

# **WEEDON ISLAND PRESERVE DEVELOPMENT FOR ECOSYSTEM MANAGEMENT AND PUBLIC USE**

**Walid M. Hatoum, P.E.**  
**and**  
**Julia A. Schulten, Ph.D.,**  
**PARSONS ENGINEERING SCIENCE, INC.**  
Tampa, Florida

## **ABSTRACT**

Weedon Island Preserve, in St. Petersburg, Florida, has 11 different ecosystems and is home to as many as 37 endangered, threatened, and special-concern species. Parsons Engineering Science has been contracted by Pinellas County to prepare a Master Plan for design of proposed improvements to the preserve. Parsons ES also investigated the existing ecological and cultural resources in the areas proposed for improvement, assessed impacts to these resources, and made recommendations for ecosystem management and improvement. These recommendations focused on placement of facilities in previously-disturbed areas, native plantings, exotic species control, and mitigation for gopher tortoise relocation, and wetland mitigation.

## **INTRODUCTION**

Weedon Island Preserve represents an excellent example of a community's efforts at ecosystem restoration, preservation, and management. The preserve was established in 1974 as the first purchase under Florida's Environmentally Endangered Lands Act. Pinellas County, the City of St. Petersburg, and the Southwest Florida Water Management District are currently funding the development of the preserve to manage, restore, and enhance its ecosystems, while providing visitors with aesthetic, educational, and recreational enjoyment with emphasis on interpretation of the natural and cultural attributes of the preserve.

Pinellas County has proposed improvements to the Weedon Island Preserve including upgrading the main access road, constructing a maintenance building and new residence for the preserve superintendent, replacing the fishing pier, constructing infrastructure to support an interpretive center, and constructing boardwalks and observation towers. Many of the areas proposed for improvement will not be significantly altered from their existing state, with the exception of the interpretive center complex.

The County contracted with Parsons Engineering Science (Parsons ES) to develop a Master Plan to implement for the Unit Management Plan (Pinellas County Park Department, 1993). The stated goal of the management plan is to develop compatible facilities that will provide for a variety of outdoor recreational experiences and serve to protect examples of native Florida for the enjoyment of the public. In other words, the County intends to provide the public the ability to experience the

unique natural and man-made habitats on the island while protecting and enhancing the existing ecosystem.

Along with developing the Master Plan for the preserve improvements, Parsons ES investigated the existing ecological and cultural resources at the site, assessed impacts to the areas planned for development, and made recommendations for ecosystem management and enhancement.

## **STUDY SITE**

Weedon Island Preserve is located in St. Petersburg, on the west shore of Old Tampa Bay (Figure 1). It covers 250 hectares (627 acres) of upland and submerged land, and consists of a group of low-lying islands of which Weedon Island is the largest (Figure 2). The smaller islands, Mud Hole Island, Benjamin Island, Snake Island, Christmas Island, Gooze Island, and Ross Island, are all located to the east and south of the main island. Tampa Bay is the main body of water to the east and south of Weedon Island, while Riviera Bay and Grande Bayou form the western border. A spit of land, located between Masters Bayou to the north and Riviera Bayou to the south, connects Weedon Island to the St. Petersburg side of the mainland. Florida Power's Bartow oil-fired power plant lies to the north of the preserve.

The preserve encompasses 11 ecological communities, from upland to wetland to aquatic (Figure 3). Thirty-seven endangered, threatened, or special-concern species have been identified within the preserve boundaries. Weedon Island has been designated an aquatic preserve and all permanent water bodies are designated Outstanding Florida Waters.

In addition to its outstanding ecological attributes, Weedon Island also has a rich history, with cultural resources representing human presence dating back as far as 400 AD. Dr. Leslie Weedon, an early owner of the island, found three graves of the Spanish Colonial period, containing iron armor and other artifacts. Other archaeological explorations of the island's burial mounds and shell mounds conducted earlier in this century found Indian skeletons, ceramic vessels, and shells. The Indian burial mound at the north end of the island is listed on the National Register of Historic Places.

Weedon Island also has ties to the early and recent history of Pinellas County. A speakeasy and dance hall provided entertainment during the 1920's; the headquarters of Eastern Air Transport were located at Grand Central Airport in the uplands of the island; and the Sun Haven Movie Studio made movies on a soundstage on the island (Thompson, 1992).

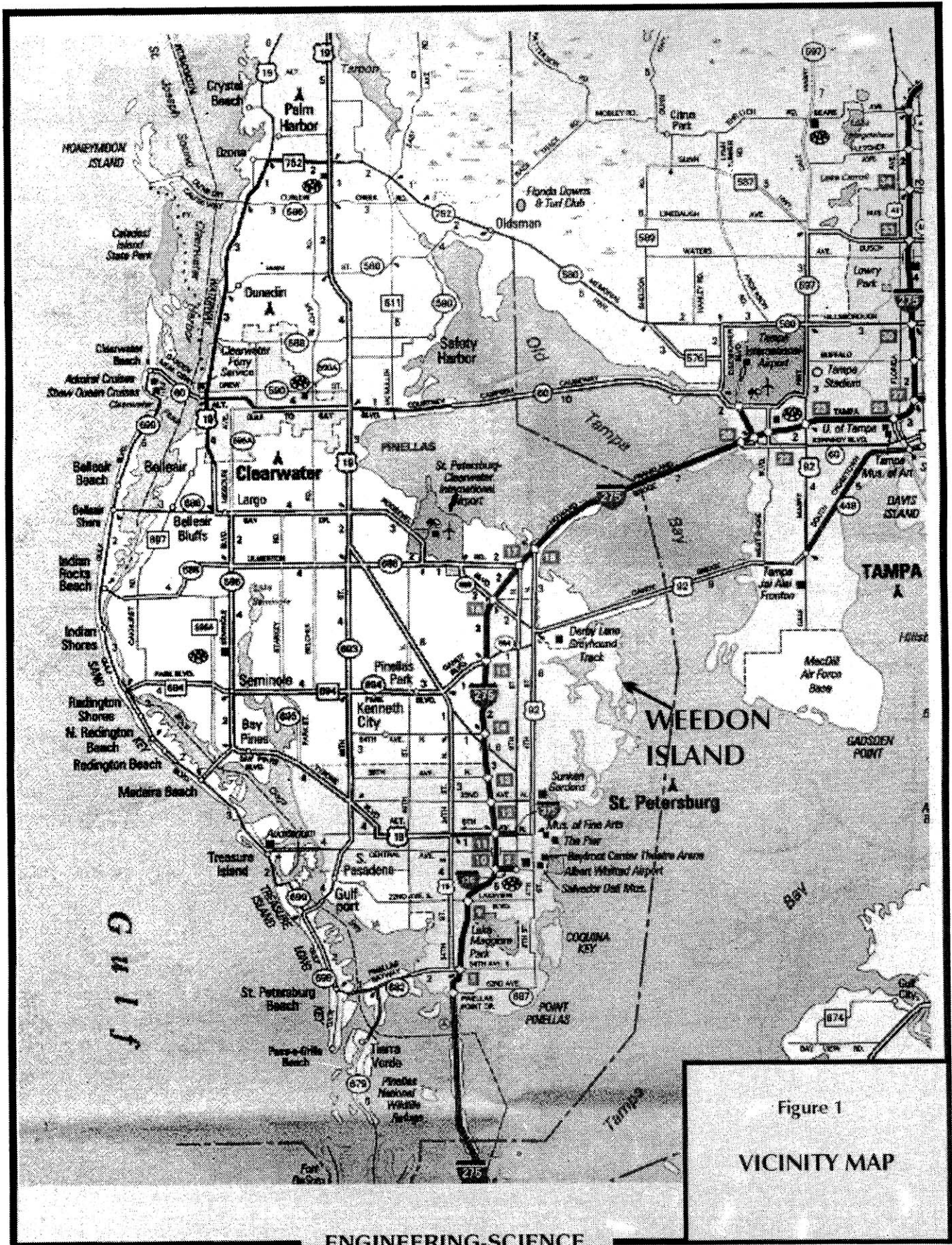


Figure 1  
VICINITY MAP

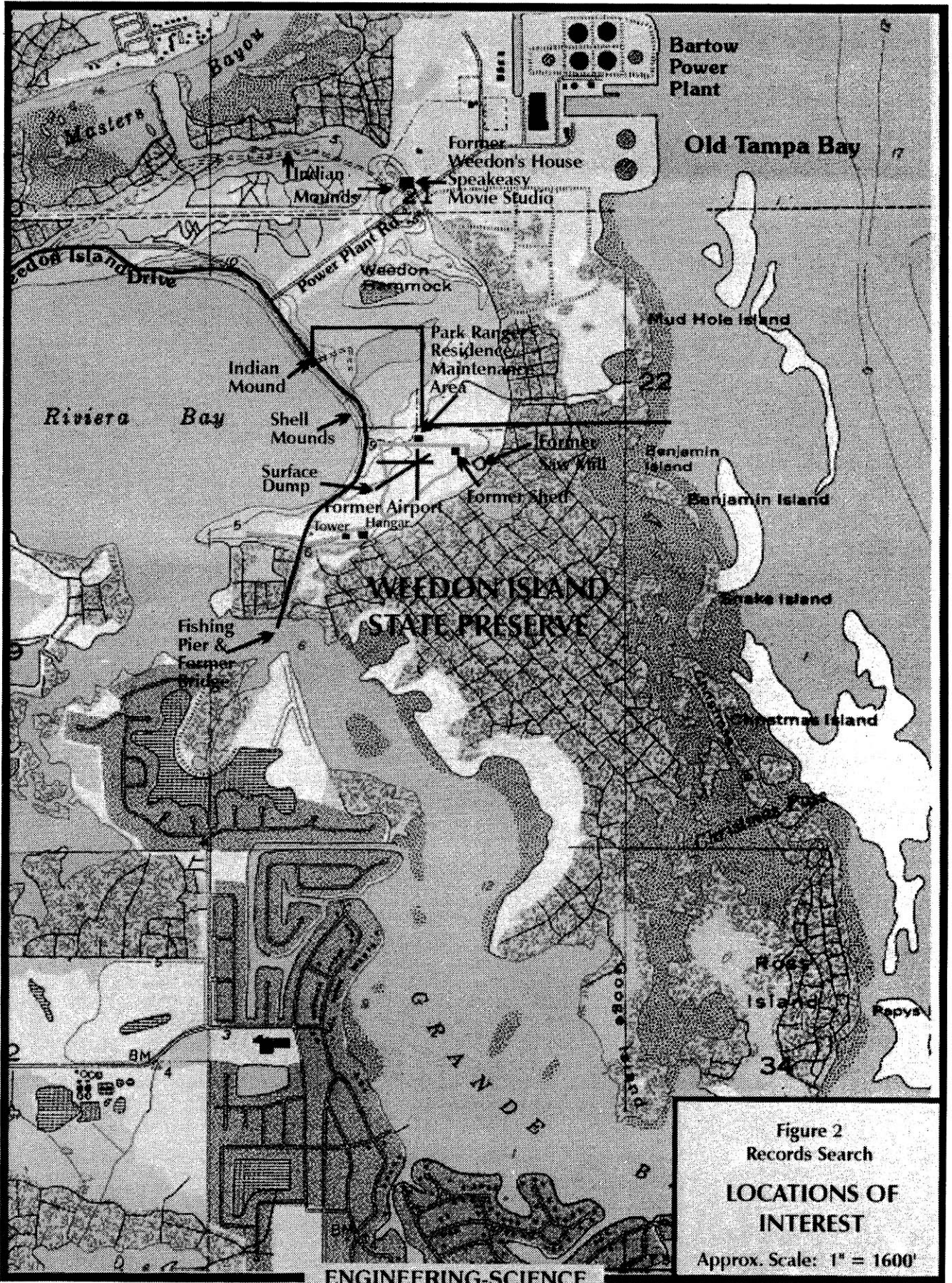
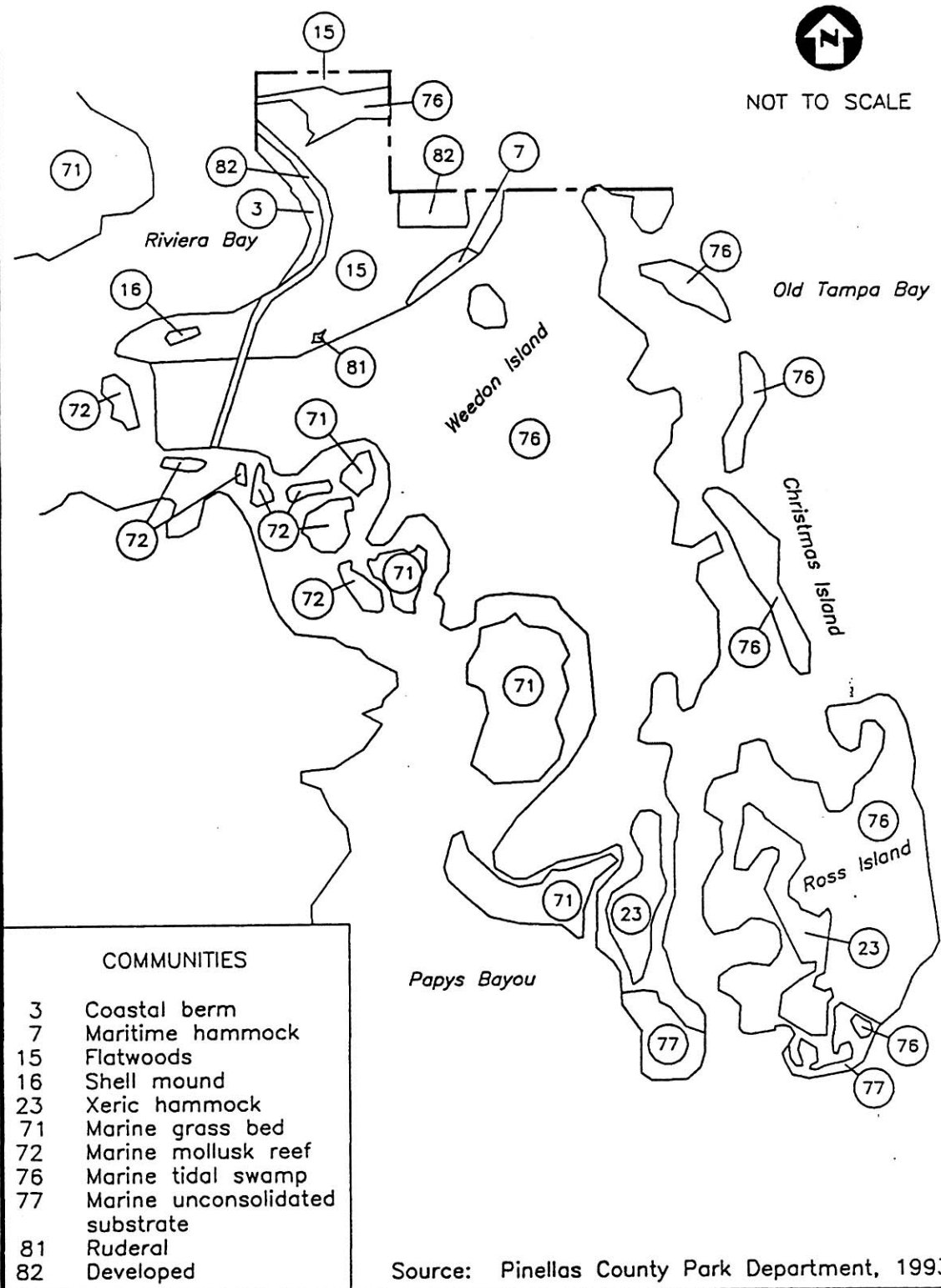


Figure 2  
Records Search  
**LOCATIONS OF INTEREST**  
Approx. Scale: 1" = 1600'

# Figure 3. Ecological communities at Weedon Island Preserve



MAP: 08/20/93 BY: J.S.V., DATE: 1-94

## METHODS AND MATERIALS

As the Unit Management Plan states, "preservation and enhancement of natural conditions is most important" in management of the Weedon Island Preserve. To accomplish these preservation and enhancement goals, the County contracted with Parsons ES to survey the existing state of the ecosystems, including plants and wildlife, vegetation communities, protected species, wetlands, and exotic plant control practices.

Parsons ES conducted ecological surveys during October 1994 to identify and define the natural communities within the areas proposed for improvement, as shown in Figure 2. Comprehensive upland vegetation and wildlife surveys were conducted for areas surrounding the proposed location of the interpretive center complex, which lies in the largest contiguous area of native vegetation. General community evaluations were conducted for the five other management areas. As part of the surveys, biologists identified all plant communities, noted species composition, made wildlife observations, and identified protected flora and fauna that use or potentially use the area. Recommendations were made on ways of limiting the impact of the improvements and maintaining and improving the existing ecosystems.

At the proposed interpretive center location, upland vegetation was surveyed along defined transects at 60-foot intervals along a northwest to southeast baseline. Percent aerial coverage of the canopy, shrub/scrub, and herb layers was visually estimated for the dominant plant species between the transects. Qualitative natural community evaluations were conducted for the remaining improvement locations. Natural community descriptions as defined in the Guide to Natural Communities of Florida (Florida Natural Areas Inventory [FNAI], 1990) were used to classify all of the natural communities within or adjacent to the five major development areas.

Surveys for federal and state-listed endangered, threatened, and special-concern species were incorporated into the detailed vegetation survey. All observed gopher tortoise (Gopherus polyphemus) burrows were mapped and classified as active, inactive, or old, using the criteria of Auffenburg and Franz (1982). A conversion factor of 0.614, developed by Auffenburg and Franz to equate the number of active and inactive burrows counted to the actual number of tortoises residing on the site, was used. Use of the standard 0.614 conversion factor is recommended by the Wildlife Methodology Guidelines (Allen, 1988) and is widely used in Florida as no other consensus conversion factor is available for differing regions of the state or habitat types.

Wetlands are the largest ecological resource on the Weedon Island Preserve, totaling approximately 160 hectares (400 acres). Parsons ES identified wetlands in the improvement areas and located jurisdictional boundaries. Wetland involvement and permitting issues were evaluated for the improvement areas.

Another aspect of ecosystem management being implemented at the preserve is exotic plant control. Historical development activities on Weedon Island have led to the invasion and replacement of native plant communities by aggressive, non-native (exotic) plant species that have an adverse effect on the native plant and animal communities. One resource management objective that Pinellas County is pursuing for the preserve is restoration and preservation of native plant communities. This objective

includes management, and elimination where possible, of exotic and nuisance plant species. Parsons ES reviewed and made recommendations on the County's Exotic Plant Control Management Plan to determine if any changes need to be made to the plan, and to provide recommendations for revisions and additions to the plan where necessary. Aspects of the current control plan that Parsons ES reviewed include locations where controls are used, plant species that are controlled, types and methods of physical and chemical controls, control schedules, and disposition of plant materials, as well as the effects of proposed preserve improvements on the exotics control plan.

## RESULTS

### Vegetative Community Survey Results

Plant species observed during the Parsons ES survey are listed by vegetative community type in Table 1. Because the survey covered only those areas proposed for improvement, this list is not comprehensive for the entire preserve.

In general, the vegetation survey identified flatwoods as the dominant plant community at the proposed location of the interpretive center. As part of this community type, several distinct vegetative phases were observed, including mesic pine flatwoods, dry prairies, and scrubby flatwoods. In addition to the flatwoods associations, several areas of disturbed land were identified that have not been completely recolonized by native vegetation.

The mesic pine flatwoods community is characterized by an open canopy forest of widely spaced pine trees (*Pinus eliotii*) and cabbage palms (*Sabal palmetto*) with a dense ground cover of saw palmetto (*Serenoa repens*) and various herbaceous species. Mesic pine flatwoods occur on relatively flat, moderately to poorly drained soils.

The dry prairie community is characterized as a nearly treeless plain with a dense ground cover of saw palmetto, wiregrass (*Aristida stricta*) and other grasses, forbs, and low shrubs. The dry prairie community is similar to the mesic pine flatwoods area but lacks pine and palm trees or their density is below 2.5 trees per hectare (1 tree per acre).

The scrubby flatwoods community is drier than the mesic flatwoods or dry prairies. Dominant scrubby flatwoods vegetation includes live oak (*Quercus virginiana*, *Q. geminata*), Chapman oak (*Q. chapmanii*), slash pine, cabbage palm, saw palmetto, and rusty lyonia (*Lyonia ferruginea*). Scrubby flatwoods are found at slightly higher elevation than mesic flatwoods or dry prairies. Soils consist of well-drained, white, sandy soils.

Table 1. Weedon Island Preserve - Plant Species List  
Weedon Island Preserve - November 1994

Scientific Name	Common Name	Observed					
		Mesic Pine Flatwoods	Dry Prairie	Scrubby Flatwoods	Estuarine Tidal Swamp	Estuarine Brass Bed	Ruderal
<i>Ambrosia artemisiifolia</i>	Ragweed	x	x	x			x
<i>Ampelopsis arborea</i>	Pepper vine						x
<i>Andropogon floridanus</i>	Florida bluestem	x		x			
<i>Andropogon virginicus</i>	Broomsedge	x	x	x			
<i>Aristida stricta</i>	Wire grass	x	x	x			x
<i>Asimina reticulata</i>	Pawpaw	x		x			
<i>Avicennia germinans</i>	Black mangrove				x		x
<i>Baccharis halimifolia</i>	Salt myrtle	x			x		
<i>Bambusa sp.</i>	Bamboo						x
<i>Blechnum serrulatum</i>	Swamp fern	x	x		x		x
<i>Callicarpa americana</i>	Beautybush	x	x	x			x
<i>Canavalia maritima</i>	Seaside bean			x			
<i>Casuarina equisetifolia</i>	Australian pine				x		
<i>Cenchrus incertus</i>	Sandspur	x	x	x			x
<i>Chamaecrista sp.</i>	Sensitive plant	x	x				x
<i>Chrysopsis sp.</i>	Goldenaster			x			x
<i>Conocarpus erecta</i>	Buttonwood				x		
<i>Cuscuta gronovii</i>	Dodder	x	x	x			x
<i>Cyperus ligularis</i>	Alabama flat sedge				x		
<i>Dactyloctenium aegyptium</i>	Crow foot grass	x	x				
<i>Dioscorea bulbifera</i>	Air potato						x
<i>Distichlis spicata</i>	Seashore saltgrass				x		x
<i>Eragrostis sp.</i>	Love grass	x	x	x			x
<i>Erechtites hieracifolia</i>	Firewood		x				x
<i>Eupatorium capillifolium</i>	Dog fennel	x	x	x			x
<i>Galactia elliottii</i>		x	x				x
<i>Halodule wrightii</i>	Shoalgrass					x	
<i>Hypericum gentianoides</i>	Pinweed	x	x				
<i>Hypericum tetrapetalum</i>	St. Peters wort	x	x				
<i>Ilex glabra</i>	Gallberry	x					
<i>Iva frutescens</i>	Marsh elder				x		
<i>Laguncularia racemosa</i>	White mangrove				x		
<i>Lantana camara</i>	Lantana	x	x	x			
<i>Liatris sp.</i>	Blazing star			x			
<i>Lippia nodiflora</i>	Frog-fruit		x				x



Table 1. Weedon Island Preserve - Plant Species List (continued)

Scientific Name	Common Name	Observed					
		Mesic Pine Flatwoods	Dry Prairie	Scrubby Flatwoods	Estuarine Tidal Swamp	Estuarine Brass Bed	Ruderal
<i>Ludwigia decurrens</i>	Primrose willow				x		x
<i>Lyonia ferruginea</i>	Rusty lyonia	x	x	x			
<i>Lyonia lucida</i>	Shiny lyonia	x		x			
<i>Magnolia virginiana</i>	Sweet bay magnolia	x					x
<i>Malavaviscus arboreus</i>	Turk's-cap mallow	x					x
<i>Melaleuca quinquenervic</i>	Melaleuca						x
<i>Melia azedarach</i>	Chinaberry						x
<i>Mikania scandens</i>	Hemp vine	x	x				x
<i>Momordica charantia</i>	Wild balsam apple	x					x
<i>Monarda punctata</i>	Horsemint			x			x
<i>Myrica cerifera</i>	Wax myrtle	x					x
<i>Opuntia stricta</i>	Prickly-pear cactus	x	x	x			x
<i>Physalis walteri</i>	Ground cherry						
<i>Phytolacca americana</i>	Pokeweed	x					x
<i>Pinus elliotii</i>	Slash pine	x		x			x
<i>Poinsettia cyanthophora</i>	Painted-leaf	x	x				x
<i>Polygala nana</i>	Batchelor button		x				x
<i>Pteridium aquilinum</i>	Bracken fern	x	x	x			x
<i>Pterocaulon virgatum</i>	Blackroot	x	x	x			x
<i>Quercus chapmanii</i>	Chapman's oak			x			
<i>Quercus geminata</i>	Scrub live oak			x			
<i>Quercus virginiana</i>	Virginia live oak			x			
<i>Rhizophora mangle</i>	Red mangrove				x		
<i>Rhus copallina</i>	Winged sumac	x		x			x
<i>Ruppia maritima</i>	Widgeon-grass					x	
<i>Sabal palmetto</i>	Cabbage palm	x		x			x
<i>Sabatia brevifolia</i>	Narrow leaved sabatia	x	x				
<i>Salicornia virginica</i>	Glasswort				x		
<i>Schinus terebinthifolius</i>	Brazilian pepper	x		x	x		x
<i>Scoparia dulcis</i>	Sweet broom	x	x				x
<i>Serenoa repens</i>	Saw palmetto	x	x	x			x
<i>Sesuvium portulacastrum</i>	Sea purslane				x		
<i>Setaria sp.</i>	Small foxtail		x				
<i>Smilax auriculata</i>	Greenbriar	x	x	x			x
<i>Smilax laurifolia</i>	Catbriar	x	x	x			x

Table 1. Weedon Island Preserve - Plant Species List (continued)

Scientific Name	Common Name	Observed					
		Mesic Pine Flatwoods	Dry Prairie	Scrubby Flatwoods	Estuarine Tidal Swamp	Estuarine Brass Bed	Ruderal
<i>Strophostyles helvola</i>	Sand bean				x		
<i>Thalassia testudinum</i>	Turtle grass					x	
<i>Toxicodendron radicans</i>	Poison ivy	x		x			x
<i>Urena lobata</i>	Caesar-weed	x					x
<i>Vaccinium myrsinites</i>	Shiny blueberry		x	x			
<i>Vitis rotundifolia</i>	Muscadine	x					x
<i>Yucca aloifolia</i>	Spanish bayonet			x			

These flatwoods communities are classified by the Florida Game and Freshwater Fish Commission as potential gopher tortoise habitat and 72 gopher tortoise burrows were observed during the Parsons ES site survey.

A building with paved access and parking areas, landscaping, and a storm water retention facility is planned for the interpretive center complex. Parsons ES recommended that these be located within previously disturbed portions of the site to minimize impacts to the native flatwoods community. New plantings will be material native to the preserve or to the types of communities found in the preserve. This will reduce the need for irrigation while preserving and enhancing the native ecosystems.

The other areas proposed for improvements are located in a variety of communities.

Natural communities located adjacent to the main access road vary from scrubby flatwoods to estuarine tidal swamp. The latter is dominated by red mangrove (Rhizophora mangle), black mangrove (Avicennia germinans), white mangrove (Laguncularia racemosa), and buttonwood (Conocarpus erecta) in the canopy, with glasswort (Salicornia virginica) and sea purslane (Sesuvium portulacastrum) as ground cover. This study recommended that improvements to the access road use the existing roadway surface, to avoid impacts to natural communities and to archaeological resources.

The maintenance and residence area improvements are proposed for a location that currently supports similar uses. This location is surrounded by mesic flatwoods, and no expansion of the existing developed areas is proposed.

The fishing pier is proposed to be removed and replaced in the same footprint as the existing pier. Natural communities associated with this structure include estuarine grass beds, tidal swamp along the shoreline, and developed land along the access road to the fishing pier. Estuarine grass beds are extensive on all sides of Weedon Island and are vegetated with the marine grasses Thalassia testudinum, Halodule wrightii, Ruppia maritima, and various algae. Because the footprint of the pier will not be changed, no permanent impact is expected to the natural communities.

The boardwalk alignments are located in the tidal swamp community. In most areas, the boardwalk is proposed to be located on top of existing spoil berms, which were created during dredging of mosquito control ditches. Vegetation along the spoil mounds is dominated by the exotics Australian pine (Casuarina equisetifolia) and Brazilian pepper (Schinus terebinthifolius). Placement of the boardwalk along the spoil mounds will have the benefit of requiring removal of exotic vegetation and will minimize impacts to the tidal swamp natural community.

### **Protected Species Review**

The detailed survey of protected species focused on the gopher tortoise, federally-classified as a Category II species, and state-listed as a species of special concern. Parsons ES observed 72 gopher tortoise burrows, 22 active, 34 inactive, and 16 old, in the area proposed for the interpretive center complex. Approximately 100 percent of the site was surveyed, since all of the area is potential gopher tortoise

habitat. Only active and inactive burrow locations are considered in the population estimate, per the method of Auffenburg and Franz (1982).

In the flatwoods community, 56 burrows (22 active and 34 inactive) times the 0.614 conversion factor equates to 34 tortoises that use the proposed improvement area. This indicates a density of approximately 1 tortoise per hectare.

To allow development of the interpretive center complex, Parsons ES recommended relocation of tortoises through consultation with Florida Game and Fresh Water Fish Commission. Procedures necessary for this alternative include identification and survey of a recipient site capable of supporting an increase in tortoise density, securing relocation permits, trapping and moving the tortoises, and development of a relocation plan.

Construction of other proposed improvements is not expected to directly affect protected species. Parsons ES recommended that the County coordinate with the U.S. Fish and Wildlife Service and the National Marine Fisheries Service to identify precautions required in potential manatee (Trichechus manatus) areas during construction of the replacement fishing pier.

## **Wetland Evaluation**

With the exception of the boardwalk entrance, no wetlands were identified in the proposed interpretive center area, nor in the area proposed for maintenance building/residence improvements.

Construction of the boardwalk entrance is proposed to be located in a wetland located south of the interpretive center complex. Vegetation observed along the upland edge included beautybush (Callicarpa americana), Turk's-cap mallow (Malavaviscus arboreus), saw palmetto, and horsemint (Monarda punctata). The wetland has 7 to 15 meters of predominantly freshwater wetland vegetation along the upland/wetland fringe. A predominance of Alabama flatsedge (Cyperus ligularis), swamp fern (Blechnum serrulatum), and hydric soils define the wetland boundary. Tidal swamp vegetation was observed in the main portion of the wetland. Red mangrove, black mangrove, white mangrove, and buttonwood are the dominant species. Australian pine and Brazilian pepper vegetate the upland spoil berms within the wetland.

Construction of approximately 3,500 linear meters of boardwalks with tiered observation towers will impact these wetlands. Parsons ES recommended that, whenever possible, the boardwalks be located on top of upland spoil berms created by historical mosquito ditching. Minimal impacts from crossing mangrove-lined ditches are expected. Construction of observation towers in the wetlands will require temporary construction of access roadways. These access roadways will be located on top of upland spoil berms or routed through non-forested wetlands. Where wetland impacts are minimal, the roadways will be considered to have temporary impact. Disturbed areas shall be restored to the pre-construction condition. Excessive or permanent impacts to wetlands will require mitigation.

In order to determine mitigation and/or compensation requirements for the boardwalk impacts, cross sections of representative wetland ditch crossings will be

prepared and an average wetland impact will be determined. The total wetland impact will be calculated by multiplying the number of crossings by the average acreage of wetlands per crossing. Mitigation for impacts to tidal swamp wetlands is proposed at one-to-one, type-for-type. Any additional mitigation may be achieved through enhancement activities, exotic plant management plans, etc.

Improvements to the main access road are expected to be contained in the existing cleared right-of-way with the exception of constructing additional parking and improving rest room facilities near the fishing pier and possible improvements to a culvert crossing. A portion of the existing access road has jurisdictional wetlands along one or both sides. These tidal swamp wetlands are dominated by mangroves.

The improvements to the main access road turn-around and rest room area will impact historically disturbed wetlands. These impacts will not require wetland mitigation. However, impacts that may occur to the adjacent tidal swamp wetlands, including those at the culvert crossing, will require wetland mitigation.

The fishing pier is located in the tidal waters of Riviera Bay. Wetlands associated with this area include estuarine grass beds located in the general vicinity and tidal swamp along the shoreline. Replacement of the fishing pier will be in the same footprint as the existing structure; therefore, no significant impacts to wetlands are expected.

## **Exotic Plant Control**

Aerial photos dating as far back as 1926 show vegetation disturbance from dredge spoil piles and clearing activities associated with cultivation construction of dwellings. Most of the upland areas within the preserve were altered during development associated with the dance hall and the airfield.

Predominant exotic tree species present in disturbed upland and lowland areas of the preserve include Brazilian pepper, Australian pine, ear-tree (Enterolobium contortisiliquum), chinaberry (Melia azedarach), and melaleuca (Melaleuca quinquenervia). Additional exotic species include bamboo (Bambusa sp.), Turk's cap mallow, and air potato (Dioscorea bulbifera). In addition, most mangrove areas of the preserve were draglined for mosquito control in the 1960s. Spoil mounds from these dredging activities have been heavily colonized by Australian pine and Brazilian pepper.

The state initially implemented an exotic plant control program to eradicate exotic and nuisance plant species from the preserve, as detailed in the Exotic Plant Control Management Plan section of the Unit Management Plan. This program has continued under Pinellas County management of the preserve. The exotic plant control activities to date have successfully eliminated undesirable species in many accessible areas of the preserve; most of these areas are currently in the maintenance phase. Due to a lack of manpower and funding, the exotics control management plan has not been implemented in most areas that are less accessible.

Current exotic plant control techniques used at the preserve include manual removal, herbicide application with Garlon 4/diesel solution, and burning. Mechanical removal is not effective for control of Australian pine, Brazilian pepper, or melaleuca

when used alone because the soil disturbance creates conditions for regrowth from seeds and root fragments, and allows further invasion by pioneering exotic plants. Intense follow-up with other control methods is also required. In addition, this technique is not recommended for natural areas due to disturbance of soil and potential damage to non-target vegetation. Burning is currently used for maintenance of flatwoods areas, but is not applicable to remaining areas requiring exotics control (mangroves, xeric hammocks). Water level manipulation is not readily applicable due to constraints and tolerance of exotic species present. Effective biological controls are not currently available for exotic species present at the preserve.

Activities associated with the proposed management plan will provide an opportunity for exotics removal and maintenance in some areas of the preserve by providing improved access. For example, the approximately 3.5 kilometer boardwalk will improve access for exotics removal, disposal of plant materials, and maintenance in mangrove areas. Design of the boardwalk to allow small carts and chippers/shredders will greatly facilitate removal of exotics along, and adjacent to, the proposed boardwalk.

Parsons ES recommended that precautions be taken during all grading and filling activities associated with the preserve improvements, as well as the removal of large-stem exotics, to minimize the enhancement of seedbed conditions. Damage to non-target vegetation and potential water quality impacts are potential concerns for exotics control in mangrove areas. Herbicides effective for Australian pine and Brazilian pepper control are not selective and mangroves are highly sensitive to these herbicides. Overspray and heavy rainfall following application can wash the herbicide off the trunk and damage non-target vegetation and/or enter surface water. For these reasons, use of injection techniques instead of basal bark or girdle application is preferred for exotics control in mangrove areas.

## **CONCLUSIONS**

Much of the uplands within the preserve, including the location of the proposed interpretive center complex, was altered during development earlier in this century. The mangrove areas were draglined for mosquito control during the 1960S. These activities have resulted in disturbance of native communities and invasion of exotics in many parts of the preserve. Today, the County is working toward restoration of these areas through the exotic plant control activities and prescribed burn programs. The proposed improvements, while increasing the public use value of the preserve, also offer opportunities for ecosystem improvement as well. Recommendations for siting have the goals of minimizing impact to natural communities and incorporating restoration and preservation to the maximum extent possible.

## **ACKNOWLEDGEMENTS**

The authors wish to acknowledge the special assistance from Mr. Keith Thompson, Pinellas County Park Department Weedon Island Preserve Supervisor. Thanks are also extended to Ms. Kim Marler and Mr. Robert McConnell of Parsons ES for their work in analysis of biological resources and to Dr. Petar Glumac, Parsons ES, for his work on historical and archaeological resources.

## LITERATURE CITED

- Allen, M. 1988. Wildlife survey methodology guidelines for section 18D of the Application for Development Approval. Florida Game and Freshwater Fish Commission. Tallahassee, FL.
- Auffenburg, W.G. and R. Franz. 1982. The status and distribution of the gopher tortoise (Gopherus polyphemus). pp. 95-126 in: Bury, R.B. (ed.), North American Tortoises: Conservation and Ecology. Wildlife Research Report 12: U.S. Dept. Interior, Washington, DC.
- Florida Natural Areas Inventory. 1990. Guide to the Natural Communities of Florida, Tallahassee, FL.
- Pinellas County Park Department. 1993. Weedon Island State Preserve Unit Management Plan. Pinellas County, FL.
- Thompson, K. 1992. The Weedon Island Story. Florida Department of Natural Resources, Division of Recreation and Parks.