| Herb-of-grace | *Bacopa monnieri* | |
| Saltwort; Turtleweed | *Batis maritima* | |
| Beggarticks; Romerillo | *Bidens alba* | |
| Silverhead; Samphire | *Blutaparon vermiculare* | |
| Scarlert spiderling | *Boerhavia coccinea* | |
| Smallhead doll's-daisy | *Boltonia diffusa* | |
| Bushy seaside oxeye | *Borrichia frutescens* | |
| American bluehearts | *Buchnera americana* | |
| Gumbo limbo | *Bursera simaruba* | |
| Coastal searocket | *Cakile lanceolata* | |
| American beautyberry | *Callicarpa americana* | |
| Baybean; Seaside jackbean | *Canavalia rosea* | |
| Bird pepper | *Capsicum annuum* var. *glabriusculum* | |
| Papaya | *Carica papaya* | |
| Natal plum* | *Carissa macrocarpa* | |
| Seven-year apple | *Casasia clusiifolia* | |
| Love vine; Devil's gut | *Cassytha filiformis* | |
| Australian pine* | *Casuarina equisetifolia* | |
| Madagascar periwinkle* | *Catharanthus roseus* | |

*** Non-native Species**

| Common Name | *Scientific Name* | Primary Habitat Codes (for imperiled species) |
|---|---|---|
| West Indian cock's-comb | *Celosia nitida* | MAH, SHM |
| Spurred butterfly pea | *Centrosema virginianum* | |
| Partridge pea | *Chamaecrista fasciculata* | |
| Sensitive pea | *Chamaecrista nictitans* var. *aspera* | |
| Snowberry; Milkberry | *Chiococca alba* | |
| Coco plum | *Chrysobalanus icaco* | |
| Bush goldenrod; Woody goldenrod | *Chrysoma pauciflosculosa* | |
| Coastal plain golden aster | *Chrysopsis scabrella* | |
| Purple thistle | *Cirsium horridulum* | |
| Sorrelvine; Marinevine | *Cissus trifoliata* | |
| Tread softly; Finger rot | *Cnidoscolus stimulosus* | |
| Seagrape | *Coccoloba uvifera* | |
| Buttonwood | *Conocarpus erectus* | |
| Canadian horseweed | *Conyza canadensis* | |
| Leavenworth's tickseed | *Coreopsis leavenworthii* | |
| Pine-barren frostweed | *Crocanthemum corymbosum* | |
| Shakeshake* | *Crotalaria incana* | |
| Smooth rattlebox* | *Crotalaria pallida* var. *obovata* | |
| Rattleweed | *Crotalaria retusa* | |
| Rabbit-bells | *Crotalaria rotundifolia* | |
| Vente conmigo | *Croton glandulosus var. floridanus* | |
| Seaside croton | *Croton punctatus* | |
| Madagascar rubbervine* | *Cryptostegia madagascariensis* | |
| Fiveangled dodder | *Cuscuta pentagona* | |
| Coinvine | *Dalbergia ecastaphyllum* | |
| Whitetassels | *Dalea carnea* var. *carnea* | |
| Dixie ticktrefoil | *Desmodium tortuosum* | |
| Sixangle foldwing | *Dicliptera sexangularis* | |
| Noyau vine | *Distimake dissectus* | |
| Varnish leaf | *Dodonaea viscosa* | |
| West Indian chickweed; Drymary* | *Drymaria cordata* | |
| Clustered millie graines | *Edrastima uniflora* | |
| Florida tasselflower | *Emilia fosbergii* | |
| Lilac tasselflower* | *Emilia sonchifolia* | |
| American burnweed; Fireweed | *Erechtites hieraciifolius* | |
| Oakleaf fleabane | *Erigeron quercifolius* | |
| Beach creeper | *Ernodea littoralis* | |
| Coralbean | *Erythrina herbacea* | |
| White stopper | *Eugenia axillaris* | |
| Spanish stopper | *Eugenia foetida* | |
| Surinam cherry* | *Eugenia uniflora* | |
| Dogfennel | *Eupatorium capillifolium* | |

*** Non-native Species**

| Common Name | *Scientific Name* | Primary Habitat Codes (for imperiled species) |
|---|---|---|
| Limestone sandmat | *Euphorbia blodgettii* | |
| Dixie sandmat | *Euphorbia bombensis* | |
| Coastal dune sandmat; Sand dune spurge | *Euphorbia cumulicola* | MF, DM |
| Painted leaf; Fire-on-the-mountain | *Euphorbia cyathophora* | |
| Pillpod sandmat | *Euphorbia hirta* | |
| Hyssopleaf sandmat | *Euphorbia hyssopifolia* | |
| Spotted sandmat | *Euphorbia maculata* | |
| Coastal beach sandmat | *Euphorbia mesembrianthemifolia* | |
| Jacob's ladder; Devil's Backbone; Redbird flower | *Euphorbia tithymaloides* subsp. *smallii* | |
| Slender dwarf morning-glory | *Evolvulus alsinoides* | |
| Council tree* | *Ficus altissima* | |
| Strangler fig; Golden fig | *Ficus aurea* | |
| Indian laurel* | *Ficus microcarpa* | |
| Florida yellowtops | *Flaveria floridana* | |
| Narrowleaf yellowtops | *Flaveria linearis* | |
| Florida swamp privet | *Forestiera segregata* | |
| White twinevine | *Funastrum clausum* | |
| Coastal bedstraw | *Galium hispidulum* | |
| Caribbean purple everlasting | *Gamochaeta antillana* | |
| Silk oak* | *Grevillea robusta* | |
| Gray nicker | *Guilandina bonduc* | |
| Prickly apple cactus; West coast prickly-apple | *Harrisia aboriginum* | CS, MAH |
| East coast dune sunflower | *Helianthus debilis* subsp. *debilis* | |
| West coast dune sunflower | *Helianthus debilis* subsp. *vestitus* | BD, CG |
| Scorpions tail | *Heliotropium angiospermum* | |
| Seaside heliotrope; Salt heliotrope | *Heliotropium curassavicum* | |
| Bladder mallow | *Herissantia crispa* | |
| Camphor weed | *Heterotheca subaxillaris* | |
| Coastalplain hawkweed | *Hieracium megacephalon* | |
| Diamondflowers | *Houstonia nigricans* var. *nigricans* | |
| Roundleaf bluet; Innocence | *Houstonia procumbens* | |
| Manyflower marshpennywort | *Hydrocotyle umbellata* | |
| Moonflower | *Ipomoea alba* | |
| Beach morning-glory | *Ipomoea imperati* | |
| Oceanblue morning-glory | *Ipomoea indica* | |
| Railroad vine; Bayhops | *Ipomoea pes-caprae* subsp. *brasiliensis* | |
| Saltmarsh morning-glory | *Ipomoea sagittata* | |
| Beach moonflower | *Ipomoea violacea* | |
| Juba's bush | *Iresine diffusa* | |
| Bigleaf sumpweed | *Iva frutescens* | |

*** Non-native Species**

| Common Name | *Scientific Name* | Primary Habitat Codes (for imperiled species) |
|---|---|---|
| Seacoast marshelder | *Iva imbricata* | |
| Scarlet jungleflame* | *Ixora coccinea* | |
| Joewood | *Jacquinia keyensis* | CS, CG, MAH |
| Chandelier plant* | *Kalanchoe delagoensis* | |
| Virginia saltmarsh mallow | *Kosteletzkya pentacarpos* | |
| White mangrove | *Laguncularia racemosa* | |
| Sanibel shrubverbena | *Lantana depressa* var. *sanibelensis* | CS, CG, MF |
| Buttonsage | *Lantana involucrata* | |
| Trailing shrubverbena* | *Lantana montevidensis* | |
| Lantana; Shrubverbena* | *Lantana strigocamara* | |
| Pineland pinweed | *Lechea sessiliflora* | |
| Virginia pepperweed | *Lepidium virginicum* | |
| White leadtree* | *Leucaena leucocephala* | |
| Gopher apple | *Licania michauxii* | |
| Carolina sea lavender | *Limonium carolinianum* | |
| Coral honeysuckle | *Lonicera sempervirens* | |
| Small fruit primrosewillow | *Ludwigia microcarpa* | |
| Creeping primrosewillow | *Ludwigia repens* | |
| Christmasberry | *Lycium carolinianum* | |
| Garden tomato* | *Lycopersicon esculentum* | |
| False mallow | *Malvastrum corchorifolium* | |
| Mazapan; Turkscap mallow* | *Malvaviscus penduliflorus* | |
| Mango* | *Mangifera indica* | |
| Axilflower | *Mecardonia acuminata* subsp. *peninsularis* | |
| Snow squarestem | *Melanthera nivea* | |
| Punk tree* | *Melaleuca quinquenervia* | |
| Chocolate weed* | *Melochia corchorifolia* | |
| Creeping cucumber | *Melothria pendula* | |
| Poorman's patch; Stickleaf | *Mentzelia floridana* | |
| Climbing hempvine | *Mikania scandens* | |
| Balsampear* | *Momordica charantia* | |
| Spotted beebalm | *Monarda punctata* | |
| Southern bayberry; Wax myrtle | *Morellla cerifera* | |
| Twinning soldierbush | *Myriopus volubilis* | |
| Myrsine; Colicwood | *Myrsine cubana* | |
| Tropical puff | *Neptunia pubescens* | |
| Oleander* | *Nerium oleander* | |
| Seaside evening-primrose | *Oenothera humifusa* | |
| Southern beeblossom | *Oenothera simulans* | |
| Pricklypear | *Opuntia humifusa* | |
| Shell-mound pricklypear | *Opuntia stricta* | BD, CS, CG |
| Leafless swallowwort | *Orthosia scoparia* | |
| Butterweed | *Packera glabella* | |
| Florida pellitory | *Parietaria floridana* | |

*** Non-native Species**

| Common Name | *Scientific Name* | Primary Habitat Codes (for imperiled species) |
|---|---|---|
| American nailwort | *Paronychia americana* | |
| Virginia creeper; Woodbine | *Parthenocissus quinquefolia* | |
| Corkystem passion flower | *Passiflora suberosa* | |
| Gulf coast swallowwort | *Pattalias palustre* | |
| Spreading cinchweed | *Pectis prostrata* | |
| Red bay | *Persea borbonia* var. *borbonia* | |
| Swamp smartweed; Mild waterpepper | *Persicaria hydropiperoides* | |
| Guinea hen weed | *Petiveria alliacea* | |
| Capeweed; Turkey tangle fogfruit | *Phyla nodiflora* | |
| Drummond's leafflower | *Phyllanthus abnormis* | |
| Coastal groundcherry | *Physalis angustifolia* | |
| Walter's groundcherry | *Physalis walteri* | |
| Pokeweed | *Phytolacca americana* | |
| Florida fishpoison tree; Jamaican dogwood | *Piscidia piscipula* | |
| Devil's claw; Pullback | *Pisonia aculeata* | |
| Catclaw blackbead | *Pithecellobium unguis-cati* | |
| Rosy camphorweed | *Pluchea baccharis* | |
| Sweetscent | *Pluchea odorata* | |
| Boykin's milkwort | *Polygala boykinii* | |
| Procession flower | *Polygala incarnata* | |
| Swamp smartweed; Rustweed; Juniperleaf | *Polypremum procumbens* | |
| Little Hogweed* | *Portulaca oleracea* | |
| Pink purslane; Kiss-me-quick | *Portulaca pilosa* | |
| Redstem purslane | *Portulaca rubricaulis* | |
| Sweet everlasting; Rabbit tobacco | *Pseudognaphalium obtusifolium* | |
| Guava* | *Psidium guajava* | |
| Wild coffee | *Psychotria nervosa* | |
| Blackroot | *Pterocaulon pycnostachyum* | |
| Mock bishopsweed; Herbwilliam | *Ptilimnium capillaceum* | |
| Jamaican capertree | *Quadrella jamaicensis* | |
| Live oak | *Quercus virginiana* | |
| White indigoberry | *Randia aculeata* | |
| Red mangrove | *Rhizophora mangle* | |
| Michaux's snoutbean | *Rhynchosia michauxii* | |
| Rougeplant | *Rivina humilis* | |
| Perennial glasswort; Virginia glasswort | *Salicornia ambigua* | |
| Carolina willow; Coastalplain willow | *Salix caroliniana* | |

*** Non-native Species**

| Common Name | *Scientific Name* | Primary Habitat Codes (for imperiled species) |
|---|---|---|
| Tropical sage; Blood sage | *Salvia coccinea* | |
| Southern river sage | *Salvia misella* | |
| Water pimpernel; Limewater brooksweed | *Samolus ebracteatus* | |
| Pineland pimpernel; Seaside brooksweed | *Samolus valerandi* subsp. *parviflorus* | |
| Perennial glasswort | *Salicornia ambigua* | |
| Beachberry; Inkberry; Gullfeed | *Scaevola plumieri* | BD, CS, CG |
| Beach naupaka* | *Scaevola taccada* | |
| Australian umbrella tree; Octopus tree* | *Schefflera actinophylla* | |
| Brazilian pepper* | *Schinus terebinthifolia* | |
| Sweetbroom; Licoriceweed | *Scoparia dulcis* | |
| Princess-of-the-night* | *Selenicereus pteranthus* | |
| Nightblooming cactus* | *Selenicereus undatus* | |
| Glossy shower* | *Senna surattensis* | |
| Elliott's fanpetal | *Sida elliottii* | |
| Common wireweed; Common fanpetals | *Sida ulmifolia* | |
| Saffron plum | *Sideroxylon celastrinum* | |
| False mastic | *Sideroxylon foetidissimum* | |
| American black nightshade | *Solanum americanum* | |
| Black nightshade | *Solanum chenopodioides* | |
| Chapman's goldenrod | *Solidago odora* var. *chapmanii* | |
| Seaside goldenrod | *Solidago sempervirens* | |
| Spiny sowthistle* | *Sonchus asper* | |
| Common sowthistle* | *Sonchus oleraceus* | |
| Yellow necklace pod* | *Sophora tomentosa* var. *occidentalis* | |
| Yellow necklace pod | *Sophora tomentosa* var. *truncata* | |
| Prostrate false buttonweed | *Spermacoce prostrata* | |
| Woodland false buttonweed | *Spermacoce remota* | |
| Creeping oxeye* | *Sphagneticola trilobata* | |
| Blue porterweed; Joee | *Stachytarpheta jamaicensis* | |
| Common chickweed | *Stellaria media* | |
| Pineland scalypink | *Stipulicida setacea* var. *lacerata* | |
| Sea blite; Annual seepweed | *Suaeda linearis* | |
| Bay cedar | *Suriana maritima* | |
| Java plum | *Syzygium cumini* | |
| Cape honeysuckle* | *Tecoma capensis* | |
| Australian almond* | *Terminalia muelleri* | |
| Portia tree* | *Thespesia populnea* | |
| Blackeyed susan vine* | *Thunbergia alata* | |
| Eastern poison ivy | *Toxicodendron radicans* | |
| Burrnut; Jamacian feverplant* | *Tribulus cistoides* | |

*** Non-native Species**

| Common Name | *Scientific Name* | Primary Habitat Codes (for imperiled species) |
|---|---|---|
| Florida mayten | *Tricerma phyllanthoides* | CS, SHM |
| Forked bluecurls | *Trichostema dichotomum* | |
| Coat buttons* | *Tridax procumbens* | |
| Florida valerian | *Valeriana scandens* | |
| White crownbeard; | | |
| White crownbeard; Frostweed | *Verbesina virginica* | |
| Giant ironweed | *Vernonia gigantea* | |
| Fourleaf vetch | *Vicia acutifolia* | |
| Hairypod cowpea | *Vigna luteola* | |
| Summer grape | *Vitis aestivalis* | |
| Muscadine | *Vitis rotundifolia* | |
| Sleepy morning | *Waltheria indica* | |
| Tallowwood; Hog plum | *Ximenia americana* | |
| Hercules'-club | *Zanthoxylum clava-herculis* | |
| Wild lime; Lime pricklyash | *Zanthoxylum fagara* | |

## INVERTEBRATES

### ECHINODERMS

| | | |
|---|---|---|
| Purple sea urchin | *Arbacia punculata* | MUS |
| Lined sea star | *Luidia clathrata* | MUS |
| Nine-armed seastar | *Luidia senegalensis* | MUS |
| Short-spined urchin | *Lytechinus variegatus* | MUS |
| Five-holed keyhole urchin | *Mellita quinquiesperforata* | MUS |
| Serpent brittle star | *Ophioderma brevispinum* | MUS |

### GASTROPODS

| | | |
|---|---|---|
| Mottled seahare | *Aplysia brasiliana* | MUS |
| Striate bubble | *Bulla striata* | MUS |
| Ragged seahare | *Bursatella leachii* | MUS |
| Lightning whelk | *Busycon sinistrum* | MUS |
| Pear whelk | Busycotypus spiratus | MUS |
| Jujube topsnail | *Calliostoma jujubinum* | MUS |
| Common nutmeg | *Cacellaria reticulata* | MUS |
| Ribbed canthari | *Cantharus multangulus* | MUS |
| Mauve-mouth drill | *Calotrophon ostrearum* | MUS |
| Fly specked cerith | *Cerithium muscarum* | MUS |
| Lace murex | *Chicoreus dilectus* | MUS |
| Apple murex | *Chicoreus pomum* | MUS |
| Floirda cone | *Conus anabathrum* | MUS |
| Alphabet cone | *Conus spurius atlanticus* | MUS |
| Spiny slippersnail | *Crepidula aculeata* | MUS |
| Eastern white slippersnail | *Crepidula atrasolea* | MUS |

*** Non-native Species**

| Common Name | *Scientific Name* | Primary Habitat Codes (for imperiled species) |
|---|---|---|
| Atlantic slippersnail | *Crepidula fornicata* | MUS |
| Spotted slippersnail | *Crepidula maculosa* | MUS |
| Cayenne keyhole limpet | *Diodora meta* | MUS |
| Banded tulip | *Fasciolaria lilium* | MUS |
| True tulip | *Fasciolaria tulipa* | MUS |
| Atlantic figsnail | *Ficus papyratia* | MUS |
| Crown conch | *Melongena corona* | MUS |
| Colorful moonsnail | *Naticarius canrena* | MUS |
| Shark's eye | *Neverita duplicata* | MUS |
| Coffeebean trivia | *Niveria pediculus* | MUS |
| Lettered olive | *Oliva sayana* | MUS |
| Scotch bonnet | *Phalium granulatum* | MUS |
| Milk moonsnail | *Polinices lacteus* | MUS |
| Tinted canthari | *Pollia tincta* | MUS |
| Atlantic marginella | *Prunum apicinum* | MUS |
| Junonia | *Scaphella junonia* | MUS |
| White baby's ear | *Sinum perspectivum* | MUS |
| Florida fighting conch | *Strombus alatus* | MUS |
| Common American auger | *Terebra dislocata* | MUS |
| Florida horse conch | *Triplofusus giganteus* | MUS |
| Chesnut turbans | *Turbo castanea* | MUS |
| Gulf oyster drill | *Urosalpinx perrugata* | MUS |
| Florida wormsnails | *Vermicularia knorrii* | MUS |
| Sanibel turrets | *Zonulispira crocata* | MUS |

## BIVALVES

| | | |
|---|---|---|
| Cut-ribbed ark | *Anadara floridana* | MUS |
| Transverse ark | *Anadara ovalis* | MUS |
| Buttercup lucine | *Anodontia alba* | MUS |
| Pointed venus clam | *Anomalocardia auberiana* | MUS |
| Common jingle shell | *Anomia ephipium* | MUS |
| Mossy ark | *Arca imbricata* | MUS |
| Turkey wing | *Arca zebra* | MUS |
| Florida spiny jewelbox | *Archinella cornuta* | MUS |
| Atlantic calico scallop | *Argopecten gibbus* | MUS |
| Atlantic bay scallop | *Argopecten irradians* | MUS |
| Stiff penshell | *Atrina rigida* | MUS |
| Sawtooth penshell | *Atrina serarata* | MUS |
| Fallen angelwing | *Barnea truncata* | MUS |
| Broad-ribbed cardita | *Carditamera floridana* | MUS |
| Scaly scallop | *Caribachlamys muscosus* | MUS |
| Leafy jewelbox | *Chama macerophylla* | MUS |
| Cross-barred venus clam | *Chione elevata* | MUS |
| Imperial venus clam | *Chione latilirata* | MUS |

*** Non-native Species**

| Common Name | *Scientific Name* | Primary Habitat Codes (for imperiled species) |
|---|---|---|
| Eastern oyster | *Crassostrea virginica* | MUS |
| Angelwing | *Cyrtopleura costata* | MUS |
| Atlantic giant cockle | *Dinocardium robustum* | MUS |
| Cross-hatched lucine | *Divaricella quadrisulcata* | MUS |
| Coquina clam | *Donax variabilis* | MUS |
| Disc dosinia | *Dosinia discus* | MUS |
| Elegant dosinia | *Dosinia elegans* | MUS |
| Minor jackknife clam | *Ensis minor* | MUS |
| Ribbed mussel | *Geukensia demissa* | MUS |
| Comb bittersweet | *Glycymeris pectinata* | MUS |
| Common egg cockle | *Laevicardium laevigatum* | MUS |
| Rough scallop | *Lindapecten muscosus* | MUS |
| Thick buttercup lucine | *Lucina pectinata* | MUS |
| Pennsylvania lucine | *Lucina pensylvanica* | MUS |
| Calico clam | *Macrocallista maculata* | MUS |
| Sunray venus clam | *Macrocallista nimbosa* | MUS |
| Southern quahog | *Mercenaria campechiensis* | MUS |
| Ponderous ark | *Noetia ponderosa* | MUS |
| False angelwing | *Petriocolaria pholadiformis* | MUS |
| Atlantic pearl oyster | *Pinctada imbricata* | MUS |
| Atlantic kittenpaw | *Plicatula gibbosa* | MUS |
| Channeled duckclam | *Raeta plicatella* | MUS |
| Alternate tellin | *Tellina alternata* | MUS |
| Rose petal tellin | *Tellina lineata* | MUS |
| Speckled tellin | *Tellina listeri* | MUS |
| Tampa tellin | *Tellina tampaensis* | MUS |
| Florida pricklycockle | *Trachycardium egmontianum* | MUS |
| Yellow pricklycockle | *Trachycardium muricatum* | MUS |

## JELLYFISH

| | | |
|---|---|---|
| Moon jellyfish | *Aurelia aurita* | MUS |
| Ovate comb jellyfish | *Beroe ovate* | MUS |
| Sea nettle | *Chrysaora quinquecirrha* | MUS |

## ARTHROPODS

## CRUSTACEANS

| | | |
|---|---|---|
| Mangrove tree crab | *Aratrus pisonii* | MS |
| Speckled crab | *Arenaeus cribrarius* | MUS |
| Flame box crab | *Calappa flammea* | MUS |
| Blue crab | *Callinectes sapidus* | MUS, |
| Striped hermit crab | *Clibanarius vittatus* | MUS |
| Atlantic sand crab | *Emerita talpoida* | MUS |

*** Non-native Species**

| Common Name | *Scientific Name* | Primary Habitat Codes (for imperiled species) |
|---|---|---|
| Calico box crab | *Hepatus epheliticus* | MUS |
| Horseshoe crab | *Limulus polyphemus* | MUS |
| Florida stone crab | *Menippe mecenaria* | MUS |
| Ghost crab | *Ocypode quadrata* | BD, MUS |
| Fiddler crab | *Uca sp.* | MS, MUS |

## VERTEBRATES

## FISH

### Sharks, Rays

| | | |
|---|---|---|
| Spotted eagle ray | *Aetobatus narinari* | MUS |
| Southern stingray | *Dasyatis americana* | MUS |
| Bull shark | *Carcharhinus leucas* | MUS |
| Blacktip shark | *Carcharhinus limbatus* | MUS |
| Sandbar shark | *Carcharhinus plumbeus* | MUS |
| Nurse shark | *Ginglymostoma cirratum* | MUS |
| Cownose ray | *Rhinoptera bonasus* | MUS |
| Bonnethead shark | *Sphyrna tiburo* | MUS |

### Bony Fishes

| | | |
|---|---|---|
| Sheepshead | *Archosargus probatocephalus* | MUS |
| Trumpet fish | *Aulostomus maculatus* | MUS |
| Gafftopsail catfish | *Bagre marinus* | MUS |
| Blue runner | *Caranx crysos* | MUS |
| Jack crevalle | *Caranx hippos* | MUS |
| Common snook | *Centropomus undecimalis* | MUS |
| Spotted seatrout | *Cynoscion nebulosus* | MUS |
| Ladyfish | *Elops saurus* | MUS |
| Goliath grouper | *Epinephelus itajara* | MUS |
| White grunt | *Haemulon plumierii* | MUS |
| Pinfish | *Lagodon rhomboides* | MUS |
| Mangrove snapper | *Lutjanus griseus* | MUS |
| Atlantic tarpon | *Megalops atlanticus* | MUS |
| Flathead mullet | *Mugil cephalus* | MUS |
| Gag grouper | *Mycteroperca microlepis* | MUS |
| Gulf flounder | *Paralichthys albiguttata* | MUS |
| Black drum | *Pogonias cromis* | MUS |
| Cobia | *Rachycentron canadum* | MUS |
| Red drum | Sciaenops ocellatus | MUS |
| Spanish mackerel | *Scomberomorus maculatus* | MUS |
| Southern puffer | *Sphoeroides nephelus* | MUS |
| Atlantic needlefish | *Strongylura marina* | MUS |

*** Non-native Species**

| Common Name | *Scientific Name* | Primary Habitat Codes (for imperiled species) |
|---|---|---|
| Florida pompano | *Trachinotus carolinus* | MUS |

## AMPHIBIANS

### Frogs and Toads

| | | |
|---|---|---|
| Florida cricket frog | *Acris gryllus dorsalis* | DM, MAH |
| Eastern narrowmouth toad | *Gastrophryne carolinensis* | DM, MAH |
| Green treefrog | *Hyla cinerea* | DM, MAH |
| Squirrel treefrog | *Hyla squirella* | DM, MAH |
| Southern leopard frog | *Lithobates sphenocephalus* | DM, MAH |
| Cuban treefrog* | *Osteopilus septentrionalis* | MTC |
| Southern chorus frog | *Pseudacris nigrita* | DM |

## REPTILES

### Turtles and Tortoises

| | | |
|---|---|---|
| Loggerhead sea turtle | *Caretta caretta* | BD, MUS |
| Green sea turtle | *Chelonia mydas* | BD, MUS |
| Florida snapping turtle | *Chelydra serpentina* | BD, DM |
| Gopher tortoise | *Gopherus polyphemus* | CB, CS, CG |
| Striped mud turtle | *Kinosternon baurii* | DM, MH |
| Kemp's ridley sea turtle | *Lepidochelys kempii* | BD, MUS |
| Ornate diamondback terrapin | *Malaclemys terrapin macrospilota* | MS, MUS |
| Peninsula cooter | *Pseudemys peninsularis* | DM, MUS |
| Florida box turtle | *Terrapene bauri* | CS, MAH |

### Alligators and Crocodiles

| | | |
|---|---|---|
| American alligator | *Alligator mississippiensis* | DM, MAH, MUS |
| American crocodile | *Crocodylus acutus* | MUS |

### Lizards

| | | |
|---|---|---|
| Green anole | *Anolis carolinensis* | MTC |
| Six-lined racerunner | *Aspidoscelis sexlineatus* | MTC |
| Black spinytail iguana* | *Ctenosaura similis* | DV |
| Southeastern five-lined skink | *Eumeces inexpectatus* | MTC |
| Brown anole* | *Norops sagrei* | MTC |
| Ground skink | *Scincella lateralis* | SM |

*** Non-native Species**

| Common Name | *Scientific Name* | Primary Habitat Codes (for imperiled species) |
|---|---|---|

## Snakes

| | | |
|---|---|---|
| Southern black racer | *Coluber constrictor priapus* | MTC |
| Eastern diamondback | *Crotalus adamanteus* | CS, CG |
| Southern ringneck snake | *Diadophis punctatus punctatus* | MTC |
| Eastern indigo snake | *Drymarchon couperi* | CS, CG, DV |
| Scarlet kingsnake | *Lampropeltis triangulum elapsoides* | MAH |
| Eastern coachwhip | *Masticophis flagellum flagellum* | CS, CG, MF |
| Mangrove salt marsh snake | *Nerodia clarkii compressicauda* | MS, MUS |
| Eastern rat snake | *Pantherophis alleghaniensis* | MTC |
| Florida brown snake | *Storeria victa* | MF, MAH |
| Bluestripe ribbon snake | *Thamnophis sauritus nitae* | MTC |
| Peninsula ribbon snake | *Thamnophis sauritus sackenii* | MTC |

## BIRDS

### Loons and Grebes

| | | |
|---|---|---|
| Common loon | *Gavia immer* | MUS |
| Horned grebe | *Podiceps auritus* | MUS |

### Albatrosses, Petrels, and Shearwaters

| | | |
|---|---|---|
| Sooty shearwater | *Puffinus griseus* | MUS |

### Anhinga, Cormorants, Pelicans, and Frigatebirds

| | | |
|---|---|---|
| Anhinga | *Anhinga anhinga* | BM, BS, CDLK |
| Magnificent frigatebird | *Fregata magnificens* | MUS |
| Northern gannet | *Morus bassanus* | MUS |
| American white pelican | *Pelecanus erythrorhynchos* | MUS, OF |
| Brown pelican | *Pelecanus occidentalis* | MUS, OF |
| Double crested cormorant | *Phalacrocorax auritus* | MUS, MS |

### Wading Birds

| | | |
|---|---|---|
| Great egret | *Ardea alba* | BD, MUS, MAH, MS |
| Great blue heron | *Ardea herodias* | MS, MUS, DM |
| Cattle egret | *Bubulcus ibis* | MTC |
| Green heron | *Butorides virescens* | DM, MS, MUS |
| Little blue heron | *Egretta caerulea* | MUS, MS, BD |
| Reddish egret | *Egretta rufescens* | MUS |
| Snowy egret | *Egretta thula* | MUS, MS, BD |
| Tricolored heron | *Egretta tricolor* | MUS, MS, BD |
| White ibis | *Eudocimus albus* | MTC |

*** Non-native Species**

| Common Name | *Scientific Name* | Primary Habitat Codes (for imperiled species) |
|---|---|---|
| Wood stork | *Mycteria americana* | MS |
| Yellow-crowned night heron | *Nyctanassa violacea* | MUS, MAH, MS |
| Black-crowned night heron | *Nycticorax nycticorax* | MUS, MAH, MS |
| Roseate spoonbill | *Platalea ajaja* | MUS |
| Glossy ibis | *Plegadis falcinellus* | MUS |

### Ducks, Geese, and Swans

| | | |
|---|---|---|
| Blue-winged teal | *Anas discors* | BM, BS, CDLK |
| Mottled duck | *Anas fulvigula* | OF |
| Lesser scaup | *Aythya affinis* | MUS, MS, DM |
| Canvasback | *Aythya valisineria* | MUS |
| Hooded merganser | *Lophodytes cucullatus* | MUS |
| Red-breasted merganser | *Mergus serrator* | MUS |
| Ruddy duck | *Oxyura jamaicensis* | MUS |

### Diurnal Raptors

| | | |
|---|---|---|
| Cooper's hawk | *Accipiter cooperii* | OF |
| Sharp-shinned hawk | *Accipiter striatus* | OF |
| Short-tailed hawk | *Buteo brachyurus* | MTC |
| Red-tailed hawk | *Buteo jamaicensis* | OF |
| Red-shouldered hawk | *Buteo lineatus* | MTC |
| Broad-winged hawk | *Buteo platypterus* | OF |
| Turkey vulture | *Cathartes aura* | MTC |
| Northern harrier | *Circus cyaneus* | OF |
| Black vulture | *Coragyps atratus* | MTC |
| Swallow tailed kite | *Elanoides forficatus* | OF |
| Merlin | *Falco columbarius* | OF |
| Peregrine falcon | *Falco peregrinus* | BD, OF |
| Southeastern American kestrel | *Falco sparverius paulus* | OF |
| Southern bald eagle | *Haliaeetus leucocephalus* | MTC |
| Osprey | *Pandion haliaetus* | MTC |

### Quails

| | | |
|---|---|---|
| Northern bobwhite | *Colinus virginianus* | MF |

### Coots, Cranes, Gallinules, and Rails

| | | |
|---|---|---|
| American coot | *Fulica americana* | DM, MUS |
| Common gallinule | *Gallinula galeata* | DM |
| Purple gallinule | *Porphyrio martinica* | MUS, DM |
| Sora | *Porzana carolina* | DM |
| Clapper rail | *Rallus longirostris* | DM |

*** Non-native Species**

| Common Name | *Scientific Name* | Primary Habitat Codes (for imperiled species) |
|---|---|---|

## Shorebirds

| | | |
|---|---|---|
| Spotted sandpiper | *Actitis macularius* | MUS |
| Ruddy turnstone | *Arenaria interpres* | MUS |
| Sanderling | *Calidris alba* | MUS |
| Dunlin | *Calidris alpina* | MUS |
| Red knot | *Calidris canutus rufa* | MUS |
| Stilt sandpiper | *Calidris himantopus* | MUS |
| Western sandpiper | *Calidris mauri* | MUS |
| Pectoral sandpiper | *Calidris melanotos* | MUS |
| Least sandpiper | *Calidris minutilla* | MUS |
| Semipalmated sandpiper | *Calidris pusilla* | MUS |
| Piping plover | *Charadrius melodus* | BD, MUS |
| Snowy plover | *Charadrius nivosus* | BD, MUS |
| Semipalmated plover | *Charadrius semipalmatus* | BD, MUS |
| Killdeer | *Charadrius vociferus* | BD, MUS, CG |
| Wilson's plover | *Charadrius wilsonia* | BD, MUS |
| Common snipe | *Gallinago gallinago* | DM |
| American oystercatcher | *Haematopus palliatus* | MUS |
| Black-necked stilt | *Himantopus mexicanus* | MUS |
| Short-billed dowitcher | *Limnodromus griseus* | MUS |
| Long-billed dowitcher | *Limnodromus scolopaceus* | MUS |
| Marbled godwit | *Limosa fedoa* | MUS |
| Long-billed curlew | *Numenius americanus* | MUS |
| Whimbrel | *Numenius phaeopus* | MUS |
| Black-bellied plover | *Pluvialis squatarola* | MUS |
| American avocet | *Recurvirostra americana* | MUS |
| Lesser yellowlegs | *Tringa flavipes* | MUS |
| Greater yellowlegs | *Tringa melanoleuca* | MUS |
| Solitary sandpiper | *Tringa solitaria* | MUS |
| Willet | *Tringa semipalmata* | MUS |

## Gulls, Terns, and Skimmers

| | | |
|---|---|---|
| Bonaparte's gull | *Chroicocephalus philadelphia* | MUS |
| Gull-billed tern | *Gelochelidon nilotica* | MUS |
| Caspian tern | *Hydroprogne caspia* | MUS |
| Herring gull | *Larus argentatus* | MUS |
| Ring-billed gull | *Larus delawarensis* | MUS |
| Great black-backed gull | *Larus marinus* | MUS |
| Laughing gull | *Leucophaeus atricilla* | MUS |
| Black tern | *Chlidonias niger* | MUS |
| Bridled tern | *Onychoprion anaethetus* | MUS |
| Black skimmer | *Rynchops niger* | BD, MUS |
| Least tern | *Sternula antillarum* | MUS |

*** Non-native Species**

| Common Name | *Scientific Name* | Primary Habitat Codes (for imperiled species) |
|---|---|---|
| Forster's tern | *Sterna forsteri* | MUS |
| Common tern | *Sterna hirundo* | MUS |
| Royal tern | *Thalasseus maximus* | MUS |
| Sandwich tern | *Thalasseus sandvicensis* | MUS |
| **Alcids** | | |
| Razorbill | *Alca torda* | MUS |
| **Pigeons and Doves** | | |
| Common ground-dove | *Columbina passerina* | MTC |
| Eurasian collared-dove* | *Streptopelia decaocto* | MTC |
| Mourning dove | *Zenaida macroura* | MTC |
| **Old World Parrots** | | |
| Budgerigar* | *Melopsittacus undulatus* | DV |
| **Cuckoos** | | |
| Yellow-billed cuckoo | *Coccyzus americanus* | MH, MS |
| Mangrove cuckoo | *Coccyzus minor* | MH, MS |
| **Owls** | | |
| Burrowing owl | *Athene cunicularia floridana* | CS, MAH, MF |
| Great horned owl | *Bubo virginianus* | CS, MAH, MF |
| Eastern screech owl | *Megascops asio* | CS, MAH, MF |
| Barred owl | *Strix varia* | CS, MAH, MF |
| Barn owl | *Tyto alba* | CS, MAH, MF |
| **Goatsuckers and Swifts** | | |
| Chuck-will's widow | *Caprimulgus carolinensis* | MF, MAH |
| Chimney swift | *Chaetura pelagica* | MTC |
| Common nighthawk | *Chordeiles minor* | OF |
| **Hummingbirds** | | |
| Ruby-throated hummingbird | *Archilochus colubris* | OF |
| **Woodpeckers** | | |
| Northern flicker | *Colaptes auratus* | MAH |
| Pileated woodpecker | *Dryocopus pileatus* | MF, MAH |

*** Non-native Species**

| Common Name | *Scientific Name* | Primary Habitat Codes (for imperiled species) |
|---|---|---|
| Red-bellied woodpecker | *Melanerpes carolinus* | MF, MAH |
| Downy woodpecker | *Picoides pubescens* | MAH |
| Yellow-bellied sapsucker | *Sphyrapicus varius* | MAH |
| **Kingfishers** | | |
| Belted kingfisher | *Megaceryle alcyon* | MUS, MAH, MS, DM |
| **Flycatchers** | | |
| Eastern wood-pewee | *Contopus virens* | MAH |
| Great crested flycatcher | *Myiarchus crinitus* | MF, MAH |
| Eastern phoebe | *Sayornis phoebe* | MAH |
| Gray kingbird | *Tyrannus dominicensis* | MAH, MS |
| **Shrikes and Vireos** | | |
| Loggerhead shrike | *Lanius ludovicianus* | CS, CG |
| Black-whiskered vireo | *Vireo altiloquus* | MAH |
| Yellow-throated vireo | *Vireo flavifrons* | MAH |
| White-eyed vireo | *Vireo griseus* | MF, MAH |
| Blue-headed vireo | *Vireo solitarius* | MF, MAH |
| **Crows and Jays** | | |
| American crow | *Corvus brachyrhynchos* | MTC |
| Fish crow | *Corvus ossifragus* | MTC |
| Blue jay | *Cyanocitta cristata* | MTC |
| **Swallows** | | |
| Barn swallow | *Hirundo rustica* | OF |
| Purple martin | *Progne subis* | OF |
| Bank swallow | *Riparia riparia* | OF |
| Northern rough-winged swallow | *Stelgidopteryx serripennis* | OF |
| Tree swallow | *Tachycineta bicolor* | OF |
| **Wrens** | | |
| Marsh wren | *Cistothorus palustris* | DM |
| Sedge wren | *Cistothorus platensis* | DM, MS |
| Carolina wren | *Thryothorus ludovicianus* | MF, MAH |
| House wren | *Troglodytes aedon* | MTC |

*** Non-native Species**

| Common Name | *Scientific Name* | Primary Habitat Codes (for imperiled species) |
|---|---|---|
| **Bluebirds, Gnatcatchers, Kinglets, and Thrushes** | | |
| Hermit thrush | *Catharus guttatus* | MAH |
| Gray-cheeked thrush | *Catharus minimus* | MAH |
| Swainson's thrush | *Catharus ustulatus* | MAH |
| Veery | *Catharus fuscescens* | MAH |
| Barn swallow | *Hirundo rustica* | OF |
| Wood thrush | *Hylocichla mustelina* | MAH |
| Northern waterthrush | *Parkesia noveboracensis* | MAH |
| Louisiana waterthrush | *Parkesia motacilla* | MF, MAH |
| Blue-gray gnatcatcher | *Polioptila caerulea* | MF, MAH |
| Ruby-crowned kinglet | *Regulus calendula* | MF, MAH |
| American robin | *Turdus migratorius* | MTC |
| **Mimids** | | |
| Gray catbird | *Dumetella carolinensis* | MF, MAH |
| Northern mockingbird | *Mimus polyglottos* | MTC |
| Brown thrasher | *Toxostoma rufum* | MF, MAH |
| **Starlings** | | |
| European starling* | *Sturnus vulgaris* | MTC |
| **Waxwings** | | |
| Cedar waxwing | *Bombycilla cedrorum* | MF |
| **Warblers** | | |
| Common yellowthroat | *Geothlypis trichas* | MF, MAH |
| Worm-eating warbler | *Helmitheros vermivorum* | MAH |
| Orange-crowned warbler | *Leiothlypis celata* | MAH |
| Swainson's warbler | *Limnothlypis swainsonii* | MAH |
| Black-and-white warbler | *Mniotilta varia* | MAH |
| Tennessee warbler | *Leiothlypis peregrina* | MAH |
| Prothonotary warbler | *Protonotaria citrea* | MAH |
| Ovenbird | *Seiurus aurocapilla* | MAH |
| Northern parula | *Setophaga americana* | MF, MAH |
| Black-throated blue warbler | *Setophaga caerulescens* | MAH |
| Hooded warbler | *Setophaga citrina* | MAH |
| Yellow-rumped warbler | *Setophaga coronata* | MAH |
| Prairie warbler | *Setophaga discolor* | MF |
| Yellow-throated warbler | *Setophaga dominica* | MAH |
| Magnolia warbler | *Setophaga magnolia* | MAH |

*** Non-native Species**

| Common Name | *Scientific Name* | Primary Habitat Codes (for imperiled species) |
|---|---|---|
| Palm warbler | *Setophaga palmarum* | CS, MAH |
| Yellow warbler | *Setophaga petechia* | MAH |
| Pine warbler | *Setophaga pinus* | MAH |
| American redstart | *Setophaga ruticilla* | MF, MAH |
| Blackpoll warbler | *Setophaga striata* | MAH |
| Cape May warbler | *Setophaga tigrina* | MAH |
| Black-throated green warbler | *Setophaga virens* | MAH |
| **Sparrows** | | |
| Swamp sparrow | *Melospiza georgiana* | DM, MAH |
| Eastern towhee | *Pipilo erythrophthalmus* | CS, CG, MAH |
| **Cardinals, Tanagers, Grosbeaks, and Buntings** | | |
| Northern cardinal | *Cardinalis cardinalis* | MTC |
| Blue grosbeak | *Passerina caerulea* | MAH |
| Indigo bunting | *Passerina cyanea* | MAH |
| Painted bunting | *Passerina ciris* | MAH |
| Scarlet tanager | *Piranga olivacea* | MAH |
| Summer tanager | *Piranga rubra* | MAH |
| Rose-breasted grosbeak | *Pheucticus ludovicianus* | MAH |
| **Icterids** | | |
| Red-winged blackbird | *Agelaius phoeniceus* | DM, MAH, CG |
| Baltimore oriole | *Icterus galbula* | MAH |
| Orchard oriole | *Icterus spurius* | MAH |
| Boat-tailed grackle | *Quiscalus major* | MTC |
| Common grackle | *Quiscalus quiscula* | MTC |
| **Meadowlarks** | | |
| Bobolink | *Dolichonyx oryzivorus* | DM |
| **Finches and Old World Sparrows** | | |
| Pine siskin | *Spinus pinus* | SM, CB |
| American goldfinch | *Spinus tristis* | OF |

*** Non-native Species**

| Common Name | *Scientific Name* | Primary Habitat Codes (for imperiled species) |
|---|---|---|

## MAMMALS

### Cingulates

| | | |
|---|---|---|
| Nine-banded armadillo* | *Dasypus novemcinctus* | MTC |

### Didlphids

| | | |
|---|---|---|
| Virginia opossum | *Didelphis virginiana* | MTC |

### Rodents

| | | |
|---|---|---|
| Black rat* | *Rattus rattus* | MTC |
| Eastern gray squirrel | *Sciurus carolinensis* | MTC |
| Hispid cotton rat | *Sigmodon hispidus* | MTC |

### Lagomorphs

| | | |
|---|---|---|
| Marsh rabbit | *Sylvilagus palustris* | DM, MAH |

### Carnivores

| | | |
|---|---|---|
| Coyote* | *Canis latrans* | MTC |
| Feral cats* | *Felis catus* | DV |
| North American river otter | *Lontra canadensis* | DM, MS, MUS |
| Bobcat | *Lynx rufus* | CS, CG, MAH, MS |
| Florida black bear | *Ursus americanus floridanus* | MTC |

### Omnivores

| | | |
|---|---|---|
| Raccoon | *Procyon lotor* | MTC |
| Feral hog* | *Sus scrofa* | MTC |

### Sirens

| | | |
|---|---|---|
| Florida manatee | *Trichechus manatus latirostris* | MUS |

### Cetatceans

| | | |
|---|---|---|
| Atlantic bottle-nose dolphin | *Tursiops truncates* | MUS |

*** Non-native Species**

**TERRESTRIAL**

Beach Dune ..... BD
Coastal Berm ..... CB
Coastal Grassland ..... CG
Coastal Strand ..... CS
Dry Prairie ..... DP
Keys Cactus Barren ..... KCB
Limestone Outcrop ..... LO
Maritime Hammock ..... MAH
Mesic Flatwoods ..... MF
Mesic Hammock ..... MEH
Pine Rockland ..... PR
Rockland Hammock ..... RH
Sandhill ..... SH
Scrub ..... SC
Scrubby Flatwoods ..... SCF
Shell Mound ..... SHM
Sinkhole ..... SK
Slope Forest ..... SPF
Upland Glade ..... UG
Upland Hardwood Forest ..... UHF
Upland Mixed Woodland ..... UMW
Upland Pine ..... UP
Wet Flatwoods ..... WF
Xeric Hammock ..... XH

**PALUSTRINE**

Alluvial Forest ..... AF
Basin Marsh ..... BM
Basin Swamp ..... BS
Baygall ..... BG
Bottomland Forest ..... BF
Coastal Interdunal Swale ..... CIS
Depression Marsh ..... DM
Dome Swamp ..... DS
Floodplain Marsh ..... FM
Floodplain Swamp ..... FS
Glades Marsh ..... GM
Hydric Hammock ..... HH
Keys Tidal Rock Barren ..... KTRB
Mangrove Swamp ..... MS
Marl Prairie ..... MP
Salt Marsh ..... SAM
Seepage Slope ..... SSL
Shrub Bog ..... SHB
Slough ..... SLO
Slough Marsh ..... SLM
Strand Swamp ..... STS
Wet Prairie ..... WP

**LACUSTRINE**

Clastic Upland Lake ..... CULK
Coastal Dune Lake ..... CDLK
Coastal Rockland Lake ..... CRLK
Flatwoods/Prairie ..... FPLK
Marsh Lake ..... MLK
River Floodplain Lake ..... RFLK
Sandhill Upland Lake ..... SULK
Sinkhole Lake ..... SKLK
Swamp Lake ..... SWLK

**RIVERINE**

Alluvial Stream ..... AST
Blackwater Stream ..... BST
Seepage Stream ..... SST
Spring-run Stream ..... SRST

**SUBTERRANEAN**

Aquatic Cave ..... ACV
Terrestrial Cave ..... TCV

**ESTUARINE**

Algal Bed ..... EAB
Composite Substrate ..... ECPS
Consolidated Substrate ..... ECNS
Coral Reef ..... ECR
Mollusk Reef ..... EMR
Octocoral Bed ..... EOB
Seagrass Bed ..... ESGB
Sponge Bed ..... ESPB
Unconsolidated Substrate ..... EUS
Worm Reef ..... EWR

**MARINE**

Algal Bed ..... MAB
Composite Substrate..... MCPS
Consolidated Substrate ..... MCNS
Coral Reef..... MCR
Mollusk Reef..... MMR
Octocoral Bed ..... MOB
Seagrass Bed ..... MSGB
Sponge Bed..... MSPB
Unconsolidated Substrate ..... MUS
Worm Reef..... MWR

**ALTERED LANDCOVER TYPES**

Abandoned field ..... ABF
Abandoned pasture..... ABP
Agriculture ..... AG
Canal/ditch ..... CD
Clearcut pine plantation ..... CPP
Clearing..... CL
Developed..... DV
Impoundment/artificial pond ..... IAP
Invasive exotic monoculture..... IEM
Pasture - improved..... PI
Pasture - semi-improved ..... PSI
Pine plantation..... PP
Road ..... RD
Spoil area ..... SA
Successional hardwood forest..... SHF
Utility corridor ..... UC

**MISCELLANEOUS**

Many Types of Communities..... MTC
Overflying ..... OF

# Appendix 6—Imperiled Species Ranking Definitions

The Nature Conservancy and the Natural Heritage Program Network (of which FNAI is a part) define an element as any exemplary or rare component of the natural environment, such as a species, natural community, bird rookery, spring, sinkhole, cave, or other ecological feature. An element occurrence (EO) is a single extant habitat that sustains or otherwise contributes to the survival of a population or a distinct, self-sustaining example of a particular element.

Using a ranking system developed by The Nature Conservancy and the Natural Heritage Program Network, the Florida Natural Areas Inventory assigns two ranks to each element. The global rank is based on an element's worldwide status; the state rank is based on the status of the element in Florida. Element ranks are based on many factors, the most important ones being estimated number of Element occurrences, estimated abundance (number of individuals for species; area for natural communities), range, estimated adequately protected EOs, relative threat of destruction, and ecological fragility.

Federal and State status information is from the U.S. Fish and Wildlife Service; and the Florida Fish and Wildlife Conservation Commission (animals), and the Florida Department of Agriculture and Consumer Services (plants), respectively.

## FNAI GLOBAL RANK DEFINITIONS

G1 ..... Critically imperiled globally because of extreme rarity (5 or fewer occurrences or less than 1000 individuals) or because of extreme vulnerability to extinction due to some natural or fabricated factor.

G2 ..... Imperiled globally because of rarity (6 to 20 occurrences or less than 3000 individuals) or because of vulnerability to extinction due to some natural or man-made factor.

G3 ..... Either very rare or local throughout its range (21-100 occurrences or less than 10,000 individuals) or found locally in a restricted range or vulnerable to extinction of other factors.

G4 ..... Apparently secure globally (may be rare in parts of range).

G5 ..... Demonstrably secure globally.

GH ..... Of historical occurrence throughout its range may be rediscovered (e.g., ivory-billed woodpecker).

GX ..... Believed to be extinct throughout range.

GXC ..... Extirpated from the wild but still known from captivity or cultivation.

G#? ..... Tentative rank (e.g., G2?).

G#G# ..... Range of rank; insufficient data to assign specific global rank (e.g., G2G3).

G#T#.....Rank of a taxonomic subgroup such as a subspecies or variety; the G portion of the rank refers to the entire species and the T portion refers to the specific subgroup; numbers have same definition as above (e.g., G3T1).

G#Q .....Rank of questionable species - ranked as species but questionable whether it is species or subspecies; numbers have same definition as above (e.g., G2Q).

G#T#Q.....Same as above, but validity as subspecies or variety is questioned.

GU.....Due to lack of information, no rank or range can be assigned (e.g., GUT2)

G? .....Not yet ranked (temporary).

S1 .....Critically imperiled in Florida because of extreme rarity (5 or fewer occurrences or less than 1000 individuals) or because of extreme vulnerability to extinction due to some natural or man-made factor.

S2 .....Imperiled in Florida because of rarity (6 to 20 occurrences or less than 3000 individuals) or because of vulnerability to extinction due to some natural or man-made factor.

S3 .....Either very rare or local throughout its range (21-100 occurrences or less than 10,000 individuals) or found locally in a restricted range or vulnerable to extinction of other factors.

S4 .....Apparently secure in Florida (may be rare in parts of range).

S5 .....Demonstrably secure in Florida.

SH.....Of historical occurrence throughout its range, may be rediscovered (e.g., ivory-billed woodpecker).

SX .....Believed to be extinct throughout range.

SA .....Accidental in Florida, i.e., not part of the established biota.

SE .....An exotic species established in Florida may be native elsewhere in North America.

SN.....Regularly occurring but widely and unreliably distributed; sites for conservation hard to determine.

SU.....Due to lack of information, no rank or range can be assigned (e.g., SUT2).

S?.....Not yet ranked (temporary).

N .....Not currently listed, nor currently being considered for listing, by state or federal agencies.

## LEGAL STATUS

### FEDERAL

**(Listed by the U. S. Fish and Wildlife Service - USFWS)**

LE..... Listed as Endangered Species in the List of Endangered and Threatened Wildlife and Plants under the provisions of the Endangered Species Act. Defined as any species that is in danger of extinction throughout all or a significant portion of its range.

PE..... Proposed for addition to the List of Endangered and Threatened Wildlife and Plants as Endangered Species.

LT..... Listed as Threatened Species. Defined as any species that is likely to become an endangered species within the near future throughout all or a significant portion of its range.

PT..... Proposed for listing as Threatened Species.

C ..... Candidate Species for addition to the list of Endangered and Threatened Wildlife and Plants. Defined as those species for which the USFWS currently has on file sufficient information on biological vulnerability and threats to support proposing to list the species as endangered or threatened.

E(S/A)..... Endangered due to similarity of appearance.

T(S/A)..... Threatened due to similarity of appearance.

EXPE, XE..... Experimental essential population. A species listed as experimental and essential.

EXPN, XN.... Experimental non-essential population. A species listed as experimental and non-essential. Experimental, nonessential populations of endangered species are treated as threatened species on public land, for consultation purposes.

## STATE

**ANIMALS... (Listed by the Florida Fish and Wildlife Conservation Commission - FWC)**

FE.....Federally-designated Endangered

FT.....Federally-designated Threatened

FXN .....Federally-designated Threatened Nonessential Experimental Population

FT(S/A) .....Federally-designated Threatened species due to similarity of appearance.

ST .....Listed as Threatened Species by the FWC. Defined as a species, subspecies, or isolated population, which is acutely vulnerable to environmental alteration, declining in number at a rapid rate, or whose range or habitat, is decreasing in area at a rapid rate and therefore is destined or very likely to become an endangered species within the near future.

SSC .....Listed as Species of Special Concern by the FWC. Defined as a population which warrants special protection, recognition or consideration because it has an inherent significant vulnerability to habitat modification, environmental alteration, human disturbance or substantial human exploitation that, in the near future, may result in its becoming a threatened species.

**PLANTS ..... (Listed by the Florida Department of Agriculture and Consumer Services - FDACS)**

LE..... Listed as Endangered Plants in the Preservation of Native Flora of Florida Act. Defined as species of plants native to the state that are in imminent danger of extinction within the state, the survival of which is unlikely if the causes of a decline in the number of plants continue, and includes all species determined to be endangered or threatened pursuant to the Federal Endangered Species Act of 1973, as amended.

LT..... Listed as Threatened Plants in the Preservation of Native Flora of Florida Act. Defined as species native to the state that are in rapid decline in the number of plants within the state, but which have not so decreased in such number as to cause them to be endangered.

# Appendix 7—Cultural Resource Management Guidelines

**These procedures apply to state agencies, local governments, and non-profits that manage state-owned properties.**

## A. General Discussion

Historic resources are both archaeological sites and historic structures. Per Chapter 267, Florida Statutes, '*Historic property' or 'historic resource' means any prehistoric district, site, building, object, or other real or personal property of historical, architectural, or archaeological value, and folklife resources. These properties or resources may include, but are not limited to, monuments, memorials, Indian habitations, ceremonial sites, abandoned settlements, sunken or abandoned ships, engineering works, treasure trove, artifacts, or other objects with intrinsic historical or archaeological value, or any part thereof, relating to the history, government, and culture of the state."*

## B. Agency Responsibilities

Per State Policy relative to historic properties, state agencies of the executive branch must allow the Division of Historical Resources (Division) the opportunity to comment on any undertakings, whether these undertakings directly involve the state agency, i.e., land management responsibilities, or the state agency has indirect jurisdiction, i.e., permitting authority, grants, etc. No state funds should be expended on the undertaking until the Division has the opportunity to review and comment on the project, permit, grant, etc.

State agencies shall preserve the historic resources which are owned or controlled by the agency.

Regarding proposed demolition or substantial alterations of historic properties, consultation with the Division must occur, and alternatives to demolition must be considered.

State agencies must consult with Division to establish a program to location, inventory and evaluate all historic properties under ownership or controlled by the agency.

## C. Statutory Authority

Statutory Authority and more in-depth information can be found at:
http://www.flheritage.com/preservation/compliance/guidelines.cfm

## D. Management Implementation

Even though the Division sits on the Acquisition and Restoration Council and approves land management plans, these plans are conceptual. Specific information regarding individual projects must be submitted to the Division for review and recommendations.

Managers of state lands must coordinate any land clearing or ground disturbing activities with the Division to allow for review and comment on the proposed project. Recommendations may include, but are not limited to: approval of the project as submitted, cultural resource assessment survey by a qualified professional archaeologist, modifications to the proposed project to avoid or mitigate potential adverse effects.

Projects such as additions, exterior alteration, or related new construction regarding historic structures must also be submitted to the Division of Historical Resources for review and comment by the Division's architects. Projects involving structures fifty years of age or older, must be submitted to this agency for a significance determination. In rare cases, structures under 50 years of age may be deemed historically significant. These must be evaluated on a case by case basis.

Adverse impacts to significant sites, either archaeological sites or historic buildings, must be avoided. Furthermore, managers of state property should make preparations for locating and evaluating historic resources, both archaeological sites and historic structures.

## E. Minimum Review Documentation Requirements

In order to have a proposed project reviewed by the Division, certain information must be submitted for comments and recommendations. The minimum review documentation requirements can be found at:http://www.flheritage.com/preservation/compliance/docs/minimum_review_documentation_requirements.pdf.

* * *

Questions relating to the treatment of archaeological and historic resources on state lands should be directed to:

Deena S. Woodward
Division of Historical Resources
Bureau of Historic Preservation
Compliance and Review Section
R. A. Gray Building
500 South Bronough Street
Tallahassee, FL 32399-0250

Phone: (850) 245-6425

Toll Free: (800) 847-7278
Fax: (850) 245-6435

The criteria to be used for evaluating eligibility for listing in the National Register of Historic Places are as follows:

**1)** Districts, sites, buildings, structures, and objects may be considered to have significance in American history, architecture, archaeology, engineering, and/or culture if they possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:

- **a)** are associated with events that have made a significant contribution to the broad patterns of our history; and/or
- **b)** are associated with the lives of persons significant in our past; and/or
- **c)** embody the distinctive characteristics of type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; and/or
- **d)** have yielded, or may be likely to yield, information important in prehistory or history.

**2)** Ordinarily cemeteries, birthplaces, or graves of historical figures; properties owned by religious institutions or used for religious purposes; structures that have been moved from their original locations; reconstructed historic buildings; properties primarily commemorative in nature; and properties that have achieved significance within the past 50 years shall not be considered eligible for the *National Register*. However, such properties will qualify if they are integral parts of districts that do meet the criteria or if they fall within the following categories:

- **a)** religious property deriving its primary significance from architectural or artistic distinction or historical importance; or
- **b)** building or structure removed from its original location but which is significant primarily for architectural value, or which is the surviving structure most importantly associated with a historic person or event; or
- **c)** birthplace or grave of an historical figure of outstanding importance if there is no appropriate site or building directly associated with his productive life; or
- **d)** cemetery which derives its primary significance from graves of persons of transcendent importance, from age, distinctive design features, or association with historic events; or

**e)** a reconstructed building, when it is accurately executed in a suitable environment and presented in a dignified manner as part of a restoration master plan, and no other building or structure with the same association has survived; or a property primarily commemorative in intent, if design, age, tradition, or symbolic value has invested it with its own exceptional significance; or

**f)** a property achieving significance within the past 50 years, if it is of exceptional importance.

**Restoration** is defined as the act or process of accurately depicting the form, features, and character of a property as it appeared at a particular period of time by means of the removal of features from other periods in its history and reconstruction of missing features from the restoration period. The limited and sensitive upgrading of mechanical, electrical and plumbing systems and other code-required work to make properties functional is appropriate within a restoration project.

**Rehabilitation** is defined as the act or process of making possible a compatible use for a property through repair, alterations and additions while preserving those portions or features that convey its historical, cultural or architectural values.

**Stabilization** is defined as the act or process of applying measures designed to reestablish a weather resistant enclosure and the structural stability of an unsafe or deteriorated property while maintaining the essential form as it exists at present.

**Preservation** is defined as the act or process of applying measures necessary to sustain the existing form, integrity and materials of an historic property. Work, including preliminary measures to protect and stabilize the property, generally focuses upon the ongoing maintenance and repair of historic materials and features rather than extensive replacement and new construction. New exterior additions are not within the scope of this treatment; however, the limited and sensitive upgrading of mechanical, electrical and plumbing systems and other code-required work to make properties functional is appropriate within a preservation project.

# Appendix 8—Land Management Review

# FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

## MEMORANDUM

**TO:** Keith Singleton, Program Consultant
Division of State Lands

**FROM:** Wes Howell, Chief, Bureau of Natural and Cultural Resources
Division of Recreation and Parks

Steve Cutshaw, Chief, Office of Park Planning
Division of Recreation and Parks

**SUBJECT:** Response to Draft Land Management Review (LMR)
Cayo Costa State Park

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The Land Management Review draft report provided to Division of Recreation and Parks (DRP) determined that management of Cayo Costa State Park by the DRP met the two tests prescribed by law. Namely, the review team concluded that the land is being managed for the purposes for which it was acquired and in accordance with the land management plan.

Attached is DRP's Managing Agency Response to the draft LMR report. The responses were prepared via a coordinated effort of the park, district office, and our offices.

Thank you for your attention.

/ca

# 2020 Land Management Review Team Report for Cayo Costa State Park

## Table of Contents

## Introduction

Section 259.036, F.S. requires a periodic on-site review of conservation and recreation lands titled in the name of the Board of Trustees to determine (1) whether the lands are being managed for the purposes for which they were acquired and (2) whether they are being managed in accordance with their land management plan adopted pursuant to s. 259.032, F.S. In cases where the managed areas exceed 1,000 acres in size, such a review must be scheduled at least every five years. In conducting this review, a statutorily constructed review team "shall evaluate the extent to which the existing management plan provides sufficient protection to threatened or endangered species, unique or important natural or physical features, geological or hydrological functions or archaeological features. The review shall also evaluate the extent to which the land is being managed for the purposes for which it was acquired and the degree to which actual management practices, including public access, are in compliance with the adopted management plan."

The land management review teams are coordinated by the Division of State Lands and consist of representatives from the Division of Recreation and Parks (DEP), the Florida Forest Service (DACS), the Fish and Wildlife Conservation Commission, the local government in which the property is located, the DEP District in which the parcel is located, the local soil and water conservation district or jurisdictional water management district, a conservation organization member, and a local private land manager.

Each Land Management Review Report is divided into three sections. Section 1 provides the details of the property being reviewed as well as the overall results of the report. Section 2 provides details of the Field Review, in which the Review Team inspects the results of management actions on the site. Section 3 provides details of the Land Management Plan Review, in which the team determines the extent to which the Management Plan provides for and documents adequate natural and recreational resource protection.

Finally, each report may also contain an Appendix that lists individual team member comments. This is a compilation of feedback, concerns or other thoughts raised by individual team members, but not necessarily indicative of the final consensus reached by the Land Management Review Team.

## Property Reviewed in this Report

**Name of Site:** Cayo Costa State Park
**Managed by:** Department of Environmental Protection, Florida Park Service
**Acres:** 2,458 **County:** Lee
**Purpose(s) for Acquisition:** To develop, operate and maintain the property for outdoor recreational, park, conservation, historic, and related purposes.
**Acquisition Program(s):** CARL/P2000/Florida Forever **Original Acquisition Date:** 9/07/1976
**Area Reviewed:** Entire Property **Last Management Plan Approval Date:** 12/9/2005
**Review Date:** 2/13/2020

**Agency Manager and Key Staff:**

- Rick Argo, Park Manager
- Mary Mazyck, PSS
- William Nash, Assistant Park Manager

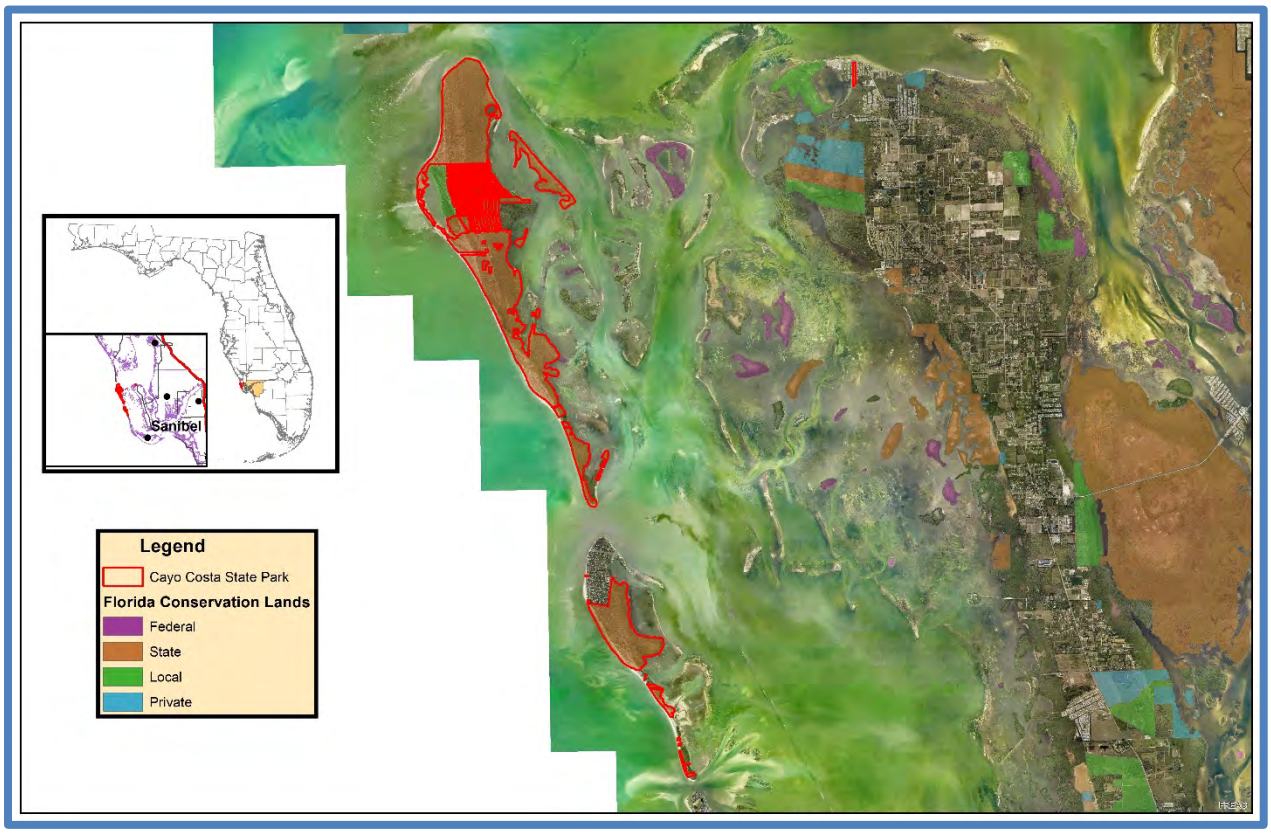
**Review Team Members** (voting)

- Karen Rogers, DRP District
- Local Gov't., None
- Becky Schneider, FWC
- Tori Gray, DEP District
- Clark Ryals, FFS
- Marie Dessources, SFWMD
- Marlene Rodak, Conservation Org.
- Private Land Manager, None

**Non-Team Members** (attending)

- Keith Singleton, DEP/DSL
- Dennis Giardina, FWC/IPMS
- Melynda Brown, DEP/RCP
- Joseph Bozzo, SFWMD

## Property Map



## Overview of Land Management Review Results

***Is the property managed for purposes that are compatible with conservation, preservation, or recreation?***

***Yes = 6, No = 0***

***Are the management practices, including public access, in compliance with the management plan?***

***Yes = 6, No = 0***

*Table 1* shows the average scores received for each applicable category of review. *Field Review* scores refer to the adequacy of management actions in the field, while *Management Plan Review* scores refer to adequacy of discussion of these topics in the management plan. Scores range from 1 to 5 with 5 signifying excellence. For a more detailed key to the scores, please see *Appendix A*.

**Table 1: Results at a glance.**

| Major Land Management Categories | Field Review | Management Plan Review |
|---|---|---|
| Natural Communities / Forest Management | 3.74 | 3.55 |
| Prescribed Fire / Habitat Restoration | 3.94 | 2.56 |
| Hydrology | 4.50 | 2.50 |
| Imperiled Species | 4.13 | 2.89 |
| Exotic / Invasive Species | 4.53 | 2.56 |
| Cultural Resources | 4.75 | 4.67 |
| Public Access / Education / Law Enforcement | 3.94 | 3.44 |
| Infrastructure / Equipment / Staffing | 2.72 | N/A |

**Color Code** (See Appendix A for detail)

| Excellent | Above Average | Below Average | Poor |
|---|---|---|---|

### Consensus Commendations for the Managing Agency

The following commendations resulted from discussion and vote of the review team members:

1. The team commends the Florida Park Service (FPS) for remaining committed to invasive plant control, surpassing established treatment goals many of the past five years and for targeting all category 1 and 2 exotics on the island. (6+, 0-)
2. The team commends the FPS for a sustained, dedicated effort to eradicate feral hogs from the park. (6+, 0-)
3. The team commends the FPS for their efforts at annual site monitoring, establishing erosion control measures for imperiled sites, and exotic plant treatment practices on archaeological sites. (6+, 0-)

### Consensus Recommendations to the Managing Agency

The following recommendations resulted from a discussion and vote of review team members. The next management plan update should include information about how these recommendations have been addressed:

1. The team recommends the park manager and staff continue to reach out to private property owners to encourage acceptance of prescribed burning to maintain dependent natural communities and to reduce fuels that should make their properties safer from wildfires. (6+, 0-)

   ***Managing Agency Response:*** ***Park management will continue to reach out to private property owners living on the island to educate them about the importance of prescribed burning in reducing fuel loads and maintain fire dependent communities on the island. Park managment will***

***also provide them with information about wildfire prevention measures that the homeowners could implement around their property to assist with protection of their home in case of a wildfire.***

2. The team recommends the FPS address the energy needs of park residences and facilities present and future, including renewable technologies that are more affordable and dependable. (6+, 0-)

   ***Managing Agency Response:*** ***Park management will request funding to assess overall energy needs of park residences and facilities (both existing and newly proposed) to determine the best solution available to resolve energy supply issues at the park. This will include exploring options for additional renewable technologies that are more affordable and dependable.***

# Field Review Details

## Field Review Checklist Findings

The following items received high scores on the review team checklist, which indicates that management actions exceeded expectations.

1. **Natural communities, specifically beach dune, coastal berm, coastal strand, maritime hammock, mesic flatwoods, coastal grasslands, shell mound, depression marsh, marine tidal swamp, and marine unconsolidated substrate.**
2. **Listed species, animals and plants in general, and specifically shorebirds, sea turtles, and gopher tortoise.**
3. **Natural resource survey/monitoring resources, specifically invasive species survey and monitoring.**
4. **Cultural Resources, specifically cultural resource survey, and protection and preservation.**
5. **Resource management (prescribed fire), specifically frequency, and quality.**
6. **Non-native, invasive, and problem species, specifically prevention and control of plants, animals, and pests/pathogens.**
7. **Ground Water Monitoring, specifically quality.**
8. **Surface Water Monitoring, specifically quality.**
9. **Environmental education and outreach, specifically wildlife, invasive species, habitat management activities, recreational opportunities, and management of visitor impacts.**
10. **Management resources, specifically waste disposal, and sanitary facilities**.

## Items Requiring Improvement Actions in the Field

The following items received low scores on the review team checklist, which indicates that management actions noted during the Field Review were not considered sufficient (less than 3.0 score on average). Please note that overall good scores do not preclude specific recommendations by the review team requiring remediation. The management plan update should include information on how these items have been addressed:

1. Forest Management, specifically timber inventory, received a below average score. The review team is asked to evaluate, based on information provided by the managing agency, whether forest management is sufficient.

***Managing Agency Response:*** ***Disagree. The overall management goals of the park and natural communities are being met through the current forest management regime. The park will continue to manage these forests with proper care so they remain healthy and vigorous for generations to come. A timber assessment has been scheduled.***

2. Adjacent Property Concerns, specifically expanding development, received a below average score. The review team is asked to evaluate, based on information provided by the managing agency, whether adjacent property concerns are sufficiently addressed.

   ***Managing Agency Response:*** ***The District is working with the Office of Park Planning and Division of State Lands to identify park boundaries along outparcels and address issues of potential encroachment on state park property. All outparcels have been identified in the optimum park boundary for greater resource protection and enhanced management access. The Division will address adjacent property concerns in the update of the management plan.***

3. Management Resources, specifically buildings, equipment, staff, and funding, received below average scores. The review team is asked to evaluate, based on information provided by the managing agency, whether management resources are sufficient.

   ***Managing Agency Response:*** ***Additional staff can only be assigned to this or other park units if they are appropriated by the Legislature or reassigned from other units. Funding is determined annually by the Florida Legislature. This funding is allocated at the Division and District levels in order to best meet annual operational and resource management needs. Any deemed increase in Division Budget/staffing will follow the established legislative budget request process.***

## Field Review Checklist and Scores

| Field Review Item | Reference # | Anonymous Team Members | | | | | | | | Average |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | |
| **Natural Communities (I.A)** | | | | | | | | | | |
| Beach Dune | I.A.1 | 5 | 5 | 5 | 4 | 5 | 4 | | | 4.67 |
| Coastal Berm | I.A.2 | 5 | 5 | 5 | 4 | 5 | 5 | | | 4.83 |
| Coastal Strand | I.A.3 | 5 | 5 | 5 | 4 | 5 | 5 | | | 4.83 |
| Maritime Hammock | I.A.4 | 4 | 4 | 5 | 4 | 5 | 4 | | | 4.33 |
| Mesic Flatwoods | I.A.5 | 4 | 4 | 4 | 4 | 3 | 5 | | | 4.00 |
| Coastal Grasslands | I.A.6 | 5 | 5 | 5 | 5 | 5 | x | | | 5.00 |
| Shell Mound | I.A.7 | 5 | 5 | 5 | 5 | 5 | 4 | | | 4.83 |
| Depression Marsh | I.A.8 | X | 4 | X | 4 | 5 | x | | | 4.33 |
| Marine Tidal Swamp (Mangrove Swamp) | I.A.10 | 5 | 5 | 5 | 5 | 5 | 5 | | | 5.00 |
| Marine Unconsolidated Substrate | I.A.11 | 5 | 5 | 5 | 5 | 5 | 5 | | | 5.00 |
| | | | | | | | | | **Natural Communities Average Score** | 4.68 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Listed species: Protection & Preservation (I.B)** | | | | | | | | | | |
| Animals | I.B.1 | 5 | 4 | 4 | 3 | 4 | 3 | | | 3.83 |
| Shore Birds | I.B.1.a | 5 | 4 | 4 | 4 | 5 | 3 | | | 4.17 |
| Sea Turtles | I.B.1.b | 5 | 5 | 5 | 4 | 5 | 5 | | | 4.83 |
| Gopher Tortoise | I.B.1.c | 5 | 5 | 4 | 3 | 5 | 3 | | | 4.17 |
| Indigo Snake | I.B.1.d | 5 | 3 | 3 | 3 | 5 | x | | | 3.80 |
| Plants | I.B.2 | 5 | 4 | 4 | 3 | 5 | 3 | | | 4.00 |
| | | | | | | | | **Listed Species Average Score** | | 4.13 |
| **Natural Resources Survey/Management Resources (I.C)** | | | | | | | | | | |
| Listed species or their habitat monitoring | I.C.2 | 5 | 4 | 4 | 2 | 4 | 2 | | | 3.50 |
| Other non-game species or their habitat monitoring | I.C.3 | 4 | 4 | 3 | 2 | 3 | 3 | | | 3.17 |
| Fire effects monitoring | I.C.4 | 3 | 4 | 2 | 3 | 3 | 4 | | | 3.17 |
| Invasive species survey / monitoring | I.C.6 | 5 | 5 | 5 | 5 | 4 | 5 | | | 4.83 |
| **Cultural Resources (Archeological & Historic sites) (II.A, II.B)** | | | | | | | | | | |
| Cultural Res. Survey | II.A | 5 | 5 | 4 | 4 | 5 | 5 | | | 4.67 |
| Protection and preservation | II.B | 5 | 5 | 5 | 4 | 5 | 5 | | | 4.83 |
| | | | | | | | | **Cultural Resources Average Score** | | 4.75 |
| **Resource Management, Prescribed Fire (III.A)** | | | | | | | | | | |
| Area Being Burned (no. acres) | III.A.1 | 4 | 4 | 4 | 4 | 2 | 5 | | | 3.83 |
| Frequency | III.A.2 | 4 | 4 | 4 | 4 | 3 | 5 | | | 4.00 |
| Quality | III.A.3 | 4 | 4 | 4 | 4 | 3 | 5 | | | 4.00 |
| | | | | | | | | **Resource Management, Prescribed Fire Average Score** | | 3.94 |
| **Forest Management (III.C)** | | | | | | | | | | |
| Timber Inventory | III.C.1 | 1 | 4 | 3 | 3 | 3 | x | | | 2.80 |
| | | | | | | | | **Forest Management Average Score** | | 2.80 |
| **Non-Native, Invasive & Problem Species (III.D)** | | | | | | | | | | |
| **Prevention** | | | | | | | | | | |
| prevention - plants | III.D.1.a | 5 | 4 | 5 | 4 | 5 | 4 | | | 4.50 |
| prevention - animals | III.D.1.b | 5 | 4 | 5 | 3 | 4 | 4 | | | 4.17 |
| prevention - pests/pathogens | III.D.1.c | 5 | 5 | 5 | 4 | 4 | 4 | | | 4.50 |
| **Control** | | | | | | | | | | |
| control - plants | III.D.2.a | 5 | 5 | 5 | 4 | 5 | 5 | | | 4.83 |
| control - animals | III.D.2.b | 5 | 5 | 5 | 4 | 4 | 5 | | | 4.67 |
| control - pest/pathogens | III.D.2.c | 5 | 4 | 5 | 4 | 4 | 5 | | | 4.50 |
| | | | | | | | | **Non-Native, Invasive & Problem Species Average Score** | | 4.53 |
| **Ground Water Monitoring (III.E.2)** | | | | | | | | | | |
| Ground water quality | III.E.2.a | 5 | 5 | 5 | 4 | 4 | 4 | | | 4.50 |
| | | | | | | | | **Ground Water Monitoring Average Score** | | 4.50 |
| **Surface Water Monitoring (III.E.3)** | | | | | | | | | | |
| Surface water quality | III.E.3.a | 5 | 5 | 5 | 4 | 4 | 4 | | | 4.50 |
| | | | | | | | | **Surface Water Monitoring Average Score** | | 4.50 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Resource Protection (III.F)** | | | | | | | | | | |
| Boundary survey | III.F.1 | 3 | 4 | 3 | 4 | 4 | 4 | | | 3.67 |
| Gates & fencing | III.F.2 | 3 | 5 | 3 | 4 | 4 | 4 | | | 3.83 |
| Signage | III.F.3 | 4 | 4 | 3 | 4 | 4 | 4 | | | 3.83 |
| Law enforcement presence | III.F.4 | 3 | 4 | 4 | 3 | 3 | 4 | | | 3.50 |
| | | | | | | | **Resource Protection Average Score** | | | 3.71 |
| **Adjacent Property Concerns (III.G)** | | | | | | | | | | |
| **Land Use** | | | | | | | | | | |
| Expanding development | III.G.1.a | 1 | 3 | 5 | 3 | 2 | 2 | | | 2.67 |
| Inholdings/additions | III.G.2 | 4 | 3 | 4 | 3 | 2 | 2 | | | 3.00 |
| **Public Access & Education (IV.1, IV.2, IV.3, IV.4, IV.5)** | | | | | | | | | | |
| **Public Access** | | | | | | | | | | |
| Boat Access | IV.1.c | 5 | 4 | 3 | 4 | 3 | 4 | | | 3.83 |
| **Environmental Education & Outreach** | | | | | | | | | | |
| Wildlife | IV.2.a | 5 | 4 | 5 | 4 | 4 | 4 | | | 4.33 |
| Invasive Species | IV.2.b | 5 | 4 | 5 | 4 | 4 | 4 | | | 4.33 |
| Habitat Management Activities | IV.2.c | 5 | 4 | 5 | 3 | 4 | 4 | | | 4.17 |
| Interpretive facilities and signs | IV.3 | 5 | 3 | 4 | 3 | 4 | 4 | | | 3.83 |
| Recreational Opportunities | IV.4 | 5 | 5 | 4 | 3 | 5 | 5 | | | 4.50 |
| Management of Visitor Impacts | IV.5 | 5 | 4 | 4 | 3 | 5 | 4 | | | 4.17 |
| | | | | | | | **Public Access & Education Average Score** | | | 4.17 |
| **Management Resources (V.1, V.2, V.3. V.4)** | | | | | | | | | | |
| **Maintenance** | | | | | | | | | | |
| Waste disposal | V.1.a | 5 | 5 | 5 | 3 | 4 | 5 | | | 4.50 |
| Sanitary facilities | V.1.b | 4 | 5 | 4 | 3 | 4 | 5 | | | 4.17 |
| **Infrastructure** | | | | | | | | | | |
| Buildings | V.2.a | 1 | 2 | 2 | 2 | 3 | 4 | | | 2.33 |
| Equipment | V.2.b | 1 | 2 | 2 | 1 | 2 | 1 | | | 1.50 |
| Staff | V.3 | 2 | 2 | 1 | 2 | 2 | 2 | | | 1.83 |
| Funding | V.4 | 2 | 2 | 2 | 2 | 2 | 2 | | | 2.00 |
| | | | | | | | **Management Resources Average Score** | | | 2.72 |

| Color Code: | Excellent | Above Average | Below Average | Poor | See Appendix A for detail |
|---|---|---|---|---|---|
| | | Missing Vote | Insufficient Information | | |

# Land Management Plan Review Details

## Items Requiring Improvements in the Management Plan

The following items received low scores on the review team checklist, which indicates that the text noted in the Management Plan Review does not sufficiently address this issue (less than 3.0 score on average.). Please note that overall good scores do not preclude specific recommendations by the review team requiring remediation. The next management plan update should address the checklist items identified below:

1. Listed Species protection and preservation, plants in general, and specifically gopher tortoise, and indigo snake, received below average scores. This is an indication that the management plan does not sufficiently address protection and preservation of listed species.

   ***Managing Agency Response:*** ***The protection and preservation of plants in general, and listed species, particularly gopher tortoise and indigo snake, will be more thoroughly addressed in the next plan update. The current management plan was reviewed by the relevant agencies and was in full compliance with Chapters 253 and 259, F.S., and Chapter 18-2, F.A.C., when it was approved by ARC.***

2. Natural Resources Survey and Monitoring Resources, specifically other non-game species or their habitat monitoring, received a below average score. This is an indication that the management plan does not sufficiently address survey or monitoring.

   ***Managing Agency Response:*** ***Natural Resources Survey and Monitoring Resources including other non-game species or their habitat monitoring will be more thoroughly addressed in the next plan update. The current management plan was reviewed by the relevant agencies and was in full compliance with Chapters 253 and 259, F.S., and Chapter 18-2, F.A.C., when it was approved by ARC.***

3. Resource Management prescribed fire, specifically area being burned, frequency, and quality, received below average scores. This is an indication that the management plan does not sufficiently address prescribed fire needs.

   ***Managing Agency Response:*** ***Prescribed fire, including the area being burned, frequency, and quality will be addressed in the next management plan update. The current management plan was reviewed by the relevant agencies and was in full compliance with Chapters 253 and 259, F.S., and Chapter 18-2, F.A.C., when it was approved by ARC.***

4. Forest Management, specifically timber inventory, received a below average score. This is an indication that the management plan does not sufficiently address forest management.

   ***Managing Agency Response:*** ***Timber management will be addressed in the next management plan update, and a timber assessment will be completed prior to plan submittal to ARC. The current management plan was reviewed by the relevant agencies and was in full compliance with Chapters 253 and 259, F.S., and Chapter 18-2, F.A.C. when it was approved by ARC.***

5. Non-native, Invasive & Problem Species, specifically prevention of plants,and animals, and prevention and control pests/pathogens, received below average scores. This is an indication that the management plan does not sufficiently address prevention of invasive species.

   ***Managing Agency Response:*** ***Non-native, Invasive and Problem Species including the prevention of pests/pathogens and the control of plants and pests/pathogens will be more thoroughly addressed in the next plan update. The current management plan was reviewed by the relevant agencies and was in full compliance with Chapters 253 and 259, F.S., and Chapter 18-2, F.A.C., when it was approved by ARC.***

6. Ground Water Monitoring, specifically quality, received a below average score. This is an indication that the management plan does not sufficiently address ground water monitoring.

***Managing Agency Response:*** ***Ground water monitoring will be more thoroughly addressed in the next management plan update. The current management plan was reviewed by the relevant agencies and was in full compliance with Chapters 253 and 259, F.S., and Chapter 18-2, F.A.C., when it was approved by ARC.***

7. Surface Water Monitoring, specifically quality, received a below average score. This is an indication that the management plan does not sufficiently address surface water monitoring.

   ***Managing Agency Response:*** ***Surface water monitoring will be more thoroughly addressed in the next management plan update. The current management plan was reviewed by the relevant agencies and was in full compliance with Chapters 253 and 259, F.S., and Chapter 18-2, F.A.C., when it was approved by ARC.***

8. Resource Protection, specifically gates & fencing, received a below average score. This is an indication that the management plan does not sufficiently address resource protection..

   ***Managing Agency Response:*** ***Resource Protection including boundary survey, gates and fencing, will be more thoroughly addressed in the next management plan update. The current management plan was reviewed by the relevant agencies and was in full compliance with Chapters 253 and 259, F.S., and Chapter 18-2, F.A.C., when it was approved by ARC.***

9. Adjacent Property Concerns, specifically discussion of potential surplus land determination, received a below average score. This is an indication that the management plan does not sufficiently address adjacent property.

   ***Managing Agency Response:*** ***Adjacent property concerns including discussion of potential surplus land determination will be more thoroughly addressed in the next plan update. The current management plan was reviewed by the relevant agencies and was in full compliance with Chapters 253 and 259, F.S., and Chapter 18-2, F.A.C., when it was approved by ARC.***

## Management Plan Review Checklist and Scores

| Plan Review Item | Reference # | Anonymous Team Members | | | | | | | | Average |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | |
| **Natural Communities (I.A)** | | | | | | | | | | |
| Beach Dune | I.A.1 | 5 | 5 | 4 | 3 | 5 | 4 | | | 4.33 |
| Coastal Berm | I.A.2 | 5 | 5 | 4 | 3 | 4 | 4 | | | 4.17 |
| Coastal Strand | I.A.3 | 5 | 5 | 5 | 3 | 4 | 4 | | | 4.33 |
| Maritime Hammock | I.A.4 | 5 | 5 | 4 | 3 | 4 | 4 | | | 4.17 |
| Mesic Flatwoods | I.A.5 | 5 | 5 | 5 | 3 | 4 | 4 | | | 4.33 |
| Coastal Grasslands | I.A.6 | 5 | 4 | 5 | 3 | 4 | 4 | | | 4.17 |
| Shell Mound | I.A.7 | 5 | 4 | 5 | 3 | 4 | 4 | | | 4.17 |
| Depression Marsh | I.A.8 | 5 | 5 | 5 | 3 | 4 | 4 | | | 4.33 |
| Marine Tidal Swamp (Mangrove Swamp) | I.A.10 | 5 | 5 | 5 | 3 | 4 | 4 | | | 4.33 |
| Marine Unconsolidated Substrate | I.A.11 | 5 | 5 | 5 | 3 | 4 | 4 | | | 4.33 |
| | | | | | | | | | **Natural Communities Average Score** | 4.27 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Listed species: Protection & Preservation (I.B)** | | | | | | | | | | |
| Animals | I.B.1 | 5 | 5 | 4 | 3 | 4 | 3 | | | 4.00 |
| Shore Birds | I.B.1.a | 5 | 5 | 5 | 3 | 4 | 4 | | | 4.33 |
| Sea Turtles | I.B.1.b | 5 | 5 | 5 | 3 | 3 | 4 | | | 4.17 |
| Gopher Tortoise | I.B.1.c | 5 | 1 | 1 | 1 | 2 | 1 | | | 1.83 |
| Indigo Snake | I.B.1.d | 2 | 1 | 1 | 1 | 2 | 1 | | | 1.33 |
| Plants | I.B.2 | 2 | 2 | 2 | 1 | 2 | 1 | | | 1.67 |
| | | | | | | | | **Listed Species Average Score** | | 2.89 |
| **Natural Resources Survey/Management Resources (I.C)** | | | | | | | | | | |
| Listed species or their habitat monitoring | I.C.2 | 3 | 4 | 5 | 2 | 3 | 2 | | | 3.17 |
| Other non-game species or their habitat monitoring | I.C.3 | 3 | 3 | 3 | 2 | 3 | 3 | | | 2.83 |
| Fire effects monitoring | I.C.4 | 3 | 4 | 3 | 2 | 2 | 5 | | | 3.17 |
| Invasive species survey / monitoring | I.C.6 | 3 | 5 | 4 | 3 | 3 | 5 | | | 3.83 |
| **Cultural Resources (Archeological & Historic sites) (II.A, II.B)** | | | | | | | | | | |
| Cultural Res. Survey | II.A | 5 | 5 | 5 | 4 | 4 | 5 | | | 4.67 |
| Protection and preservation | II.B | 5 | 5 | 5 | 4 | 4 | 5 | | | 4.67 |
| | | | | | | | | **Cultural Resources Average Score** | | 4.67 |
| **Resource Management, Prescribed Fire (III.A)** | | | | | | | | | | |
| Area Being Burned (no. acres) | III.A.1 | 4 | 3 | 2 | 2 | 2 | 3 | | | 2.67 |
| Frequency | III.A.2 | 2 | 3 | 3 | 2 | 3 | 3 | | | 2.67 |
| Quality | III.A.3 | 2 | 3 | 2 | 2 | 2 | 3 | | | 2.33 |
| | | | | | | | | **Resource Management, Prescribed Fire Average Score** | | 2.56 |
| **Forest Management (III.C)** | | | | | | | | | | |
| Timber Inventory | III.C.1 | 4 | 2 | 3 | 2 | 3 | 3 | | | 2.83 |
| | | | | | | | | **Forest Management Average Score** | | 2.83 |
| **Non-Native, Invasive & Problem Species (III.D)** | | | | | | | | | | |
| **Prevention** | | | | | | | | | | |
| prevention - plants | III.E.1.a | 3 | 3 | 2 | 2 | 2 | 2 | | | 2.33 |
| prevention - animals | III.E.1.b | 3 | 3 | 2 | 2 | 2 | 2 | | | 2.33 |
| prevention - pests/pathogens | III.E.1.c | 3 | 3 | 2 | 1 | 2 | 2 | | | 2.17 |
| **Control** | | | | | | | | | | |
| control - plants | III.E.2.a | 3 | 3 | 3 | 3 | 4 | 3 | | | 3.17 |
| control - animals | III.E.2.b | 3 | 3 | 3 | 3 | 4 | 3 | | | 3.17 |
| control - pest/pathogens | III.E.2.c | 3 | 3 | 1 | 1 | 2 | 3 | | | 2.17 |
| | | | | | | | | **Non-Native, Invasive & Problem Species Average Score** | | 2.56 |
| **Ground Water Monitoring (III.E.2)** | | | | | | | | | | |
| Ground water quality | III.F.2.a | 3 | 2 | 3 | 2 | 3 | 2 | | | 2.50 |
| | | | | | | | | **Ground Water Monitoring Average Score** | | 2.50 |
| **Surface Water Monitoring (III.E.3)** | | | | | | | | | | |
| Surface water quality | III.F.3.a | 3 | 2 | 3 | 2 | 3 | 2 | | | 2.50 |
| | | | | | | | | **Surface Water Monitoring Average Score** | | 2.50 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Resource Protection (III.F)** | | | | | | | | | | |
| Boundary survey | III.G.1 | 3 | 4 | 3 | 2 | 3 | 3 | | | 3.00 |
| Gates & fencing | III.G.2 | 3 | 4 | 2 | 2 | 3 | 3 | | | 2.83 |
| Signage | III.G.3 | 3 | 4 | 3 | 2 | 3 | 3 | | | 3.00 |
| Law enforcement presence | III.G.4 | 3 | 4 | 3 | 2 | 3 | 4 | | | 3.17 |
| | | | | | | | **Resource Protection Average Score** | | | 3.00 |
| **Adjacent Property Concerns (III.G)** | | | | | | | | | | |
| **Land Use** | | | | | | | | | | |
| Expanding development | III.H.1.a | 4 | 4 | 4 | 3 | 3 | 4 | | | 3.67 |
| Inholdings/additions | III.H.2 | 5 | 5 | 5 | 3 | 4 | 4 | | | 4.33 |
| Discussion of Potential Surplus Land Determination | III.H.3 | 1 | 2 | 2 | 2 | 3 | 3 | | | 2.17 |
| Surplus Lands Identified? | III.H.4 | 5 | 4 | 5 | 4 | 5 | 4 | | | 4.50 |
| **Public Access & Education (IV.1, IV.2, IV.3, IV.4, IV.5)** | | | | | | | | | | |
| **Public Access** | | | | | | | | | | |
| Boat Access | IV.1.c | 5 | 3 | 3 | 2 | 3 | 5 | | | 3.50 |
| **Environmental Education & Outreach** | | | | | | | | | | |
| Wildlife | IV.2.a | 5 | 4 | 4 | 3 | 3 | 4 | | | 3.83 |
| Invasive Species | IV.2.b | 5 | 4 | 4 | 3 | 3 | 4 | | | 3.83 |
| Habitat Management Activities | IV.2.c | 5 | 4 | 4 | 3 | 3 | 4 | | | 3.83 |
| Interpretive facilities and signs | IV.3 | 5 | 4 | 4 | 3 | 4 | 4 | | | 4.00 |
| Recreational Opportunities | IV.4 | 5 | 5 | 5 | 3 | 4 | 4 | | | 4.33 |
| Management of Visitor Impacts | IV.5 | 5 | 4 | 5 | 2 | 3 | 4 | | | 3.83 |
| | | | | | | | **Public Access & Education Average Score** | | | 3.88 |
| **Managed Area Uses (VI.A, VI.B)** | | | | | | | | | | |
| **Existing Uses** | | | | | | | | | | |
| Swimming | VI.A.1 | 5 | 5 | 5 | 5 | 5 | 4 | | | 4.83 |
| Fishing | VI.A.2 | 5 | 5 | 5 | 4 | 5 | 4 | | | 4.67 |
| Sunbathing | VI.A.3 | 5 | 5 | 5 | 5 | 5 | 4 | | | 4.83 |
| Shell Collecting | VI.A.4 | 4 | 5 | 4 | 4 | 5 | 4 | | | 4.33 |
| Wildlife Viewing | VI.A.5 | 5 | 5 | 5 | 5 | 5 | 4 | | | 4.83 |
| Camping (tent/cabin) | VI.A.6 | 5 | 5 | 5 | 4 | 5 | 4 | | | 4.67 |
| Picnicking | VI.A.7 | 5 | 5 | 5 | 4 | 5 | 4 | | | 4.67 |
| Boating | VI.A.8 | 5 | 5 | 4 | 4 | 5 | 4 | | | 4.50 |
| Hiking/biking | VI.A.9 | 5 | 5 | 5 | 4 | 5 | 4 | | | 4.67 |

| Color Code: | Excellent | Above Average | Below Average | Poor | See Appendix A for detail |
|---|---|---|---|---|---|
| | | Missing Vote | Insufficient Information | | |

# Appendix A: Scoring System Detail

**Explanation of Consensus Commendations:**

Often, the exceptional condition of some of the property's attributes impress review team members. In those instances, team members are encouraged to offer positive feedback to the managing agency in the form of a commendation. The teams develop commendations generally by standard consensus processes or by majority vote if they cannot obtain a true consensus.

**Explanation of Consensus Recommendations:**

Subsection 259.036(2), F.S., specifically states that the managing entity shall consider the findings and recommendations of the land management review. We ask team members to provide general recommendations for improving the management or public access and use of the property. The teams discuss these recommendations and develop consensus recommendations as described above. We provide these recommendations to the managing agency to consider when finalizing the required ten-year management plan update. We encourage the manager to respond directly to these recommendations and include their responses in the final report when received in a timely manner.

**Explanation of Field Review Checklist and Scores, and Management Plan Review Checklist and Scores:**

We provide team members with a checklist to fill out during the evaluation workshop phase of the Land Management Review. The checklist is the uniform tool used to evaluate both the management actions and condition of the managed area, and the sufficiency of the management plan elements. During the evaluation workshop, team members individually provide scores on each issue on the checklist, from their individual perspective. Team members also base their evaluations on information provided by the managing agency staff as well as other team member discussions. Staff averages these scores to evaluate the overall conditions on the ground, and how the management plan addresses the issues. Team members must score each management issue 1 to 5: 1 being the management practices are clearly insufficient, and 5 being that the management practices are excellent. Members may choose to abstain if they have inadequate expertise or information to make a cardinal numeric choice, as indicated by an "X" on the checklist scores, or they may not provide a vote for other unknown reasons, as indicated by a blank. If a majority of members failed to vote on any issue, that issue is determined to be irrelevant to management of that property or it was inadequately reviewed by the team to make an intelligent choice. In either case staff eliminated the issue from the report to the manager.

**Average scores are interpreted as follows:**

Scores 4.0 to 5.0 are *Excellent*

Scores 3.0 to 3.99 are *Above Average*

Scores 2.0 to 2.99 are *Below Average*

Scores 1.0 to 1.99 are considered *Poor*