2018 Shell Key Preserve Management Plan Update

DRAFT

Prepared by
Pinellas County Parks and Conservation Resources

Revised on July 9, 2018

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	i, 1, 6
2.	The land acquisition program, if any, under which the property was acquired.	18-2.018 & 18-2.021	1
3.	Degree of title interest held by the Board, including reservations and encumbrances such as leases.	18-2.021	i, 1, Appendix 2
4.	The legal description and acreage of the property.	18-2.018 & 18-2.021	i, Appendix 2
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 (Figure 2)
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	i
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	i, 7, 10 (Figure 6), 14
8.	Identification of adjacent land uses that conflict with the planned use of the property, if any.	18-2.021	11
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)	i, 1, 13
10.	Proximity of property to other significant State, local or federal land or water resources.	18-2.021	1, 11, 5 (Figure 4)

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	i, 11, 13, 14
12.	A description of past and existing uses, including any unauthorized uses of the property.	18-2.018 & 18-2.021	6
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	58
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	6 – 18
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	iv, 55
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	i, 1, 11, 13, 32

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)	i, 6, 13, 58, 62, 63
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	11, 13, 14, 58 – 65
19.	Letter of compliance from the local government stating that the LMP is in compliance with the Local Government Comprehensive Plan.	BOT requirement	Appendix 10
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	14, 15, 16
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	v, 64, 68
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	37
23.	A statement regarding incompatible use in reference to Ch. 253.034(10).	253.034(10)	i, 6 - 16

*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	ii, 18, Appendix 3
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)	1
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)	1, Appendix 3
27.	Summary of comments and concerns expressed by the advisory group for parcels over 160 acres	18-2.021	Appendix 3
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)	Appendix 3

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	13, Appendix 7
30.	Summary of comments and concerns expressed by the management review team, if required by Section 259.036, F.S.	18-2.021	Appendix 7
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	Appendix 7

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, 21 (Figure 10), Appendix 12
33.	Insert FNAI based natural community maps when available.	ARC consensus	22 – 26 (Figure 12) Appendix 11
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	22 – 30 (Figure 12), Appendix 13
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	19
36.	Location and description of known and reasonably identifiable renewable and non-renewable resources of the property regarding beaches and dunes.	18-2.021	16, 21 (Figure 10), 22, 26 (Figure 12), Appendix 11
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	22
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 – 30, Appendix 13
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	28, 29, Appendix 13
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	Appendix 11
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)	iv, v, 14, 15, 54, 55, 57
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.		i, 32 – 57
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.		iii – vi, 32 – 57
42-C.	The associated measurable objectives to achieve the goals.		iii – vi, 32 – 57
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.*		iii – vi, 32 – 57

43.	***Quantitative data description of the land regarding an inventory of forest and other natural resources and associated acreage. *See footnote.*	253.034(5)	i, Appendix 13
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).		i, 37
44-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).		iii, 37
44-C.	Measurable objectives (see requirement for #42-C).		iii, 37
44-D.	Related activities (see requirement for #42-D).		37
44-E.	Budgets (see requirement for #42-E).		68, 69
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).		i, 32 – 51
45-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).		i, iii – vi, 32 – 51
45-C.	Measurable objectives (see requirement for #42-C).		i, iii – vi, 32 – 51
45-D.	Related activities (see requirement for #42-D).		32 – 51
45-E.	Budgets (see requirement for #42-E).		68, 69
46.	***Quantitative data description of the land regarding an inventory of exotic and invasive plants and associated acreage. *See footnote.*	253.034(5)	iii, 30, 32, 33
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	15
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).		i, 32, 33, 37, 39
48-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).		iii, 32, 33, 37, 39
48-C.	Measurable objectives (see requirement for #42-C).		iii, 32, 33, 37, 39
48-D.	Related activities (see requirement for #42-D).		32, 33, 37, 39
48-E.	Budgets (see requirement for #42-E).		68, 69

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	5 (Figure 4), 11, 13
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	5 (Figure 4), 13
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	13, 24, 26 (Figure 12), Appendix 13
52.	***Quantitative description of the land regarding an inventory of hydrological features and associated acreage. *See footnote.*	253.034(5)	i
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).	↓	22
53-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).		iv, 30, 42 – 48
53-C.	Measurable objectives (see requirement for #42-C).		iv, 30, 42 – 48
53-D.	Related activities (see requirement for #42-D).		iv, 30, 42 – 48
53-E.	Budgets (see requirement for #42-E).		68, 69

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	i, 31, Appendix 15, 54, 55, 56 (Figure 21)
55.	***Quantitative data description of the land regarding an inventory of significant land, cultural or historical features and associated acreage.	253.034(5)	Appendix 15, 54, 55, 56 (Figure 21)
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	iv, 31, Appendix 15, 54, 55, 56 (Figure 21)
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).		iv, v, Appendix 15, 54, 55, 56 (Figure 21), 57
57-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).		iv, v, Appendix 15, 54, 55, 56 (Figure 21), 57
57-C.	Measurable objectives (see requirement for #42-C).		iv, v, Appendix 15, 54, 55, 56 (Figure 21), 57
57-D.	Related activities (see requirement for #42-D).		iv, v, Appendix 15, 54, 55, 56 (Figure 21), 57
57-E.	Budgets (see requirement for #42-E).		68, 69

**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)	15
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).		15
59-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).		15
59-C.	Measurable objectives (see requirement for #42-C).		15

59-D.	Related activities (see requirement for #42-D).		15
59-E.	Budgets (see requirement for #42-E).		68, 69
60.	*** Quantitative data description of the land regarding an inventory of recreational facilities and associated acreage.	253.034(5)	15
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).		i, 33 – 37, 57 – 65
61-B.	Detailed description of both short and long-term management goals (see requirement for # 42-B).		iv, v, 33 – 37, 57 – 65
61-C.	Measurable objectives (see requirement for #42-C).		iv, v, 33 – 37, 57 – 65
61-D.	Related activities (see requirement for #42-D).		iv, v, 33 – 37, 57 – 65
61-E.	Budgets (see requirement for #42-E).		68, 69

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	LMPCC 1
63.	Place the Executive Summary at the front of the LMP. Include a physical description of the land.	ARC and 253.034(5)	i
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	ii
65.	Key management activities necessary to achieve the desired outcomes regarding other appropriate resource management.	259.032(10)	iii - iv
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, law enforcement activities.	253.034(5)	68, 69
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)	68, 69
68.	A statement of gross income generated, net income and expenses.	18-2.018	68-69

*** = 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.

Shell Key Preserve Management Plan
Executive Summary

State of Florida Form

Lead Agency: Pinellas County (Florida) Department of Parks and Conservation Resources, Resource and Asset Management

Common Name of Property: Shell Key Preserve

Location: Pinellas County, Florida

Acreage Breakdown:

Land Cover Classification	*Acres*
Marine Tidal Swamp	168 (9.19%)
Marine Tidal Marsh	6 (0.33%)
Marine Unconsolidated Substrate	642 (35.12%)
Beach Dune	157 (8.59%)
Marine Grass Bed	855 (46.77%)
TOTAL	*1828*

Leases: No. 4228 Florida Internal Improvement Trust (263 acres)

Use: Single use for conservation and protection of natural resources and for resource-based public outdoor activities and education that are compatible with the conservation and protection of this public land

Management Responsibilities: Pinellas County (Florida) Department of Parks and Conservation Resources; law enforcement by Pinellas County Sheriff's Office

Designated Use: Preserve

Sublease(s): None

Contract(s): Submerged Land Agreement No. MA52-132

Encumbrances: None

Type of Acquisition: Fee Simple for County-owned properties

Unique Features: Important shorebird colonies and habitat, extensive seagrass beds, resource-based recreational use

Archaeological/Historical: One known archaeological site located on the eastern-most edge of the Preserve.

Management Needs: Minimize human disturbances for nesting, wintering, and migratory shorebirds by (1) posting core protection areas, (2) controlling exotic vegetation (3) ensuring that the rules of the Preserve remain consistent with Pinellas County Code of Ordinances Chapter 90, (4) limiting overnight camping to the designated camping area on the south end of the main island.

Acquisition Needs/Acreage: Pinellas County is interested in acquiring in-holdings that are in private ownership should they become available.

Surplus Lands/Acreage: Assessing the maps, communities and cultural resources, there is no opportunity to surplus of any portion of the Preserve.

Public Involvement: User-groups represented on Shell Key Advisory Group (SKAG), public stakeholders' meetings, Pinellas County Board of County Commissioners public meeting.

Noted Accomplishments:

- Alcohol and pets are prohibited in the Preserve.
- All Australian-pines and other exotic vegetation have been removed from Shell Key.
- Campers are required to have a permit and bring and use removable portable toilets.
- In 2015, for the protection of sea turtles, campfires were restricted from May 1st through September 30th.
- "Slow Speed Minimum Wake" in the northwest portion inside the Preserve is now "Idle Speed No Wake.
- Proactively posting the Bird Preservation Area (BPA) in advance of the beach nesting bird season.
- Nesting attempts by sea turtles increased from 4 in 2008 to 63 in 2016.

GOALS AND OBJECTIVES FOR SHELL KEY PRESERVE	
SECTION 3. RESOURCE MANAGEMENT	
A. Habitat Restoration and Improvement **Objective:** Provide resource management to restore and improve the natural communities of Shell Key Preserve.	
Exotic Species Control	**Goal A1:** Annually conduct maintenance to remove all invasive exotic vegetation from Shell Key. **Goal A2:** Within 10 years remove all invasive exotics from the smaller mangrove islands within the Preserve.
Replanting Native Species	**Goal A3:** Following large-scale removal of invasive exotics, restore native vegetation through natural recruitment or by replanting as necessary.
B. Imperiled Species Protection **Objective:** Minimize impacts to protect those imperiled species utilizing the Preserve, including beach-nesting birds, nesting sea turtles, and manatees.	
Bird Protection	**Goal B1:** Annually post BPA with signs by March. **Goal B2:** Annually as needed, temporarily twine and post around birds attempting to establish solitary or colonial nests on beaches located outside of the BPA. **Goal B3:** Annually as needed, protect beach-nesting birds during holiday weekends through SSP volunteers. **Goal B4**: As needed, trap and remove terrestrial predators known to impact beach-nesting birds and nesting sea turtles.
Sea Turtle Protection	**Goal B5:** Annually as needed, support efforts of FWRI and Sea Turtle Trackers to locate and demarcate nesting sea turtles.
Manatee Protection	**Goal B6:** Annually, minimize impacts to manatees and other species through posting and enforcement of established aquatic use zones.
C. Forest Management **Objective:** Utilize forest management techniques, specifically prescribed fire, to maintain natural communities on Shell Key.	
	Goal C1: Annually evaluate the conditions to determine if prescribed burning should be conducted on Shell Key, and complete burns as needed.

D. Monitoring **Objective:** Conduct surveys and support the work of others to monitor the natural resources of Shell Key Preserve.	
Species Inventories	**Goal D1:** As needed, update lists of species utilizing the Preserve.
Beach Nesting Birds	**Goal D2:** Annually as needed, monitor fates of nesting attempts by beach-nesting birds through SSP and other volunteers.
Beach Nesting Sea Turtles	**Goal D3:** Annually as needed, monitor fates of nesting attempts by sea turtles through FWC and Sea Turtle Trackers.
Fisheries Independent Monitoring	**Goal D4:** Annually support monitoring of fisheries by FWRI fisheries and review data summary report.
Water Quality	**Goal D5:** Annually support monitoring of water quality by Pinellas County's Department of Public Works Environmental Management Division and review data summary report.
Seagrasses	**Goal D6**: As needed, support analyses of seagrass distribution by Pinellas County's Department of Public Works Environmental Management Division and review data summary report.
E. Research **Objective:** Coordinate and support scientific studies conducted at Shell Key Preserve by researchers from partnering agencies and other institutions, and use information provided to support management decisions.	
Site Use Applications	**Goal E1:** As needed, review Site Use applications submitted by researchers interested in conducting studies at the Preserve.
F. Cultural Management **Objective:** Identify and protect historic and archaeological resources supported by the Preserve.	
	Goal F1: As needed, coordinate with the Florida Division of Historical Resources prior to allowing any activity which causes ground disturbances in areas with high probability of supporting cultural resources.

G. Security **Objective:** Enforce rules and regulations as detailed in Pinellas County Code of Ordinances Chapter 90 to protect the natural and cultural resources supported by the Preserve.	
	Goal G1: As funding allows, contract PCSO for law enforcement officers dedicated to patrolling Shell Key Preserve and other environmental lands.
SECTION 4. PUBLIC RECREATION	
A. Public Access **Objective:** Provide public access to areas of Shell Key Preserve where compatible with the conservation and protection of natural and cultural resources.	
Regulatory Zones	**Goal A1:** As needed, maintain signs that identify the boundary of the Preserve. **Goal A2:** As needed, update regulatory zones and maintain signs that identify designated areas within the Preserve.
Shuttle Operators	**Goal A3:** As needed, meet with commercial shuttle operator partners to ensure visitors are encouraged to enjoy resource-based recreational opportunities compatible with the conservation and protection of the Preserve.
Signs	**Goal: A4:** As needed, maintain signs that describe the rules of the Preserve in a clear and informative manner. **Goal A5:** On an ongoing basis, support PCSO law enforcement officers in their efforts to enforce the rules of the Preserve.
B. Public Use **Objective:** Provide opportunities for resource-based recreational use of Shell Key Preserve where compatible with the conservation and protection of the natural and cultural resources.	
Camping	**Goal B1:** In FY2019, establish fee-based camping permits. **Goal B2:** As needed, support efforts to coordinate volunteers to conduct periodic clean-ups at Shell Key, especially in the designated camping area.
Liveaboard Vessels	**Goal B3:** As needed, support efforts by PCSO to prohibit liveaboard vessels from mooring in the Preserve for more than 14 days.
Special Event Permit	**Goal B4:** As needed, administer special event permits for the Preserve.

SECTION 5. OUTREACH AND EDUCATION	
Objective: Provide education and outreach programs describing the ecology of coastal ecosystems and the benefits of preserving and enhancing these natural resources.	
Salty Topics & Marine Research Speaker Series **Environmental Enhancement & Restoration Program**	**Goal 1:** As resources allow, provide outreach and educational programs through the Florida Sea Grant Agent.
Shell Key Preserve Visitors Guide	**Goal 2:** As needed, update Shell Key Preserve brochure and make available online; as resources allow, provide hardcopy brochures to shuttle operators, ELU, and County offices for distribution to visitors.

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INTRODUCTION

Shell Key Preserve is located in the Gulf of Mexico, immediately west of Tierra Verde, FL in southern Pinellas County (Figure 1). It includes the main island of Shell Key, surrounding waters, several mangrove islands, seagrass beds, and sandflats. Many of the mangrove islands within Shell Key Preserve are named (God's Island, Panama Key, Sawyer Key, Summer Resort Key, and Sister Key), while numerous others of various sizes are unnamed (Figure 2). The total size of the Preserve, including the island and its waterways, is 1828 acres. Shell Key itself covers approximately 195 acres with a linear distance of approximately 2.67 miles (from the northeast tip to the southeast tip, following the center of the island). The island now referred to as Shell Key once consisted of several small unnamed keys that merged into one barrier island. Given the dynamic nature of barrier islands, its shape has changed dramatically over the years and continues to change. In 2015, Shell Key connected with the mainland of Tierra Verde at Collany Island (Figure 3). Ingress to the island is usually by boat, although it may be accessed by foot across the newly formed land bridge and occasionally by swimmers, waders or walkers at other points during low tides. Extensive seagrass beds lie to the east of Shell Key.

All of Shell Key Preserve is located within Pinellas County, the State's most densely populated county. Its southern boundary is Bunces Pass. Immediately south of the pass is the Fort De Soto Park Aquatic Habitat Management Area (managed by Pinellas County as a seagrass protection area) and the regionally significant Fort De Soto County Park (Figure 4). The surrounding area to the north and east of the Preserve is Pass-a-Grille and Tierra Verde, densely urbanized communities. To the west is the Gulf of Mexico. A legal description of the Preserve and available deeds are included in Appendix 1.

Shell Key Preserve is managed by the Pinellas County Board of County Commissioners (BCC) through the Department of Parks and Conservation Resources (PCR). Pinellas County entered into Lease Agreement No. 4228 (Appendix 2) with the Board of Trustees of the Florida Internal Improvement Trust Fund of the State of Florida (FIITF) in December 2000. The initial Shell Key Preserve Management Plan, written by the Pinellas County Department of Environmental Management (DEM), was approved by the BCC in March 2000 and by the Florida Department of Environmental Protection (DEP) Acquisition Restoration Council (ARC) in October 2000. The first Plan update was written by DEM and approved by the BCC in October 2007 and DEP in December 2007.

As part of the current update to the Plan, the Shell Key Advisory Group (SKAG) was established in accordance with 259.032(10) (b), Florida Statutes (F.S.) to provide public input for the Plan to be presented to the BCC and DEP's ARC. The members of the SKAG received a copy of the Plan 30 days prior to the public meeting. The Plan was also available on the County's website for the public to review. Appendix 3 lists all participants and the written record from the public hearing. This update to the Plan serves as the basic statement of policy and direction in the management of the Shell Key Preserve by PCR. The plan includes the most recent information and data available as of September 2017. Responses to recommendations from the ARC will be included (Appendix 4) when the final plan has been approved.

Figure 1. Location of Shell Key Preserve, Pinellas County, Florida

Figure 2. Shell Key Preserve Boundary Map

Figure 3. Land Bridge Map

Figure 4. Significant Federal and Local Resources near Shell Key Preserve

SECTION 1. GENERAL INFORMATION

The Preserve was established under the management of Pinellas County in December 2000. With the exception of limited law enforcement and local volunteer efforts, there was virtually no management oversight provided prior to that time. The adoption of the 2000 Shell Key Preserve Management Plan was in response to the need for a plan to address public use and to provide protection for nesting and wintering shorebirds. Concurrence among DEP, the Florida Fish and Wildlife Conservation Commission (FWC), St. Petersburg Audubon Society, Audubon of Florida, local businesses, recreational boaters, and other stakeholders was critical in the development and adoption of the Plan. The Plan was updated in 2007, and changes were made in the management of several public uses in the Preserve. These changes were made where activities were found to be inconsistent with the County Code of Ordinances and such activities appeared to be incompatible with the Sate-mandated goal of natural resource management of the Preserve. Pets and alcohol were no longer permitted within the Preserve boundary, in accordance with Pinellas County Code of Ordinances and consistent with the management of other environmental lands. Camping and campfires were restricted to the southern public use area, a camping permit was now required and campers were required to bring, use and remove portable toilets. In 2015, for the protection of sea turtles, campfires were restricted from May 1st through September 30th.

History

Aerial photos as far back as 1926 show a small island west of Tierra Verde and south of Bunces Pass. As islands are dynamic in nature, over the next 50 years, aerial photos show this island growing to form a barrier island, then moving, and almost disappearing at various times. In the late 1970's and early 1980's, another island began forming just to the south. From 1994 through 1998, the two islands merged to form the barrier island know as Shell Key.

Access into the Preserve typically has been by waterborne vessel. As an undeveloped barrier island, boat access into the northern part of the Preserve was through a narrow pass located between the northeast tip of Shell Key and western shore of Collany Island. This narrow pass has changed dramatically over time (Figure 3). The pass closed completely in early 2015, when a land bridge connected Shell Key to Collany Island. Shell Key is no longer considered a barrier island, but rather a barrier spit (a barrier beach that is connected at one end to the mainland). It is expected that dynamic forces will continue to reshape Shell Key's form over time.

In October 2015 a breach through the mangroves and island was beginning to form along the western shoreline. By October 2017, following Hurricane Irma, a natural pass had formed allowing vessel access into the back waters of the Preserve. It is expected that dynamic forces will continue to reshape Shell Key's form over time.

The southern area of the Preserve consists of shallow waters with thick seagrass flats. This area is most frequently used by visitors in kayaks, canoes and shallow-water boats. Seagrass scarring from boaters historically has been a problem in this area.

Shell Key is undeveloped and provides rare coastal habitat in Florida that is critical to the survival of certain wildlife species. These same natural features that attract wildlife to Shell Key

also attract thousands of human visitors annually. Popular activities in the Preserve include boating, swimming, sun-bathing, bird watching, shelling, picnicking, camping, and fishing.

With the exception of avian data collected between 1992 and 2000 by volunteers for St. Petersburg Audubon Society and Audubon of Florida, little information concerning biological diversity and public use was available for the development of the 2000 Shell Key Preserve Management Plan. The need to manage resource-based public uses within the high level of sensitivity of natural resources supported by the Preserve was recognized and addressed. From 2000 through 2007, most resource management activities in the Preserve focused on the protection of nesting, wintering and resting migrant birds on and around Shell Key through monitoring and designating human exclusion zones. The monitoring efforts provided valuable data to support updated management approaches and the establishment of new rules for the Preserve as detailed in the 2007 update to the Plan. For example, dogs and other pets were excluded from the Preserve due to their impacts to birds.

Public uses in the Preserve (Figure 5) were also monitored closely between 2000 and 2007. Changes were made in the 2007 Plan update, when several public use activities taking place in the Preserve appeared incompatible with the County Code of Ordinances. One such change prohibited the possession and/or consumption of alcoholic beverages.

Ownership

Ownership within the Preserve, by acreage and percent of its geographical area, is shown in Table 1. Most of the property within Shell Key Preserve is in public ownership (Figure 6). A large portion of the property is owned by the State of Florida, having been acquired in 1845 from the U.S. Government as sovereign land when Florida became a state. State-owned areas of the Preserve are leased to Pinellas County under Lease No. 4228 (Appendix 2) and placed under management by Pinellas County. Purchased through local funds, the remaining public property is owned by Pinellas County. In 2009, the most recent acquisition, Pinellas County acquired the remaining 2.3 acres of Panama Key. A few scattered, privately-held parcels exist within the Preserve boundary, and Pinellas County continues to evaluate these for possible purchase.

In accordance with Chapter 768.28, F.S. Pinellas County is self-insured. The letter of proof of self-insurance is provided in Appendix 5.

Table 1. Property Ownerships at Shell Key Preserve		
OWNERSHIP	**ACRES**	**PERCENT**
Pinellas County*	819.0	44.80%
State of Florida: Florida Submerged Lands Program	709.0	38.79%
State of Florida Florida Internal Improvement Trust Fund	263.2	14.39%
State of Florida: Florida Department of Transportation	3.4	0.19%
Private	33.4	1.83%
TOTAL:	**1828.0**	**100.00%**

* "Penny for Pinellas" funds were used to purchase 39.51 acres, which represent 4.8% of Pinellas County's ownership, or 2.2% of the entire Preserve.

Figure 5. Public Use Zones Map

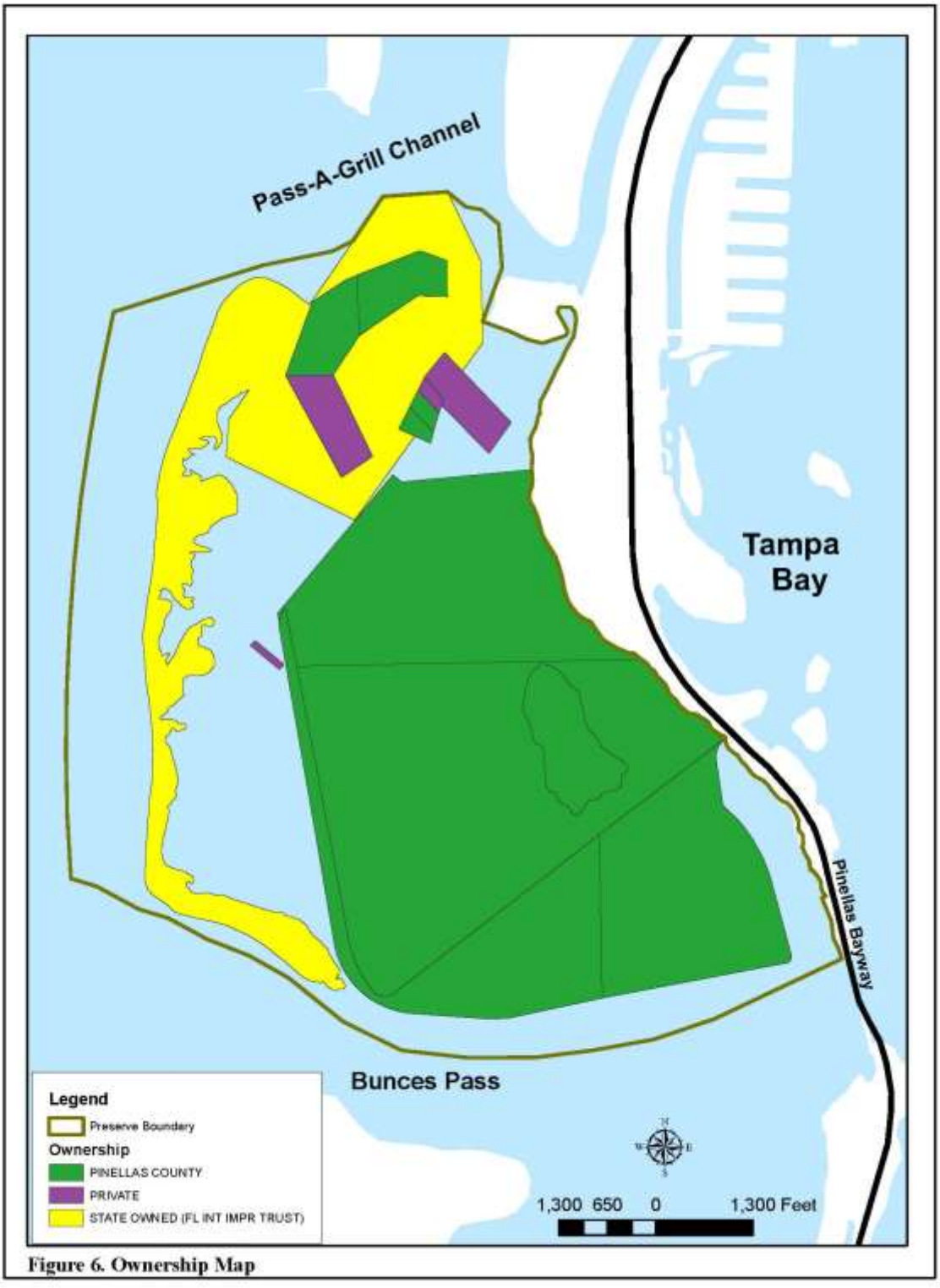

Figure 6. Ownership Map

Easements

One easement exists within the boundary of Shell Key Preserve. A distribution easement with Florida Power (now Duke Energy) has been in existence since 1998 (Appendix 6).

Adjacent Land Use

There are no adjacent land uses that conflict with the planned uses of Shell Key Preserve. The Future Land Use designations for the adjoining mainland of Tierra Verde to the east is heavily developed with low and medium density residential development (both single-family and multi-family) and some commercial uses (Figure 7). Located to the northeast, just outside the Preserve in Tierra Verde, lies Collany Island, mostly designated as low density residential. Approximately 10 acres of commercial property are located east of Collany Island that include a restaurant, a vehicle storage lot, and a multi-use development. North of this property are low and medium density residential areas of Pass-a-Grille and Tierra Verde. St. Petersburg Beach lies across the intracoastal waterway to the west of Collany Island. To the south is Bunces Pass and Fort De Soto Park, a Pinellas County regional park with an active boat ramp, swimming beaches, campground, fishing pier, and a beach to accommodate dogs. To the west of the Preserve is the Gulf of Mexico.

East of the Preserve is State Route 679 that leads to Fort De Soto Park. East of this are several islands that are part of the U. S. Fish and Wildlife Service's Pinellas National Wildlife Refuge. The Refuge was established as breeding islands for colonial birds. The islands, which are closed to the public, include Indian, Tarpon, Mule and Jackass Keys. The surrounding seagrasses are protected through "Combustion Motor Exclusion" and "Manatee Protection" zones.

Also east of the Preserve in Tierra Verde is Cabbage Key Management Area, which is managed by PCR (Figure 4). It consists of approximately 40 acres of coastal hammock, three oligohaline ponds, 20 acres of submerged aquatic seagrass, and two mangrove islands. The coastal hammock and ponds have been recognized by the St. Petersburg Audubon Society as important bird habitat. The three ponds are critical resting areas for migrant and wintering birds.

Policy Compliance

This Plan serves as a fundamental statement of policy and direction for the management of Shell Key Preserve. It identifies the objectives, criteria, and standards that guide each aspect of the management of the Preserve's natural and cultural resources, and sets forth specific management actions that will be implemented to meet management goals as defined throughout the Plan. Approval of the Plan by Pinellas County and the State of Florida does not supersede any prevailing statutes, rules, regulations, and ordinances of appropriate local, state or federal agencies.

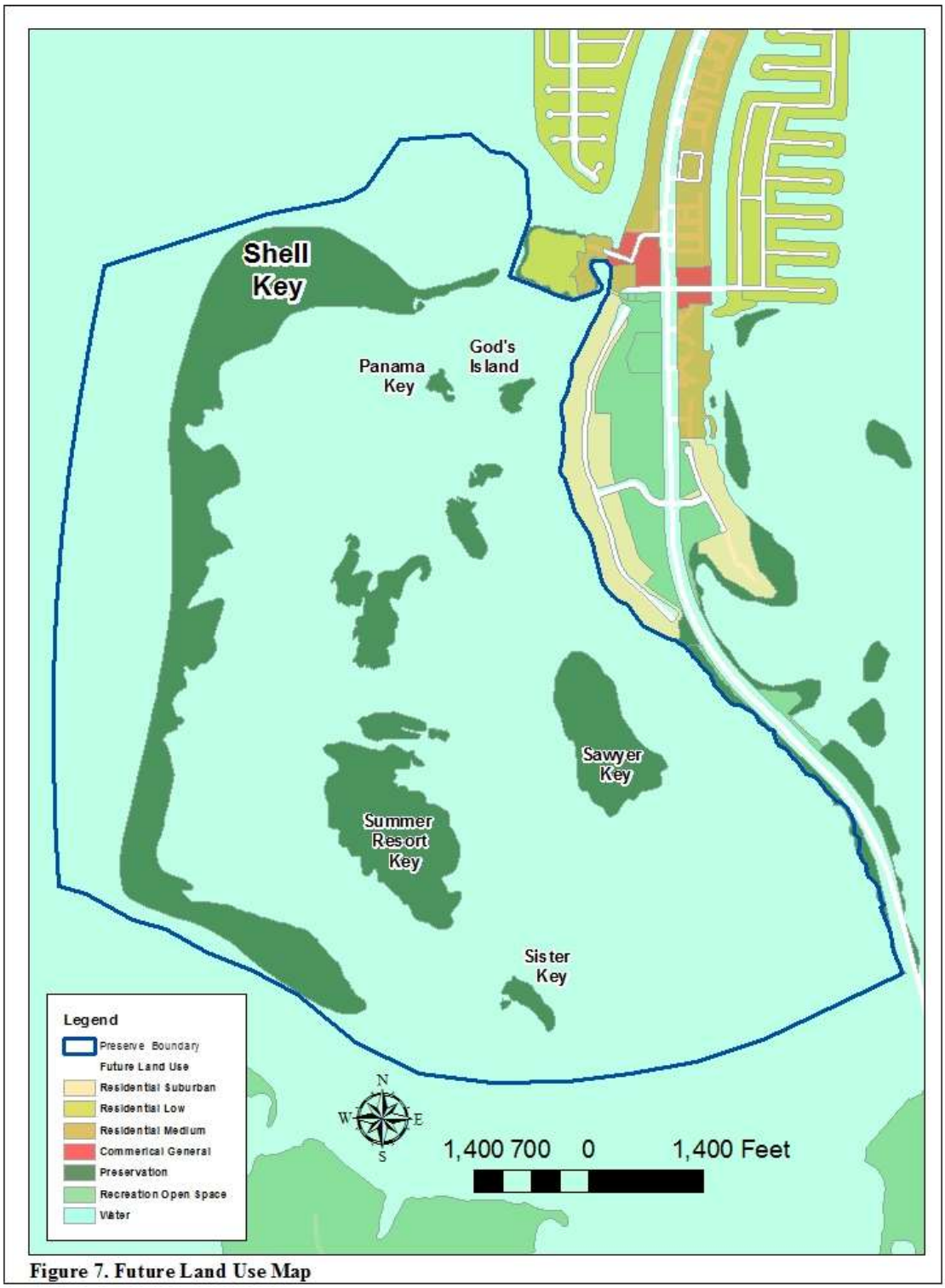

Figure 7. Future Land Use Map

State Policies

No legislative or executive directives constrain the use of this property other than the official lease agreement with the State of Florida. The purpose of the lease requires that the property be managed "only for the conservation and protection of natural and historical resources and for resource-based public outdoor activities and education which are compatible with the conservation and protection of these public lands." The lease also includes four specific conditions that establish the minimum standards for the Plan:

1. The primary purpose of the lease shall be to ensure management compatible with the protection and conservation of wintering and nesting shorebirds.
2. The Plan shall delineate core areas for the protection of shorebirds within the greater Shell Key area.
3. Critical bird habitat within the core area shall be posted to prohibit trespass and minimize human disturbance to wintering, nesting, and migrating shorebirds. The posted boundaries shall remain flexible and reflective of bird use and changes in island geography and topography.
4. Beach raking and mechanical cleaning activities shall be prohibited during shorebird nesting season and turtle nesting season.

Given the potential impacts of beach raking on the structure and function of beach ecosystems, Pinellas County is committed to not conducting beach raking or mechanical cleaning activities at Shell Key any time of the year, including nesting seasons.

In addition to the lease requirements, the Preserve is subject to appropriate state and federal laws, as well as the policies of the Board of Trustees of the Internal Improvement Trust Fund regarding state-owned lands. The Plan shall meet the requirements of Section 253.034, F.S., Chapter 18-2.021, Florida Administrative Code (FAC) and is intended to be consistent with the State Lands Management Plan. In accordance with Section 253.035, the Plan will be reviewed and updated in 2027. Should the Plan require significant changes prior to 2027, the Shell Key Advisory Group will reconvene to assist with input. This Plan is intended to meet the requirements for beach and shore preservation as defined in Chapter 161, F.S. and Chapter 62B-33, FAC.

In accordance with Chapter 259.036, F.S. a land management review team selected by DEP evaluated the 2007 Management Plan and the management of the Preserve in 2014. The team evaluated the extent to which current management actions are sufficient, whether the land is being managed for the purpose for which it was acquired, and whether actual management practices, including public access, are in compliance with the Management Plan. The evaluation and land manager's response are included in Appendix 7.

Shell Key Preserve lies in both the Boca Ciega and the Pinellas County Aquatic Preserves (Figure 4). All permanent water bodies within the Preserve are designated as "Outstanding Florida Waters" pursuant to Chapter 62-302, FAC. Administered by the DEP, this program was created by Section 403.061, F.S. to address water bodies that are "worthy of special protection because of their natural attributes."

County Policies

Code of Ordinances Chapter 90

Pinellas County Code of Ordinances Chapter 90 (Chapter 90) provides rules and regulations that control the public's use and for the protection of the resources of Pinellas County Parks, Preserves and Management Areas (Appendix 8). It includes detailed information concerning: the Parks and Conservation Resources Advisory Board; vessels and live-aboard; protection of property, facilities, flora and fauna; permits; enforcement and penalties; and the identification of county-owned environmental lands subject to Charter restrictions. This ordinance, enforced by PCR and the Pinellas County Sheriff's Office (PCSO), was most recently updated in August, 2016.

Board of County Commissioners Strategic Plan

The BCC Strategic Plan was adopted in March 2015 (Appendix 9). This document provides the BCC direction on five goals. The goal of "Practice Superior Environmental Stewardship" and associated strategies to achieve this goal indicates unequivocally that the County remains committed to the protection of natural resources and preserves.

Pinellas County Comprehensive Plan

The implementation of this Plan will assist with fulfilling the goals, objectives, and policies of the 2008 *Pinellas County Comprehensive Plan* and is in compliance with this document (Appendix 10). As detailed below, the relevant elements of the *Comprehensive Plan* are the Natural Resource Conservation & Management Element; Recreation, Open Space & Culture Element; Coastal Management Element; Capital Improvement Element; and the Future Land Use & Quality Communities Element (Appendix 10).

Goal 3 of the Natural Resource Conservation & Management Element states, "Pinellas County's environmental lands and resource-based parks are the hallmark of this County's environmental commitment, and these lands are to be protected and managed in perpetuity for their contribution to the biodiversity and biological sustainability of the region, as a means of providing respite from urban life and because they instill future generations with a sense of appreciation for Florida's natural heritage." This element further affirms the County's commitment to providing educational, and recreational opportunities that enhance appreciation for, and encourage the stewardship of, natural systems and their dependent living resources.

The goals, objectives and policies of the Recreation, Open Space & Culture Element focus on the need to conserve, protect, and appropriately manage natural and cultural resources and continue the acquisition of open space and environmentally sensitive areas. Goal 5 is "to promote the arts, culture, and historic and archaeological resources within Pinellas County, and their preservation, through public and private investment and by raising awareness of existing facilities and programs. The objectives and policies further recognize the need to identify, inventory and provide protection of archaeological sites in the County.

Protection and management of coastal and marine resources, including boater education, seagrass protection, and effective marine speed zones, are among the goals, objectives, and policies of the Coastal Management Element.

The Capital Improvements Element states, "Pinellas County shall undertake actions necessary to provide adequate, needed public facilities in a manner which protects investments in existing facilities, maximizes the use of existing facilities and promotes orderly growth." This includes projects identified to protect the natural and cultural resources in the County.

Goal 1 of the Future Land Use & Quality Communities Element states, "The pattern of the land use in Pinellas County shall provide a variety of urban environments to meet the needs of a diverse population and the local economy, conserve and limit demands on natural and economic resources to ensure sustainable built and natural environments, be in overall public interest, and effectively serve the community and environmental needs of the population." Goal 3 of this Element states "Pinellas County shall promote a balanced relationship between the natural environment and development."

Pinellas County Charter Amendment

Pinellas County's designated environmental lands, including County-owned property within Shell Key Preserve, are protected under Pinellas County Charter, Article II, Section 2.08 (Appendix 8). Under this Charter the County may not remove the environmental lands designation or sell, convey, or transfer any fee simple interest, lease or license for a period longer than 10 years unless authorized by a majority vote of the electorate of Pinellas County in a referendum held at a general or special election called by the BCC.

Arthropod Management Plan

Mosquito control throughout the County is the responsibility of the Department of Public Works, Mosquito Control and Vegetation Management Unit program. This program does not include spraying in the Preserve, therefore there is no Arthropod Management Plan. Should spraying be warranted, an Arthropod Management Plan will be developed.

Non-Recreational Infrastructure

Within the Preserve itself, no development has been allowed except for a structure on the County owned island, Panama Key. The structure was leased from 1988 to 2012 to the Pinellas Marine Institute (PMI), part of a contracted program in the Department of Juvenile Justice (Circuit VI). In 2012 Pinellas County entered into a lease agreement with the University of South Florida's College of Marine Science (Appendix 2). The purpose of the agreement is to convert the existing premises into an Off-Grid Island Renewable Energy Learning Laboratory for research and development. This structure was consumed by a fire in February 2018 and all debris was removed in April 2018. The existing dock and supporting structures were no longer functional and were removed to address safety concerns in May 2018.

No other facility or infrastructure development is planned for the Preserve. All such activities, of course, are subject to the granting of appropriate permits, easements, licenses, and other required legal instruments.

Staffing

From 2001 through September 2010, the Preserve was managed by the Department of Environmental Management's Environmental Lands Division (ELD). Pinellas County budget reductions from 2008 thought 2010 resulted in a reduction of ELD staff. On October 1, 2010 management responsibilities were transferred to the Department of Parks and Conservation Resources (PCR) and ELD staff was incorporated within this newly-formed department. This resulted in a considerable loss in the number of staff assigned to the Preserve. Figure 8 shows the PCR organizational chart. Management of the Preserve is the overall responsibility of the South County Land Manager under the supervision of the Environmental Division Manager and the Bureau Director. With no additional PCR staff assigned to work in the preserve, all resource management responsibilities lie solely with the South County Land Manager, with assistance from the North County Land Manager and volunteers.

A Project Management Specialist is responsible for the volunteer program, under the supervision of the South County Operations Manager. The Project Management Specialist provides administrative support for tracking hours, recruiting groups for special projects and training long-term volunteers.

PCR administrative staff provides assistance for citizen contacts regarding the Preserve. Staff at PCR administrative offices processes Shell Key camping permits.

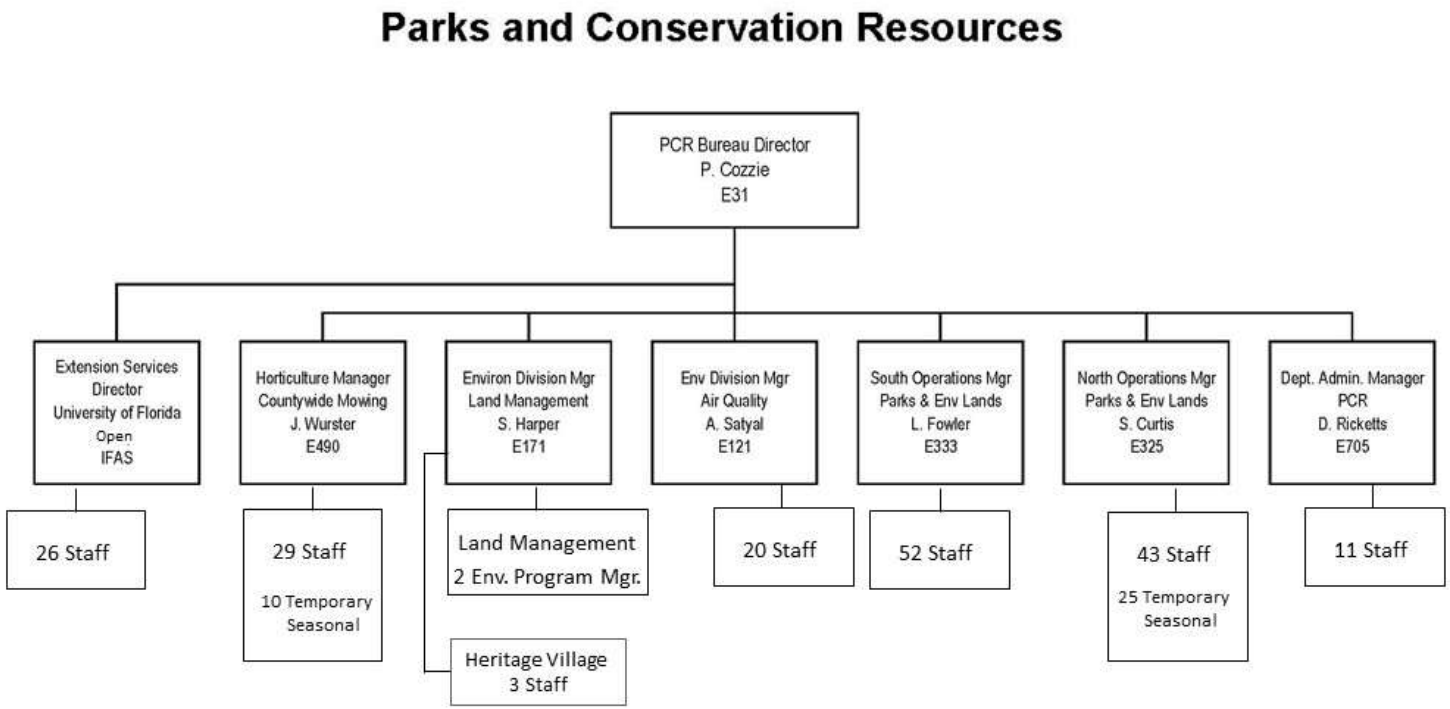

Figure 8. Parks and Conservation Resources Organizational Staffing 2017

PCR has a contract with the PCSO to provide law enforcement for all environmental lands. The PCSO's Environmental Lands Unit (ELU), also referred to as the "LIMA unit," provides the primary enforcement of Chapter 90 and applicable state laws in the Preserve, as it has done since 2001.

Volunteer Program

A team of long-term volunteers assists staff with a wide variety of Preserve tasks including: installation of signs, staking and twining of the Bird Preservation Area (BPA) boundary, and the monitoring of nesting shorebirds and sea turtles. Staff also works with volunteers and community groups who support management efforts by removing exotic vegetation and trash from the island. Between 2008 and 2016, 166 individuals contributed over 3700 hours toward the management of the Preserve.

PCR works to increase volunteer contributions to parks and preserves through a dedicated Project Management Specialist. Volunteer groups, especially those who have a sustained interest in the environment, are encouraged for special events and clean-ups.

Collaboration

Shell Key Preserve is managed by Pinellas County in accordance with this Plan. When requested by the County, the FWC provides expertise and support for species management within the Preserve. Pinellas County is a member of the Florida Shorebird Alliance Suncoast Shorebird Partnership (SSP). The SSP is a group of land managers, local Audubon chapters and volunteers that meets regularly to share management strategies in protecting nesting shorebirds and to discuss monitoring results following each nesting season. Results are compared and discussed in an effort to coordinate regional management practices and to identify techniques and practices that support sound stewardship of shorebirds. Pinellas County staff also participates in bi-monthly teleconference meetings with county land managers from across Florida to discuss techniques and practices that support sound stewardship of natural resources.

Extensive partnerships have been established with researchers from other agencies and Audubon volunteers to complete work at the Preserve. Research partners bring expertise and resources that allow for detailed investigations beyond the scope of local government. This is described in more detail in Section 3.

Pinellas County emphasized involvement of numerous stakeholder groups when drafting the 2017 Plan. Two stakeholder meetings were held to introduce the draft Plan to the public, one on 09/2017 and 08/2018. The SKAG meeting was held on September 25, 2017, in which members of the SKAG were invited to participate and developed a list of suggestions to be considered for incorporation in the Plan. SKAG members were selected to represent numerous user groups, including: boaters, campers, bird watchers, Tierra Verde residents, charter boat captains, recreational fisherman, and local environmentalists. Appendix 3 lists all participants, provides minutes from public hearing, and responses to comments from the SKAG public hearing.

SECTION 2. NATURAL RESOURCES

Shell Key Preserve, as an undeveloped barrier spit, provides rare coastal habitat in Florida that is critical to certain wildlife species. There are no known unique natural features such as virgin timber, natural rivers or streams or coral reefs located in the Preserve. The future land use map in the *Pinellas County Comprehensive Plan* identifies Shell Key as a preservation area that is to remain essentially in a natural state (Figure 7). In addition, the submerged lands within the Preserve are managed consistently with the laws and policies of the Fort De Soto Aquatic Habitat Management Area, where natural resource protection is the main objective and where public uses consistent with resource initiatives are also allowed. The Florida Natural Areas Inventory (FNAI)[1] report (Appendix 11) includes listed species documented in the Preserve or with the potential to occur in the Preserve.

Other significant land and water resources exist in the vicinity of the Preserve. To the south, visitors can enjoy Fort De Soto County Park and Fort De Soto Park Aquatic Management Area (Figure 4). Managed by the U. S. Fish and Wildlife Service, the Pinellas National Wildlife Refuge is within one mile of Shell Key Preserve's eastern boundary, with the urbanized island of Tierra Verde between the Pinellas Refuge and the Preserve.

Topography

Shell Key Preserve's topography ranges in elevation from 0 to 4 ft. above MSL (Figure 9). Escarpments of the dunes are occasionally found along the western shoreline.

Soils

Two types of soils are found within the Preserve (Figure 10), as determined by the *Soil Survey of Pinellas County, Florida*[2]. Detailed descriptions of these two hydric soil types are provided in Appendix 12.

Kesson Fine Sand

Kesson Fine Sand, very frequently flooded, is very poorly drained with a surface layer of black fine sand and shell fragments. The sub surface layers consist of light brownish gray fine sand, and shell fragments low in organic matter. This soil type supports the growth of salt marsh and mangrove swamp communities. This soil type is found the flooded portions of Shell Key and the smaller mangrove islands.

Beaches

Beaches soils are composed of sandy marine sediments with shell fragments. This soil type on Shell Key supports dune and coastal strand vegetation.

[1] Florida Natural Areas Inventory, *Guide to the Natural Communities in Florida*, 2010.
[2] U.S. Department of Agriculture, Natural Resources Conservation Service, 2006.

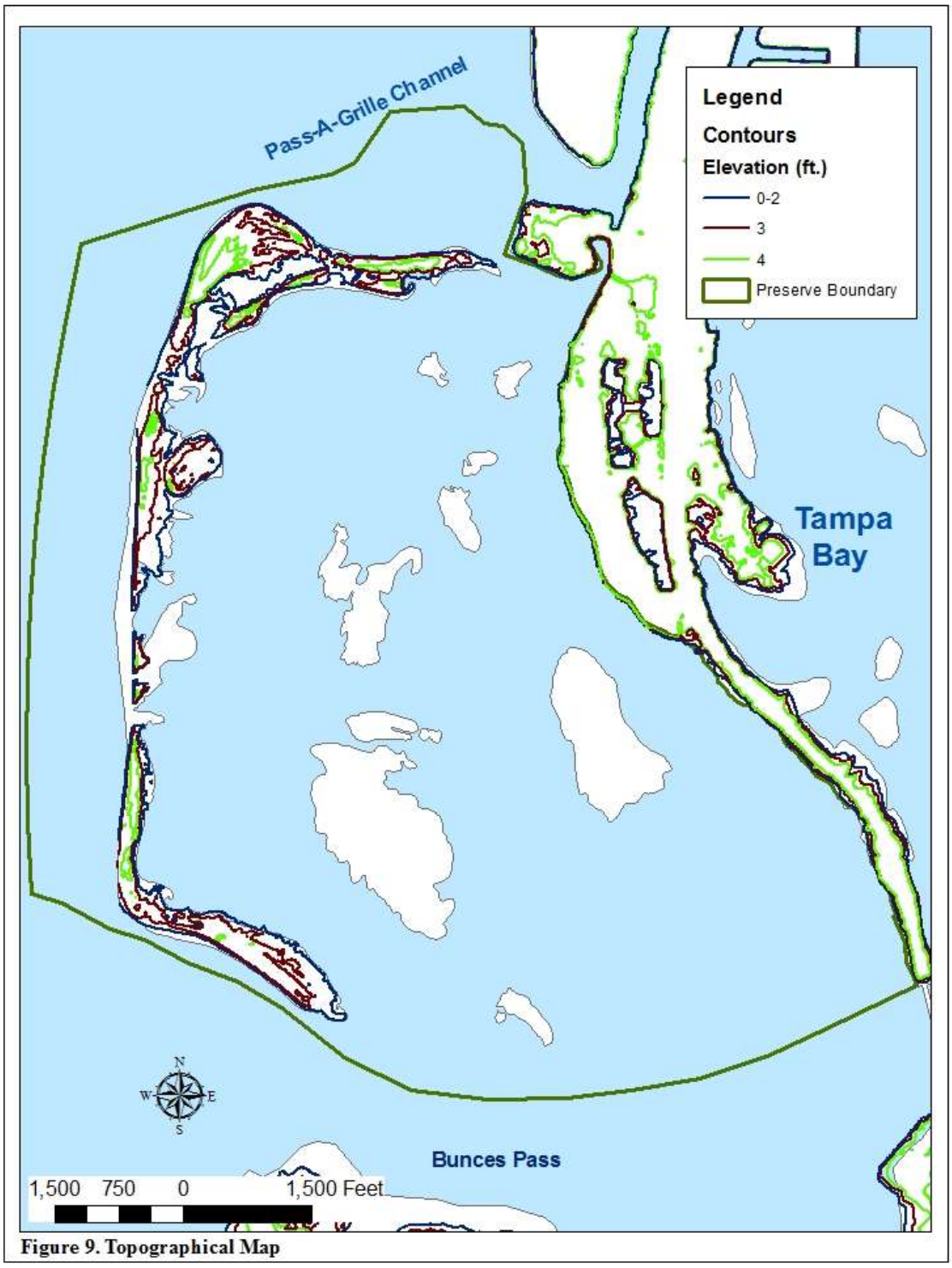

Figure 9. Topographical Map

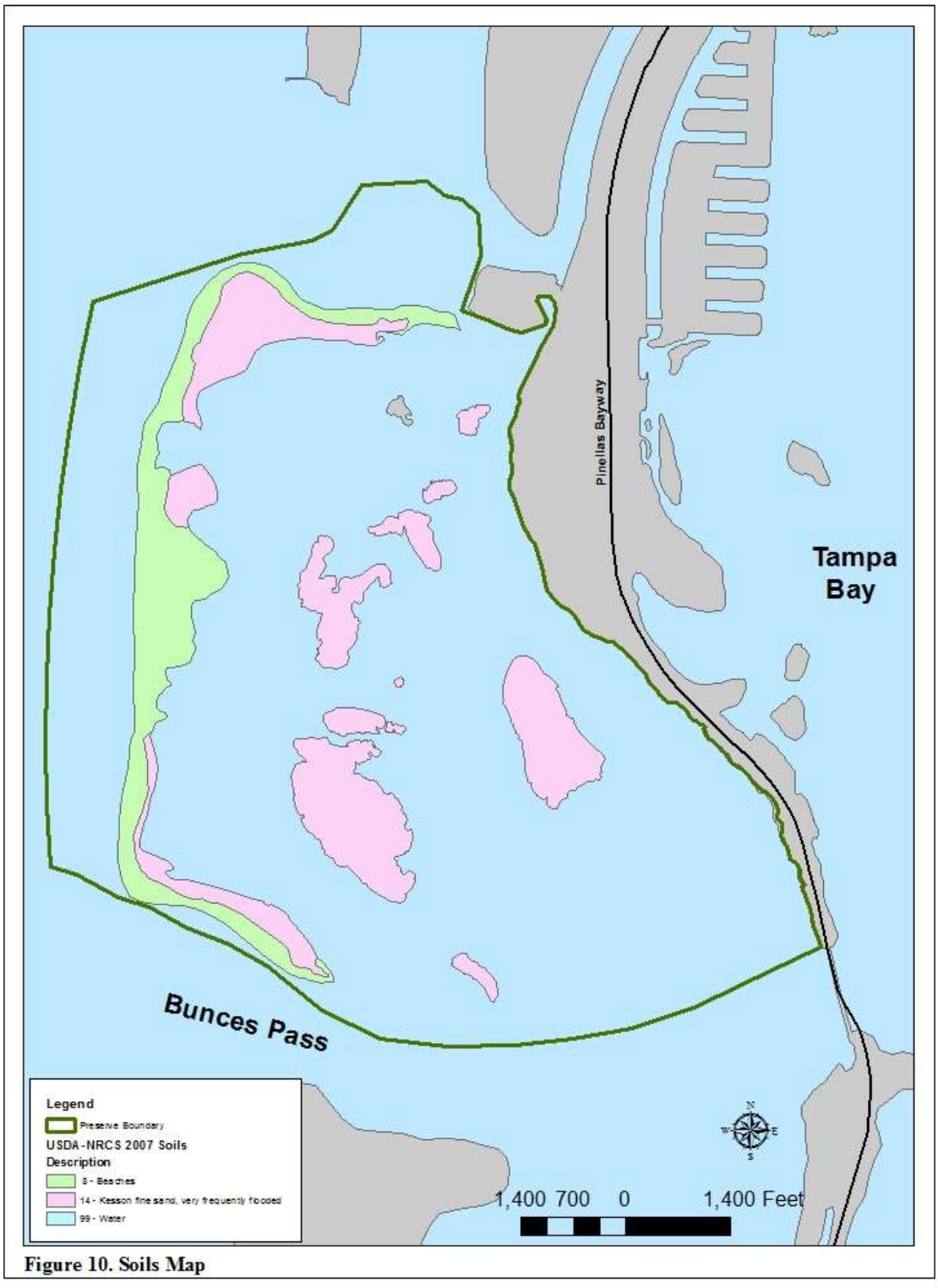

Figure 10. Soils Map

Geology

Shell Key, formerly known as Bunce Key and Shell Island, was once two separate islands. Sometime after February 1994 the islands merged to form one continuous barrier island. The dynamic nature of the barrier island is reflected in the recent erosion of sand along the northern half of the western shoreline and the accretion of sand at the northeastern tip (Figure 11). In 2009 DEP sampled three locations on Shell Key. "Carbonate material averaged 52.0 percent of the three samples (from locations PI-43 through PI-45) processed from Shell Key Shoal. The mean grain size before carbonate digestion was 0.369 mm (1.440 phi)."[3]

Shell Key has shifted in size, configuration and location over the years as is typical of barrier islands. There have been no comprehensive studies to evaluate net losses or gains from erosion and accretion of sand in the Preserve. However, Dr. Ping Wang of the University of South Florida completed in June 2018 a study of sediment transport discussed in Section 3, Research.

Minerals

There are no known mineral resources within Shell Key Preserve.

Hydrologic Conditions

No permanent fresh surface waters exist on any of the islands in the Preserve. There are no wells on any of the islands within the Preserve.

[3] Phelps, Ladle and Dabous (2010). *A Sedimentological And Granulometric Atlas Of The Beach Sediments Of Florida's Southwest Coast And Keys.* Florida Department of Environmental Protection.

Figure 11. Shoreline Changes (2007-2016) Map

Plant Communities and Cover Types

Shell Key Preserve contains five distinct communities, as described by FNAI (Figure 12). The premise of the FNAI classification is that physical factors such as climate, geology, soil, hydrology, and fire frequency generally determine the species composition of an area, and that areas which are similar with respect to these factors will tend to have natural communities with similar species compositions.

Specific assessments and acreages of the natural communities for Shell Key Preserve are provided below. The acreages are estimates as the detailed map (Figure 12) was produced in 2007 and does not reflect the current island migration. Detailed FNAI descriptions of these natural communities are provided in Appendix 11. A complete list of the 108 plant species documented on the island by Pinellas County staff and various partners is provided in Appendix 13.

Marine Tidal Marsh – 6 Acres

This community type is dominated by smooth cordgrass (*Spartina alterniflora)* and occurs along the relatively flat eastern shoreline of Shell Key with its low wave energy.

Marine Tidal Swamp – 168 Acres

This community type, consisting primarily of mangroves, dominates the majority of the islands within the Preserve, excluding Shell Key itself. Marginal fringes of mangroves exist along the shorelines surrounding the Preserve on Collany Island and Tierra Verde.

Beach Dune – 157 Acres

This community type is comprised of wind-deposited foredune and wave-deposited upper beach and, because of the influence of local winds and waves, is the dominant community on Shell Key. In a few areas, the beach dune community has been invaded by exotic vegetation, which at this point is in maintenance condition. Fire is rare in this community due to lack of consistent fuels necessary to carry through the vegetation.

Marine Unconsolidated Substrate – 642 Acres

This community type includes the subtidal, intertidal and supratidal beach habitat below the beach dune community. This is a zone of sparse vegetation and is a rich feeding zone for wading birds and shorebirds.

Marine Grass Bed – 855 Acres

Seagrass beds of four species fill in the majority of the area east of Shell Key. Turtle-grass (*Thalassia testudinum*) is the dominant seagrass in the middle and eastern areas of the Preserve. Shoal-grass (*Halodule wrightii*) is the dominant seagrass from the mid to western areas. Small patches of Widgeon-grass (*Ruppia maritima*) and Manatee-grass (*Syringodium filiforme*) are found throughout the Preserve. This zone is densely vegetated and is a rich feeding zone for

wintering, nesting and resting migrant birds as well as for resident bird species. Further, the seagrass beds provide opportunities for West Indian manatees (*Trichechus manatus*) to feed on grasses, bottlenose dolphins (*Tursiops truncatus*) to feed on fish, and numerous fish species to feed on other fish and plankton. The seagrass beds within the Preserve support healthy nursery and feeding areas for many species of both recreational and commercial fish species. The grasses are particularly important for juvenile fish to conceal themselves from larger predators such as birds and other fish.

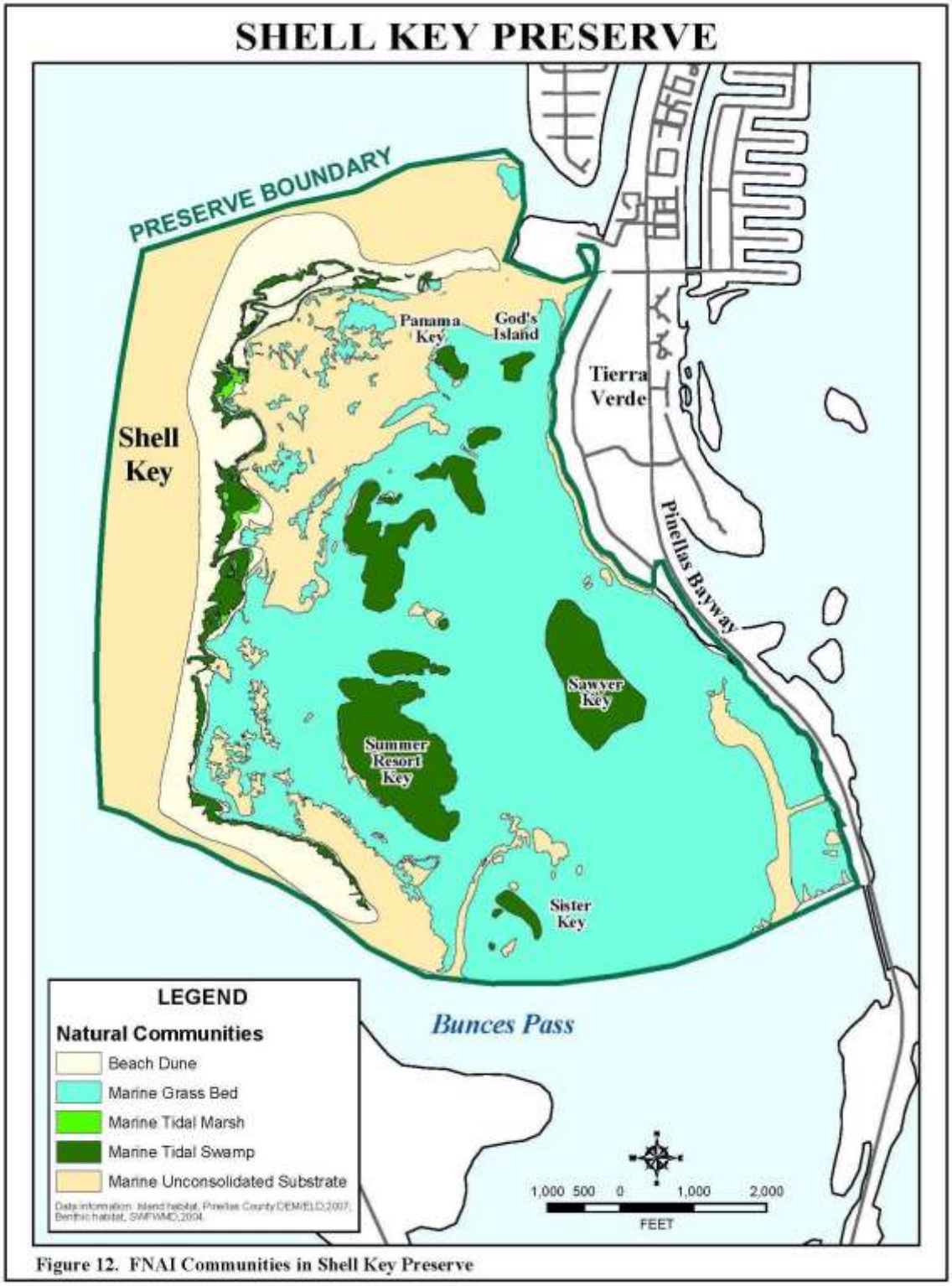

Figure 12. FNAI Communities in Shell Key Preserve

Wildlife

Shell Key Preserve supports diverse wildlife species common to an undeveloped barrier spit and surrounding waters. To date, documented species include: 156 birds, 25 butterflies, 7 reptiles, 6 mammals, and 2 moths. The species lists (Appendix 13) represent a compilation of results from surveys that County staff and volunteers have conducted since 2001.

Birds

Shell Key Preserve provides critical habitat required by resident and migratory birds to feed, rest, and reproduce. Pinellas County staff and volunteers monitored the wintering and nesting birds of Shell Key Preserve from 2000 to 2009. Since 2010, surveys have been coordinated through the SSP. Pinellas County volunteers conduct monthly surveys throughout the beach nesting breeding season, from mid-March through August. Both colonial and solitary nesting occurs on Shell Key. Species observed nesting since 2000 include the Black Skimmer (*Rynchops niger*), Least Tern (*Sternula antillarum*), American Oystercatcher (*Haematopus palliatus*), Wilson's Plover (*Charadrius wilsonia*), and Willet (*Tringa semipalmata*). Causes of nest failure include overwash and flooding during severe storms; disturbances by humans and dogs; and predation by raccoons (*Procyon lotor*), Fish Crows (*Corvus ossifragus*), Laughing Gulls (*Leucophaeus atricilla*), and Yellow-crowned Night Herons (*Nyctanassa violacea*). A complete list of the 156 bird species documented in the Preserve can be found in Appendix 13. Details of beach nesting bird surveys and management of the BPA are discussed in more detail in Section 3, Imperiled Species Protection.

Fishes

The Fisheries Independent Monitoring (FIM) program at FWC's Fish and Wildlife Research Institute (FWRI) has sampled both juvenile and adult fishes in and around Fort De Soto and Shell Key Preserve for over two decades. From 2008 through 2015, 113 species were identified within the Preserve (Appendix 13). The summary of these studies are discussed in more detail in Section 3, Monitoring.

Sea Turtles

Since 2001, three turtle species have been recorded on the main island or in the Preserve: loggerhead sea turtle (*Caretta caretta*), green sea turtle (*Chelonia mydas*), and diamond-backed terrapin (*Malaclemys terrapin*). The green sea turtle is a federally-listed endangered species while the loggerhead sea turtle is considered by the State of Florida and the United States Fish and Wildlife Service (USFWS) to be a threatened species. Both the loggerhead and green sea turtles have nested on Shell Key, as detailed in Section 3, Monitoring.

Other Reptiles

Several species of reptiles have been observed on Shell Key. The brown anole (*Anolis sagrei*) is the only lizard documented. Three nonvenomous snakes also inhabit the Shell Key: southern black racer (*Coluber constrictor priapus*), yellow ratsnake (*Elaphe obsoleta quadrivittata*), and saltmarsh snake (*Nerodia clarkia*).

Butterflies and Moths

Twenty-five species of butterflies and two species of moths have been observed on Shell Key (Appendix 13). None of these is listed as a species of conservation concern. Seven of the 25 butterflies are most likely residents that breed on the island, given that their host plants are present. Other butterflies and moths are likely strays that wandered over from Tierra Verde, Fort De Soto Park, and other areas in the region.

Mammals

Other wildlife species observed in the Preserve include raccoons, marsh rabbits (*Sylvilagus palustris*), and house rats (*Rattus rattus)*. These species most likely immigrated from nearby Tierra Verde. During the winter months, extremely low tides allow these species to swim or raft to Shell Key. These species and others may walk across the newly formed land bridge. While marsh rabbits pose no known threat to other wildlife, raccoons and rats may impact the nesting success of wildlife.

There has been one official sighting of a coyote (*Canin latrans*) on Shell Key. In August 2015, according to the Pinellas County Animal Services Coyote Sighting report, one coyote was spotted at 5 A.M. on the northern portion of the beach. Coyotes have also been reported at both Tierra Verde and Fort De Soto Park. Coyotes are known predators of nesting shorebird eggs and chicks as well as sea turtle eggs and hatchlings.

The protection of seagrasses is important to the sustainability of a wide variety of marine species in the Preserve. The bottlenose dolphin (*Tursiops truncates*) and the endangered West Indian manatee (*Trichechus mantus*) utilize the expansive seagrass beds.

Imperiled Species

Imperiled species are those that are listed by FNAI, USFWS, FWC, and the Florida Department of Agriculture and Consumer Services (FDA) as endangered, threatened or of special concern. Several imperiled floral and faunal species have been documented in the Preserve (Appendix 13). Presently, there are three state endangered or threatened plants along with 15 state endangered or threatened wildlife species (Table 2). Of the 18 state listed species, six are federally listed as designated by the USFWS.

Table 2. Listed Species Recorded in the Preserve					
Scientific Name	**Common Name**	**FNAI State Rank[1]**	**Federal Rank[2]**	**State Rank[3]**	**Florida Department of Agriculture and Consumer Services[4]**
Plants					
Chamaesyce cumulicola	Sand-dune Spurge	S2			E
Opuntia stricta	Erect prickly pear, shell-sound pricklypear				T
Scaevola plumieri	Inkberry, beachberry, Plumier's half-flower, gullfeed				T
Birds					
Calidris canutus	Red Knot	S2	T	FT	
Charadrius melodus	Piping Plover	S2	T	FT	
Charadrius nivosus	Snowy Plover	S1		ST	
Egretta caerulea	Little Blue Herron	S4		ST	
Egretta rufescens	Reddish Egret	S2		ST	
Egretta tricolor	Tricolored Heron	S4		ST	
Falco sparverius	American Kestrel	S3		ST	
Haematopus palliatus	American Oystercatcher	S2		ST	
Mycteria Americana	Wood Stork	S3	T	FT	
Platalea ajaja	Roseate Spoonbill	S2		ST	
Rynchops niger	Black Skimmer	S3		ST	
Sternula antillarum	Least Tern	S3		ST	
Reptiles					
Caretta caretta	loggerhead sea turtle	S3	T	FT	
Chelonia mydas	green sea turtle	S2	E	FE	
Mammals					
Trichechus mantaus	West Indian manatee	S2	T	FT	

1- FNAI State Element Rank

Florida Natural Areas Inventory - http://www.fnai.org/trackinglist.cfm (February 2017)

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 30 occurrences or less than 3000 individuals) or because of vulnerability to extinction due to some natural or man-made factor.

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

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

2-Federal Rank
United States Fish and Wildlife Service, http://www.fws.gov/endangered
E = Endangered T = Threatened

3-State Rank
Florida Fish and Wildlife Conservation Commission, http://myfwc.com/media/1515251/threatened-endangered-species.pdf
E=Endangered ST=State Threatened FT= Listed as Threatened Species at the Federal level by the U. S. Fish and Wildlife Service

4 – Florida Department of Agriculture and Consumer Services - Notes on Florida's Endangered and Threatened Plants https://plants.usda.gov/java/threat?stateSelect=US12&statelist=states
E = Endangered T = Threatened

Exotic Species

FWC defines an exotic species as one that was introduced into Florida by human activity and is free-ranging in an area to which it was not native in pre-Columbian times. Exotic flora in natural areas can have detrimental effects to the native flora and fauna (Langland and Burks, 1998)[4]. Exotics have few, if any, natural controls and can adversely affect native species. Thus, the approach of the *Natural Resource Conservation and Management Element*, *Pinellas County Comprehensive Plan* is to remove exotic species from natural communities. The Florida Exotic Pest Plant Council (FLEPCC), a non-regulatory organization of professional botanists and others, compiles lists of invasive exotic plants. Category I species are defined by FLEPPC as species that are invading and disrupting native plant communities. Category II species are defined by FLEPPC as species that have shown invasive properties and the potential to disrupt native plant communities. Appendix 14 provides the 2017 list of Category I and Category II invasive exotic plants identified at Shell Key.

The most prominent exotic plant species have been Australian-pines (*Casuarina equistetifolia*), Brazilian pepper tree (*Schinus terebinthifolia*) and beach naupaka (*Scaevola taccada*). All of the mature plants on Shell Key have been removed or chemically treated. However, seedlings are a perpetual problem due to the seed sources left behind by the mature plants and/or introduced by wind and wildlife. Seedlings must be removed or chemically treated regularly to prevent re-infestation. Mature exotics, especially Australian-pines, remain on some of the smaller mangrove islands.

Water Resources

The Department of Public Works, Environmental Management Division staff monitor water quality and seagrasses within Shell Key Preserve. Water quality monitoring sites are located east of Shell Key, but do not include Gulf waters to the west. Results of these data are discussed in Section 3, Monitoring.

[4] K.A. Langeland and K. Craddock Burks (1998). *Identification and Biology of Non-Native Plants in Florida's Natural Areas*. University of Florida. Gainesville, FL.

Cultural Resources

The Florida Master Site File has one known archaeological site recorded in close proximity to the Preserve. The site, a shell midden, was recorded by Piper Archaeological. According to Mike Wisenbaker of the Florida Department of State, Division of Historical Resources (DHR), "there are also three surveys that have a bearing on at least portions of Shell Key"[5] (Appendix 15). These surveys appear to have been conducted in the Pass-A-Grille channel to the north of the Preserve.

[5] Wisenbaker, Mike, Florida Department of State, DHR, telephone communication with Pam Leasure, March 2017.

SECTION 3. RESOURCE MANAGEMENT

Resource management by PCR is focused at the natural community or ecosystem level, a holistic approach that provides benefits beyond those afforded by single-species management. Activities include posting the core BPA, monitoring beach nesting bird activity, removing exotic species, replanting native vegetation and posting the rules of the Preserve. Budget constraints limit resource management activities in the Preserve. Based on available staff and within existing and future budgetary constraints, the long-range goal is to maintain the current activities and level of service. This will be done with the help of volunteers and through partnerships for research and monitoring projects.

A. Habitat Restoration and Improvement

Habitat restoration projects on Shell Key have focused on exotic vegetation removal and replanting native vegetation in selected areas. Contractors were hired to cut mature Australian-pines and chemically treat each stump. The felled trees were cut into 3-foot sections and used by campers as firewood. The contractor chemically treated all remaining FLEPPC, Category I and II invasive plants on Shell Key. To date exotic removal and revegetation have been the only restoration activities that have taken place on Shell Key. Over $70,000 has been spent since 2007 on exotic removal, revegetation and maintenance. Proper chemical selection and application techniques are followed by licensed spray technicians to prevent damage to the surrounding environment. Should additional resources become available, PCR will explore opportunities to restore or otherwise improve other natural communities, such as beach dunes and seagrass beds.

Objective: Provide resource management to restore and improve the natural communities of Shell Key Preserve.

<u>Exotic Species Control</u>

Exotic vegetation removal is an important and continuing process at the Preserve. The highest priority is placed on control of FLEPPC, Category I and II species (Appendix 14). Shell Key no longer has large infestations of exotic vegetation, and is considered to be at a maintenance level with an estimated coverage of less than 10 acres. PCR staff, contractors and volunteers continue to chemically treat exotic vegetation where necessary to prevent large re-infestations.

The removal or chemical treatment of exotic vegetation will remain a priority in order to sustain the native flora. Staff and volunteers will continue with the maintenance program at Shell Key to prevent re-infestation of exotics.

> **Goal A1: Annually conduct maintenance to remove all invasive exotic vegetation from Shell Key.**

Many of the smaller mangrove islands in the Preserve have infestations of exotic vegetation, mostly Australian-pines. A priority will be to chemically treat or remove all exotic vegetation on

the smaller islands in the Preserve. As resources allow, PCR will hire contractors to chemically treat or remove all exotic vegetation on the smaller mangrove islands.

Goal A2: Within 10 years remove all invasive exotics from the smaller mangrove islands within the Preserve.

Replanting Native Species

In 2008 a contractor was hired to replant native vegetation to provide shade no longer provided by the Australian-pines. Approximately six acres were planted with 140 native trees that included: varnish leaf (*Dodonae viscose*), strangler fig (*Ficus aurea*), Florida privet (*Forestier segreata*), red cedar (*Juniperus virginiana*), slash pine (*Pinus elliotti*) and live oak (*Quercus virginiana*). Replanting was not necessary in all other areas on Shell Key, as restoration occurred through natural recruitment of native vegetation.

Exotic vegetation on the main island is considered in maintenance condition and replanting will not be a priority. Removal of the exotic vegetation on the smaller mangrove islands could result in the need to replant native species if natural recruitment of native vegetation is not sufficient.

Goal A3: Following large-scale removal of invasive exotics, restore native vegetation through natural recruitment or by replanting as necessary.

B. Imperiled Species Protection

Protection of imperiled species is challenging on Shell Key and in the Preserve. Exotic and nuisance wildlife are threats to the nesting birds and sea turtles. PCR staff will monitor the presence of exotic and nuisance animals in the Preserve. Staff will coordinate removal efforts when necessary and practical.

Objective: Minimize impacts to protect those imperiled species utilizing the Preserve, including beach-nesting birds, nesting sea turtles, and manatees.

Bird Protection

The BPA (Figure 5) and the No Entry zone (Figure 13), established in the 2000 Plan, are posted to exclude humans from important habitat for birds and to prevent undue disturbance. In the BPA, such intrusions often flush nesting or resting birds, forcing them to expend additional energy, and leave eggs and young unprotected. Within minutes after a disturbance, exposed eggs and young birds may succumb to elevated temperatures or nest predators. The No Entry zone is important to some migratory species, as they rest or replenish fat reserves. For nesting, resting and feeding birds, any undue disturbances may further imperil their fragile conservation status.

Wildlife predation and intrusions are also a problem for beach nesting and migratory birds. Dogs have not been permitted in the Preserve since 2008 to prevent disturbance. Historically, raccoons, known predators, were trapped and removed from the island. The land bridge now provides terrestrial predators with more convenient access to the island.

The BPA has been located in approximately the same location on the island since 2000 (Figure 5). The desirable habitat for beach-nesting birds includes dry sandy beach for nesting, sparse vegetation for shelter and close proximity to the shoreline for feeding. Staff and volunteers post with signs the BPA to clearly mark the area. Each spring, posts are positioned to maintain one half of the beach for birds and the other half for beach visitors.

Goal B1: Annually post BPA with signs by March.

Figure 13. Aquatic Use Zones Map

The new land bridge on the northeastern portion of the island has created desirable beach-nesting bird habitat outside the BPA (Figure 3). The area now has a dry sandy beach for nesting and sparse vegetation for shelter. This area also offers close proximity to the shoreline for feeding, either to the south on the mudflats or to the north along the shoreline of Shell Key. This area is posted when nesting activities have been found by staff or volunteers.

Goal B2: Annually as needed, temporarily twine and post around birds attempting to establish solitary or colonial nests on beaches located outside of the BPA.

During the nesting season the SSP provides local land managers additional volunteer assistance (Bird Stewards) on weekends and holidays. PCR staff requests support from the Bird Stewards when nesting activity is found on the island. The volunteers are stationed in close proximity to the posted area to protect the nesting birds from human intrusions. They also educate the visitors on the importance of limiting human disturbance in the posted areas.

Goal B3: Annually as needed, protect beach-nesting birds during holiday weekends through SSP volunteers.

As has been done since 2000, PCR will monitor intrusions of predators accessing the Preserve. Staff will also depend on close communication with volunteer partners conducting regular beach nesting surveys. If it is determined that there is an increase in detrimental impacts to wildlife by terrestrial meso-predators, PCR will collaborate with agencies such as United States Department of Agriculture and FWC to assist in reduction. PCR will also support efforts by the Tierra Verde Community Association, conducted in collaboration with FWC, to change human behaviors that affect the presence and abundance of coyotes. A reduction in the suitability of attractiveness of Tierra Verde landscapes to coyotes will indirectly support efforts to minimize impacts of these predators at both Shell Key Preserve and Fort De Soto Park.

Goal B4: **As needed, trap and remove terrestrial predators known to impact beach-nesting birds and nesting sea turtles**.

Sea Turtle Protection

FWRI is the agency responsible for beach nesting sea turtles at Shell Key. Permit holders, Sea Turtle Trackers, are volunteers trained by FWRI to provide the primary sea turtle protection on the island. The BPA provides some sea turtle protection by restricting human intrusions.

PCR staff will continue to post the BPA to restrict human intrusions for the protection of imperiled species. Staff will continue to partner and assist FWRI and Sea Turtle Trackers as needed.

Goal B5: Annually as needed, support efforts of FWRI and Sea Turtle Trackers to locate and demarcate nesting sea turtles.

Manatee Protection

Manatees are often seen in the waters of the Preserve. The County provides an online mapping application that citizens may use to report manatee sightings; however, the quality and consistency of these data preclude detailed trend analysis for sightings within the Preserve. The 855 acres of seagrasses provide feeding areas in the shallow waters of the Preserve. The slow moving manatees often cannot avoid speeding watercraft. Collisions with vessel hulls or

propellers can inflict serious or mortal wounds. PCR provides manatee protection through the Preserves aquatic use zones (Figure 13). Boaters are required to use caution and slower speeds in the Preserve. PCR will continue to protect manatees and their habitat through the aquatic use zones.

Goal B6: Annually, minimize impacts to manatees and other species through posting and enforcement of established aquatic use zones.

C. Forest Management

There is no timbering activity within Shell Key Preserve. Fire is rare in the natural communities on Shell Key. There have been no prescribed burns conducted at Shell Key. There have been two wildfires in the Preserve, both started by campfires left unattended. In December 2016, a wildfire burned approximately 0.11 acres on Panama Key, where the only structure in the Preserve is located. The Tierra Verde Fire Department, with assistance from ELU, prevented the fire from burning the stilted structure. In the camping area on Shell Key in March 2017, a wild fire burned approximately 2.5 acres. ELU responded on site to evacuate other campers and visitors.

Objective: Utilize forest management techniques, specifically prescribed fire, to maintain natural communities on Shell Key.

PCR will continue to evaluate the natural communities on Shell Key. If deemed necessary, PRC is equipped with staff, drip torches, backpack sprayers, small pumps for drafting out of surface water and miscellaneous hand tools to conduct a prescribed burn to maintain healthy natural communities on Shell Key.

Goal C1: Annually evaluate the conditions to determine if prescribed burning should be conducted on Shell Key, and complete burns as needed.

D. Monitoring

A number of monitoring programs are conducted in the Preserve, typically completed with County staff, other agencies and volunteers. These monitoring programs provide PCR valuable expertise and resources that PCR staff can't provide. PCR utilizes the data collected to make informed decisions of management of the Preserve.

Objective: Conduct surveys and support the work of others to monitor the natural resources of Shell Key Preserve.

Species Inventories

The County staff, FWC, FWRI and volunteers have recorded detailed flora and fauna inventories since 2000. These lists are kept up-to-date as staff identifies new species (Appendix 13). Currently, there are 108 verified floral species of which 95 are native to the area and 317 verified faunal species. Each list clearly indicates species that are imperiled and species that are exotic. Imperiled species, as well as all of the flora and fauna, are protected in the Preserve under Chapter 90. Management efforts include posting of signs, public education, brochures and PCSO law enforcement.

PCR staff will continue to identify new species as observed and update species lists. Taxon-specific inventories may also be conducted with volunteers and experienced partnering agencies and organizations. If additional resources become available, it would be beneficial to conduct regular biological monitoring surveys; this approach would provide additional insight into patterns of abundance as well as long-term trends regarding the presence/absence of species.

Goal D1: As needed, update lists of species utilizing the Preserve.

Beach Nesting Birds

PCR staff and volunteers conduct nesting surveys, and results are entered in the Florida Shorebird Database maintained by FWC. Volunteers report nesting attempts or nests to PCR staff, who investigate to determine if additional protection is necessary. If nests reside outside of the BPA (Figure 5), staff and volunteers post the area to limit human disturbances. Volunteers, SSP bird stewards, PCR staff then monitor the nesting site weekly until the fate of the nest attempt has been determined.

Shorebird nesting occurrences have declined since 2007. From 2008 through 2016 there were 34 solitary nesting attempts and 20 colonial nesting attempts reported. The data in Table 3 are numbers of nesting attempts, nests and chicks observed and reported on Shell Key. Reconfiguration of the island may have led to a reduction in nesting attempts. Historically, black skimmers nested in large numbers in the BPA or along the beach of the northern portion of the western shoreline just outside of the BPA. The beach in this area no longer exists and is now beach dune, which is not suitable habitat for beach-nesting birds. Shell Key Preserve is one of several locations in Boca Ciega Bay that provide habitat for beach-nesting birds, as indicated in the Introduction. Additional research could place nesting at the Preserve in context with these other sites. It is possible that a reduction in the number of nesting attempts at the Preserve is associated with an increase in the number of attempts at other sites in the region. PCR will continue to participate in collaborative meetings of regional resource managers and volunteers. These meetings promote a regional approach to protecting nesting shorebirds. Several factors have contributed to failures of nests at the Preserve. Documented sources of failure of nesting attempts were: overwash from severe storms; wildlife predation and disturbances; dog disturbances; and human disturbances.

Staff will continue to coordinate management activities to support volunteer monitoring efforts and data collection of the beach nesting birds on Shell Key.

Goal D2: Annually as needed, monitor fates of nesting attempts by beach-nesting birds through SSP and other volunteers.

Table 3. Reported nesting data 2008 through 2016.
Data sources: PCR and FWC Florida Shorebird Database

	American Oystercatcher			Wilson's Plover			Snowy Plover			Least Tern			Black Skimmer		
Year	Nesting Attempts	Nests	Chicks	Nesting Attempts	Nests	Chicks	Nesting Attempts	Nests	Chicks	Nesting Attempts	Nests	Chicks	Nesting Attempts	Nests	Chicks
2008	8	5	5	3	3	6	0	0	0	3	80	5	2	200	363
2009	4	4	5	3	3	3	1	0	0	1	0	0	2	2	0
2010	3	3	4	1	1	1	0	0	0	0	0	0	3	0	0
2011	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0
2012	3	3	0	1	0	0	0	0	0	0	0	0	1	0	0
2013	2	0	0	2	0	0	0	0	0	1	2	0	2	0	0
2014	0	0	0	0	0	0	0	0	0	1	2	0	0	0	0
2015	0	0	0	0	0	0	0	0	0	2	21	0	1	1	0
2016	1	1	2	1	1	2	0	0	0	2	13	0	0	0	0

Beach Nesting Sea Turtles

FWRI oversees the monitoring of beach nesting sea turtles at Shell Key. Surveys are conducted by Sea Turtle Trackers daily, from April through October each year. Staff provides support to the volunteers on various management issues.

Sea Turtle Trackers conduct daily early-morning surveys on Shell Key to record fresh crawls and any nesting activity. FWC recorded 219 loggerhead nests and 1 green sea turtle nest on the island from 2008 through 2016 (Table 4). Per communication with Beth Brost, Biologist II, FWRI, "Increased surveillance (total # of days surveyed each year) is likely responsible, in part, for the increase in reported nesting activity."[6]

PCR staff will continue to restore and protect native habitats utilized by sea turtles. Staff will continue to provide support to FWRI and Sea Turtle Tracker when needed.

Goal D3: Annually as needed, monitor fates of nesting attempts by sea turtles through FWC and Sea Turtle Trackers.

[6] Brost, Beth, FWRI Personal Communication, with Pam Leasure February 2017.

Table 4. FWC Shell Key Preserve Sea Turtle data 2008 through 2016.									
Survey Start and End Dates	Total # Days	Loggerhead				Green Turtle			
		Nest	False Crawl	First Nest Date	Last Nest Date	Nest	False Crawl	First Nest Date	Last Nest Date
4/14-10/31 2008	91	4	2	5/20	7/30	0	0		
4/15-10/31 2009	100	4	6	6/9	7/14	0	0		
4/1-10/31 2010	81	1	0	7/15	7/15	0	0		
4/1-10/31 2011	30	0	1			0	0		
5/19-9/3 2012	12	16	16	5/27	8/5	0	0		
5/12-8/4 2013	16	30	24	5/18	8/4	1	0	6/20	6/20
5/1-10/15 2014	52	51	26	8/18	8/12	0	0		
4/15-10/31 2015	192	50	27	5/8	8/22	0	0		
4/15-10/7 2016	167	63	82	5/19	8/13	0	0		

Fisheries Independent Monitoring

Starting in 1996, FWRI's Fisheries Independent Monitoring (FIM) program has conducted monthly stratified-random sampling in Tampa Bay. Each month, sampling sites are randomly selected from all sites where a particular gear can be set. The monitoring program is fisheries independent because the data collected do not come from the fishery for the species. FIM uses a multi-gear approach to collect various species of fish and macro-invertebrates in a range of size-classes.

Three gears were used within the boundaries of the Shell Key Preserve from 2008 through 2015: 21.3-m seine, 183-m seine, and a 6.1-m otter trawl. The two seines were used along shorelines and in shallow waters, whereas the trawl was used to fish relatively deeper waters. The 21.3-m seine typically collects small (<100-mm) animals, including both species that do not attain large sizes and the juveniles of larger-sided adult species. The otter trawl collects individuals of a similar size, but in deeper waters. The 183-m seine generally collects larger juvenile, sub-adult, and adult animals. For all three gear types, all fish and recreationally or commercially important invertebrates (e.g., pink shrimp, blue crabs, stone crabs, and scallops) were identified to the lowest practical taxonomic level, counted, and a sub- sample was measured.

This report summarizes data from all gears set within the boundaries of the Shell Key Preserve from 2008 through 2015 (Figure 14). The 2016 data are not yet released for analysis. In total, 88 sites were visited and 29,115 individuals were counted (Appendix 13). Individuals represented 113 species (or species groups, when species identification was not practical).

Several of these species are of commercial/recreational importance, including: (blue crab (*Callinectes sapidus*); common snook (*Centropomus undecimalis*); pink shrimp (*Farfantepenaeus duorarum*); gray snapper (*Lutjanus griseus*); Lane snapper (*Lutjanus synagris*); gag (*Mycteroperca microlepis*); and red drum (*Sciaenops ocellatus*). The five most abundant fish collected were pinfish (*Lagodon rhomboids*), small mojarras (*Eucinostomus spp.*), pigfish (*Orthopristis chrysoptera*), rainwater killifish (*Lucania parva*), and scaled sardine (*Harengula jaguana*). Together they made up 73.6% of the total catch. Many of these species are considered forage fish species, which larger recreationally/commercially important fish use as food. The most dominant invertebrate was pink shrimp, with 682 individuals.

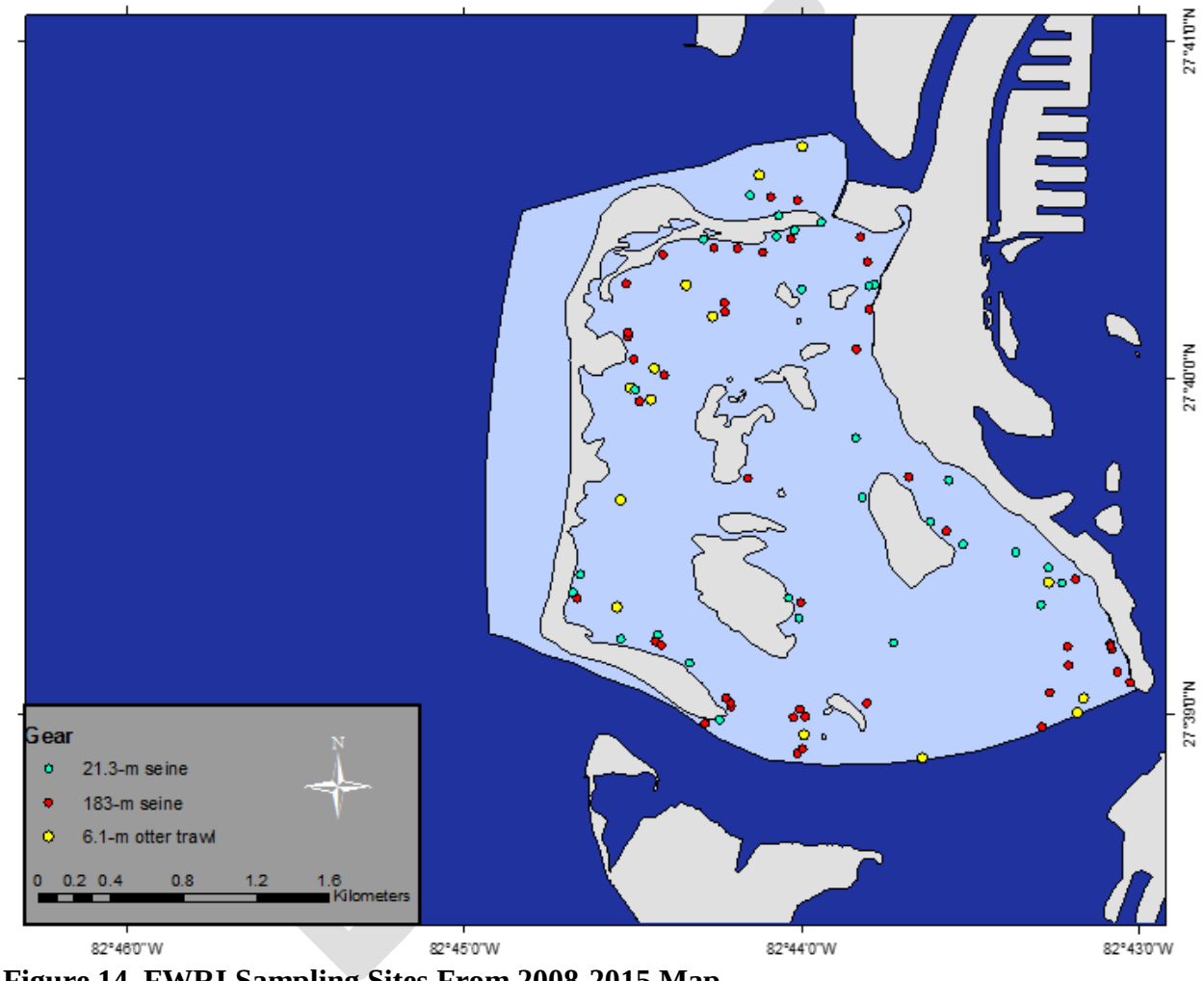

Figure 14. FWRI Sampling Sites From 2008-2015 Map.

FWRI has not requested support from PCR to date. FWRI has provided fisheries monitoring reports to staff upon request. FWRI provides expertise and resources that PCR can't provide, and PCR staff will provide support upon request from FWRI.

Goal D4: Annually support monitoring of fisheries by FWRI fisheries and review data summary report.

Water Quality

Pinellas County's Department of Public Works Environmental Management Division has monitored water quality in the County's lakes, streams, and marine waters since 1991. In 2003, a revised monitoring program was implemented to provide better geographical coverage of the County's waters and to offer more statistically robust results. Shell Key Preserve is within the W8 monitoring segment that includes Mullet Key and lower Boca Ciega Bay. The County's open water segments and the monitoring locations within the preserve are presented in Figure 15. The current monitoring program schedule includes the collection of 32 water quality samples per year within each segment. Sampling locations and dates are determined at random. During each monitoring event, the following parameters are reported: transmissivity, Secchi depth, water temperature, pH, dissolved oxygen, dissolved oxygen percent saturation, conductivity, salinity, total Kjeldahl nitrogen, total phosphorus, ammonia, nitrate-nitrite, orthophosphate, chlorophyll a, b, c, phaeophytin, total suspended solids, and turbidity. Additionally, the following field conditions are documented at each sampling location: air temperature, cloud cover, wind speed and direction, precipitation, wave height, submerged aquatic vegetation, bottom type, and other observed conditions that may impact water quality.

A status update of the water quality within the Shell Key Preserve is presented below. Water quality data are depicted in multi-year-time steps since the initiation of the new water quality monitoring program in 2003. Water quality data from 1991-2002 are provided as historical reference.

Figure 15. Water Quality Monitoring Locations 2003 to 2016

Water quality metrics for Chlorophyll A (Chla) and Total Nitrogen (TN) within the Shell Key Preserve are presented in Figure 16. Water quality data are depicted in multi-year-time steps since the initiation of the new water quality monitoring program in 2003. Water quality data from 1991-2002 are provided as a historical reference.

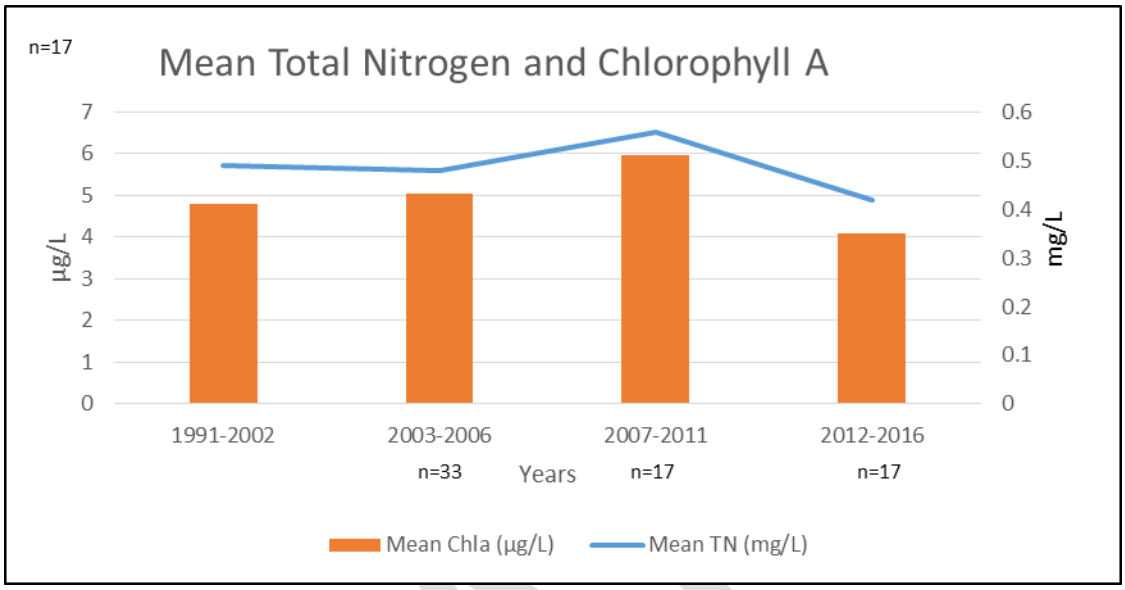

Figure 16. Mean Total Nitrogen and Chlorophyll A Concentrations Graph

Overall, the water quality within Shell Key is very good and remains consistently so. Chlorophyll is an indicator of algal growth in the water column, and excess nutrients (nitrogen) in the water column can contribute to increases in chlorophyll. Figure 16 shows the mean values for Total Nitrogen (TN) and Chlorophyll A (Chla) within the Shell Key Preserve. The state-adopted numeric water quality standards (thresholds) for TN and Chla within Boca Ciega Bay are 0.54mg/L and 6.3µg/L respectively. The most recent data (2012-2016) show a mean TN of 0.42mg/L and mean Chla of 4.09µg/L which are below and in compliance with these water quality criteria. A spatial interpolation, representing the geographic coverage of Chla values from 2003-2016 is presented in Figure 17.

Goal D5: Annually support monitoring of water quality by Pinellas County's Department of Public Works Environmental Management Division and review data summary report.

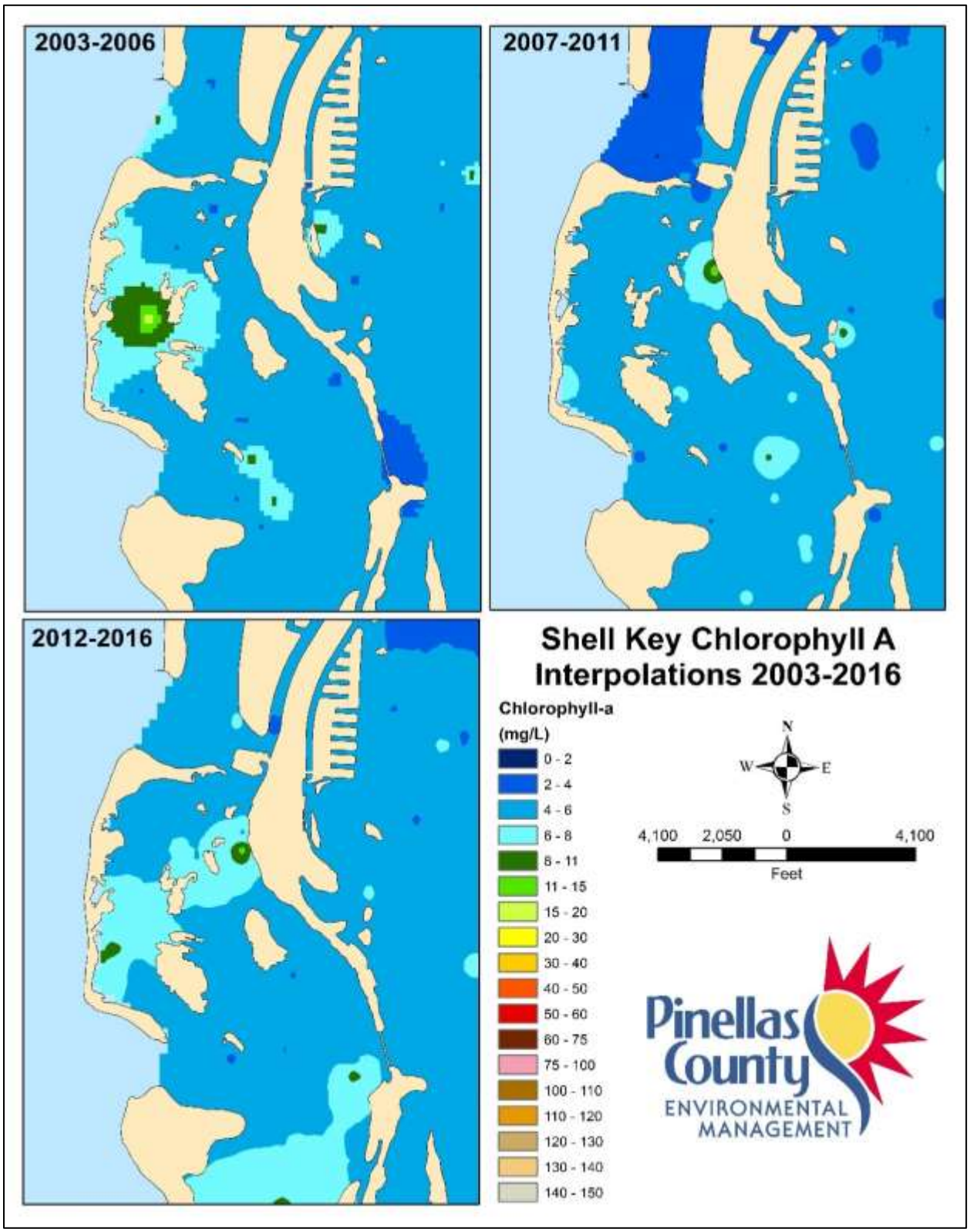

Figure 17. Spatial Interpolation of Chlorophyll A Data 2003 to 2016.

From March 2016 through July 2017 water quality sondes were deployed at various areas within the preserve to look at water depth, temperature, pH, dissolved oxygen percent saturation and mg/L, specific conductance, and salinity. A map of the deployment locations is shown in Figure 18. Those data are presented as daily averages in Table 5. As expected, the highest daily average temperatures were observed during July and August of 2016 while the coolest daily average temperature was observed in March 2016. pH ranged from 8.11 to 8.70 with the lower daily average occurring in March 2016 and the highest value occurring in July 2017. The state adopted criteria for dissolved oxygen reads "no more than 10 percent of the daily average percent dissolved oxygen (DO) saturation values shall be below 38 percent in the Peninsula Bioregion which encompasses Pinellas County. As shown in Table 5, the daily average percent dissolved oxygen values was in compliance with this standard at all times. Lastly, the measured specific conductance and salinity values were consistent with other measurements collected in this area of the bay.

Figure 18. Water Quality Sonde Locations 2006 – 2017.

Table 5. Sonde Deployment Daily Averages for 2016 and 2017

Site	Location	Date	Dep [meters]	Temp [°C]	pH	DO% [Sat]	DO [mg/l]	SpCond [mS/cm]	Sal [ppt]	Comments
SK1	NE	March 2016	0.59	21.77	8.25	100.00	7.19	49.35	32.35	
SK2	NW	March 2016	0.76	21.77	8.24	80.16	5.77	49.67	32.58	
SK3	MID	March 2016	0.53	21.75	8.13	76.50	5.51	48.80	31.96	
SK4	SE	March 2016	.	20.39	8.26	99.49	7.47	47.83	.	Depth and salinty not collected
SK5	SW	March 2016	.	19.93	8.11	209.17	15.79	48.24	31.52	Depth not collected
SK1	NE	April 2016	0.45	24.40	8.18	91.59	6.23	49.68	32.59	
SK2	NW	April 2016	0.74	24.35	8.13	66.79	4.56	50.99	33.55	
SK3	MID	April 2016	.	.	.	.	.	.	.	Sonde failed calibration and was not deployed
SK4	SE	April 2016	0.36	24.37	8.20	86.77	6.01	47.29	30.98	
SK5	SW	April 2016	.	.	.	.	.	.	.	Sonde failed calibration and was not deployed
SK1	NE	June 2016	0.57	29.67	8.31	65.69	4.05	50.13	32.92	
SK2	NW	June 2016	0.77	29.13	8.40	68.72	4.33	49.24	32.28	
SK3	MID	June 2016	.	.	.	.	.	.	.	Did not have a 5th sonde to deploy
SK4	SE	June 2016	0.56	30.00	8.37	.	.	47.62	31.14	Failed DO post-deploy verification
SK5	SW	June 2016	0.65	29.86	8.19	90.06	5.59	49.54	32.49	
SK1	NE	July/Aug 2016	0.71	32.29	8.33	86.83	5.21	50.77	33.39	
SK2	NW	July/Aug 2016	0.87	31.93	8.35	102.08	6.18	51.60	34.00	
SK3	MID	July/Aug 2016	.	.	.	.	.	.	.	Power loss
SK4	SE	July/Aug 2016	0.63	32.10	8.28	101.08	5.99	50.78	33.40	
SK5	SW	July/Aug 2016	0.75	32.04	8.13	79.82	4.73	51.16	33.68	
SK1	NE	Nov 2016	2.06	21.51	8.37	153.10	9.35	.	30.97	Conductivity not collected
SK2	NW	Nov 2016	2.29	21.25	8.45	137.83	8.45	48.65	31.83	
SK3	MID	Nov 2016	0.35	21.59	8.43	134.39	9.90	44.90	29.37	
SK4	SE	Nov 2016	0.55	21.43	8.24	113.91	8.37	47.75	31.23	
SK5	SW	Nov 2016	0.87	21.53	8.24	96.90	7.14	47.23	30.94	
SK1	NE	April 2017	0.45	23.57	8.39	95.06	6.49	53.02	34.99	
SK2	NW	April 2017	0.59	23.34	8.45	103.91	7.23	52.83	34.85	
SK3	MID	April 2017	0.18	23.76	7.88	122.47	8.65	42.32	27.94	
SK4	SE	April 2017	0.38	24.05	8.11	108.30	7.80	40.35	26.57	
SK5	SW	April 2017	0.72	23.58	8.23	108.79	7.53	52.22	34.46	
SK1	NE	July 2017	0.52	31.93	8.43	108.65	6.49	52.86	34.63	
SK2	NW	July 2017	.	.	.	.	.	.	.	Sonde did not collect data
SK3	MID	July 2017	0.35	31.59	8.70	98.37	5.79	53.64	35.51	
SK4	SE	July 2017	0.49	31.94	8.37	116.84	7.04	49.66	32.71	
SK5	SW	July 2017	.	.	.	.	.	.	.	Sonde did not collect data

Seagrasses

Seagrasses are flowering underwater plants found at shallow depths in protected bays and lagoons. Seagrass beds support fish, shrimp, crabs and other species that are dependent on the seagrasses for refuge and food. Seagrasses help stabilize sediments and improve water clarity by trapping sediment and particles. Seagrasses are also a biological indicator of ecosystem health. As chlorophyll increases water clarity is reduced. When water clarity is poor, seagrasses cannot get enough light to grow and thrive. By reducing nutrient loads, algal growth is limited and water clarity is increased supporting healthier seagrass beds. Because, TN and Chla concentrations are low (Figure 16) the corresponding water clarity is exceptional (Figure 19). The higher the transmissivity value, the better the water clarity.

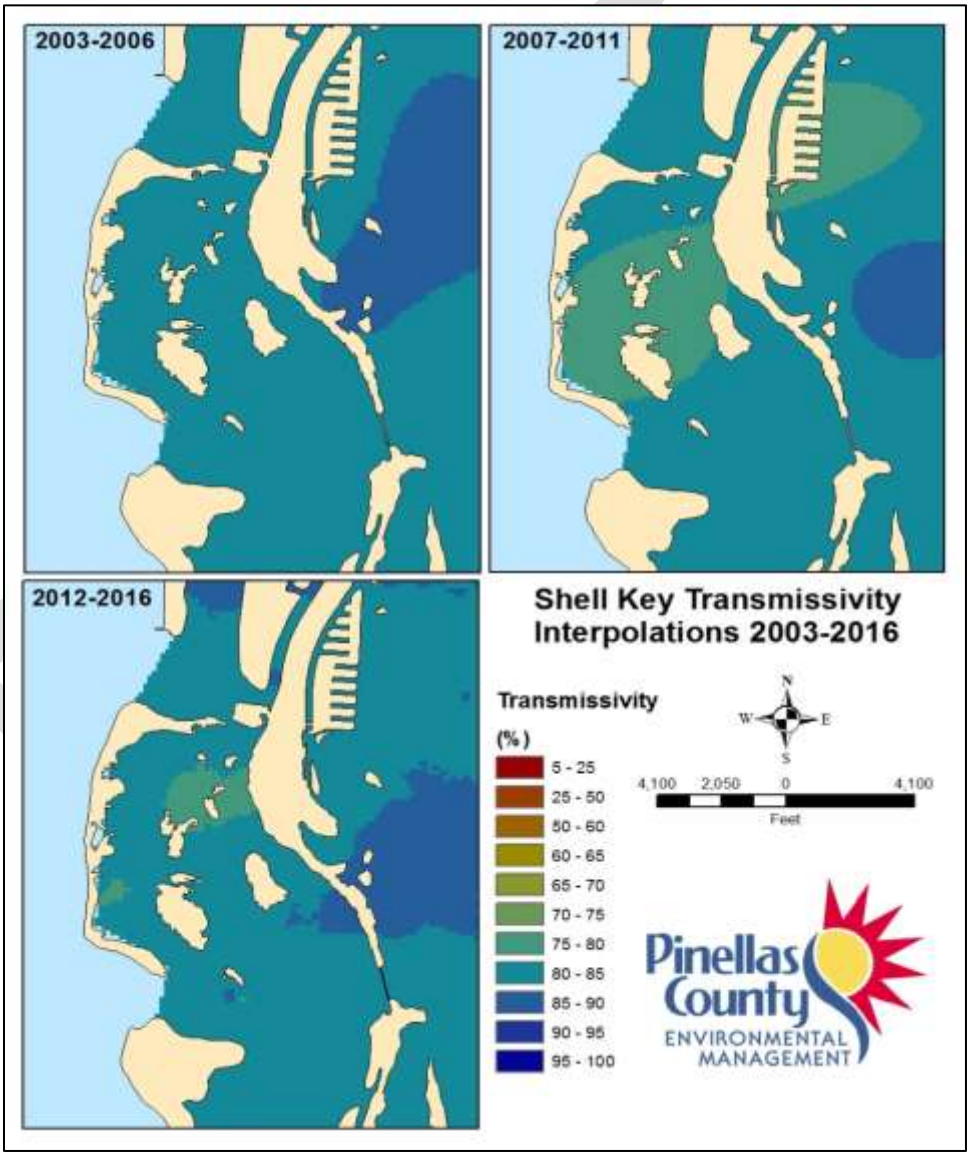

Figure 19. Spatial Interpolation of Water Clarity (Transmissivity) Data 2003-2016.

The Southwest Florida Water Management District (District) provided the seagrass data. Every two years, to assess seagrass abundance, the District conducts aerial surveys of seagrass coverage in the Tampa Bay area. In 2004 and 2008, District data indicated there were 870 acres of seagrass within the Preserve. Since that time, the Preserve added an additional 114 acres of seagrass. Figure 20 shows the change analysis between 2008 and 2016. In summary, seagrass monitoring data indicate a healthy aquatic system within the Preserve.

Goal D6: As needed, support analyses of seagrass distribution by Pinellas County's Department of Public Works Environmental Management Division and review data summary report.

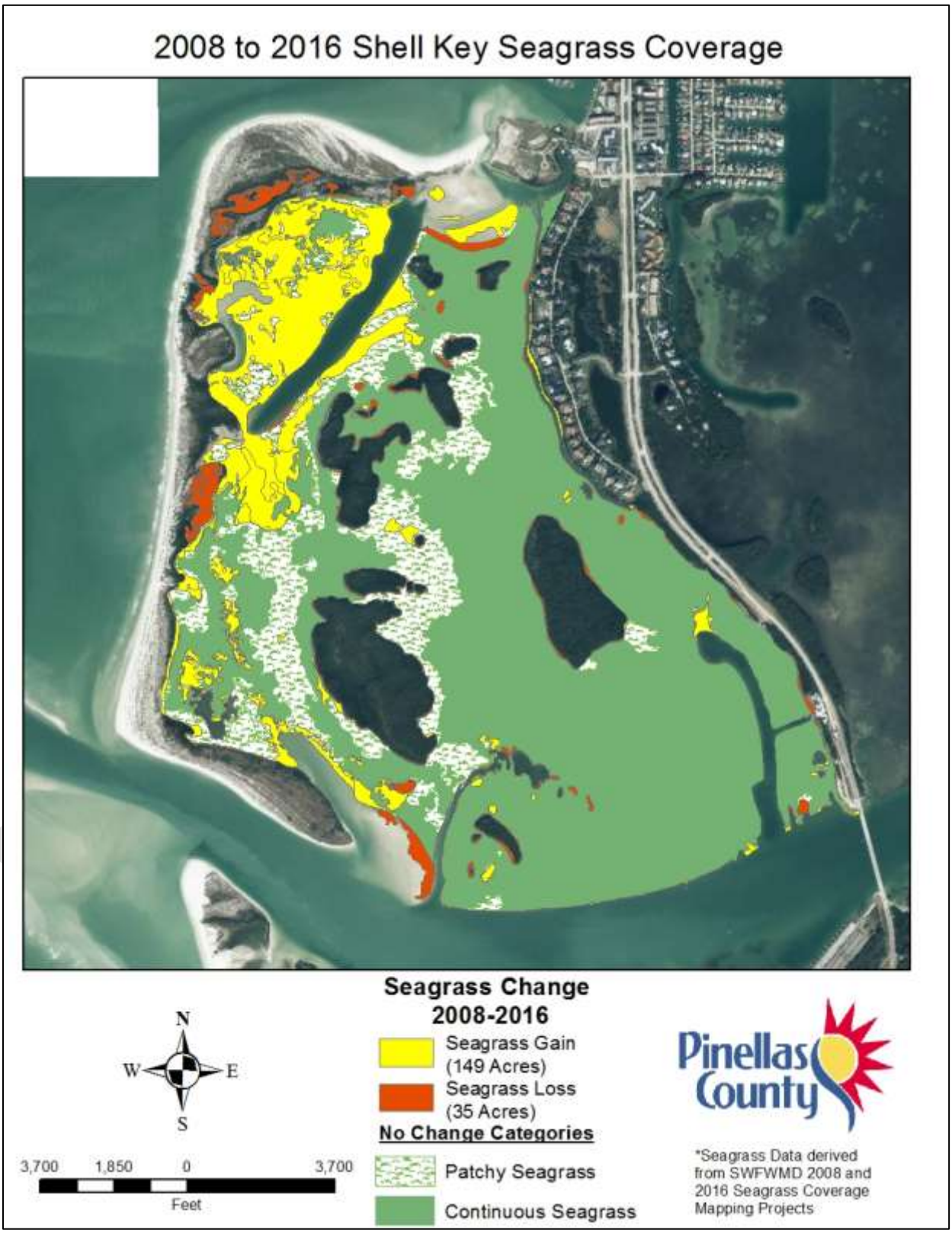

Figure 20. 2008 – 2016 Change Analysis of Seagrass Coverage Map.

E. Research

Research projects support informed management decisions. Such studies will be encouraged and supported to the fullest extent possible through partnerships with scientists from external agencies and institutions. Research partners provide expertise and resources that allow for detailed investigations beyond the scope of local government. Given the solid foundation provided by ecological and hydrological studies conducted to-date, numerous opportunities exist for future research at Shell Key Preserve. Authorized research projects conducted to date have investigated a variety of topics.

Objective: Coordinate and support scientific studies conducted at Shell Key Preserve by researchers from partnering agencies and other institutions, and use information provided to support management decisions.

Site Use Applications

Site use permits (Appendix 16) are required for scientific research and other activities that require access to non-public use areas in the Preserve. Since 2007, 13 research projects have been conducted in partnership with a variety of other agencies and institutions to study natural and cultural resources (Table 6).

Table 6. Site Use Projects in the Preserve 2007 Through 2017			
Name	Project Title	Authorized Begin Date	Authorized End Date
Burney, Chris	International Snowy Plover Survey	5/5/2007	5/13/2008
Douglass, Nancy	An Investigation of the Red Knot (*Calidris canutus*) Wintering Population of the Gulf Coast of Florida	12/7/2007	1/31/2008
Douglass, Nancy	Estimating Shorebird Oiling and Mortality Deepwater Horizon (Mississippi Canyon 252) Oil Spill Bird Study #5	8/4/2010	8/31/2010
Fraser, James	Determining Injury in the Piping Plover (*Charadrius melodu*) from the Deepwater Horizon (mc252) Oil Spill Bird Study #7	8/20/2010	3/31/2011
Gaskill, Teresa	Plant Distribution on Islands of the Tampa Bay Area According to Soil Salinity and Topography	8/1/2007	12/31/2008
Keenan, Jeff	Geotechnical Samples of Shell Key	2/2/2016	2/29/2016
Ogdon, John	St. Petersburg Audubon Society Shorebird Class	3/1/2008	4/1/2008
Phelps, Daniel	A Sedimentological and Granulometric Atlas of the Beach Sediments of Florida's Keys and Southwest Coast	10/1/2009	11/30/2009
Sage, Joe	Conservation and Management of Diamondback Terrapin Nesting Beaches on Public Lands Along Tampa Bay	4/14/2010	8/31/2010
Schwarzer, Amy	Assessing the Importance of Horseshoe Crab (*Limulus Polyphemus*) Eggs in the Diets of Migrating Red Knots (*Calidris canutus rufa*) and Sanderlings (*Calidris alba*) During Refueling Stops on Selected Florida Beaches	3/1/2008	7/1/2010
Smith, Ron	Is Shell Key a Viable Wintering Site for Short-eared Owls and Sharp-tailed Sparrows	5/1/2011	2/28/2017
Wang, Ping	Inlet Management Study for Bunces Pass and Pass-A-Grille Inlet	3/2016	11/2017
Westmark, David	Efficacy of Ultrasound to Control Mammalian Predators at a West Coast Barrier Island	5/1/2016	10/31/2016

Examples of three such projects are described below.

Goal E1: As needed, review Site Use applications submitted by researchers interested in conducting studies at the Preserve.

Nelsons and Saltmarsh Sparrow Banding

PCR volunteer and local bird expert, Ron Smith has been coordinating an authorized study with Dr. Jon Greenlaw and other local experts. They have been banding Nelson's Sparrows (*Ammodramus nelsoni nelsoni*) and the Saltmarsh Sparrows (*Ammodramus caudacutus caudacutus*) since 2010. One of the banded Saltmarsh Sparrows was spotted in June 2016 at Jacob's Point Salt Marsh in Rhode Island and reported to the Saltmarsh Habitat & Avian Research Program http://www.tidalmarshbirds.org/?p=1984.

Inlet Management Study for Bunces Pass and Pass-A-Grille Inlet
Dr. Ping Wang and colleagues, University of South Florida, Coastal Research Laboratory, were contracted by Pinellas County Department of Public Works to conduct a study of sediment transport of Bunces Pass and Pass-A-Grille inlets. Specifically for Shell Key Preserve, the study evaluated how the northeast pass closed, what sand sources caused the closure, and the conditions that led to the pass closure. Appendix 17 contains the Table of Contents and Executive Summary sections of the final report, which was completed in June 2018.

Computer models were used to compare alternative management scenarios, including multiple dredging approaches. Results of Dr. Wang's inlet management study indicated that potential dredging approaches, ranging in sizes and spatial orientations, were not sustainable due to the predicted continued influx of sand.

Results of the study allowed the County to address the closure and potential remedies using an informed, data-supported approach. Should any dredging activity be proposed in the Preserve, serious consideration will be given to the impacts to beach-nesting birds and sea turtles, impacts of transporting and disposing of dredged materials, impacts to seagrass beds, and other potential impacts to the Preserve. Any proposed dredging in the Preserve must follow all applicable local, state, and federal permitting processes.

Baseline Data for a Restoration Plan of Islands Along Pinellas County Coast
Dr. Teresa Restom Gaskill, a visiting Assistant Professor of Biology, Eckerd College conducted a study to provide Tampa Bay islands' managers data for successful planting restoration projects. The study looked at diverse ecosystems from tidal wetlands to coastal uplands in Tampa Bay, including Shell Key.

F. Cultural Resource Management

The Florida Master Site File contains one known archaeological site recorded in the Preserve. A shell midden was found in the Preserve during a survey conducted in 1987 by Dr. Robert Austin of Piper Archaeological Research, Inc. In conversation with Dr. Austin[7], the midden was found on land at Tierra Verde in close proximity to the brackish water ponds. The location was not in the waters of the preserve as the reported 1987 UTM coordinates indicate on the map (Figure 21). According to DHR records there are also three surveys in close proximity to the Preserve (Appendix 15). These surveys were conducted in Pass-A-Grill channel just north of the Preserve. Because these three surveys lie outside the Preserve, they are outside PCR's management authority.

Objective: Identify and protect historic and archaeological resources supported by the Preserve.

[7] Austin, Robert, telephone communication with Pam Leasure, March 2017

PCR will continue to consult with DHR before taking action on any new archaeological or historical resources located in the Preserve. PCR will continue to support archaeological research through partnerships from external agencies and institutions.

Goal F1: As needed, coordinate with the Florida Division of Historical Resources prior to allowing any activity which causes ground disturbances in areas with high probability of supporting cultural resources.

Figure 21. Shell Midden 1987 Location

G. Security

The ELU has provided enforcement of rules and regulations of the Preserve since 2000. Due to Countywide budget reductions, however, the number of ELU officers contracted specifically for all environmental lands has dropped from seven deputies to two. The PCSO Marine Unit provides additional support, especially at Shell Key Preserve. ELU also partners with FWC enforcement officers when possible.

Objective: Enforce rules and regulations as detailed in Pinellas County Code of Ordinances Chapter 90 to protect the natural and cultural resources supported by the Preserve.

PCSO deputies have attended the Audubon Florida, Florida Coastal Islands Sanctuaries, Inter Agency Law Enforcement Workshop. The workshop helps PCSO deputies identify beach nesting bird species and gain an understanding of the importance of protecting the areas posted by staff and volunteers.

Good communication between PCSO and the land manager is essential due to the reduction of PCR staff available to manage Shell Key Preserve. The deputies immediately report issues, such as the wild fires in 2016 and 2017 and missing signs, to the land manager. Table 7 represents the number of offenses, citations, warnings and ordinance violations from 2008 through 2016.

Table 7. Shell Key Annual Violations Data 2008 Through 2016

	2008	2009	2010	2011	2012	2013	2014	2015	2016	Total
Offenses	59	10	8	4	1	3	5	3	8	101
Incidents	5	2	4	3	5	3	6	7	7	42
Citations	145	136	110	69	40	24	21	23	38	606
Warnings	24	25	40	58	72	53	110	96	59	537
TOTALS	233	173	162	134	118	83	142	129	112	1286
*Ordinance Violations	132	104	68	40	35	25	26	30	30	490

**Included in the total Offenses, Incidents, Citations, and Warnings*

PCSO will continue to be contracted, as funding allows, to provide enforcement of rules in the Preserve and other properties managed by PCR. Opportunities to increase funds available to hire additional security staff, either through contracted PCSO deputies or through PCR Park Rangers, will be pursued. Activities will include enforcement of the existing aquatic use zones (Figure 13) to protect the aquatic resources. PCSO and the land manager will continue to identify missing or damaged signs. Replacement of signs will continue to be completed through a contract managed by Pinellas County, Department of Public Works, Environmental Management Division. Recognizing the difficult enforcement issues in the Preserve, PCR will continue to consult with ELU on all enforcement concerns. New or improved means of law enforcement that do not conflict with resource management will be pursued in order to enforce County regulations.

Goal G1: As funding allows, contract PCSO for law enforcement officers dedicated to patrolling Shell Key Preserve and other environmental lands.

SECTION 4. PUBLIC RECREATION

In the southern portion of Pinellas County, the concentration of preserves (State and Federal), parks (Ft. De Soto Park), and management areas (Cabbage Key Management Area) makes this area popular both for its ecological and recreational values (Figure 4). Conservation strategies for the long-term balance between human and nonhuman needs are necessary for sustainability of the ecological and recreational resources.

Because Shell Key is completely undeveloped, it retains a high scenic and recreational value as well as ecological significance. Resource-based recreational activities at the Preserve are compatible with the conservation and protection of the natural and cultural resources of the Preserve. No alternative or multiple uses of the property were considered for this Plan.

A. Public Access

Areas of public access and uses within the Preserve evolved as a result of research conducted by Pinellas County staff and others documenting changes to the island's natural resources. Where activities were documented to be incompatible with the State-mandated goal of protecting natural resources, changes were implemented. See the 2007 update to the management plan for details of these changes. There are currently no fees collected for accessing the Preserve.
Objective: Provide public access to areas of Shell Key Preserve where compatible with the conservation and protection of natural and cultural resources.

<u>Regulatory Zones</u>

Historically, the Preserve was accessible to the general public only by waterborne vessels, swimming or wading. When Shell Key connected to Collany Island, this allowed a private access point via the new land bridge. The boundary and rules of the Preserve are posted and must be followed by all visitors, regardless of whether they access the Preserve by water or the land bridge.

Goal A1: As needed, maintain signs that identify the boundary of the Preserve.

Island Use Zones
There are two Public Use Areas on Shell Key (Figure 22) and these are clearly identified through signage on the island. The distinction between the two is that the southern Public Use Area is designated for campfires and camping with a permit, while camping and campfires are prohibited in the northern Public Use Area.

The public is prohibited access into both the BPA and the Beach Closed areas on the island. The rule for the Beach Closed area requires that visitors must have "feet in the water" while walking that stretch of beach. These areas were established to protect the natural resources from any human disturbances.

PCR will continue to evaluate the effectiveness of existing island use zones as the conditions of the Preserve change. When deemed necessary, these changes will be addressed through public notice and appropriate signage.

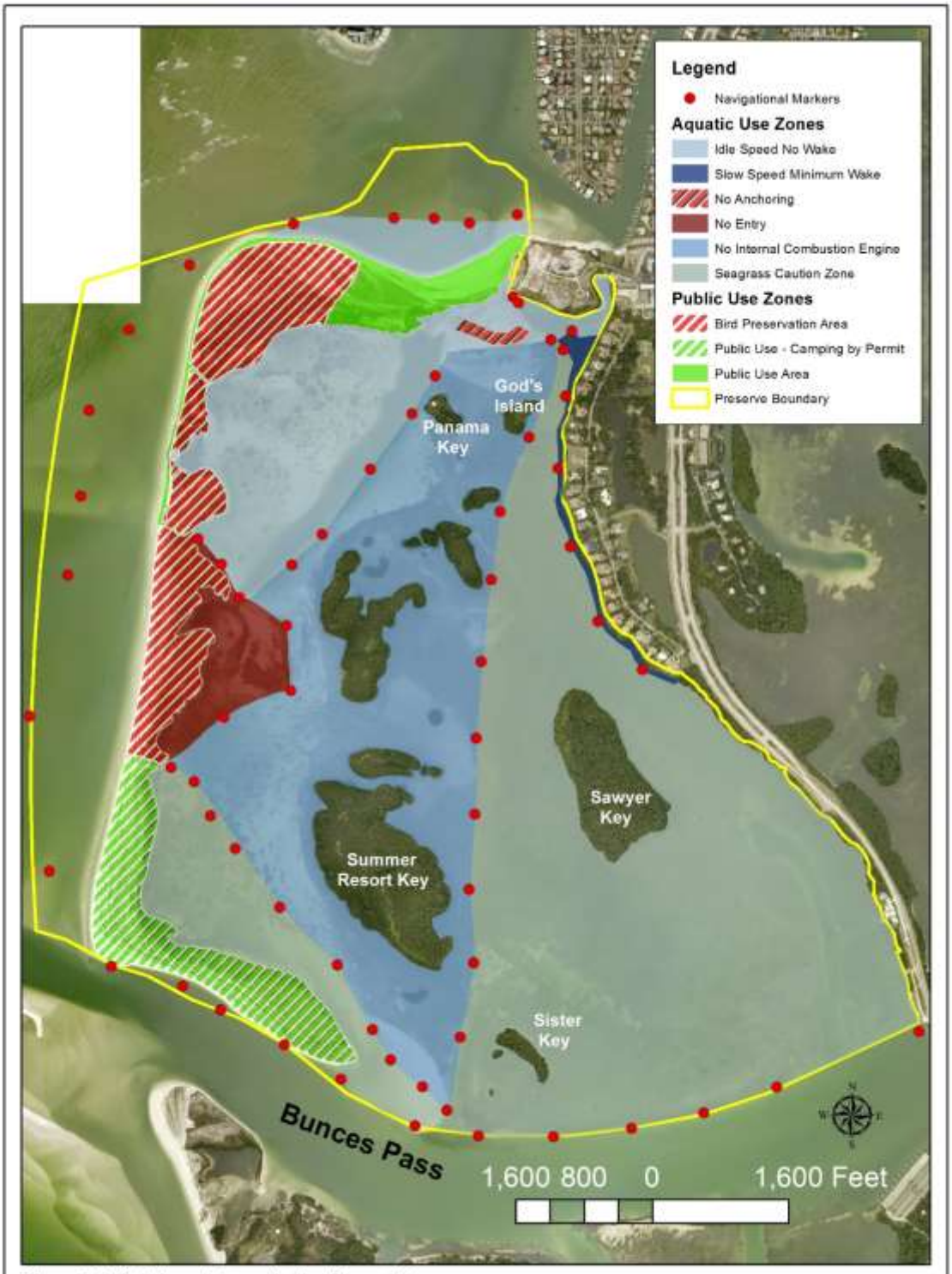

Figure 22. Public and Aquatic Use Zones Map

Aquatic Use Zones

Aquatic use zones were established in the 2000 Shell Key Preserve Management Plan and revised in the 2007 Plan update (Figure 22). The changes made in 2007 included posting the boundary of the Preserve and changing the Slow Speed, Minimum wake zone on the eastern portion of the island to Idle Speed No Wake. The zones were posted in 2002 and are maintained by Pinellas County, Department of Public Works, Environmental Management Division.

The Seagrass Caution zone, shallow waters with thick seagrasses, was established to minimize impacts to the seagrass beds. This is the only non-regulated zone in the Preserve. However, operating a vessel outside a lawfully marked channel in a careless manner that causes seagrass scarring within an aquatic preserve can result in a fine (F.S. 253.04)

The No Internal Combustion Motors zone was also established to minimize impacts to seagrass beds. This area has thick seagrasses but the waters are much shallower. At low tides the grasses and bottom are exposed. Vessels entering this zone must either use an electric trolling motor or push pole.

The No Entry zone is very shallow waters and mudflats that are exposed at low tide. This is a zone of sparse vegetation and is a rich feeding area for wading birds and shorebirds. This designation provides protection to the wildlife from all human disturbances.

The Idle Speed No Wake zone was established to maximize safe boating and swimming in the waters near the island. Vessels must be operated at a speed no greater than that which is necessary to maintain steerage and headway. The vessel must not produce a wake at this speed.

The Slow Speed, Minimum Wake zone was established along the northeastern most channel to maximize safe boating. Vessels must be fully off plane and completely settled in the water and with no elevation of the bow. Any wake created by a vessel must be minimal (very small).

Pinellas County Public Works Environmental Management mapped and analyzed severity of seagrass scaring created by boat propellers in the Preserve for three time periods (Figure 23). The analysis includes the total length of the scars mapped in the Preserve. The maps in Figure 23 show a reduction in the areas affected by propeller scarring from 2008 to 2016. The total length of scarring was reduced by 199,779 ft. from 2008 to 2014 and again by 33,537 ft. in 2016. This suggests not only a reduction of scarring, but also healing of previous scars over time.

Pinellas County will continue to evaluate the effectiveness of existing aquatic use zones as the conditions of the Preserve change. PCR will work with the appropriate agencies to update designated zones. Proposed changes include: 1) removing the historic No Anchoring Zone in the north portion of the Preserve; 2) relocating the northern edge of the No Internal Combustion Engine Zone southward to make the small, natural channel available to boaters; and 3) establishing an Idle Speed No Wake zone within the newly-formed pass near the middle of the island. . ELU will continue to enforce the aquatic use zones in the Preserve.

Goal A2: As needed, update regulatory zones and maintain signs that identify designated areas within the Preserve.

Seagrass Prop Scar Comparative Analysis 2008 vs 2014 vs 2016
Shell Key Preserve, Florida

Figure 23. Seagrass Prop Scar Comparative Analysis Map

Shuttle Operators

Commercial shuttles and charter boats bring many visitors to Shell Key. Opportunities for bird-watching, nature studies, and ecotourism are excellent. PCR staff has met with and encourages shuttle operators to promote to their patrons understanding of the need to protect the natural resources of the Preserve. PCR provides boxes of the *Shell Key Preserve Visitors Guide* brochure (Appendix 18) at no cost to the operators to distribute to their customers. Operators also provide assistance in transporting volunteers for island clean-ups and beach nesting bird survey.

Goal A3: As needed, meet with commercial shuttle operator partners to ensure visitors are encouraged to enjoy resource-based recreational opportunities compatible with the conservation and protection of the Preserve.

Signs

Signs are posted throughout the Preserve to clearly identify the Preserve boundary, regulatory zones and the rules of the Preserve. Pinellas County Code of Ordinances Chapter 90 provides rules and regulations that control the public's use of Pinellas County Parks, Preserves and Management Areas (Appendix 8). In the event of changes to Chapter 90 rules that are applicable to Shell Key, PCR will update the signs. PCR will continue to maintain signage posted on Shell Key, including boundary signs at the land bridge that has formed in the northeast tip. PCR and PCSO will continue to coordinate with Department of Public Works, Environmental Management Division, to ensure the aquatic use zones are posted. PCR will collaborate with interested volunteer groups and camping support groups to enhance the design of rule signs such that they continue to support enforcement efforts, as well as to design and deploy associated informational signs to enhance the experience of visitors. Maintenance of all signs is important to visitor safety as well as the protection of the natural resources.

Goal: A4: As needed, maintain or enhance signs that describe the rules of the Preserve in a clear and informative manner.

Signs are posted throughout the Preserve to assist with enforcement of the rules. PCSO will continue to be contracted, as funding allows, to provide enforcement of rules and regulations in the Preserve.

Goal A5: On an ongoing basis, support PCSO law enforcement officers in their efforts to enforce the rules of the Preserve.

B. Public Use

The majority of human activities at Shell Key include swimming, sunbathing, picnicking, shelling, and birding. Boating and fishing are also popular activities in the waters around Shell Key. Other activities in the Preserve include the use of personal watercraft and airboats. There are no sanitary or visitor support services, including lifeguards, provided on Shell Key. All visitors are expected to practice a "leave no trace" ethic and remove all trash upon leaving the Preserve.

In order to provide an enjoyable experience for all user groups, the following are prohibited in the Preserve, including but not limited to: alcoholic beverages; pets; nudity; use of gasoline-powered generators; littering; fireworks; removal of live animals from the beach (sea turtles, sand dollars, conchs, starfish etc.); removing, damaging or defacing trees, shrubs or any plants; feeding or harassing wildlife, and excessive noise. These rules will continue to be enforced unless otherwise amended.

Objective: Provide opportunities for resource-based recreational use of Shell Key Preserve where compatible with the conservation and protection of the natural and cultural resources.

Camping

PCR enforces a "leave no trace" camping ethic at all times from visitors to the Preserve. Camping and all campfires are restricted to the southern Public Use Area of the island (Figure 22). Campfires or any open burning of any kind are prohibited from May through September to limit disturbance to nesting sea turtles and is consistent with Chapter 62B-55.005, FAC. All overnight uses require a camping permit (Appendix 19) that can be obtained online at http://www.pinellascounty.org/forms/shell-camp.htm or at the Fort De Soto Park Administration office. Each group or person that receives a permit must agree beforehand electronically or in writing to comply with all rules pertaining to the Preserve. Each permit holder indicates the number of campers in their party and the dates of arrival and departure from Shell Key. Holders of camping permits are held responsible for all members of the camping party. Campers are required to bring, use, and remove portable toilets.

Camping permits have been required since May 2008. Table 8 shows the total number of permits issued and guests each year for the full years 2009 through 2016. The total number of permits and guests increased over time.

Table 8. Total Number of Camping Permits and Guests per Year, 2009 through 2016.

Year	Number of Permits/Year	Number of Total Guests/Year
2009	230	1608
2010	274	2056
2011	619	3620
2012	777	4300
2013	790	4189
2014	857	4906
2015	1031	4776
2016	1107	5478

Table 9 shows the average number of permits and guests per month for the full years 2009 through 2016. The months of March, April and May have the greatest average numbers of permits and guests.

Table 9. Average Number of Camping Permits and Guests per Month, 2009 through 2016.

Month	Average # of Permits/Month	Average # Total Guests/Month
January	37	146
February	47	226
March	104	536
April	98	590
May	99	640
June	43	214
July	44	261
August	29	172
September	27	135
October	54	292
November	66	347
December	62	295

PCR will continue to offer camping by permit. Permits are free at this time, but beginning in FY2019, PCR will charge a fee. Permits will be issued through the registration software being implemented for other fee-based transactions that are administered by PCR. The amount of the fee will be determined and included as part of the FY2019 fee schedule in the PCR budget proposal. Permits will be controlled based on either the daily expected number of campers or the total number of permits. The number of permits issued may be adjusted seasonally to reduce human disturbances to nesting shorebirds and sea turtles. Should human disturbances associated with camping adversely affect nesting shorebirds, sea turtles, and/or native flora, PCR reserves the right to suspend camping permits. Permits will continue to provide campers with information about Shell Key Preserve and the rules for its use.

Goal B1: In FY2019, establish fee-based camping permits.

Shell Key Preserve is a sensitive environmental area that deserves public vigilance and care. The privilege of camping carries the responsibility that campers remove all refuse, waste and trash. Staff will evaluate compliance through law enforcement data and the amount of refuse, waste and trash left on the island.

Goal B2: As needed, support efforts to coordinate volunteers to conduct periodic clean-ups at Shell Key, especially in the designated camping area.

Liveaboard Vessels

Liveaboard vessels may not moor within the Preserve for an extended period of time. ELU has enforced Chapter 90 that prohibits vessels moored within the Preserve for more than 14 days in any 30-day period. These vessels can cause environmental damage by mooring in one place for

an extended time, including sanitation issues and seagrass scarring. All vessels are prohibited from discharging waste within Preserve boundaries at any time.

PCR will continue to prohibit liveaboard vessels moored in the Preserve for more than 14 days in any 30-day period. This excludes vessels at permitted docks within the Preserve boundary.

Goal B3: As needed, support efforts by PCSO to prohibit liveaboard vessels from mooring in the Preserve for more than 14 days.

Special Event Permits

Permits are required for the following activities: scientific research; group nature activities in restricted areas not open to the public; commercial photography, television broadcasting, weddings and any activity involving special settings; all group activities involving 50 or more persons; concessions or vendors operating within the Preserve; exhibits, displays, signs and distribution of printed matter. PCR reserves the right to refuse to issue a permit if the activities are incompatible with the State-mandated goal of protection of the natural resources, such as during known nesting periods of birds and sea turtles. All concessions, leases, licenses or permits must be obtained from PCR. PCR issued one 30-day license agreement for food vending in the Preserve in 2008. No other concession leases, licenses or permits has been requested.

Goal B4: As needed, administer special event permits for the Preserve.

SECTION 5. OUTREACH AND EDUCATION

Outreach and education promote awareness and understanding of the importance of protecting the Preserve. While working in the Preserve, ELU officers, PCR staff members, and volunteers often find opportunities for an "educational moment" with visitors. After hearing explanations from staff and volunteers of the unintended ecological effects of intrusions into sensitive areas or other disturbances, most visitors are apologetic and understanding. Should additional resources become available, opportunities for additional outreach could be targeted to local communities as well as recreational user groups. PCR recognizes that Tampa Bay Watch, located adjacent to the Preserve, provides important environmental outreach and educational opportunities that benefit the Preserve.

Objective: Provide education and outreach programs describing the ecology of coastal ecosystems and the benefits of preserving and enhancing these natural resources.

Salty Topics Marine Research Speaker Series

The University of Florida, Institute of Food and Agricultural Sciences (IFAS), Florida Sea Grant Agent provides education for the Preserve through the Salty Topics program hosted at the PCR managed Weedon Island Preserve Cultural and Natural History Center. The program brings marine research scientists to a public forum. Tampa Bay is home to many universities, government, and non-government agencies at the forefront of marine research. Each series consists of 6 to 8 lectures; the Agent teaches one seminar per year and schedules expert speakers for the other sessions. The Agent utilizes Turning Point Technology to conduct pre/posts tests to establish a baseline of audience knowledge and assess knowledge gain post presentation. To date, there have been six series of Salty Topics, with a total of 32 lectures and 891 attendees.

- Ninety percent (90%) of participants reported significant knowledge gain as a result of participation at Salty Topics seminars (60% much, 30% moderate).

- Of the attendees at the Salty Topics speaker series, 44% are college students. The Agent coordinated with college professors from: Eckerd College; St. Petersburg College; University of South Florida St. Petersburg; University of South Florida Tampa; and University of Tampa, for students to attain extra credit hours for attending the scientific seminars.

- Participants were introduced to cutting edge technology and societal issues such as climate change impacts through the marine programming.

Environmental Enhancement & Restoration Programs

The environmental enhancement and restoration programs offered by the Agent provide community members, high school interns and visiting college student groups with experiential service learning opportunities that increase knowledge. Programs build hands-on skills, such as plant and animal identification and the use of field equipment. In turn, volunteers help Extension programs conduct beneficial projects and impactful programs not otherwise possible. The Agent teaches restoration programs including marine debris removal, crab trap cleanups and invasive

species removal in coastal habitats. While not all of these projects occurred in the Preserve, first-hand experience with marine issues allowed participants an opportunity to modify their behavior and to minimize negative human-induced impacts to the environment.

- The Agent coordinated 13 coastal cleanups from 2011-2016, approximately 2 per year, with 213 volunteers donating 639 hours. In total, 7 miles of shoreline were cleared of marine debris totaling 50 bags equaling approximately 1,250 pounds. Volunteers included representatives from the U.S. Coast Guard, the Lakota Nation, employees of Raymond James financial, community members, and college students.

- Students from The Ohio State University (OSU) learn about Florida's natural and coastal resources and environmental issues with the Agent each winter in a week-long service-learning program. From 2010 through 2016, 62 students from OSU have participated and contributed 2,480 hours with the Agent: 900 hours of invasive plant removal (Brazilian pepper, Australian-pine, air potato, rosary pea; approximately 36 acres treated); 250 hours of coastal cleanups (approximately 8 miles cleaned up), 1330 hours of other projects including endangered species sign installation, oyster reef creation, trail maintenance, and youth education programs at county parks and preserves. Through pre/post-tests, OSU students verified increased knowledge of natural resource issues. Students reported increased likelihood to volunteer with an environmental organization (92%) and to organize a volunteer event to benefit the environment or community (71%) as a result of the program.

Volunteers, with increased knowledge and experience, will be likely to spread such knowledge to fellow residents resulting in potential secondary benefits. A healthier marine environment should result in more enjoyable recreational opportunities for residents and visitors, and in turn, benefits to the local economy.

Goal 1: As resources allow, provide outreach and educational programs through the Florida Sea Grant Agent.

Shell Key Preserve Visitor Guide

The *Shell Key Preserve Visitor Guide* is a brochure that is distributed to visitors via the ELU, commercial shuttle transporters, Fort De Soto Park, and the PCR Administration office (Appendix 18). The brochure provides information about the rules of the Preserve, the importance of the BPA, and pertinent contact information. It also provides a map showing current public uses on the island and throughout the Preserve. This brochure is updated as rules or maps change.

PCR will continue to print the *Shell Key Preserve Visitor Guide* as resources allow. The brochure will be made available online and for distribution to visitors.

Goal 2: As needed, update Shell Key Preserve brochure and make available online; as resources allow, provide hardcopy brochures to shuttle operators, ELU, and County offices for distribution to visitors.

SECTION 6. BUDGET

Funding support for management of the Preserve is provided through PCR's general operating budget.

Funding Sources

The PCR operating budget covers salaries and all equipment, exotic vegetation management, education, equipment for posting signs and the BPA, safety and security of the Preserve. The equipment used to access the Preserve include boats, trailers and trucks. Additional funding may be available through grants and cooperative agreements.

Revenue Generation

There currently are no revenue sources generated by the Shell Key Preserve. PCR will establish a camping fee in FY2019. Revenue will contribute to Pinellas County's General Fund. An estimate of the revenue generated from the camping permit fees is provided in Table 10.

Table 10. Estimated revenue from camping fees 2019 – 2027 (amount in thousands of dollars).

2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
0	7	7	7	7	7	7	7	7	7

Annual Budget

The proposed budget for the Preserve from 2018 through 2026 is presented in Table 11. This budget represents an estimate of staff time, administrative costs and general operating costs. It is assumed that budgets in future years will not increase. There are currently no Capital Improvement Program projects scheduled at Shell Key Preserve.

	Table 11: Estimated Annual Budget for Shell Key Preserve (amount in thousands of dollars).								
	2018	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**
	Natural and Cultural Resources								
Natural and Cultural Resource Management Staff	112	112	112	112	112	112	112	112	112
	Outreach and Education								
Outreach and Education Staff and Brochures	10	10	10	10	10	10	10	10	10
	Safety and Security								
Contract with PCSO	30	30	30	30	30	30	30	30	30
Additional PCSO support or Park Ranger	0	57	57	57	57	57	57	57	57
	Equipment								
Trucks, boats and trailers	18	18	18	18	18	18	18	18	18
	Signs and Posting Equipment								
Signs and Posting Equipment	3	3	3	3	3	3	3	3	3
	Contract Exotic Control and Maintenance								
Contractors	18	0	18	0	9	0	9	0	9
TOTALS	**191 K**	**230 K**	**248 K**	**230K**	**239 K**	**230 K**	**239 K**	**230 K**	**239K**