

2007 Shell Key Preserve Management Plan

Final Plan approved by:
Pinellas County Board of County Commissioners,
October 2, 2007
and
Florida Department of Environmental Protection,
Division of State Lands,
Acquisition and Restoration Council,
December 14, 2007



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**Shell Key Preserve Management Plan
Executive Summary
State of Florida Form**

Lead Agency: Pinellas County (Florida) Department of Environmental Management, Environmental Lands Division

Common Name of Property: Shell Key Preserve

Location: Pinellas County, Florida

Acreage Breakdown:

<i>Land Cover Classification</i>	<i>Acreage</i>
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%)
<i>TOTAL</i>	<i>1828</i>

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 Environmental Management, Environmental Lands Division; 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: Natural barrier island system, important shorebird colonies, extensive seagrass beds, intense recreational use

Archaeological/Historical: No known archaeological sites

Management Needs: Minimize human disturbances for nesting, wintering, and migratory shorebirds by (1) posting core protection areas, (2) removing mammalian predators from main island, (3) eradicating exotic vegetation and replacing with native species, (4) ensuring that the rules of the Preserve remain consistent with Pinellas County Ordinance 2-6, especially by the elimination of pets and alcohol from the islands and waterways, (5) restricting overnight camping on the main island, and (6) collecting long-term ecological data to assess management goals.

Acquisition Needs/Acreage: None

Surplus Lands/Acreage: None

Public Involvement: User-groups represented on Shell Key Advisory Group (SKAG), public stakeholders' meetings, Pinellas County Environmental Science Forum (ESF)

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INTRODUCTION

Shell Key Preserve is located in the Gulf of Mexico, immediately west of Tierra Verde in southern Pinellas County (Figure 1). It includes a barrier island, several mangrove islands, seagrass beds, and sandflats. Today's barrier island once consisted of several small unnamed keys that have since merged into one island now referred to as Shell Key for the purposes of this document. Many of the mangrove islands within Shell Key Preserve are named: e.g., God's Island, Panama Key, Sawyer Key, Summer Resort Key, and Sister Key (Figure 2). Numerous unnamed mangrove islands of various sizes also exist. The total size of the Preserve, including the barrier island and its waterways, is 1828 acres. The island 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 is dynamic, however, and its shape has changed dramatically over the years. Extensive seagrass beds lie to the east of Shell Key. Ingress to the island is usually by boat although it may be accessed occasionally by swimmers or waders at the north end during low tides.

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 Ft. DeSoto Park Aquatic Habitat Management Area (managed by Pinellas County as a seagrass protection area) and the regionally significant Ft. DeSoto County Park. 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) is included in Appendix 1.

Shell Key Preserve is managed by the Pinellas County Board of County Commissioners (BOCC) through the Department of Environmental Management (DEM), Environmental Lands Division (ELD). Pinellas County entered into Lease Agreement No. 4228 (Appendix 2) with the



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

SHELL KEY PRESERVE



Figure 2. Boundary of Shell Key Preserve, Pinellas County, Florida

Board of Trustees of the Internal Improvement Trust Fund of the State of Florida in December 2000. The Shell Key Preserve Management Plan was approved by the BOCC in March 2000 and by the Florida Department of Environmental Protection (DEP) in October 2000. Over the past six years, this Plan has proven to be a somewhat satisfactory tool for ecological and recreational management of the Preserve. Members of the ELD, the Pinellas County Sheriff's Office (PCSO), County volunteers, and numerous conservation agencies closely monitored the Preserve's natural resources and public use during the intervening years and compiled data on beach-nesting birds, exotic vegetation, ecological changes in the island, and impacts of recreation. ELD staff members evaluated these management and monitoring efforts for the 2007 update as provided in this document.

SECTION 1. GENERAL INFORMATION AND OBJECTIVES

Mission, Vision, and Values

Pinellas County Department of Environment Management Mission: Leadership dedicated to a sustainable natural and urban environment in Pinellas County for present and future generations.

Environmental Lands Division Mission: To provide sound stewardship to the County's wild lands and opportunities for the appreciation of their intrinsic value.

Environmental Lands Division Vision: Pinellas County Preserves and Management Areas are designated wild areas that will be managed for the conservation, protection, and enhancement of natural and cultural resources while allowing for sustainable passive public recreational uses that are compatible with approved management plans and applicable ordinances and laws.

Environmental Lands Division Values:

1. We provide environmental programs that have regional and national relevance.
2. We focus on ecological processes in our programs, plans, decisions, and partnerships.
3. We manage our ecological resources in an urban setting, maintaining their intrinsic value as wild lands while offering passive recreational opportunities compatible with this goal.
4. We expect the highest sense of professionalism among our staff and volunteers, especially in our interactions with citizens.

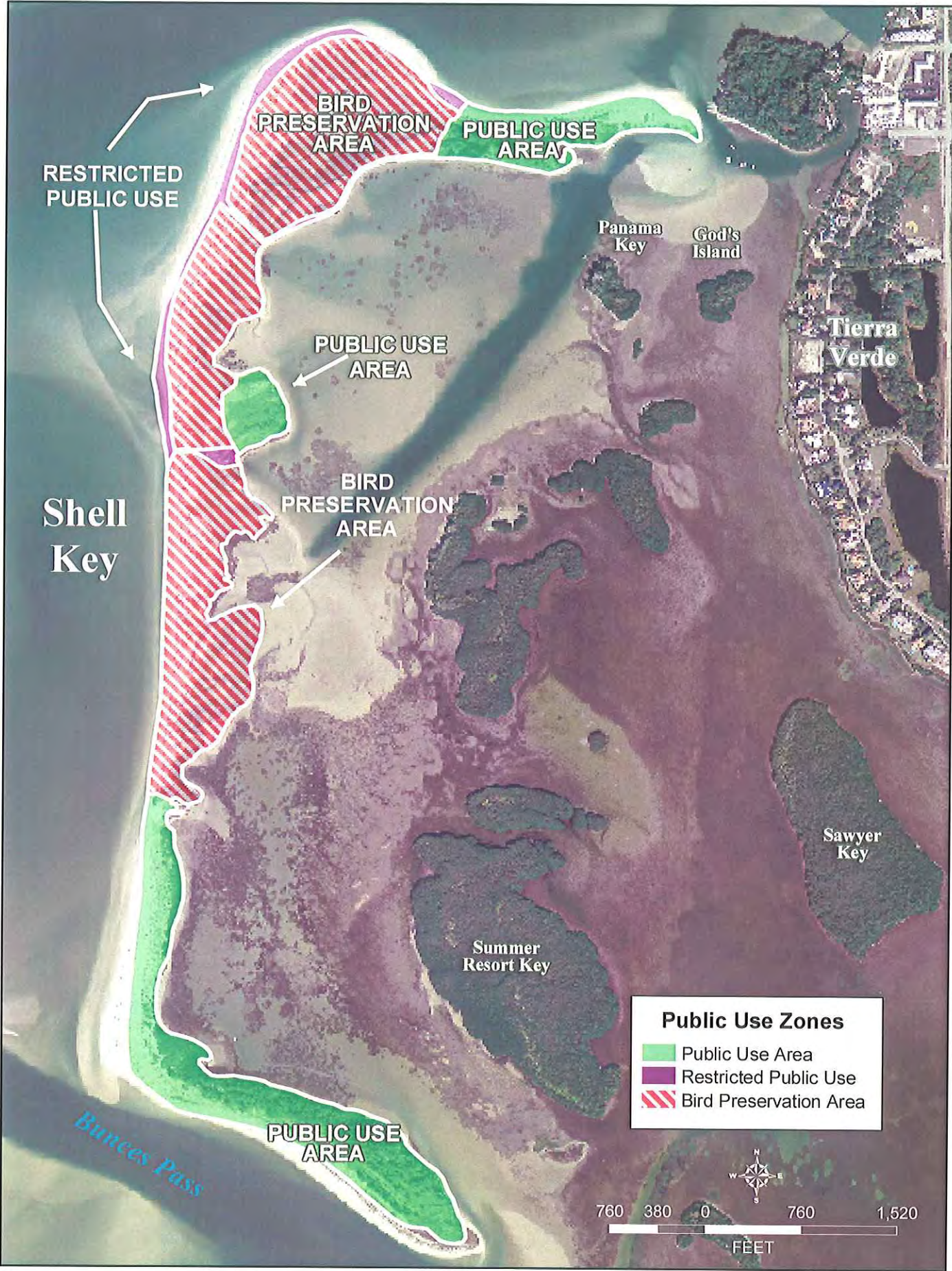
Background

The Preserve has been under the management of the ELD since December 2000. Prior to 2000, the Preserve did not exist *per se*. With the exception of limited law enforcement and local volunteer efforts, there was virtually no management oversight provided at 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 agencies such as the DEP, the Florida Fish and Wildlife Conservation Commission (FWC), and other user groups that included the St. Petersburg Audubon Society, Audubon of Florida, local businesses, recreational boaters, and other stakeholders was critical in the development and adoption of the Plan.

With the exception of avian data collected between 1992 and 2000 by volunteers for St. Petersburg Audubon Society and Audubon of Florida, few biological diversity data and public use data were available for the development of the Shell Key Preserve Management Plan.

As an undeveloped barrier island, Shell Key provides rare coastal habitat in Florida that is critical to the survival of certain wildlife species. Yet 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. The 2000 Plan recognized the need for resource-based public uses with a high level of sensitivity to the management of natural resources in the Preserve. Figure 3 delineates these uses and boundaries within the Preserve. With the exception of the Bird Preservation Area (BPA) on the island and the “No Entry Area” on the east side of the island, the public has had access to most areas within the Preserve. The BPA and “No Entry Area” are the core bird protection areas along the shoreline and in the water that are permanently posted against trespass. However, visitors have had restricted access in a public use area along the north and west side of

2000 PLAN



2007 PLAN

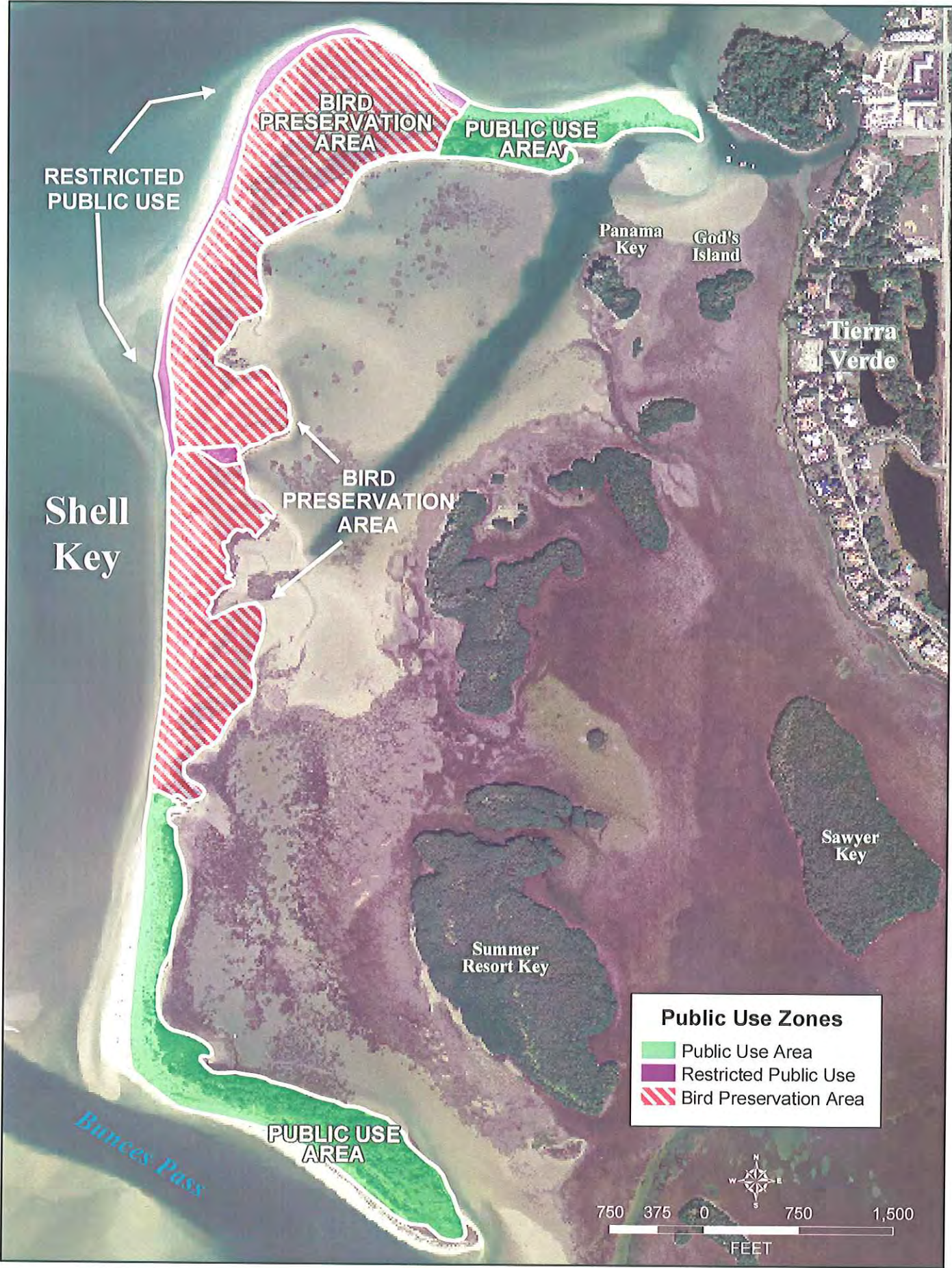


Figure 3. Public Use and Protected Areas in Shell Key Preserve

the BPA where camping and dogs have been prohibited. Two heavily used “Public Use Areas” supported nearly all of the popular public activities. Dogs were permitted in both “Public Use Areas” year round until the Plan was amended in 2002 to allow dogs in these areas only from 16 June to 14 April due to their harmful impacts on nesting and resting shorebirds.

As early as October 1994, DEM developed a contract with the Pinellas County Sheriff’s Office (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 Preserve Ordinance 2-6 and applicable state laws in and around Shell Key (as it has done since 2001). Initially, this unit included one sergeant and six deputies; but it was expanded in 2006 to nine deputies along with a sergeant due, in part, to increasing public pressure (and criminal behaviors) on the Preserve’s land and waterways. Due to County-wide budget reductions for FY08 (beginning October 2007), however, ELU will be reduced to seven deputies with support, when possible, from the PCSO Marine Unit and the FWC.

Ownership

Most of the land within Shell Key Preserve is in public ownership (Figure 4). 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 the management by Pinellas County. Purchased through local funds, the remaining public property belongs to Pinellas County. A few scattered, privately-held parcels exist within the Preserve boundary. Pinellas County continues to evaluate these for possible purchase. Ownership within the Preserve, by acreage and percent of its geographical area, is shown in Table 1.

SHELL KEY PRESERVE

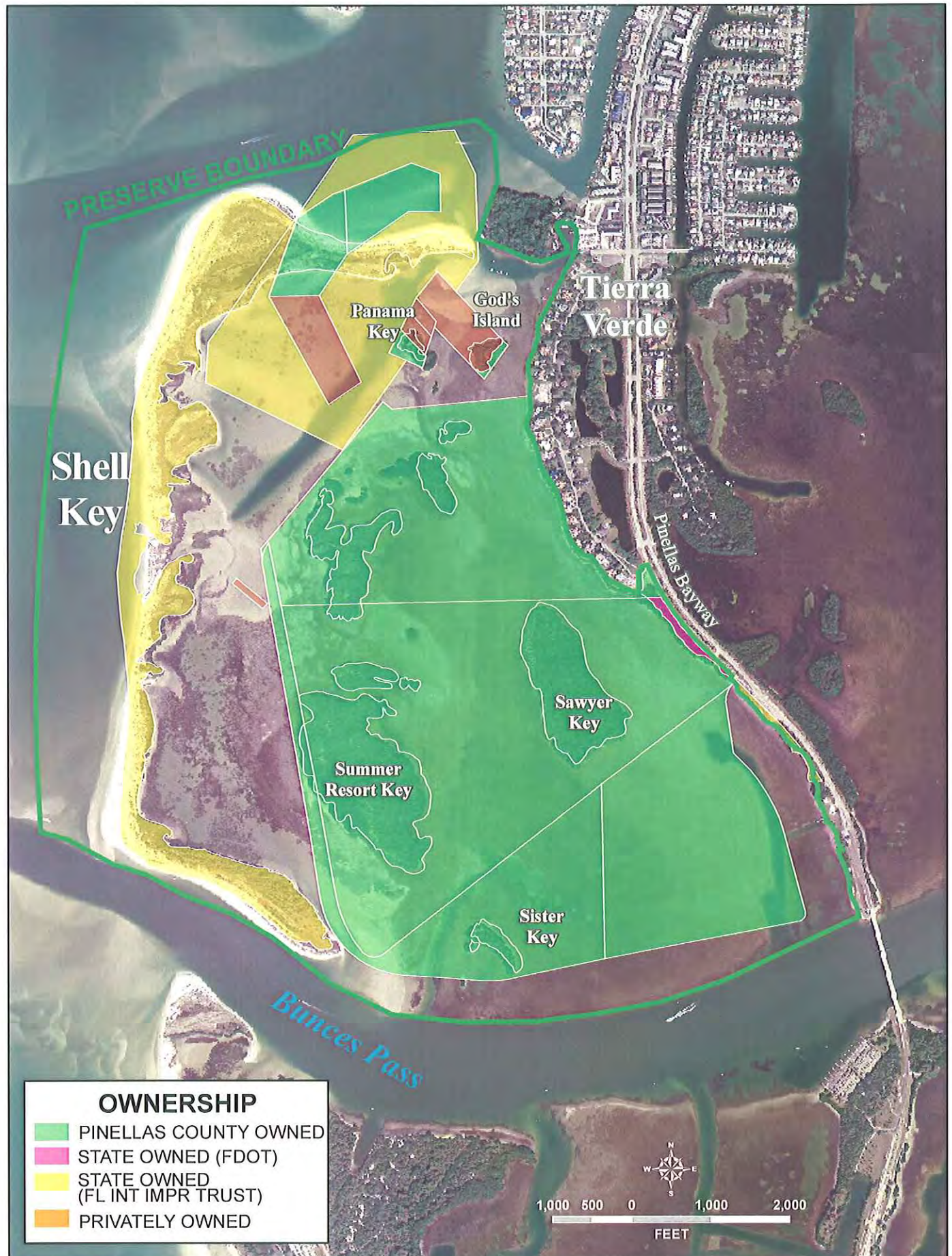


Figure 4. Property Ownership within Shell Key Preserve

Table 1. Property Ownerships at Shell Key Preserve

OWNERSHIP	ACRES	PERCENT
Pinellas County*	816.7	44.68%
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	35.7	1.95%
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 2.16% of the entire Preserve.

Non-Recreational Infrastructure

Within the Preserve itself, no development has been allowed except for a structure on Panama Key that houses the Pinellas Marine Institute, part of a contracted program in the Department of Juvenile Justice (Circuit VI). No other significant 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.

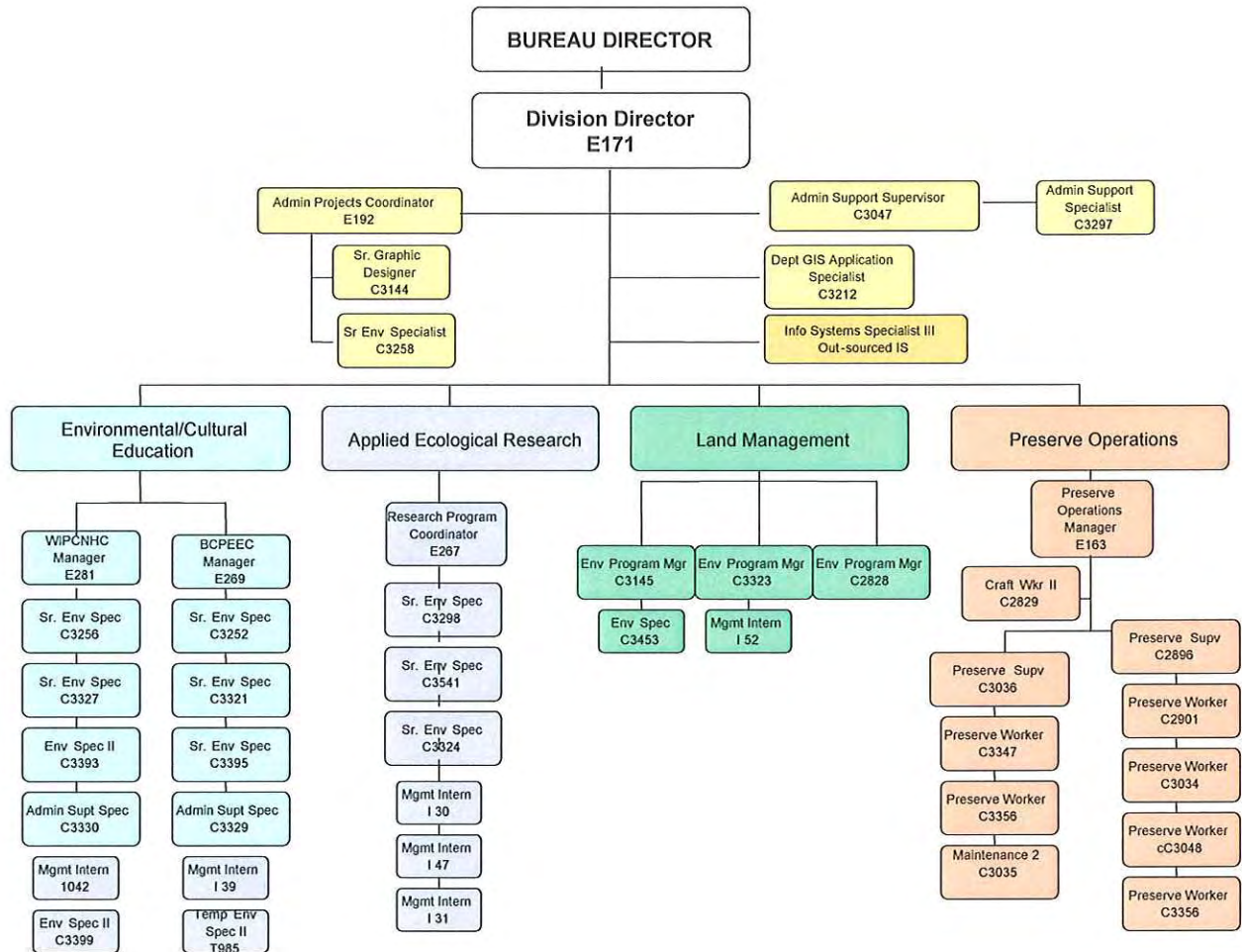
Archaeological and Cultural Resources

No known historical or archaeological resources have been located within the Preserve although a comprehensive survey of all the islands and waterways has not yet been conducted. Pinellas County will consult with the Florida Division of Historical Resources before any ground disturbances or actions that may adversely affect possible archaeological or historic resources.

Staffing

Figure 5 shows the ELD organizational chart. Management of the Preserve is the overall responsibility of the South County Land Manager under the supervision of the ELD Division Director and the DEM Bureau Director. Research and monitoring of the Preserve are the responsibilities of the ELD Research Program Director. The South Operations Preserve Supervisor, as directed by the ELD Operations Manager, provides all maintenance for exotic vegetation removal, sign replacement and reposting, and other support activities.

Figure 5. Environmental Lands Division Organizational Staffing (2007)



Volunteer Program

Since its beginning in 1998, the ELD has established a large volunteer base of nearly 400 active volunteers. Their work is coordinated through the administrative offices of the ELD with on-site coordination through various staff members. Historically, the St. Petersburg Audubon Society and Audubon of Florida provided local volunteer staffing and expertise at Shell Key Preserve under the aegis of ELD staff members for the installation of signage or barriers and for the monitoring of nesting shorebirds and wintering and migratory birds on the island. Most of these long-term volunteers are now active in the ELD volunteer program and work closely with the ELD's research and land management staff. The volunteers monitor migratory birds, assist with the staking and twining of boundaries, and provide outreach about shorebirds to visitors on busy summer holiday weekends. The ELD's operations and land management staff also work with volunteers who have provided hundreds of hours of service removing exotic vegetation, picking up trash, planting, and posting and moving the 175 signs on the island. As the island's ecology changes each year, the boundary signs of the BPA are moved to accommodate these changes. Of the ELD's 400 active volunteers, 166 individuals worked over 3700 hours between 2000 and mid-2007 for the management of the Preserve, a mark of exceptional service and conservation spirit (Table 2).

Easements

No easements exist within the boundaries of Shell Key Preserve.

Table 2. Environmental Lands Division Volunteer Hours at Shell Key Preserve (October 2000 to May 2007)

VOLUNTEER GROUP	NUMBER OF HOURS
Birders*	1761.25
Twiners**	904.25
General Land Management	546.75
General Research	245.00
Clean-ups	213.50
Stewards***	40.00
TOTAL	3710.75

* Birders – Volunteers conduct bi-monthly wintering and migratory bird counts from October through February.

** Twiners – Beginning in early March, volunteers complete the BPA boundary delineations by tying twine from post to post; from mid-March through mid-August, they patrol the BPA every 11 days and replace twine as needed.

*** Stewards – On busy summer holiday weekends, beginning in 2006, these volunteers provide outreach to visitors about the natural history and ecology of shorebirds.

Adjacent Land Use

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 6). At the northeast end across a narrow channel, just outside the Preserve in Tierra Verde, lies Collany Island mostly designated as low residential and expected to be developed in the near future. Approximately 10 acres of commercial property are located east of Collany Island that includes a restaurant, a vehicle storage lot, and a multi-use development. North of this property are the 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 farther south is Ft. DeSoto 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 Shell Key island is the Gulf of Mexico.

East of the Preserve is State Route 679 that leads to Ft. DeSoto Park. Farther east are several islands that are part of the U. S. Fish and Wildlife Service's Pinellas National Wildlife Refuge. The Pinellas 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" zones (Figure 7).

Also east of the Preserve in Tierra Verde is Cabbage Key Management Area, which is managed by ELD (Figure 8). Cabbage Key is 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.

SHELL KEY PRESERVE

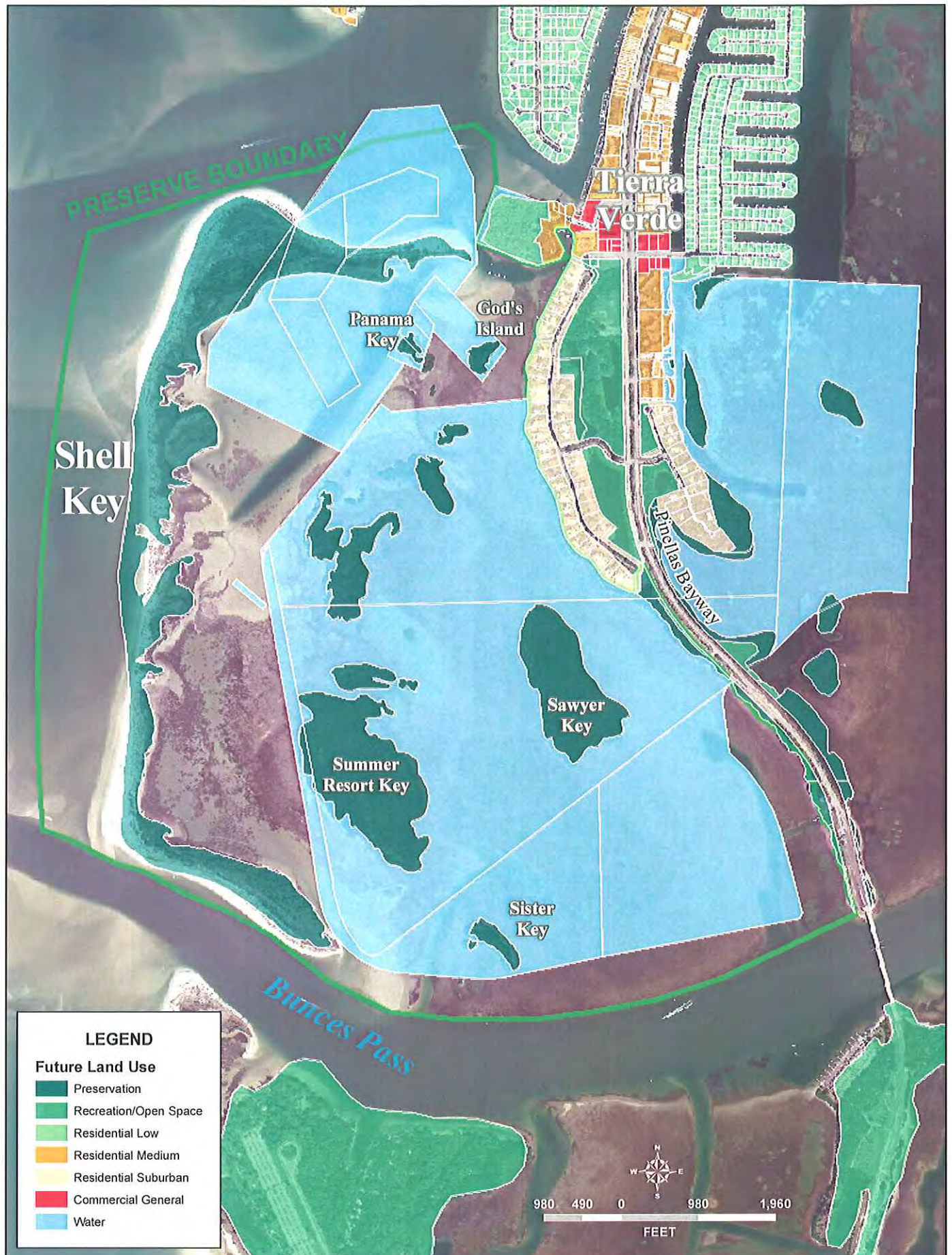


Figure 6. Future Land Uses within Shell Key Preserve

SHELL KEY- FT. DESOTO AREA

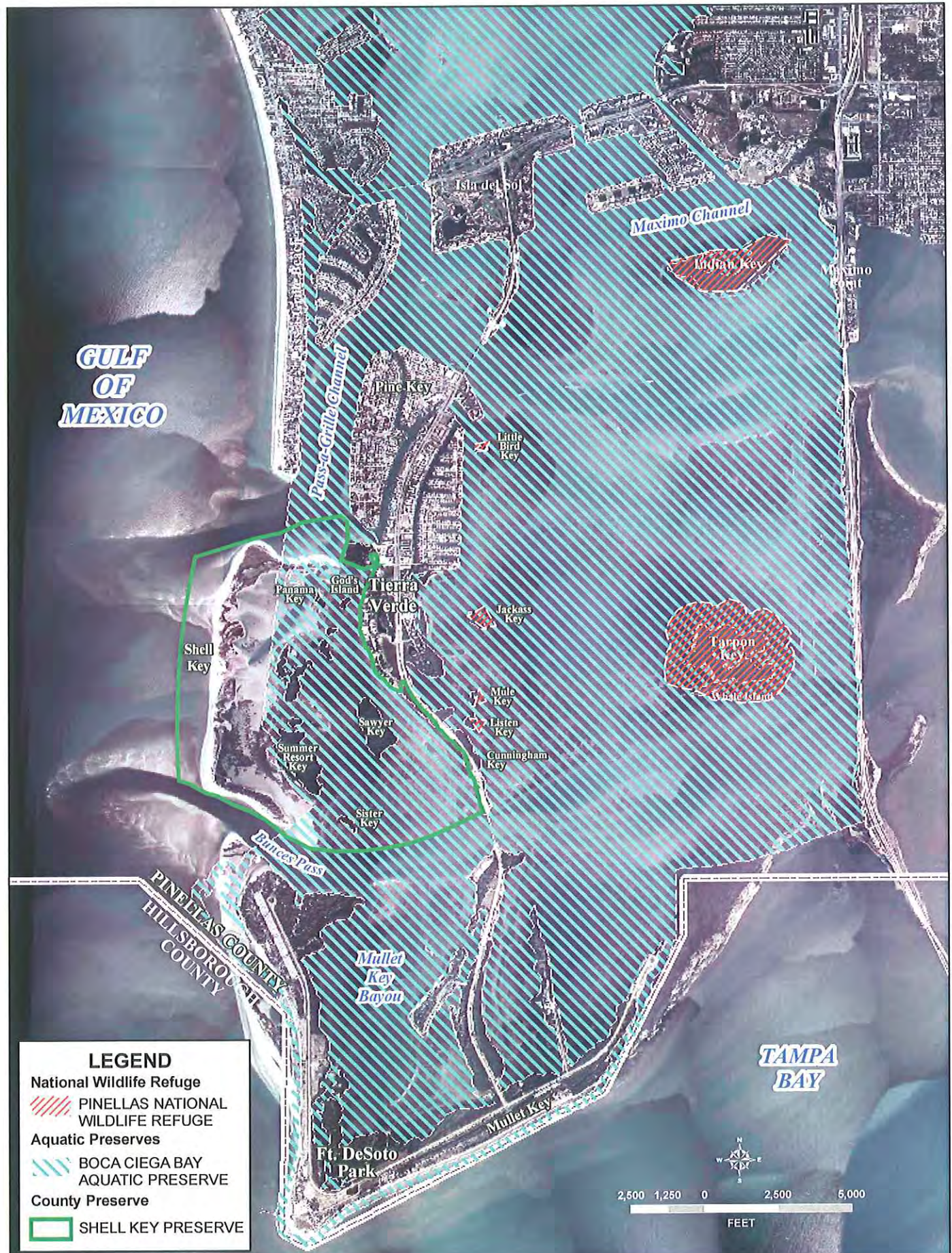


Figure 7. Significant Federal and Local Resources near Shell Key Preserve

CABBAGE KEY



Figure 8. Cabbage Key Management Area near Shell Key Preserve

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 ecology and sets forth specific management actions that will be implemented to meet management goals. Approval of the Plan by Pinellas County and the State of Florida does not supersede any prevailing status, rules, regulations, and ordinances of appropriate local, state or federal agencies.

State

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 five 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. Pinellas County leash laws shall be enforced on Shell Key.
5. Beach raking and mechanical cleaning activities shall be prohibited during shorebird nesting season and turtle nesting season.

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, Florida Statutes, Chapter 18-2, and Florida Administrative Code 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 2017. Should the Plan require changes prior to 2017, 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, Florida Statutes and Chapter 62B-33, Florida Administrative Code.

Most of the waters within the Preserve are designated as “Outstanding Florida Waters” pursuant to Chapter 62-302, Florida Administrative Code. Administered by the DEP, this program was created by Section 403.061, Florida Statutes to address water bodies that are “worthy of special protection because of their natural attributes.”

County

Pinellas County established Ordinance 2-6 to provide rules and regulations that control the public’s use of Pinellas County Preserves and Management Areas (Appendix 3). This ordinance is currently being edited, and subsequent changes must be approved by the Board of County Commissioners (BOCC). If approved by the BOCC, the amended ordinance will provide updated rules and regulations for the Preserve.

Further, the implementation of this Plan will assist with fulfilling the goals, objectives, and policies of the 1998 *Pinellas County Comprehensive Plan*. The elements targeted in the

Comprehensive Plan are the “Future Land Use Element,” the “Natural, Historical, and Cultural Resource Element,” the “Coastal Management Element,” and the “Recreation and Open Space Element” (Appendix 4). The goals, objectives, and policies in the “Future Land Use Element” state the Board of County Commissioners (BOCC) shall continue to pursue the acquisition of open space and environmentally sensitive areas and provide a balance between the natural environment and development. The goals, objectives, and policies of the “Natural, Historical, and Cultural Element” focus on the need to conserve, protect, restore and appropriately manage natural resources and continue the acquisition of open space and environmentally sensitive areas. This element also states 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. 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 *Comprehensive Plan* Evaluation Appraisal Report (EAR) based amendments is currently being updated. The proposed update to the EAR, which is due in October 2007, can be found at <http://www.pinellascounty.org/Plan/compplanupdate.htm>.

The BOCC Strategic Plan and Strategic Business Plans 2007-2012 was adopted in February 2006. This document provides BOCC direction on six strategic focus areas (SFA). The SFA that pertains to the Preserve is the “Environment, Open Space, Recreation, and Culture” (Appendix 5). This document indicates unequivocally that County residents favor the protection of natural resources and preserves. It also specifies that County government should provide passive access to natural areas, but avoid inappropriate encroachments into these areas.

Management Coordination

Shell Key Preserve is managed by Pinellas County in accordance with the lease agreement and DEP approval of this Plan. Conformance to all applicable Florida Statutes and Pinellas County laws and policies for public lands is included in this Plan. The FWC provides expertise for species management support within the Preserve. The St. Petersburg Audubon Society and Audubon of Florida currently assist with volunteer staffing and expertise to monitor the island. Pinellas County staff members regularly meet with representatives of federal, state, and local agencies to discuss the management of coastal natural resources. Regional meetings are held approximately three times per year and are attended by natural resource managers and other stakeholders. Management strategies and monitoring results are compared and discussed in an effort to coordinate regional management practices and to identify techniques and practices that support sound stewardship of natural resources. The PCSO's ELU is the primary agency for enforcement. When possible, other volunteer groups are solicited for assistance in managing the Preserve.

Pinellas County placed a great deal of emphasis on the involvement of numerous stakeholder groups in the redrafting of the 2007 Plan. Representatives of numerous user groups (i.e., boaters, campers, bird watchers, Tierra Verde residents, charter boat captains, recreational fisherman, and local environmentalists) were invited to participate in three Shell Key Preserve stakeholder meetings in early- to mid-2007. Participants developed a list of suggestions to be considered for the redrafting of the management plan. A new Shell Key Preserve Advisory Group was then established in accordance with 253.032(10) (b), Florida Statutes to provide final public input for the Plan. Appendix 6 lists all participants and provides minutes from the public hearing.

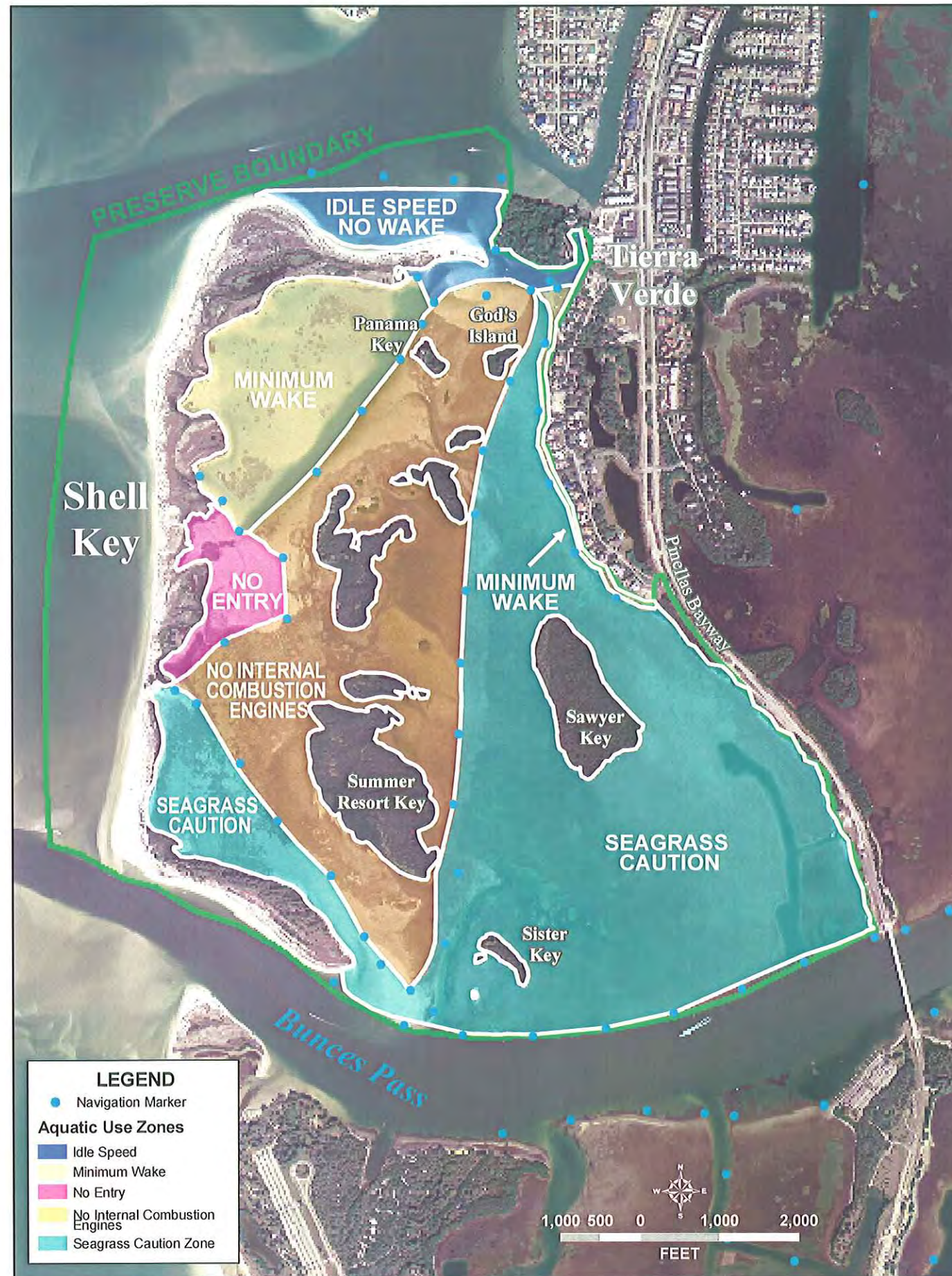
Long-Range Resource Target Conditions

Due to the dynamic nature of barrier islands, conditions change from year to year. These natural changes can affect the ecology, wildlife, and public uses within the Preserve. The presence of invasive exotic species, predominately Australian-pines (*Casuarina equisetifolia*) on the south end of Shell Key, alters natural beach and dune development, thereby impacting the biodiversity of this system. Consequently, the diligent removal of all invasive exotic species throughout the Preserve is expected to enrich the overall health of the islands and waterways.

Impacts to the seagrass beds within the Preserve are also a concern. These impacts include scars from boat propellers and unhealthy grasses due to high nutrient loads. The nutrients cause increased drift algae and epiphytic growth that limit sunlight penetration to the grass blades. According to the Florida Division of Motor Vehicles, over 56,400 boats were registered in Pinellas County in 2006. Boating pressure is great with potential to impact the ecology and wildlife in the Preserve¹. Aquatic use zones were established in 2000 (Figure 9) and posted in 2001 to help minimize impacts to the seagrass beds. An increase in drift algae and epiphytes was observed in 2005 when red tide was prevalent throughout Tampa Bay. Since a large portion of the Preserve is available to the boating public, reducing propeller scarring and nutrient loads that contribute to drift algae and epiphytes will likely provide for healthy seagrass beds in and around Shell Key.

¹ For example, during the Sundays of two consecutive Memorial Day Weekends, ELD staff members counted 466 boats in 2006 and over 530 in 2007.

2000 PLAN



2007 PLAN

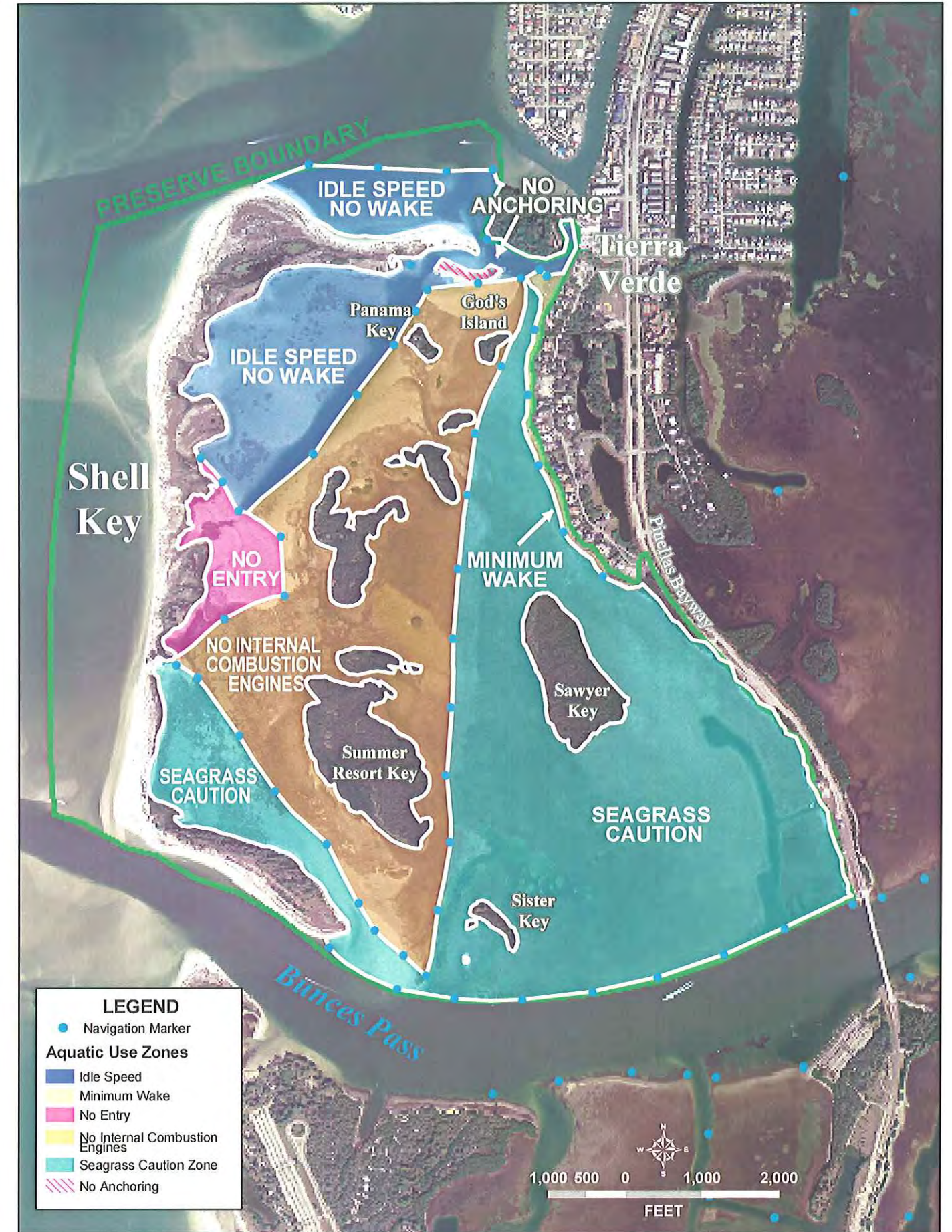


Figure 9. Aquatic Use Zones within Shell Key Preserve

Predators such as raccoons (*Procyon lotor*), fish crows (*Corvus ossifragus*), and laughing gulls (*Larus atricilla*) are a constant threat to nesting shorebirds. Trash left behind on the island encourages these predators to remain in the area. Management actions, such as posting signs, have inadvertently provided perches for predators near nesting birds. The removal of trash and the provision of predator deterrents are expected to discourage predators from frequenting the island.

Structural improvements within the Preserve are restricted to the minimum necessary for ensuring resource protection, enhancement, and sustainability while affording limited access, user safety, and compatible public uses. Thus, a hallmark of successful management of the Preserve's resources is the ongoing enhancement and protection of habitats for nesting, wintering, and resting migrant bird colonies on and around Shell Key.

Objectives

To achieve long-range target conditions, the County has determined the following management objectives:

1. To protect, restore and conserve all lands and waterways within the Preserve.
2. To minimize human disturbances to wintering, nesting and migrating shorebirds, and to continue posting the critical bird habitat within the core area as the barrier island changes.
3. To control invasive exotic flora and fauna aggressively.
4. To remove mammalian predators from the island.
5. To minimize the impacts of mammalian and avian predators on nesting shorebirds.

6. To map the island to track changes in wildlife habitats and the island's geomorphology.
7. To collect long-term ecological data to assess management goals (including those pertaining to wintering and nesting birds, seagrasses, and exotic species removal).
8. To utilize volunteers for monitoring programs, education and management of the Preserve.
9. To offer education outreach programs and interpretative signage that promote a better understanding of the Preserve.
10. To support passive public uses that are compatible with the conservation and protection of the Preserve.
11. To maximize the public's enjoyment of the island through ecological and family-friendly, resource-based recreational experiences.

SECTION 2. NATURAL RESOURCES

General

Shell Key Preserve does not possess any natural features *per se*. The uniqueness of this Preserve lies, however, in the fact that undeveloped barrier islands are extremely rare in Florida; especially so within Pinellas County. Ecological protection within the Preserve is paramount to support the biologically diverse species associated with Shell Key. The 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 6). In addition, the submerged lands within the Preserve are managed consistently with the laws and policies of the Fort DeSoto Aquatic Habitat Management Area where natural resource protection is the main objective and where public uses consistent with resource initiatives are also allowed.

Other significant land and water resources exist in the vicinity of the Preserve. To the south, visitors can enjoy Ft. DeSoto County Park and Ft. DeSoto Park Aquatic Management Area (Figure 7). 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 Shell Key Preserve. Such a concentration of preserves, parks, and management areas in the southern portion of Pinellas County makes this area popular both for its ecological and recreational values, thus mandating carefully crafted conservation strategies for the long-term balance between human and nonhuman needs.

Soils

Two types of soils (namely, Kesson and Beaches) are found within the Preserve (Figure 10), as determined by the *Soil Survey of Pinellas County, Florida* (U.S. Department of Agriculture, Natural Resources Conservation Service, 2003). Detailed descriptions of these two soil types are provided in Appendix 7. No known soil conservation or soil erosion issues occur within the Preserve. Shell Key has shifted in size, configuration and location over the years as is typical of barrier islands.

Plant Communities and Cover Types

Shell Key Preserve contains five distinct communities, as described by the Florida Natural Areas Inventory or FNAI (*Guide to the Natural Communities in Florida*, 1990), in addition to a few developed areas (Figure 11). 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 of the natural communities for Shell Key Preserve are provided below. Detailed FNAI descriptions of these natural communities are provided in Appendix 8. They are further subdivided into more detailed communities as discussed in Myers and Ewel (1990).² The descriptions from FNAI and codes of these habitat types are provided in Appendix 9.

Marine Tidal Marsh. 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.

² R.L. Myers and J.J. Ewel. (1990). *Ecosystems of Florida*. University of Central Florida Press, Orlando, FL.

SHELL KEY PRESERVE

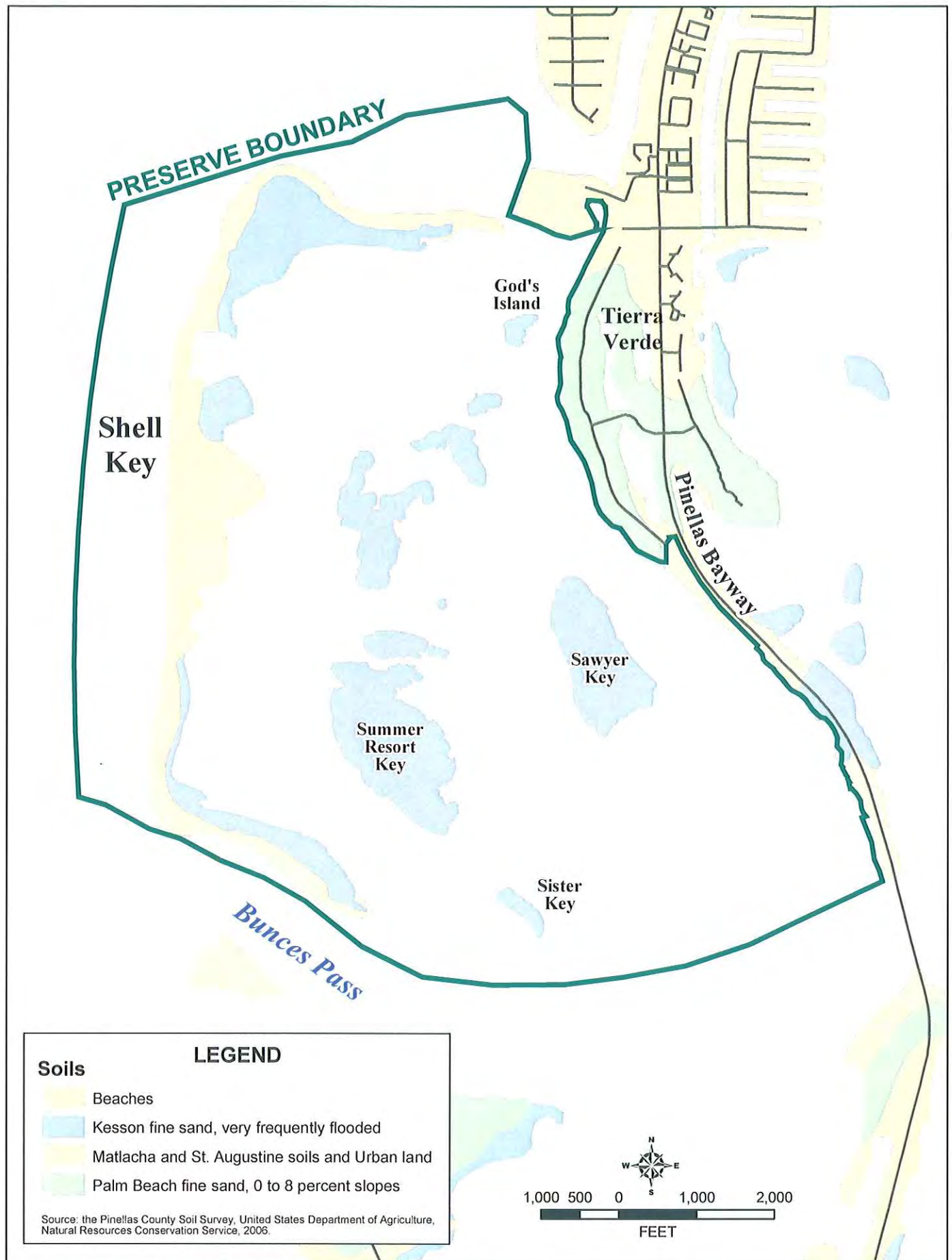


Figure 10. Soil Types in Shell Key Preserve

SHELL KEY PRESERVE

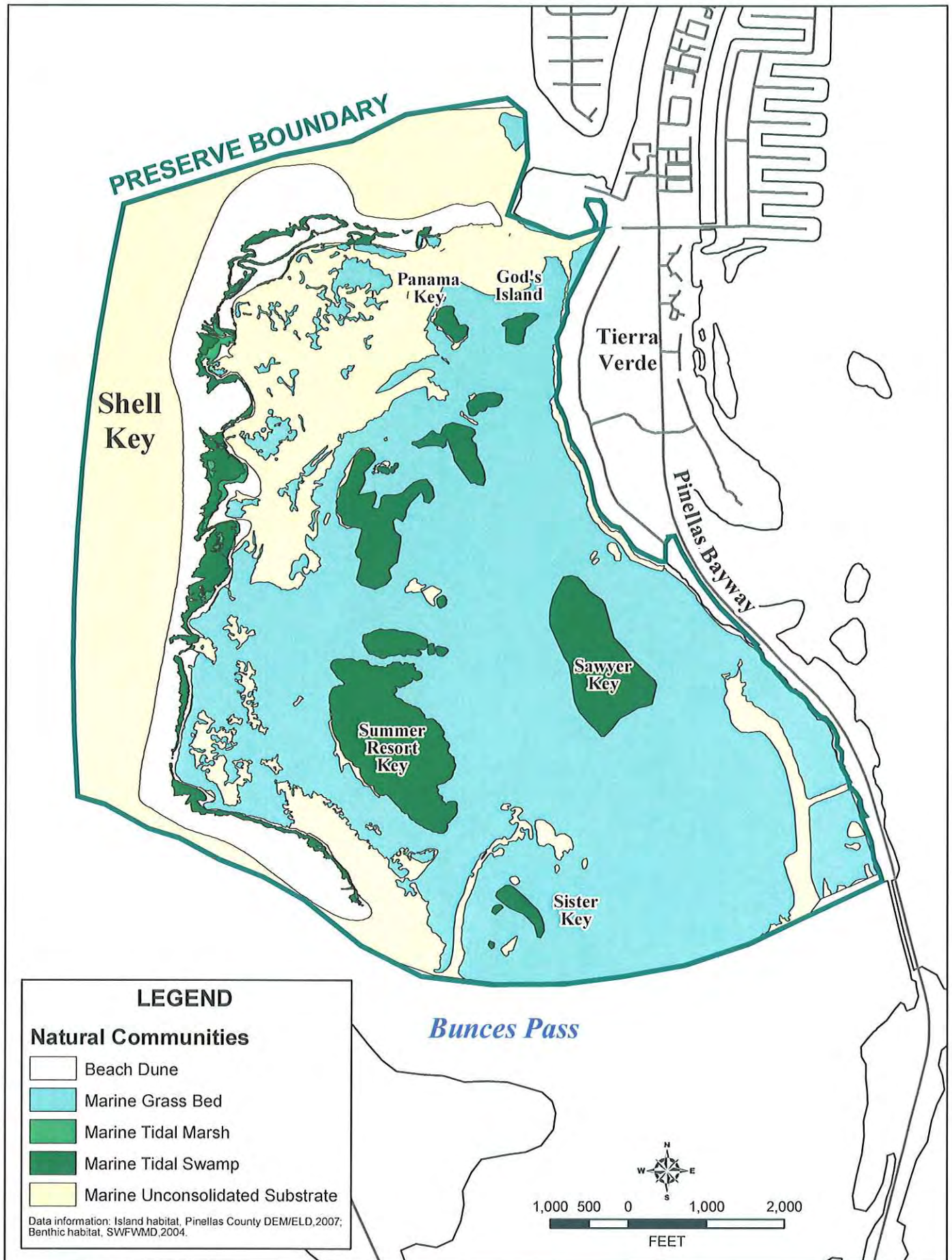


Figure 11. FNAI Communities in Shell Key Preserve

Marine Tidal Swamp. 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. 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 Australian-pines.

Marine Unconsolidated Substrate. This community type includes the subtidal, intertidal and supratidal beach habitat below the beach dune community. This is a zone of sparse vegetation but, similar to mudflats, it is a rich feeding zone for wading birds and shorebirds.

Marine Grass Bed. 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*) was 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. Aquatic use zones were established in 2000 (Figure 9) and posted in 2001 to help minimize impacts to the seagrass beds.

Developed. Some developed areas are located at the eastern and northern boundaries of the Preserve. At the northern end of the site, just south and east of Collany Island, is a dredged basin that connects to a dredged channel running along the eastern boundary of the Preserve. These dredged areas are likely to be altered permanently and, therefore, probably preclude the development of a completely natural system. Also, several commercial docks with numerous boats are located in a small basin to the north. In addition, the eastern boundary of the Preserve is bordered by single-family homes where some shoreline alteration has occurred and where there are a number of single-family private docks.

Habitat Mapping

The main island in Shell Key Preserve consists of diverse natural community types including coastal strand, foredune, upper beach, intertidal, swales, tidal marsh, tidal swamp, and overwash. To support management of the Preserve and to determine changes in the island over time, detailed mapping of habitats has been conducted annually since 2001. Ground-based surveys of the entire island are completed in the winter of each year using sub-meter accuracy GPS units. Results indicate a systematic, but spatially complex, arrangement of habitats across the island. Comparisons between survey dates reveal consistent transitions among habitat types that occur due to successional change (Figure 12, Table 3). For example, it is clear that the foredunes have steadily increased over time in certain locations (Figure 13). Results also indicate dramatic and extensive changes that result in response to storm-based disturbances (Table 3). These long-term data provide insight into the nature and rate of habitat change on the island, information that will be used to better manage and protect this natural resource.

Through annual habitat mapping and other surveys, ELD staff and volunteers have compiled a list of 90 species of plants observed on Shell Key since 2000 (Appendix 10). Two threatened species – erect prickly pear (*Opuntia stricta*) and inkberry (*Scaevola plumieri*) – are found on the island (Coile and Garland 2003).³

Of the 90 plant species, four are considered “Category I Pest Species” by the Florida Exotic Pest Plant Council: Australian-pine, carrotwood (*Cupaniopsis anacardioides*), half-flower (*Scaevola taccada* var. *sericea*) and Brazilian pepper (*Schinus terebinthifolius*). Efforts to remove them will continue aggressively.

³ N.C. Coile and M.A. Garland. (2003). *Notes on Florida's Endangered and Threatened Plants*. Florida Department of Agriculture and Consumer Services, Division of Plant Industry, Gainesville, FL. See <http://www.doacs.state.fl.us/pi/enpp/botany/images/Notes2003.pdf>.

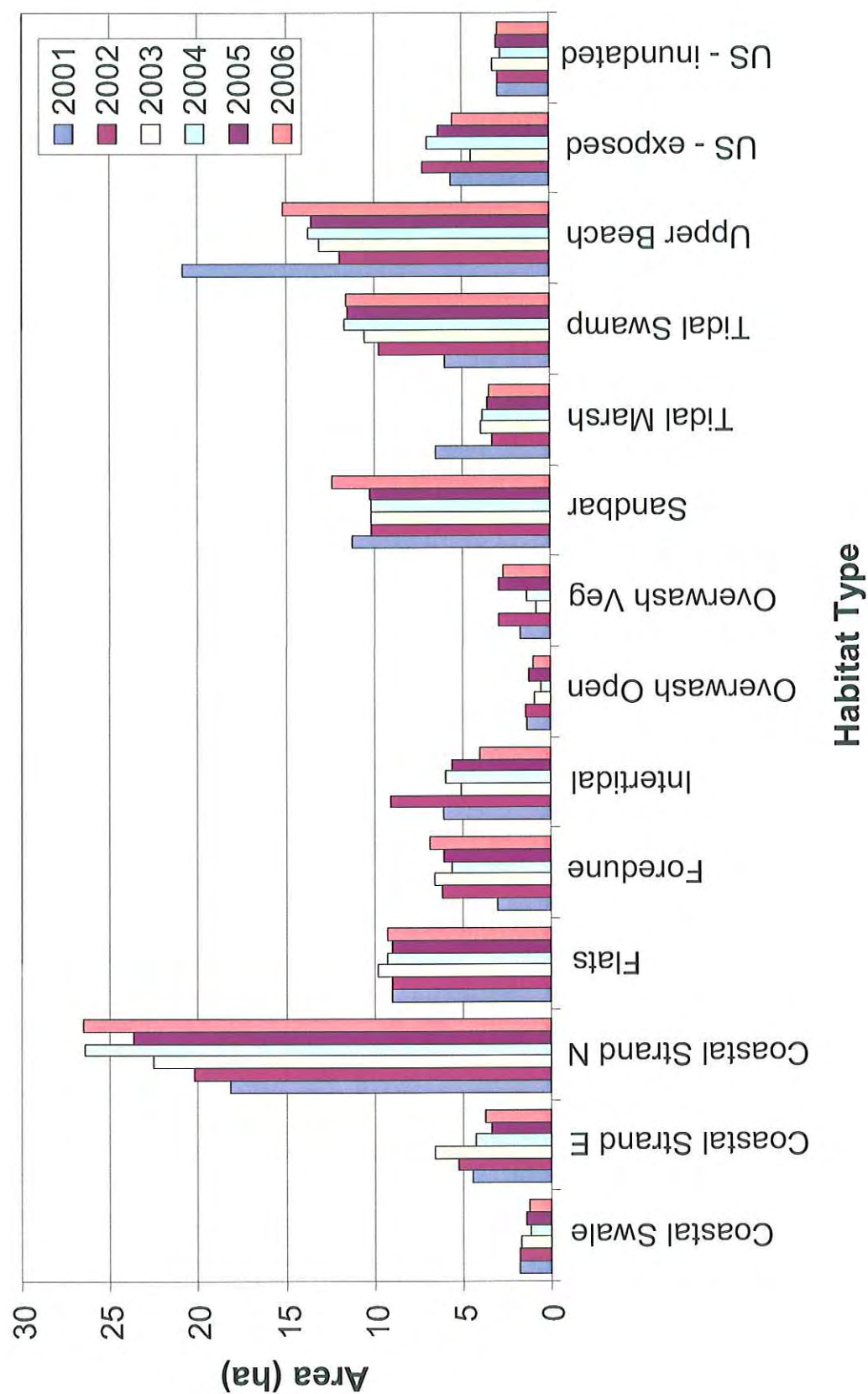


Figure 12. Area of 14 habitat types at Shell Key Preserve in six years.

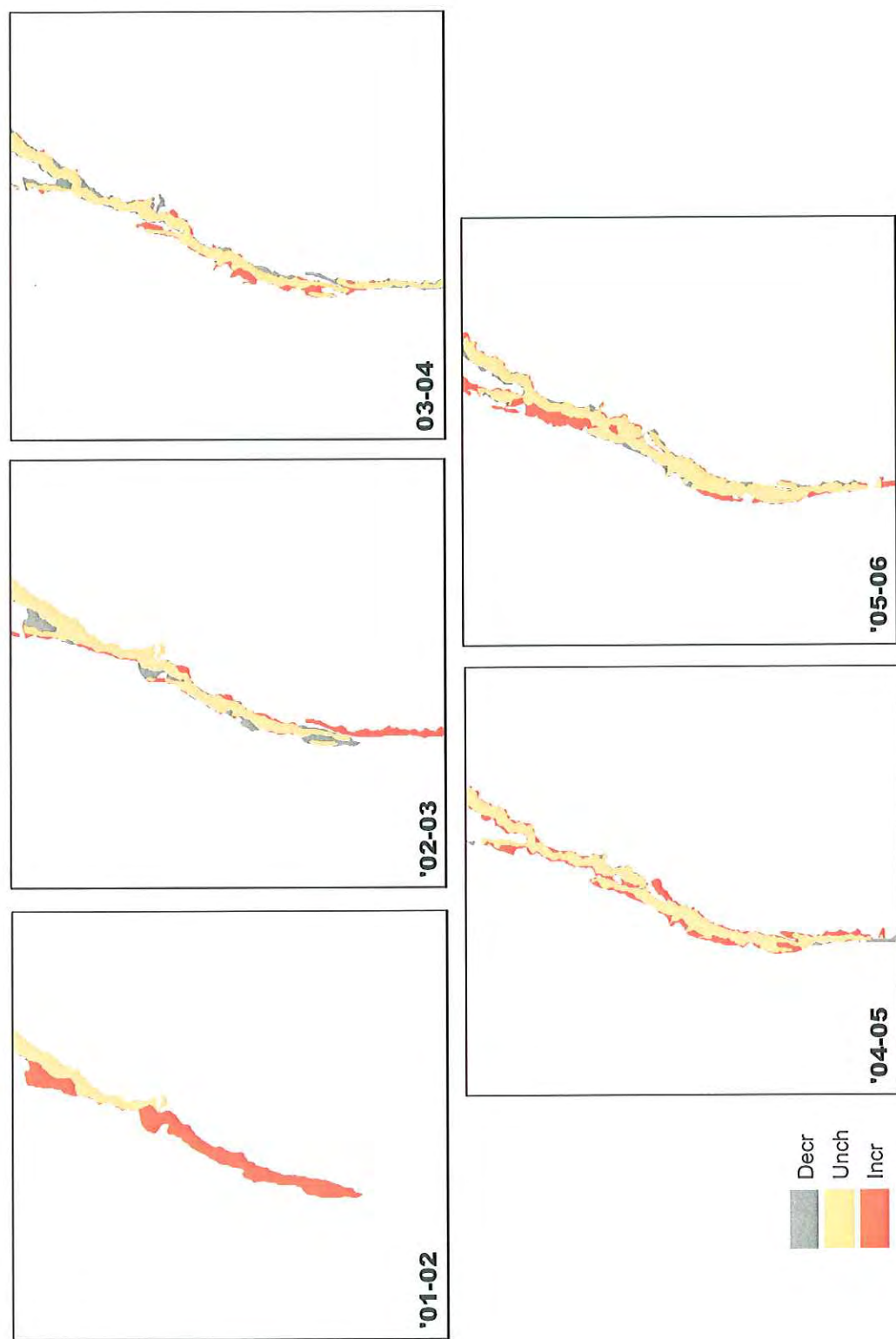


Figure 13. Changes between years of foredunes at the mid-section of Shell Key Preserve over six years. Areas labeled "Decr" transitioned from foredunes into another community type, those labeled "Unch" remained foredunes, and those labeled "Incr" transitioned into foredunes from another community type.

Table 3. Matrix of transitions among community types from one year (indicated in left column) to the subsequent year (indicated in top column). Values are the average percent change in aerial extent determined over six years. Values along the diagonal represent no change in community type.

To: From:	Coastal Swale	Coastal Strand E	Coastal Strand N	Flats	Foredune	Intertidal	Overwash Open	Overwash Veg	Sandbar	Tidal Marsh	Tidal Swamp	Upper Beach	US - exposed	US - inundated	Unclassified
Coastal Swale	79.8	0.0	16.7	0.0	0.1	0.0	0.0	0.4	0.0	0.5	2.3	0.1	0.0	0.1	0.0
Coastal Strand E	0.0	86.2	12.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0	0.0	0.0
Coastal Strand N	0.6	2.6	89.9	0.0	1.8	0.2	0.8	1.6	0.0	0.1	1.6	0.8	0.0	0.0	0.0
Flats	0.0	0.0	0.0	92.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	3.6	0.0	4.3
Foredune	0.0	0.0	7.4	0.0	82.9	0.3	0.2	1.3	0.0	0.0	0.1	7.8	0.0	0.0	0.0
Intertidal	0.0	0.0	0.9	0.0	0.0	48.8	0.1	0.0	0.0	0.3	0.7	27.4	0.1	0.0	21.6
Overwash Open	0.0	0.1	12.0	0.0	1.4	0.1	41.9	25.8	0.0	0.5	0.7	17.5	0.0	0.0	0.0
Overwash Veg	0.0	0.0	30.1	0.0	2.0	0.0	4.3	53.9	0.0	1.9	2.5	5.1	0.2	0.0	0.0
Sandbar	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	95.6	0.0	0.0	0.0	0.0	0.0	4.2
Tidal Marsh	0.1	0.0	0.7	0.0	0.0	0.2	0.0	0.0	0.0	74.6	21.3	0.1	2.5	0.5	0.1
Tidal Swamp	0.3	0.6	3.8	0.0	0.0	0.0	0.0	0.1	0.0	0.7	93.4	0.0	0.5	0.4	0.1
Upper Beach	0.1	0.2	8.1	0.0	8.4	6.4	1.7	2.7	0.0	0.0	0.2	71.3	0.0	0.0	1.0
US - exposed	0.0	0.0	0.2	6.4	0.0	0.1	0.1	0.9	0.0	6.7	1.5	0.0	77.0	1.3	5.8
US - inundated	0.0	0.0	0.1	0.0	0.0	0.5	0.0	0.0	0.0	1.3	2.6	0.0	0.5	95.0	0.0
Unclassified	0.1	0.0	0.0	9.3	0.0	45.2	0.0	0.0	11.5	0.9	0.1	10.5	22.4	0.0	0.0

Wildlife

Birds

Pinellas County staff and volunteers have monitored the birds of Shell Key Preserve annually since 2000. Regular surveys are conducted during fall/winter months and throughout the nesting season. For the fall/winter surveys, migrant and resident birds are censused along established routes every two weeks. To date, 117 species have been observed and over 169,000 individual birds counted. A complete list of bird species documented in the Preserve can be found in Appendix 10. Results indicate high variability in species richness and abundance both within and among years (Table 4). Observations indicate that mudflats are heavily utilized by a wide diversity of birds for feeding while intertidal, upper beach, and emergent sand bars are used for resting or loafing. This long-term monitoring effort has documented trends of regional and international significance, including the dramatic decline of red knots (*Calidris canutus*), a highly-imperiled species throughout its range (Figure 14a). It has also revealed less obvious trends, including a decline in willets (*Tringa semipalmata*) at Shell Key Preserve (Figure 14b).

Surveys during the nesting season of colonial and solitary nesting shorebirds are conducted at least weekly with all birds censused at least monthly. Surveys are conducted along established routes that span the main island, allowing comparisons to be made among years. Nesting species observed since 2000 include the black skimmer (*Rynchops niger*), least tern (*Sternula antillarum*), American oystercatcher (*Haematopus palliatus*), Wilson's plover (*Charadrius wilsonia*), and willet. Intrusions by raccoons, dogs, and humans have been surveyed regularly during the nesting season (Table 5). Results indicate that, while birds regularly attempt to nest (Figure 15), their reproductive success is highly variable among years (Table 6). Causes of nest failure include overwash and flooding during severe storms; disturbance by humans and dogs; and predation by raccoons, fish crows, laughing gulls, and

Table 4. Results of fall and winter surveys of birds conducted at Shell Key Preserve over seven seasons.

<i>Season</i>	<i>Dates</i>	<i>Routes</i>	<i>Individuals</i>	<i>Species</i>	<i>Avg Ind/Date</i>	<i>Avg Spp/Date</i>
Overall	72	213	185,250	116	$2,573 \pm 1,339$	44 ± 6
2000-01	11	33	29,653	84	$2,696 \pm 1,584$	44 ± 6
2001-02	10	30	33,761	82	$3,376 \pm 1,847$	48 ± 2
2002-03	13	39	35,087	92	$2,699 \pm 1,315$	44 ± 5
2003-04	8	23	22,115	76	$2,764 \pm 1,189$	47 ± 3
2004-05	10	26	18,162	89	$1,816 \pm 838$	44 ± 7
2005-06	10	31	21,583	82	$2,158 \pm 887$	43 ± 7
2006-07	10	31	24,889	71	$2,489 \pm 1,197$	39 ± 3

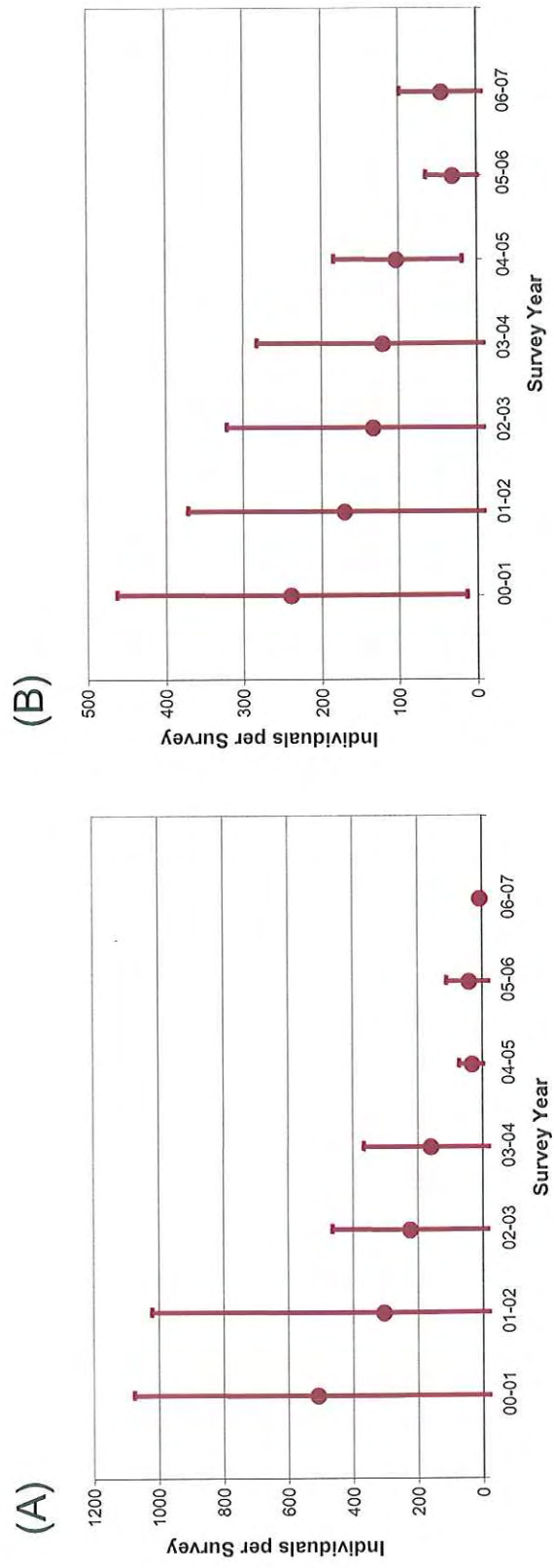


Figure 14. Average (± 1 SD) abundance of (A) Red Knots and (B) Willets at Shell Key Preserve during fall and winter surveys conducted over seven years.

Table 5. Number of intrusions by raccoons, dogs, and humans into restricted areas detected during the nesting season.

Year	Raccoons	Dogs	People
2001	52	--	72
2002	108	63	77
2003	290	82	176
2004	124	48	43
2005	29	36	112
2006	27	45	123
Total	630	274	603

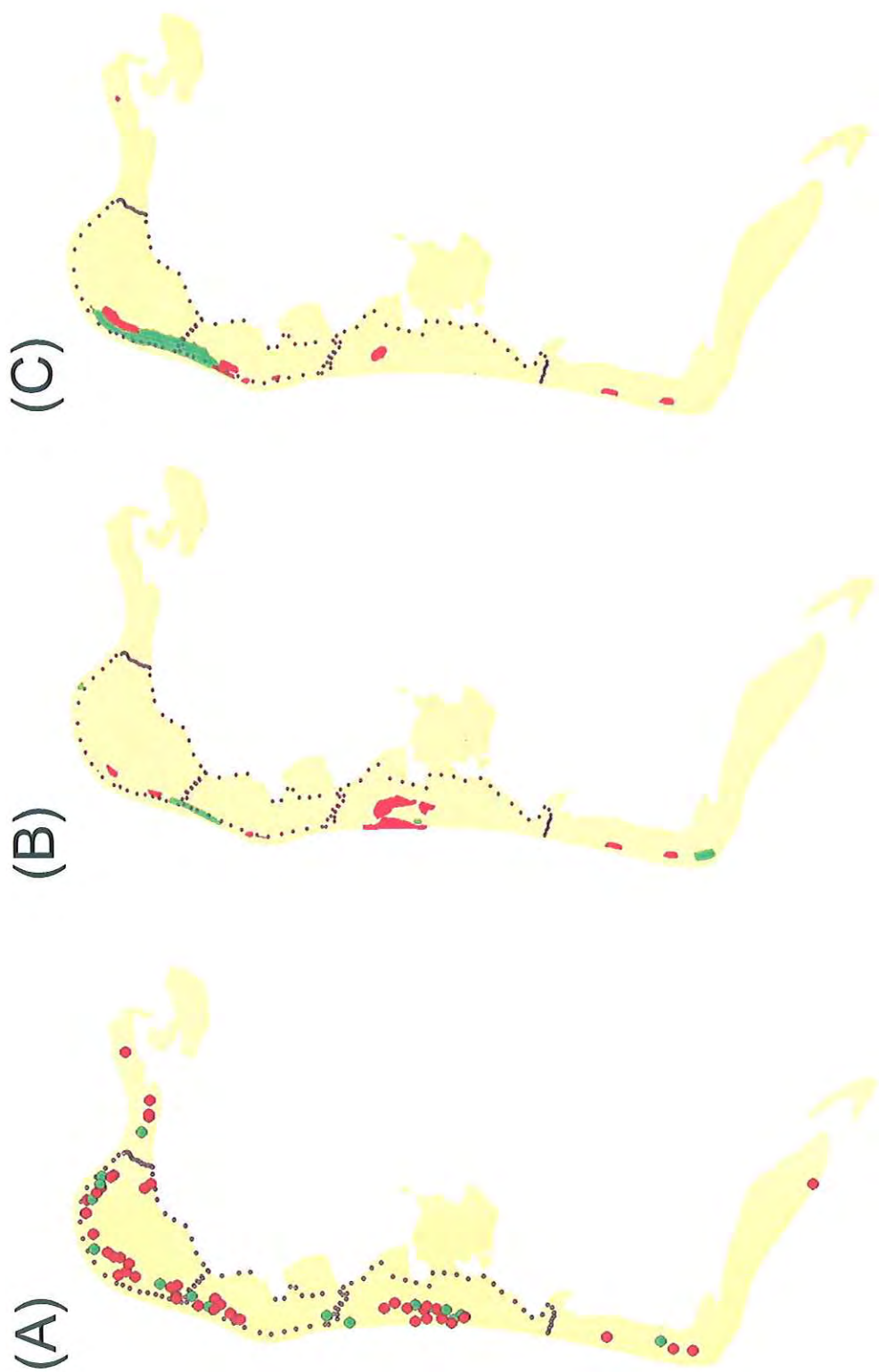


Figure 15. Maps of nesting attempts from 2001 to 2006 by (A) American Oystercatchers, (B) Least Terns, and (C) Black Skimmers. Nests or colonies indicated in red failed while those indicated in green successfully fledged young.

Table 6. Results of surveys of nesting birds conducted at Shell Key Preserve over eight seasons. Counts represent the maximum observed during any one survey conducted during the nesting season of each year.

Year	American Oystercatcher		Least Tern		Black Skimmer	
	Pairs	Chicks Fledged	Pairs (Colonies)	Chicks Fledged	Pairs (Colonies)	Chicks Fledged
2000	13	2 2	10 (1)	6 4	45 (3)	0 0
2001	16	5 3	276 (4)	0 0	130 (8)	14 2
2002	8	6 3	133 (5)	6 2	207 (2)	250 128
2003	9	6 4	187 (2)	10 2	470 (3)	246 243
2004	7	5 2	66 (2)	0 0	714 (6)	1 1
2005	5	2 2	11 (1)	0 0	155 (1)	1 0
2006	6	6 6	150 (3)	7 4	465 (1)	268 191
2007	4	0 0	0 (0)	0 0	294 (4)	0 0

yellow-crowned night herons (*Nyctanassa violacea*). Between 2001 and 2007, human and dog intrusions were implicated as sources of reproductive failure for 9 of 25 (36%) colony attempts by black skimmers, 5 of 17 (29%) colony attempts by least terns, and 14 of 71 (20%) nesting attempts by American oystercatchers.

Shell Key Preserve, recognized as an “Important Bird Area” since 2000, provides critical habitat required by resident and migratory birds to feed, rest, and reproduce. Its ecological significance is expected only to increase as waterfront development expands throughout the region.

Other Wildlife

A number of species of amphibian and reptiles has been observed on the island. Three turtle species have been recorded on the main island or in the Preserve: loggerhead seaturtle (*Caretta caretta*), green seaturtle (*Chelonia mydas*), and diamond-backed terrapin (*Malaclemys terrapin*). The green seaturtle is a federally-listed endangered species while the loggerhead seaturtle is considered by the State of Florida and the U.S. Fish and Wildlife Service to be a threatened species. The FWC recorded 54 loggerhead nests on the island from 1997 through 2005 (Appendix 10). The brown anole (*Anolis sagrei*) is the only lizard found on the island. Three nonvenomous snakes also inhabit the main island: southern black racer (*Coluber constrictor priapus*), yellow ratsnake (*Elaphe obsoleta quadrivittata*), and saltmarsh snake (*Nerodia clarkia*).

Other wildlife species observed in the Preserve include raccoons, marsh rabbits (*Sylvilagus palustris*), and house rats (*Rattus rattus*). These species most likely emigrated from nearby Tierra Verde. During the winter months, extremely low tides allow these species to swim or raft across the shallow and narrow channel that separates the mainland from the island. From this point they walk across the seagrass flats to land. While marsh rabbits pose no known threat

to other wildlife, raccoons and rats have the potential of impacting the nesting success of wildlife.

The bottlenose dolphin, the endangered West Indian manatee, and numerous fish species utilize the expansive seagrass beds of the Preserve. Thus, the protection of the seagrasses is important to the sustainability of these species in the Preserve.

State biologists have sampled both juvenile and adult fishes in the area around Fort DeSoto and Shell Key for over a decade. Typically, they collected 1-2 samples per month in the immediate Preserve area. In the fall of 2002, a County-sponsored fish monitoring project began at the Preserve. DEM staff members concentrated on sampling smaller fish species, collecting 137 samples from September 2002 to August 2003 with a 21-m, 3-mm mesh center bag seine. Samples were collected bi-monthly at sites randomly selected within nine habitat types. Over 157,900 specimens belonging to 89 taxa were collected (Appendix 10). The dominant taxa, in order of high-to-low abundance, were rainwater killifish (*Lucania parva*), spot (*Leiostomus xanthurus*), jenny (*Eucinostomus* spp.), silverside (*Menidia* spp.), goldspotted killifish (*Floridichthys carpio*), sheepshead minnow (*Cyprinodon variegates*), and pinfish (*Lagodon rhomboids*), accounting for over 90% of the total catch. A summary of these data was presented at the 2004 annual meeting of the Florida Chapter of the American Fisheries Society held in Brooksville, FL.

Butterflies and Moths

Twenty-five species of butterflies and two species of moths have been observed on Shell Key (Appendix 10). 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 have wandered over from Tierra Verde, Ft. DeSoto, and other areas in the region.

Exotic Species

A significant threat to the Preserve's natural system is the presence of exotic flora and fauna. Such species are organisms not native to Florida, but introduced as a result of human-related activities. Exotics have few, if any, natural controls and can adversely affect native species. Thus, the policy of the *Pinellas County Comprehensive Plan* is to remove exotic species from natural communities. Appendix 11 provides the Florida Exotic Pest Plant Council's 2005 list of invasive exotic plants. Some minor Brazilian pepper tree growth is found on Shell Key, but this is removed regularly to prevent further spreading. The most prominent exotic plant species problem on Shell Key is the Australian-pine. Australian-pines readily colonize beach dune habitat and, subsequently, alter natural beach and dune development. For the most part, Australian-pines have already been eradicated on the northern and central portions of the island. The south end, however, has a mature forest of Australian-pines designated for removal. Seedlings are removed or chemically treated to prevent their re-establishment.

Water Resources

DEM staff members have monitored water quality within the Shell Key Preserve boundaries since 2001. Water quality monitoring sites are located east of Shell Key, but do not include Gulf waters to the west. Measured parameters include, but are not limited to, nutrients, chlorophyll, dissolved oxygen, conductivity, pH, and water clarity. From 2001-2006, the water quality within the Preserve remained stable. Chlorophyll values were typically low, but exceeded the state standard of 11 ug/L north of Summer Resort Key; and values ranged from 11-30 ug/L near Sawyer Key (Figure 2). Higher chlorophyll values were observed most often during the wet season. Dissolved oxygen values within the Preserve were very good, ranging from 7-8mg/L. Dissolved oxygen values were typically better during the dry season and more

variable during the wet season, but overall remained relatively consistent. Water clarity ranged from 70-80% transmittance, which is considered good, with seasonal variability and better water clarity during the wet season. Overall, water quality within Preserve was stable and considered good during the 2001-2006 timeframe, based on current water quality standards.

SECTION 3. NATURAL RESOURCE MANAGEMENT

Since 2000, pursuant to the mandates of the State lease, most resource management activities in the Preserve focused on the protection of nesting, wintering and resting migrant birds on and around Shell Key. These activities included posting the core bird protection area (BPA), removing raccoons, developing predator deterrents, and picking up trash. Other management activities involved removing exotic species, replanting native vegetation, and posting the rules of the Preserve.

The BPA is posted to separate humans and dogs from bird colonies to prevent undue disturbances. 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. For some migratory species, their limited time at the Preserve may be needed to rest or to replenish fat reserves. For both nesting and resting birds, any undue disturbances may further imperil their fragile conservation status.

Monitoring efforts provide objective measures upon which the merit of current management can be assessed. Many management actions are the result of years of data-collection from the monitoring of nesting, wintering, and resting migratory birds; habitat analyses; surveys of flora and fauna; law enforcement reports; and suggestions during three stakeholders meetings (Appendix 12) and from numerous citizens and conservation partners. Objective criteria to measure the effectiveness of changes to the Plan will be established if deemed necessary and based on available staff and within budgetary constraints. As we closely monitor and evaluate the Plan's management actions, additional monitoring and changes in resource management strategies may be implemented, if warranted, prior to the next scheduled Plan revision in 2017.

Pets and Other Domestic Animals

2000 Plan

Under the 2000 management plan for Shell Key Preserve, dogs were permitted on leash or under voice-command, but only in the “Public Use Areas” of the island (Figure 3). The “Restricted Public Use Area” and the BPA were off-limits to dogs, and their owners subjected to fines for ordinance violations. Beginning in 2002, the Plan was amended to restrict dogs on the entire island annually during a critical 2-month nesting period from 15 April to 15 June. ELD staff members have since monitored and recorded dog intrusions in the BPA (Table 5). Despite enforcement of Ordinance 2-6, the documented average number of dog intrusions is approximately one intrusion per route surveyed during the nesting season (Figure 16). A single intrusion during critical nesting periods can be detrimental to an entire colony of nesting shorebirds as the eggs or chicks are exposed to extreme temperatures and predators. After four years of enforcement, ELD staff members, ELU officers, and many conservation partners concluded that the rules are too confusing for casual visitors. The leniency of the 2000 Plan is not consistent with Pinellas County Ordinance 2-6, which prohibits domestic animals within all environmental lands, including preserves, except under special circumstances.

2007 Plan

Under the 2007 management plan, consistent with other environmental lands, pets and other domestic animals, including dogs, will be prohibited in the Preserve at all times in accordance with Ordinance 2-6. Dogs within areas of intense public use present safety and sanitary concerns as well as concerns to wildlife. The Preserve boundaries will be posted accordingly to preclude any confusion.

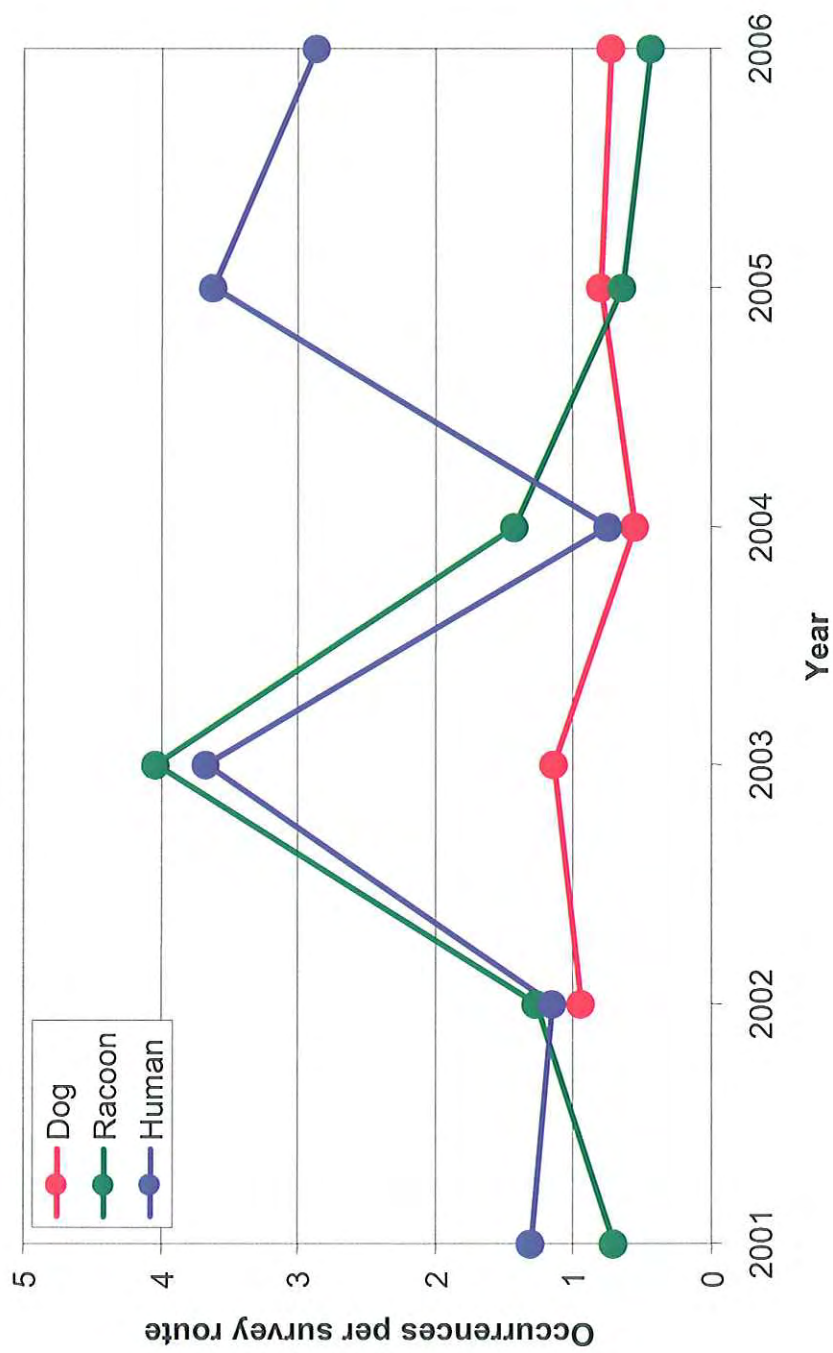


Figure 16. Average number of intrusions by raccoons, dogs, and humans into restricted areas detected per route during the nesting season.

The primary intent of this provision will be to address the impacts of dogs on shorebirds within the Preserve and on human health, safety, or welfare. Law enforcement officers will use their discretion in exercising this provision.

Problematic Nest Predators

2000 Plan

Raccoons have notable impact on nesting shorebirds and seaturtles on Shell Key. ELD staff members have recorded their intrusions in the BPA (Table 5 and Figure 16), particularly their predation on the eggs and young of shorebirds. Consequently, for the past seven years, ELD staff members have actively removed raccoons from the island.

Gulls and fish crows are also nuisance nest predators. Posts, pilings and twine – meant to delineate sensitive conservation areas on Shell Key – have inadvertently become handy perches for these birds. Thus, predator deterrents, such as bird spikes, have been placed on most perches to combat this problem. Other human-caused impacts (e.g., trash and feeding wildlife) further attract these opportunistic birds. To reduce these impacts, ELD staff members and volunteers often conduct trash clean-ups after busy holiday weekends during the summer as well as during fall/winter surveys.

2007 Plan

Nest predation on Shell Key will be monitored and appropriate management actions taken to facilitate the best possible nesting successes, especially for species of conservation concern. ELD staff members will continue to remove raccoons from the Preserve in accordance with standard conservation procedures. Staff will also continue to monitor raccoon intrusions and predation, particularly in the BPA.

To alleviate impacts by gulls and fish crows, staff and volunteers will implement new and improved methods of deterrence when feasible. Visitors will be required to comply with Pinellas County Ordinance 2-6 that prohibits feeding wildlife. Further, visitors will be obliged to remove their waste, including all trash, from the Preserve.

Control of Invasive Exotic Species

2000 Plan

The 2000 Plan called for the removal of all exotic vegetation from the Preserve, particularly the Australian-pines in the southern portion of the island. The Plan called for their removal over a 10-year period to be replaced by native tree species that would provide shade for camping. Approximately six acres of Australian-pines have been removed in the south end of the island by ELD staff and another four acres in the primary camping area (also in the south end) by private contractors. Eight acres still remain. Where Australian-pines have been removed, native vegetation has been restored where possible. Funding to-date for the removal of the pines and revegetation has been through the County's "Penny for Pinellas" tax initiative (\$101,668) and grants from the U.S. Fish and Wildlife Service (\$65,086). With the exception of the eight acres of Australian-pines, contractors and ELD staff and volunteers have removed most of the targeted exotic vegetation on the island. To prevent re-infestation by invasive exotic species, ELD staff and volunteers apply chemical treatment twice annually whenever seedlings re-emerge.

2007 Plan

Efforts to remove Australian-pine, carrotwood, exotic half-flower, Brazilian pepper, and other exotic species will continue as needed. The remaining Australian-pines in the southern portion of the island will be removed by 2012. Replanting with native species to provide shade in this camping area will continue. Exotic removal and replanting with native vegetation will be completed by contractors via County funds. This program may continue to pursue matching grant funds. Recommended replacements may include, but may not be limited to, strangler fig, gumbo limbo, South Florida slash pine, sea grape, cabbage palm and native mulberry.

Research and Monitoring

2000 Plan

Extensive research has provided a sound and robust understanding of the ecology of Shell Key Preserve, particularly the natural and anthropogenic impacts it faces. In fact, Shell Key is likely the most intensively-studied barrier island in the region, if not the entire state. Research conducted at the Preserve to-date by ELD staff members includes efforts to document the changes to the island's habitats; monitor the reproductive success of nesting shorebirds; monitor utilization by migrating and wintering birds; document intrusions into nesting areas by humans, dogs, and predators; monitor the distribution and abundance of seagrasses; inventory fish communities in diverse habitats; and monitor nesting attempts by seaturtles. In addition, partnerships have been established with researchers from other agencies and institutions. Authorized research projects conducted to date by research partners include investigations of wintering red knots and piping plovers (*C. melodus*), breeding populations of snowy plovers (*Charadrius alexandrinus*), disturbance to colonial shorebirds, and sources of bird mortality.

2007 Plan

The benefits of long-term monitoring have become apparent at Shell Key Preserve. These efforts have identified unforeseen trends in species richness and abundances, enhanced the understanding of ecological interactions, identified threats faced by wildlife, and documented dramatic rates of change to provide a sound basis for management decision-making. Because information obtained from these efforts translates into enhanced and targeted natural resource management, they will be maintained and supported. Similarly, the benefits of partnering with other agencies and institutions have been realized at the Preserve. Research partners provide expertise and resources that allow for detailed investigations beyond the scope of local government. Such partnerships, especially those that promote applied ecological research, will continue.

Given the solid foundation provided by ecological studies conducted to-date, numerous opportunities exist for future research at Shell Key Preserve. Pinellas County resources are invested largely into conducting on-going, long-term studies. Because such efforts are expected to continue into the future, additional basic and applied research likely will need to be conducted by partner scientists from external agencies and institutions. Future research might include (but certainly is not limited to) studies designed to understand the reproductive and energetic consequences of disturbance to nesting shorebirds, to place Shell Key Preserve in a regional or metapopulation context, to quantify the genetic structure of populations, to evaluate the efficacy of predator control or aversion methods, to examine ecological interactions between native and exotic species, and to analyze community succession and responses to disturbance. Such studies will be encouraged and supported to the fullest extent possible.

Law Enforcement

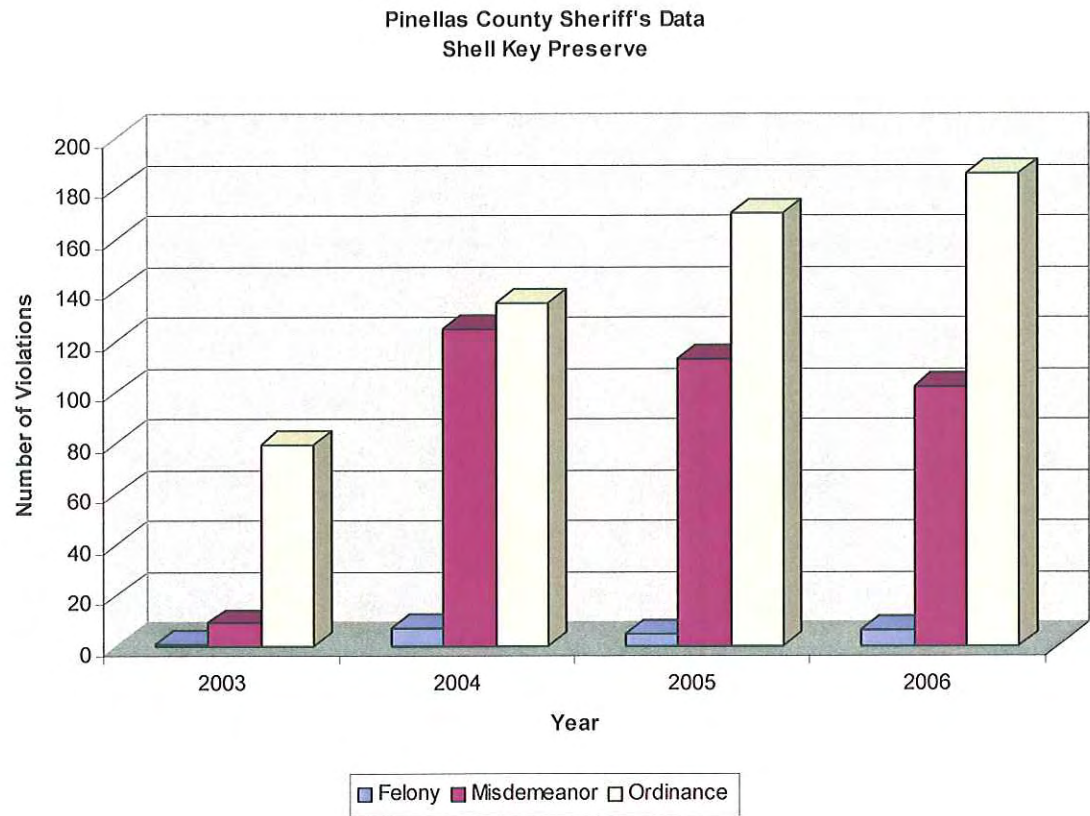
2000 Plan

The ELU has provided an enforcement presence in the Preserve since 2001. Initially, regular patrols and enforcement of regulations were necessary to ensure compliance for resource protection. Over the past several years, however, the northeastern part of the Preserve became so crowded on weekends that human health and safety emerged as a primary focus for the ELU team. This is reflected in ELU data that show an increased number of arrests and citations issued (Figure 17). Due to an increase in visitors on weekends as early as March, the ELU currently provides up to six deputies per day to patrol the Preserve. During busy summer weekends, the ELU often calls on other PCSO deputies and enforcement agencies for assistance.

2007 Plan

Contract agreements with PCSO will continue as the primary enforcement in the Preserve. Recognizing the difficult enforcement issues in the Preserve, the ELD 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 implement existing County regulations. Due to County-wide budget reductions, however, the number of ELU officers will drop in FY08 from ten (one sergeant and nine deputies) to seven deputies with support, when possible, from the PCSO Marine Unit and the FWC.

Figure 17. Types of Violations at Shell Key Preserve (2003-2006)



Signage

2000 Plan

Over 170 PVC posts have been installed on the island to support regulatory signage and to delineate the BPA against trespass. Rules posted on the regulatory signs are required to provide enforcement on the island and throughout the Preserve.

2007 Plan

Existing regulatory signs will be updated in accordance with the approved Plan. Further, additional signage will be added to incorporate education and interpretation. The goal of all such signage will be to provide visitors with a clear understanding of preserve rules *and* an understanding of conservation goals for the islands and waterways. ELD staff members will coordinate with ELU to develop appropriate regulatory and educational signage. Staff members and volunteers will continue to delineate the BPA with appropriate signage to educate visitors about the Preserve's natural resources. Preserve boundaries will also be clearly and accurately posted as needed to inform the public and to assist with enforcement within 12 months of Plan adoption.

Habitat Mapping and Protection

2000 Plan

Each year in January and February, ELD staff members mapped the various habitats of the entire island, using GPS with sub-meter accuracy. The resultant maps provided data that facilitated the adjustment of the BPA prior to the nesting season. Often during the nesting period, ELD staff members found it necessary to install temporary "No Trespassing" posts to protect birds nesting outside of these core areas.

Due to storm events and tidal changes, newly emerged islands come and go within the Preserve boundaries. These ephemeral islands provide temporary refuge for bird species such as the red knot. When practical, they have been mapped to record geological changes in the Preserve; but often it has simply not been cost-effective to post "No Trespassing" signage due to their dynamic nature.

The foredunes of a barrier island act as protection against storm events. To date, however, no protection of the foredune system has been conducted in the public use areas of the Preserve.

2007 Plan

Habitat mapping will be carried out periodically, using aerial photo interpretation of images provided by Southwest Florida Water Management District (SWFWMD). ELD staff members will "ground truth" these maps through their fieldwork. ELD staff members and volunteers will continue to adjust signs, posts, and barriers in the BPA. Areas temporarily occupied by bird colonies outside the BPA will continue to be posted as needed.

When practical, newly emerged islands will be mapped, using GPS with sub-meter accuracy, particularly the sandbars east and west of Shell Key. ELD staff members, volunteers, and conservation partners will attempt to develop low-cost methods to post these ephemeral, but locally significant, resources as wildlife habitat. They will also be enforced as "No Trespassing" areas by the ELU.

The foredunes of the island, heretofore unprotected, will be monitored as a sensitive community type and managed accordingly. Through interpretive signage and other education efforts, visitors will be encouraged to avoid these fragile systems for the purposes of protecting flora and fauna.

Education

2000 Plan

Educational and interpretive programs promote awareness and understanding of elements outlined in the management plan. Such programs foster community stewardship and are important to the long-term success of the County's management efforts. ELD staff and volunteers provided educational opportunities through interpretative programs, signs, brochures and casual conversations with visitors in the Preserve.

Staff members led interpretative programs for elementary schools, summer camp programs, and teacher-education workshops, all focused on the ecology and natural history of Shell Key Preserve. For example, ELD staff and volunteers led field-trips for the 5th grade students, teachers and parents of a local school. Staff members and volunteers from the Weedon Island Preserve Cultural and Natural History Center (WIPCNHC, an ELD facility) taught one-day programs at the Preserve for its summer camps. ELD staff members also conducted one-day workshops for teachers about coastal and barrier-island ecology.

The *Shell Key Preserve Visitor Guide* is a 2003 brochure developed by ELD that is distributed to visitors via ELD staff and volunteers, the ELU, and commercial shuttle transporters (Appendix 13). 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.

While working in the Preserve, ELU officers, ELD staff members, and volunteers often find opportunities for an "educational moment" with visitors. Occasionally, County personnel observed beachcombers, intent on finding shells or avoiding the crowds, who inadvertently trespassed inside the BPA's. After hearing explanations from staff and volunteers about the

unintended ecological effects of their intrusions, most visitors were apologetic and quickly withdrew from these sensitive sites.

2007 Plan

ELD staff members will coordinate a combined education effort by enlisting support from its volunteer network and from such groups as the St. Petersburg Audubon Society, National Audubon Society, Tampa Bay Watch, and local colleges and universities. Education and outreach programs for Shell Key Preserve will be made available for school programs, civic organizations, scout groups, and the general public when possible. These educational programs could include activity kits with materials to facilitate hands-on learning about the Preserve, including its diverse ecology and land management issues. These kits may include activity descriptions, species identification cards, and field materials. Activities may include bird identification exercises, biodiversity “scavenger hunts,” a geological profile of a barrier island, and shallow-water investigations. Organized educational tours and activities may be available on a limited, “first come, first served” basis. Programs will also be offered to promote volunteer opportunities such as clean ups, twining, and bird counts.

ELD staff members and volunteers will update the existing regulatory signs and provide others that include interpretive information about the Preserve’s ecology and stewardship. The intent will be to provide the rules and ecological education in a manner more palatable and effective than a list of “No’s” and “Don’ts.” Further, staff and volunteers will coordinate with commercial shuttle transport vessels to provide their captains and crew with education materials for distribution to passengers. Most passengers are tourists who may be unfamiliar with the sensitive ecology of the Preserve, particularly the importance of obeying applicable rules and

guidelines about the Preserve's ecology. The captains and their crew have the opportunity to educate large numbers of visitors who might be otherwise uninformed.

Land Acquisition

2000 Plan

Currently, most lands within the Preserve are held in public ownership. Pinellas County has purchased the available parcels of privately owned lands, most of which consist solely of submerged property.

2007 Plan

The County will continue to evaluate parcels currently under private ownership for potential purchase.

SECTION 4. PUBLIC USE

Effective planning and management requires a thorough understanding of the Preserve's natural and cultural resources. Management of the Preserve, including ongoing ecological monitoring, over the past six years has enabled the ELD to assess the effectiveness, efficiencies, and compatibilities of the 2000 Plan. Since the island is completely undeveloped, it retains a high scenic and recreational value as well as ecological significance. Boating pressures have increased throughout the Tampa Bay region, thus making the Preserve an extremely popular boating destination. Visitation has increased sharply during the past six years, especially on weekends and holidays.

Major human activities at Shell Key are focused on its sandy beaches, including swimming, sunbathing, picnicking, shelling, and birding. Boating and fishing are also popular activities in the waters around Shell Key. Very few boats stop along the western, high-energy side of the island but, understandably, choose instead to anchor on the better-protected south, east, and north sides of the island. Historically, most vessels anchored along the northern tip of the island; but now many anchor just east of the island, creating a rafting effect at times that hinders navigation. Opportunities for bird-watching, nature studies, and ecotourism are excellent. Primitive camping occurs mainly on the southern and northern tips of Shell Key. Public shuttles and charter boats bring many visitors to Shell Key. Parties and other events are held occasionally in the Preserve. Several local businesses, such as hotels and restaurants, also take groups of visitors to the islands and waterways. Other activities in the Preserve include the use of personal watercraft, airboats, and ultra-light seaplanes that offer short aerial tours. Recreational and commercial fishing, especially shrimp trawling, occur in the waterways east of Shell Key.

Currently, concessions, leases, licenses or permits must be obtained from the ELD. Permits are required in accordance with Pinellas County Ordinance 2-6 for the following activities:

1. Scientific research
2. Group nature activities in restricted areas not open to the public
3. Commercial photography, television broadcasting, and any activity involving special settings
4. All group activities involving 50 or more persons
5. Concessions or vendors operating within the Preserve
6. Exhibits, displays, signs and distribution of printed matter

Though swimming and limited camping are allowed on Shell Key at present, no sanitary or support services, including lifeguards, are available on Shell Key. One concern this raises is for human health and safety, especially as the numbers of swimmers and boaters increases. It is possible that exposure to human waste and garbage left by indifferent campers and day-trippers on the island and in the water will cause adverse effects on subsequent visitors.

Management actions of public uses in the Preserve as provided below were developed after reviewing scientific and enforcement data and after considering suggestions during three stakeholders meetings (Appendix 12) and from numerous citizens and conservation partners. Changes in public uses in the Preserve were made in the 2007 Plan when such activities were found to be inconsistent with County Ordinance 2-6 and when such activities appeared incompatible with the State-mandated goal of natural resource management of the Preserve. Management of the Preserve will continue to provide passive public outdoor recreation.

These management actions will be monitored closely by the ELD. If deemed necessary, additional monitoring will be conducted to establish objective criteria to measure the

effectiveness of changes to the Plan. As we monitor and evaluate the Plan's management actions additional changes in public use may be implemented, if warranted, prior to the next scheduled Plan revision in 2017.

Alcohol Use

2000 Plan

The possession and/or consumption of alcoholic beverages is prohibited on the island of Shell Key. The use of alcohol in the remainder of the Preserve, however, is subject to existing laws that govern alcohol consumption and safe boat-handling. For example, visitors who consume alcoholic beverages while standing in their boats or even in ankle-deep water act within the current limits of the law. This legal incongruity makes the Preserve a popular "party" destination for some visitors and has led, consequently, to unsafe, unhealthy, and intrusive conditions. The ambiguity is obviously inconsistent with Ordinance 2-6. For example, 2800 people and 350 boats were counted at the northeast tip of the Preserve by noon on Sunday during the Memorial Day Weekend 2006, many of whom were consuming alcohol excessively. Out of 193 citations written in 2006, 183 were for the illegal possession and/or consumption of alcohol on the island.

Increasing crowds within the boundaries of Shell Key Preserve have created numerous management concerns. These include, but are not limited to, localized impacts of pets on flora and fauna, unfettered camping and campfires, public health issues from lack of sanitary facilities, safety concerns with escalating numbers of boats and other watercraft, volumes of trash left on the island, and ambiguous regulations for alcoholic beverages that result in non-family oriented behaviors. Many of these concerns have the potential to impact water quality and natural resources negatively on and around the island.

2007 Plan

Under the 2007 management plan, the possession and/or consumption of alcoholic beverages will not be allowed in the Preserve (including the islands and waterways) in accordance with Ordinance 2-6 consistent with other environmental lands. The boundaries of the Preserve will be posted as necessary to eliminate any confusion among visitors. The intent of this provision is to address excessive and intrusive consumption of alcohol that pose a potential threat to public safety, health, or welfare. Law enforcement officers will use their discretion in exercising this provision.

Overnight Activities on Shell Key

2000 Plan

Between the hours of sunset and sunrise, visitors to Shell Key are allowed only in those locations indicated as “Public Use Areas” (Figure 3), notably in two camping spots (one on the northeastern tip and another on the southern portion of the island). With no sanitary facilities available on the island, ill-prepared visitors often use the water or the island as a latrine. Such unsightly and unhealthy conditions are most evident in the camping areas. As the most visibly impacted site, the northern camping area is also the location for repeated, but failed, nesting attempts by numerous bird species, including some of special conservation concern.

Campfires and all other open flames are also allowed in these “Public Use Areas.” Wildfires from unattended campfires have been documented on at least two occasions. The first occurred in March 2004 on the southern tip of the island in an area dominated by Australian-pines. The second occurrence was in May 2007 at the northeastern tip despite local and state-wide postings about extremely high fire hazard conditions at the time. Campfires and other open flames could become dangerous to overnight visitors on the island.

Trash left behind by campers on the island varies from season to season and is a growing concern for many of the Preserve's stakeholders. Some indiscriminate campers use wooden pallets as firewood. The nails and staples left behind are an obvious, but too-often ignored, danger to others. Tents, carpet pieces, boat batteries, propane tanks, grills, broken chairs, glass containers, and spoiled food are examples of items recently removed by County staff and volunteers – at a cost to taxpayers.

2007 Plan

A “leave no trace” camping ethic will be expected at all times from visitors to the Preserve. The overall camping experience at the Preserve will be improved in accordance with acceptable guidelines for sustainability and for public health and safety, including a requirement for campers to remove all refuse, waste, and trash. Campers will be expected to bring, use, and remove portable toilets. Camping and campfires will be restricted to the southern “Public Use Area” of the island (Figure 4) in designated locations, an approach that will limit overall human disturbance, promote protection of native wildlife, facilitate efforts to ensure compliance, and encourage public safety. Further, all overnight uses will require a “license to use” agreement or permit issued by the County. Fees may apply. Each person who receives such a license or permit will agree beforehand in writing to comply with all rules pertaining to Ordinance 2-6. Licenses or permits will be issued using a “first come, first serve” basis to a limited number of designated locations. Holders of such licenses or permits will be held responsible for all members of the camping party.

As a wildlife preserve, Shell Key is a sensitive environmental area that deserves public vigilance and care. The privilege of camping carries the responsibility of good stewardship so that the islands and waterways may remain intact for future generations. This will require that

all campers (1) plan ahead and prepare, (2) use only designated locations, (3) always obtain and carry a copy of the executed “license to use” agreement or permit, (4) dispose of waste properly, (5) leave the natural resources for others to discover and enjoy, (6) minimize campfire impacts, (7) respect wildlife, (8) be considerate of other visitors to the preserve, and (9) adhere generally to a “leave no trace” ethic. Through good public stewardship, Shell Key will remain a welcoming wild place for generations to come, a place that offers enjoyment for all who enter its boundaries.

Public Use Areas

2000 Plan

Areas for public use within the Preserve have changed very little since the adoption of the 2000 Plan (Figure 18). The number of users in the Preserve, however, has increased dramatically. Recreational and commercial fishermen continue to utilize the waters and grassbeds while recreational boaters use the island and nearby waters. Natural plant succession has changed the public-use area once available on the east side of the island’s mid-section, restricting accessibility and making it undesirable to most visitors. The temporary posting of BPA within the public-use areas will remain in order to protect nesting shorebirds.

2007 Plan

Passive recreation is a legitimate provision within the Shell Key Preserve and, consequently, will be maintained for as long as this management plan remains in effect. The public-use designation for the east side of the island’s mid-section will be eliminated so that this area will be included in the BPA.

The “Minimum Wake Area” located in the northwestern portion of the Preserve will be changed to Idle Speed (Figure 18). This location in the Preserve has a high volume of uses by all watercraft in shallow water that, consequently, will eliminate safety concerns. The change provides consistency with the adjacent “Idle Speed Zone” to the north while it further reduces confusion among boaters with regard to the navigational signs.

Any other official changes in delineated public-use areas will be in response to storms, wildfires, and other significant ecological events. Under these circumstances, the Shell Key Advisory Committee will be reconvened to evaluate the likely impacts of such events on the Preserve’s natural resources and passive recreational uses.

Liveaboard Vessels

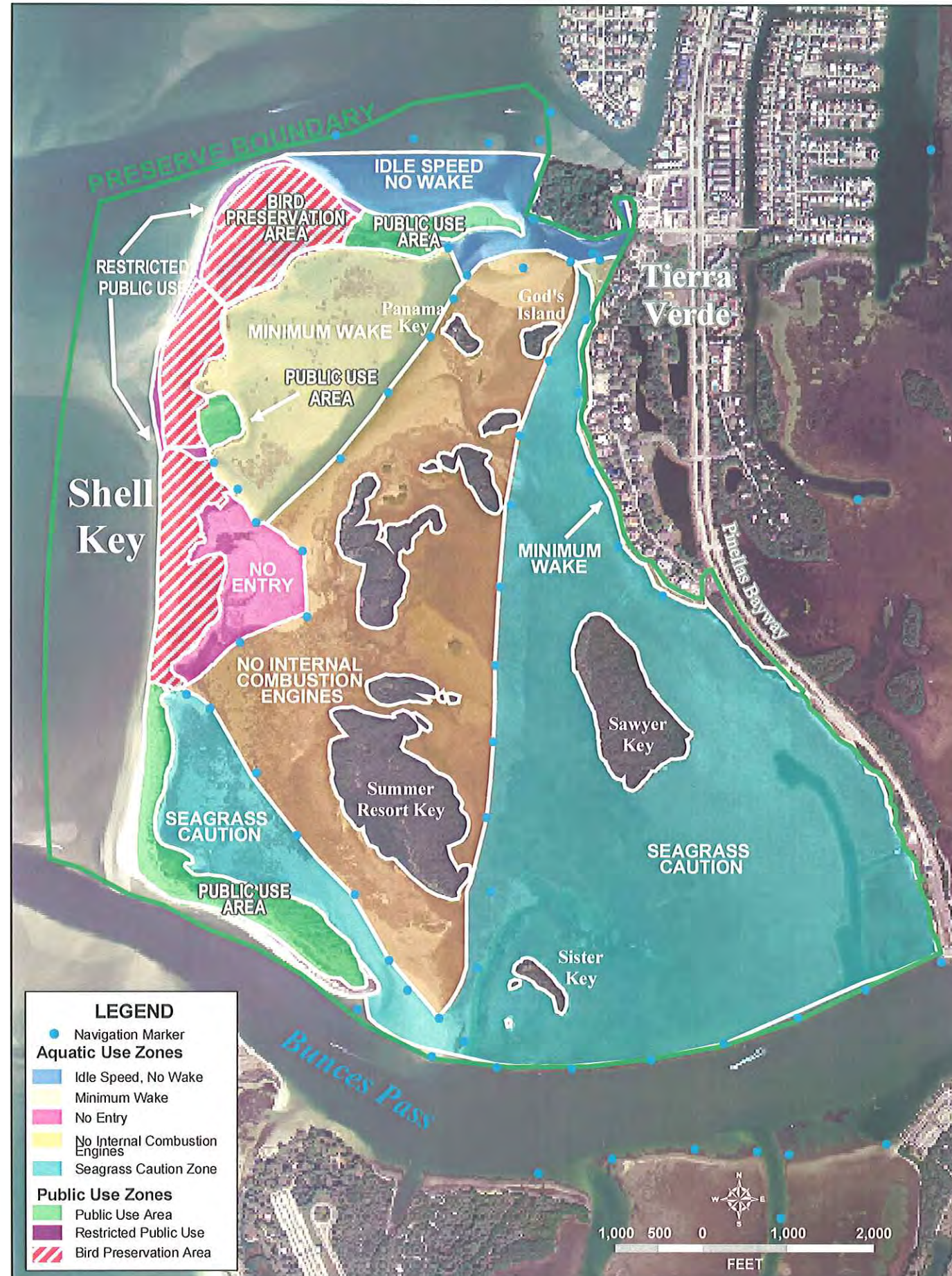
2000 Plan

Occasionally, liveaboard vessels have moored within the Preserve for an extended period of time. At these times, the ELU has enforced Ordinance 2-6 that prohibits vessels moored within the Preserve for more than 14 days in any 30-day period.

2007 Plan

ELD will continue to prohibit liveaboard vessels moored in the Preserve for more than 14 days in any 30-day period. These vessels can cause environmental damage by mooring in one place for a long period of time, including sanitation issues and seagrass scarring. This excludes vessels at permitted docks within the boundaries of the Preserve. All vessels are prohibited from discharging waste within Preserve boundaries.

2000 PLAN



2007 PLAN

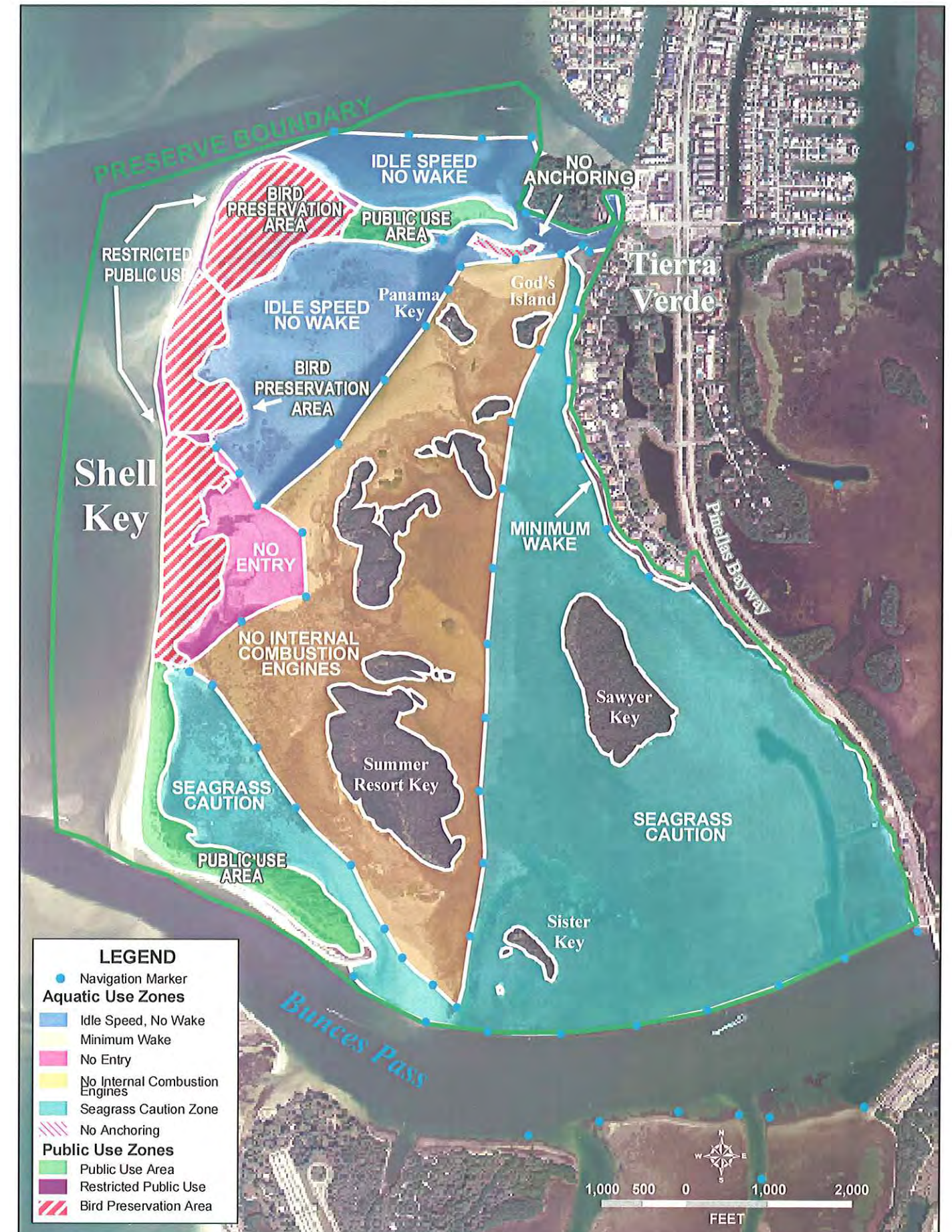


Figure 18. Public and Aquatic Use Zones at Shell Key Preserve

Noise Standards

2000 Plan

In order to provide an enjoyable experience for all user groups, especially to protect nesting shorebirds and nearby residential properties from excessive noise, all activities within the Preserve comply with the Pinellas County Code, Article XII pertaining to noise. On busy weekends, the ELU issues warnings or citations for excessive noise violations.

2007 Plan

ELD will continue to provide for an enjoyable experience for all user groups, especially to protect nesting shorebirds and nearby residential properties from excessive noise. The ELU will continue to enforce the Pinellas County Code, Article XII.

Commercial Activities

2000 Plan

Currently, two food-and-drink concessions anchor on the northeast shore of the island. Other business activities, such as commercial fishing enterprises, charter boats and eco-tourism destination charters, also utilize the Preserve.

2007 Plan

Commercial activities within Shell Key Preserve will not be allowed unless permitted as a concession or other appropriate license from the County that specifies uses consistent with the 2007 Plan. A schedule for permits and fees will be developed by the County for vendors and concessions so that they may comply with Pinellas County Ordinance 2-6. Vendors will need to

apply for a license through the County. Commercial operators and vendors with a permit or license to operate in the Preserve shall support and promote educational activities to further the protection of the resources of Shell Key.

Large Groups

2000 Plan

Groups of 50 or more people visiting the island require a permit from the ELD (Appendix 14). Permit requests have been denied when such uses may adversely impact the natural resources (including nesting shorebirds) of the Preserve and are deemed inconsistent with the management plan.

2007 Plan

ELD will continue to utilize a permitting process for groups of 50 or more people visiting the island. Each permit will be reviewed and permission granted on a case-by-case basis and dependent upon consistency with the management plan. Permits will not be issued during known nesting periods to protect nearby shorebirds.

Optimum Carrying Capacity

Carrying capacity is an estimate of the number of users who can be accommodated by a resource or facility while also providing a high quality experience for visitors and protecting the natural values of the site. In the case of the Preserve, strictly controlling the numbers of visitors to the island is impossible since it has multiple points of access along several miles of shoreline in an area with a large boating population. At this time, the ELD does not plan to restrict human access to the island other than to the BPA as outlined in this Plan. Rather it intends to monitor

the results of the “Natural Resource Management” and “Public Use” elements as previously described to determine if they are sufficient to protect the Preserve’s natural resources. The Plan will be revisited and amended if conservation methods are not effective or if specific public activities are inconsistent with natural resource management.

SECTION 5. BUDGET

Fiscal support for the Preserve's management is provided through the ELD budget. The division's proposed operating budget for FY08 – FY09 is \$2.8 million, 4.06% of which is for management of the Preserve. This budget of \$2.8 million includes the salaries and services of land management, research, education, operations, and administration as well as equipment and other materials, but does not include the cost of ELU law enforcement, estimated to be \$252,000 (approximately 36% of the total contracted cost of coverage by PCSO for all ELD properties).

As previously discussed, ELD volunteers provide indispensable service to the management and protection of the Preserve. They log over 500 service hours per year, valued at \$9,800 annually, but this accounting does not include the merit of their outreach and networking, an unquantifiable but much-appreciated aspect of their efforts on behalf of the Preserve.

ELD has budgeted over \$200,000 over the next 12 years for the removal of Australian-pines and the replanting of native trees. This long-term project will be supported through the County's Capital Improvement Program's "Penny for Pinellas" funds, which will be matched with grants from the U.S. Fish and Wildlife Service.

SECTION 6. SUMMARY

To fulfill its mission to provide sound stewardship to the County's wild lands and opportunities for the appreciation of their intrinsic value, ELD staff members and volunteers – along with colleagues from other County departments and from various conservation organizations – have provided herein certain changes in the 2000 Shell Key Preserve Management Plan as a response to their analysis of ongoing issues and concerns. Shell Key Preserve is an ever-popular destination for its ecological and recreational capital, thus mandating carefully crafted conservation strategies for the long-term balance between human and nonhuman needs. Given the specific conditions of the official lease agreement with the State of Florida, as well as pertinent elements from County Ordinance 2-6, the *Pinellas County Comprehensive Plan*, and the BOCC Strategic Plan (and its Strategic Business Plan 2007-2012), the emphasis of management for Shell Key Preserve remains clearly focused on its natural resources. Passive recreation, though encouraged and endorsed by ELD, is secondary to the conservation of its islands and waterways. It is the intent of this Plan to allow for suitable opportunities for passive recreation as they are compatible with resource management. ELD encourages the citizens of Pinellas County, indeed all visitors, to enjoy Shell Key Preserve while keeping a minimum ecological "footprint" on this exceptional public land.