Sarasota Bay Mangroves 1991: Past Alterations and Future Possibilities

By Thomas William Mayers

A Thesis Submitted in General Studies New College of the University of South Florida in partial fulfillment of the requirements for the degree of Bachelor of Arts

Under the Sponsorship of John Morrill

Sarasota, Florida May, 1991

Dedication

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This thesis is dedicated to the people who encouraged me to do it. My Mother, my family, my friends, and my professors all have added to what you see here. Special thanks to John Morrill, my thesis committee, and everyone listed under mangrove information at the end of this thesis. This is also for Sarasota Bay and all the creatures great and small that inhabit it; in recognition of the good years it has given us and with best wishes for the future.

Tom Mayers

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Ancient Worship

We are inextricably connected in a symbiotic relationship with the plants and animals in the environment of Sarasota Bay. Humans have completed a full circle here, going back to ancient times when the Paleo-Indians and Indians were pantheists. For thousands of years ancient Indians worshiped nature and enjoyed the bounty that it offered them in return. Today we have a similar choice: to worship, revere, and respect nature or to suffer from the imbalance created by an egotistical oversight. Our health and quality of life are directly related to the mangrove's health and quality of life.

Evolved

The mangroves have evolved and survived by fitting into the natural process of sea level rise and fluctuation. For at least the past ten to fifteen thousand years, humans on the west coast of Florida have adapted to these conditions by moving with the shoreline as it moved up and down the fringe of the Florida peninsula. For millions of years, the mangroves have followed this same pattern. They are defined by their ability to live in this tropical and subtropical intertidal zone and to move with the sea level in order to survive.

Today, humans differ from the past Paleo-Indian seminomadic practices of few possessions and ease of movement in response to environmental change. Billions of dollars have been invested and are being invested on fixed structures and elaborate buildings and possessions in the Sarasota Bay area. We have settled here sharing the shoreline with the mangroves, and they are one of our most prominent and important environmental features.

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- 15. There is not enough significant mangrove revegetation to offset mangrove destruction.
- 16. There is confusion at the state level concerning the protection of mangroves.
- 17. Local governments need to address regionally specific environmental concerns, like mangroves, when the state does not take the lead.
- 18. Reducing the amount of mangroves by pruning decreases their value to the environment by at least the amount of pruning done.
- 19. One of the worst things you can do to a mangrove is to over prune it.
- 20. The legal basis for mangrove protection is and should be ownership.
- 21. DNR should be the state agency monitoring mangrove protection and not DER.
- 22. The public desires a healthy environment.
- 23. There are about 45% red mangroves, 45% black mangroves, less than10% white mangroves, and less than 1% buttonwood in my survey area.



Sarasota Bay Mangroves 1991: Past Alterations and Future Possibilities General Studies Program Thomas William Mayers, Bachelor of Arts New College of the University of South Florida, 1991

ABSTRACT

The central part of this thesis is a survey of the mangroves of Sarasota Bay, included in the Sarasota Bay Mangrove Extents 1991 section of this document. Thirty-seven 1 inch=200 feet recent aerial photographs were used as a base for mapping the mangroves; over the past six months, I ground truthed these by boat and on foot. Included are field notes and pictures which show the height, type, and condition of most of the mangroves existing today, May 1, 1991. Despite my efforts to be exact, I am claiming 90% accuracy.

The text of Sarasota Bay Mangrove Extents 1991 is a description of the shoreline that follows the mapping clockwise from Cortez Bridge, south along the Manatee County shoreline to the John Ringling Bridge, and back to the Cortez Bridge along the Longboat Key and Bradenton Beach shorelines, including Jewfish Key and Sister Keys and the offshore bay islands. In the text are introductory pieces before the survey and concluding observations after it.

Two videos add another dimension to the inquiry: Sarasota Bay Mangrove Views 1991 presents authorities of mangrove studies and Sarasota Bay Fly Around is a lineal helicopter survey of the shoreline of the study area.

Dr. John B. Morrill, Faculty Sponser_

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Introduction

Mangroves

Mangroves are one of the most prominent features of Sarasota Bay. They exist on islands in the bay, as an interrupted fringe around the shoreline of the bay, and in ditches, canals, and bayous. They have been destroyed in places to make way for human development and have adapted to the various perturbations by inhabiting some of these human-made land forms.

The primary geographic area of mangroves in Florida lies along the coast of south Florida between Cape Canaveral on the east and Tarpon Springs on the west (Odum et al, 1982) and the Florida Keys. Mangroves exist world-wide as tropical trees and shrubs that have adapted to loose, wet soils, saline habitat, periodic tidal submergence, and usually have degrees of viviparity of propagules. Although there are more than 12 families and more than 50 species of plants throughout the tropics designated as mangroves (Chapman, 1970), we have only three halophytic species we call mangroves in Florida. These trees are the red mangrove, <u>Rhizophora mangle</u>, black mangrove, <u>Avicennia germinans</u>, and the white mangrove, <u>Laguncularia racemosa</u>. These trees, along with the buttonwood tree that is sometime called a mangrove and other plants in their association, dominate the shoreline vegetation of Sarasota Bay. Mangrove is a catch-all, botanically diverse, nontaxonomic expression (Chapman 1970) given to these trees which can mean an individual specimen or a entire plant community (Macnae, 1968).



This chart simplifies a complex natural phenomenon. It does not include the buttonwood and other plants in this saltwater wetlands plant community. It does not account for the white mangroves that sometimes grow below the Mean High Water Line or the black mangroves that often are found landward of the Mean High Water Line. What it does do is help us understand mangroves and the difficulty in applying simple terminology to complex natural phenomena. If you want to see these problems in action, look at the mangrove pruning rule and its brief history.

One application of this model could be in forming a simplified rule. Most mangrove pruning or destruction debates center around who owns the mangroves. Basically, the state of Florida says mangroves by definition grow in salt water; therefore, they belong to the state and the public. When the scientific basis of this statement is studied, it reveals flaws in this argument. In fact, not all mangroves grow in the water (below Mean High Water Line). As I have just stated, white mangrove do not usually fit into this description, and black mangroves are often

found above this Mean High Water Line. Further, the buttonwood is often called a mangrove and almost never grows below the Mean High Water Line.

On the other hand, homeowners sometimes claim that mangroves are trees and trees are generally a land feature; therefore, the homeowners should own the property that extends to the farthest tree. With this understanding, they should be allowed to do what they like with their property; mangrove regulation is perceived as another case of the state infringing on individual rights.

With these two sides of the story presented, a compromise is in order. This is exactly what the mangrove pruning rule is trying to accomplish. By dealing with all the factors in their complexity, the rule has been at best a confusing effort to regulate a complicated issue. Any effort to simplify this mangrove rule would have to include a compromise that clearly defines the issues and offers a fair solution to each side. Using this simple model, we can hypothesize a fair compromise that would be easy to regulate. As red and black mangroves generally grow in the water, they could be protected as property of the state. As the white mangrove and the buttonwood generally grow landward of the water, they would be considered upland plants and subject to city or county zoning laws.

As in any simplification, this would only be a general guideline, and there could be exceptions based on further inquiry into particular sites. Any damage or pruning to the state trees, the red and black mangroves, would require a permit from the state. Any damage or pruning to the upland mangroves, the white mangrove and the buttonwood, would require a local city or county permit. In the final analysis, a survey will be needed to establish the Mean High Water Line and that point should be and is the dividing point of state and individual property rights.

Sentinels

Large black mangroves are the seaward mangroves in some of Sarasota Bay's mangrove fringe. As the sea level has risen in the past 100 years, these large, old sentinels hold the shore as younger red mangroves move upland of them in thick fringe areas. Dense pneumatophore mats of these large trees are often equal in biomass to the upper story branches and canopy. These trees may be destined to fall to erosion as the sea level rises; many are in the process of doing so around the bay. But, until then, they will remain stalwarts in the mangrove fringe natural erosion defense.

This phenomenon gives us a gauge to measure the gradual rise of sea level over the past 50 to 100 years and shows this level of rise to be less than 1 foot. Further, the location of seagrass beds immediately offshore of the mangrove fringe along the bayshore may show previous extents of mangroves.

This delicate but strong interrelationship of the mangroves and seagrasses is matched by the web of intricate complexity in the interdependent detrital cycles. The mangroves are well known as producers of large amounts of leaf and branch detritus. The upland plants also have a season of leaf fall. Seagrasses have the same process of seasonally losing leaves. These three detritus cycles occur at slightly different times of the year, with the ultimate time release fertilizer process as the result. As one of these plants is producing detritus, the other receives the benefit from it. The seagrasses lose their leaves in large quantities at the end of summer. These leaves wash into the net of mangrove roots and are held there while they gradually decompose. Even the red tide is part of this infinitely complex cycle

of nature at work fertilizing.

When we try to solve our human problems by dredging and filling to get to deep water, getting rid of mangroves because they interrupt our view or are thought to harbor rats and snakes, and clear cut and replace natural upland woods, we are part of this cycle. Our part has now become the biggest part in the survival of this ancient natural system. Once upland plants are removed, the mangroves will suffer; once the mangroves are diminished, the seagrasses will suffer from a lack of fertilizer and so on.



Relativity

Humans have had a long relationship with nature. Our views, which have evolved over thousands of years, were formed at a time when nature was in excess with pristine waters and vast forests. The human attitude brought from Paleo-Indian times is that nature needs to be conquered in order for humans to be comfortable. Today, we should react to recent changes in conditions by adapting to a diminishing environment on Sarasota Bay.

As humans displaced nature, they found at some point they missed something they had displaced. So, humans formed their first ecological thoughts on the basis of their needs and scarcity. At this time, our own ecological thoughts are based on the same principles. It is to our own interest to pursue the protection of mangroves: whatever protection means. The intent of our actions should be based on our desire to protect and cultivate these endangered species that provide us with so many benefits: the mangroves of Sarasota Bay.

What should be done to manage the bay? The answer is relative to the point in time the question is asked. From 1950 to 1960, dredge and fill finger canals seemed an excellent solution to the problem of too much environment. From 1960 to 1970, people began to see isolated environmental problems, where nature lost the competition for space. Laws have been enacted to protect the environment from 1970 to the present day. A dredge and fill finger canal project that was justified by the abundance of mangroves in 1960 would be inappropriate today. These laws are becoming more restrictive and have their basis in a concern for the health and welfare of the public.

The Project

Since about 50% of the original mangrove area on Sarasota Bay has been destroyed by human habitat development (based on this survey), the remaining mangrove areas are of essential value to the human population. Problems created by the loss of these vital areas will cost the taxpayers millions of dollars and diminish the quality of life in the bay area. This project interprets information gathered in current and past studies and maps mangrove areas existing today. The philosophy and legislation that has shaped our evolving perception are discussed, and possible maintenance scenarios are compared. The purpose of this project is to increase the public's awareness by defining, describing and mapping mangrove extents.

A volume of maps accompanies this thesis to show the extent of existing mangrove areas using recent 1 inch = 200 feet aerial photographs (ground-truthing for accuracy). Shoreline alterations and mangrove areas are clearly defined in these maps and discussed in general and on a site specific basis in the text of this thesis. Recent photographs and field notes have been included with these maps.

A video, Sarasota Bay Mangrove Views 1991, presents authorities on the subject speaking about their understanding of the present mangrove situation; their remarks are interspersed with Sarasota Bay aerial footage and wildlife and nature scenes. Another video, Sarasota Bay Fly Around, will take the viewer on a video trip, showing the shoreline of Sarasota Bay by helicopter, from Cortez Bridge, clockwise around the bay, back to Cortez Bridge. This video presentation of the Sarasota Bay survey area shoreline shows alterations and the remaining mangroves.

It is provided as a reference for shoreline studies with 10 copies already distributed



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tai suntao berrer - Accuracy

In this survey and mapping, I am claiming 90% accuracy for many reasons. Foremost among these is to account for inconsistencies and to express the degree to which these maps are reliable. Every attempt has been made to be as accurate as possible, but there is no doubt that there will be inaccuracies. Look out your window or walk down the street to the bayshore and you will find 100% accuracy. There is no way I can claim this report will hold up under this scrutiny.

Why 90% accuracy? It is a conservative number. I might have claimed 95% accuracy and not been far off. If I missed an illegal pruning or claimed one incorrectly, just put that in the 10% inaccurate. If there is a small clump of mangroves overlooked, include that in the 10%. The intent of this report is to give a general idea of the state of our mangrove areas on May 1, 1991. What I have documented are the cumulative effects of the past construction of humans and the changes brought about by nature. What 90% accuracy will give you is the big picture. Large nature areas with no designation or management plan stand out as well as small and large areas of mangrove fringe shoreline that are ripe for development. Altered shoreline can be compared in quantity to mangrove areas for the bay and in specific locales.

Admittedly, this report is limited in its consideration of Sarasota Bay since it focuses on mangroves. Among the numerous other significant factors are pollution from humans and human development, seagrasses, sea water quality and circulation, upland plants, noise, benthic animals, and tidewater mosquitos. These and other factors directly effect the health of Sarasota Bay and the quality of life we

enjoy here.

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Salvage

The term salvage ecology is taken from salvage archaeology, that is, archaeology in front of the bull dozer. As time passes, we see more and more of the little natural environment remaining whittled away on all fronts. The purpose of video taping and recording what is left is to assure a record is made of the current extents. Mapping from aerial photographs and ground-truthing further define, delimit, and describe these mangrove areas.

State, county, and city governments work on a site by site basis. They begin to look at an area after a permit has been applied for, or a violation has been reported. Often this is too late, as the perturbation has occurred, and it is almost impossible to determine what was there before the site was altered.

The primary advantage of video taping from a helicopter to monitor the mangrove fringe is that it provides an easy reference to the condition of specific areas of the bay at the date it was filmed in a format familiar and available to most people. Vital information is easily obtained through these video tapes and is available for reference.

Because it is easy to extrapolate previous extents after viewing the entire shoreline, these video tapes can be used for conceptualizing and planning. Past shoreline management practices can be reviewed and considered; future mangrove alterations can be anticipated. The helicopter video technique can give precise information in a concise form on a large scale project, such as this study of mangroves on Sarasota Bay. Public money would be well spent video-taping the mangrove shoreline on a regular basis.



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Mangrove Extents on Sarasota Bay 1991

extent (ik-stent'), n.,

- the space, amount, or degree to which a thing extends; size; length, breadth.
- 2. scope; limits; comprehensiveness; coverage.
- an extended space; vast area: as, an extent of woodland.

Webster's Dictionary New World College Edition

Manatee County Mainland Shoreline, Cortez Bridge South to Manatee County-Sarasota County Line

Mangrove extents exist in many forms on Sarasota Bay. Some are the remnants of the original mangrove fringe around the bay shore; there are many islands composed wholly or partially of mangroves, and there are mangroves in human-made ditches, canals, and bayous.

In this study, I divided the bay into contiguous mangrove areas for ease of identification and description. These areas consist of one site or several adjacent sites grouped together under a unifying name: for example, the <u>Bird Islands off</u> <u>Cortez</u>, the <u>Cortez Shoreline</u>, and the <u>Two spoil islands off the Paradise Bay Trailer</u> <u>park docks</u>. While these areas are arbitrary, they help in the recognition of locations. These mangrove areas are underlined throughout this document.

Each area has unique qualities that deserve discussion and present possible problems or models for future solutions in mangrove management. By comparing sites, we may learn from the past fifty years of shoreline alterations made by humans. In this age of advanced technology, clear thinking in comparing these sites and learning from our historical perspective will be more valuable than the most powerful computer. This general survey of the mangrove areas of the bay can serve as a data base for ground-truthing LANDSAT computerized maps of existing Florida wildlife habitat. It will also give directions to some of the most pristine, beautiful areas of the bay. By informing the public about these areas and collecting information on them, I hope to help protect them by facilitating passive public use and appreciation of our mangrove

(nature) areas on Sarasota Bay.

This description begins at the Cortez Bridge at the north end of the bay and continues clockwise around the bay's shore south to the Ringling Bridge and Causeway then continues clockwise up the Longboat Key bay shore back up to the Cortez Bridge. The Manatee County mainland shoreline is the beginning, the Sarasota mainland shoreline is next, then the Ringling Causeway-St. Armands Key-City Island shoreline, and so on up Longboat Key and back to the Cortez Bridge, concluding with Jewfish and Sister Keys.

The Cortez shoreline, which has few mangrove sites, can be characterized as 90% seawall and rip-rap and less than 10% mangroves. This area extends from the bridge to the southern-most fish house in Cortez. These mangrove sites illustrate the value of these few areas in improving the environment in a heavily used, industrialized fishing center. Several small mangrove sites improve their surrounding environment in Cortez. Just north of the Coast Guard station is a small fisherman's house with a healthy, dense stand of about 50 mixed red, black, and white mangroves about 20 feet high separating the house from the bay. These trees provide erosion control and aesthetic and privacy values, as well as other advantages over the rip-rap and seawalled shoreline adjacent to this site. The largest mangrove sites here are to the north and south of Sigma Fish House. These are good models for the fringe mangroves' use: relatively unpruned with boat docks running offshore and as a buffer for the large, modern, fish packing house immediately upland. Here the mangroves function as landscaping and as a filter for noise in a busy, heavily used area. The proportion of mangrove shoreline to seawalled-rip-rapped altered shoreline here in Cortez is

similar to the proportions Sarasota Bay could have had without mangrove protection legislation. It is important to note the high landscapingaesthetic values and the utilitarian filtering values of these mangrove trees in heavily used public areas, which is rapidly becoming the dominant condition on Sarasota Bay.

Audubon Bird Island Sanctuary off Cortez has two small mangrove islands offshore, one to the south and one to the east of the north tip of Bird Island. These two small islands, about 500 feet off Bird Island, serve as habitat for birds. The small one off the north east tip, about 10 feet in diameter and 5 feet tall, consists of stout, stunted black and red mangroves on an oyster bar. About 100 feet in diameter, the island to the south of Bird Island is on mud substrata where the 20' to 25' red and black mangroves are well established.

Awash at high tide, Bird Island is valuable as a large (1,800 feet long by 100 feet wide) nesting and roosting site for many birds. There is a year round population of pelicans, ibis, egrets, frigate birds, cormorants, and herons. Red, black, and white mangroves vegetate the island in that order of density. These islands, isolated offshore, are important to the birds because they lack predators like raccoons and snakes that can cause havoc in a nesting or roosting population. Problems associated with this large natural resource to our bay system are erosion from waves caused by storms and by boat wakes from the intracoastal waterway and natural pruning caused by excreta of the large bird population. One solution to the diminishing mangrove stand on the island has been attempted in several revegetation plantings by local groups of Organized Florida Fishermen (OFF), the National Audubon Society, the Florida Department of Natural Resources, and the

University of Florida Marine Extension Service.

These islands off Cortez are accessible only by boats with shallow draft at high tide. They are surrounded by extensive seagrass beds, and care must be taken not to scar the seagrass beds and hit some of the oysters, rocks, and general debris in the surrounding waters with one's outboard motor. Landing and walking on Bird Island is restricted (by permission only) by the National Audubon Society to protect the baby birds during nesting season and to offer the roosting birds sanctuary at all times.

These islands and the village of Cortez itself would make a pleasant cance trip for bird watching and photographing. The beautiful and endangered white pelicans migrate here every year and add to the local scenery. This area has the unique character and flavor of an old Florida fishing village and a modern fish processing industry. There are several fish houses in Cortez that retail or wholesale fish, a seafood restaurant, a Coast Guard station, and day-trip deep sea fishing boats by the base of the Cortez bridge to the north.

On the mainland shore, next to Bird Island, is a beautiful large mangrove stand that covers over 2500 feet of shoreline and is over 800 feet deep; the mangroves have an average height of 35 feet. This shoreline between Bayshore Fish House and Paradise Bay Trailer Park is important because of its large size and its location between two heavily developed areas. Access points into this dense mangrove interior can be the many drainage ditches; and this mangrove property has some exotics intruding on the spoil piles. The slight intrusion of Australian pine and Brazilian pepper is common throughout the bay where mangrove land was ditched, leaving upland spoils to support these

exotics. This is more of an inconvenience than a major problem as the exotics are not gaining ground in the mangroves' saline environment.

The removal of these exotic trees could be a management policy but should be low on the list of things to do in these remote mosquito ditched locations since it would be difficult and expensive to remove these isolated trees. The upland area of these mangroves is highly varied from native pine flatwoods and oak hammock to saltern areas with saltwater wetlands extending to Cortez Road; culverts connect these to additional mangrove and saltern areas to the north of Cortez Road. A best management plan should include an improved water circulation plan to insure that these large saltwater wetlands do not become physically isolated from the bay waters. Between this property and the Paradise Bay Trailer Park is a large pond with freshwater aquatic weeds in the water; exotic grass and ornamentals on the trailer park, land side; and mangroves on the other side. This upland property, with its unique and valuable wetlands, is one of the few large undeveloped areas on the bayshore and should be carefully monitored to ensure that the varied mangrove areas throughout the uplands and to the north of Cortez Road are preserved.

Farther south, off the Manatee County shore, are <u>two spoil islands which</u> resulted from a major channel dredging from the Paradise Bay Trailer Park to the deep water of the bay. These islands have exotic Australian pines and Brazilian pepper along with native buttonwood trees upland. The fringes of these two islands contain red and black mangrove with white mangroves between them and the upland plants. These are good examples of artificially created islands serving as habitat areas for wildlife and as filtering areas to offset human density. As we

look to the future of a predicted sea level rise and diminishing shoreline mangrove fringe areas, these artificially created islands are models for possible alternate sources of land areas for future mangrove growth, wildlife habitat, and public recreation in the Sarasota Bay system.

Between these islands off the Paradise Bay Trailer park and the Mount Vernon subdivision is an "interceptor canal" which was dredged through the mangroves in much the same way as the Arvida canal on south Longboat Key. Offshore of the canal is a finger of mangroves about 1,000 feet long by 20 feet wide at the tip and 50 feet wide at the base of the finger. This finger has been pruned recently, leaving some canopy and pruning debris, which could be a pruning violation on state property. The homes on the mainland side of this canal have some seawall, rip-rap, and mangrove shore, with exotic St. Augustine grass and manicured yards. Some of these mainland homes provide good examples of a preserved mangrove fringe, with boat docks offshore for an adequate access point to the bay.

There is a valuable high priority isolated nature area at the base of this canal with black, red, and white mangroves growing to 35 feet and a detrital pond. Great care should be taken that these few isolated nature areas remain intact, especially where they are scarce. (Pruning here, that is relatively recent, appears to be on public property.) Oases to the wildlife, these areas are an essential part of a healthy bay. Where a nature area is left, the wildlife shows its appreciation by inhabiting it.

Mount Vernon is a large development covering about 1/4 mile of the

mainland shoreline northeast of the New College-Tidy Island Preserve. The entire shoreline was pruned around 1976 and has been continually pruned over the years. At the north end, little canopy is left, and all the mangroves are hedged to about 6 feet high. There is a good transition view of what was here before pruning along side the pruned area. It is obvious that the extent of the unpruned mangrove is more than double that of the adjacent pruned mangrove, the result of a trade off made when human desires for a breeze and a view oppose the wildlife's need for food and habitat. It is also a good example of applied pruning practice. Basically, the Florida Department of Environmental Regulation (DER) pruning rule allows 25% of the mangroves to be pruned; here, more than 50% pruning has occurred. **In viewing areas around the bay where over-pruning or pruning** violations have occurred, it is easy to see that great gains in mangrove area would occur if illegal pruning were discontinued.

There is a surprisingly large and beautiful high priority nature area on the south point of the Mount Vernon shore. Nestled between two story Mount Vernon buildings, several natural detrital ponds interconnect with the bay. Consisting of several acres of mangroves and ponds, this area is a valuable nature habitat. An existing isolated, altered pond here can be compared in value to the adjacent natural ponds. This pond could be engineered to provide more natural habitat through increased water exchange with the bay and could be vegetated with mangroves to enhance this area with a walking trail access point already in place for Mount Vernon residents.

About 600 feet offshore of the Mount Vernon development is a small island less than 75 feet in diameter, composed primarily of red mangroves about 15 feet

tall with a few black mangroves on an oyster bar.

Directly across from the Coral Shores Development is 1.000 feet of healthy mangrove fringe shoreline that is ripe for development. This mangrove fringe consists primarily of red and black mangroves about 20 feet high with a few whites on the inner fringe. This would be an excellent area to use offshore docks without pruning the mangroves (as was done at Sigma Fish House in Cortez). Another example of this approach can be seen just around the corner of this <u>shoreline at Bay</u> <u>Hollow Condominium</u>. Here the pruning is extensive and could be in violation of the law, but the trees were left, and the dock allows an adequate access point to the boats and bay water for the residents.

As we progress down the Manatee County, east Sarasota Bay shoreline, we arrive at the <u>New College-Tidy Island Preserve</u>. This area includes one of the largest and most valuable extents of mangroves in the bay system. It is actually a large peninsula that includes several islands, an embayment, and a modern housing development nestled in the middle of the mangroves of Tidy Island. The mangroves here should be preserved under agreements made when the housing development was permitted by state and local agencies around 1980.

Inside the embayment of the Tidy Island preserve is an island 200 feet by 400 feet, consisting primarily of red and black mangroves with a few whites in the higher elevations. Inundated at high tide, this island is a popular roosting spot for endangered Roseate Spoonbills. One of the most remote areas of the bay, this embayment of the Tidy Island Preserve should be considered a high priority nature area as a sanctuary with management policies including no spraying of insecticides, no motor boat traffic, and

increased public awareness of the value of one of the few Roseate Spoonbill roosting areas in the Sarasota Bay system. If we do not set aside a few of these areas now, with special management policies, there will be none left for future generations to enjoy.

The embayment has rock outcroppings, a hidden lagoon, extensive seagrass beds, ibis, ospreys, kingfishers, white pelicans, spoonbills, and wood storks that all make this area well worth a boat trip. You must take care not to scar the shallow seagrass beds or damage the motorboat propeller on the rocks scattered throughout the entrance to this embayment. It is a good idea to plan boat trips to these areas in small skiffs at high tide, as it is barely accessible by canoe at low tide. The large (25 feet) and otherwise healthy mangroves on the south shore of this embayment have freeze damage. Photographic possibilities abound; and it is good to stay a distance from the birds to avoid disturbing them.

In these mangrove areas, there has been extensive dredging in the past, both for an access and for mosquito ditching. Where this dredging and ditching occurred, there are spoil mounds with exotic Australian pine and Brazilian pepper interloping into the mangrove areas. These trees should be removed where it is easy to gain an access to them, but can be left without much danger to the mangroves in the remote spoil sites, as they are limited in their expansion by saline soils where the mangroves grow.

One long channel bisects the peninsula, creating a large island of the tip that is almost all mangrove with a few small spoil areas with Australian pine intrusion. These large mangrove areas are difficult to explore but can be an adventure for those few individuals who attempt excursions into the interiors. Acting as efficient

air, water, and noise filters for the surrounding human habitat, the value of the mangrove areas is similar to that of the rain forests of the world. They have value as a biological filter and oxygen producer in addition to the infinite diversity in animal life and other natural systems they harbor.

Tidy Island was developed around 1980. Interestingly, it was allowed partially because of the mitigation value of setting aside the large mangrove areas (discussed in the New College-Tidy Island Preserve). Further, the mangrove fringe in front of the houses was retained and pruned to allow the homeowners a view while attempting to maintain the beneficial ecological values which the mangroves provide. The balance of this mitigated settlement can be judged today by looking at the project as a whole. In the pruned area, some of the houses have no mangroves in front of them, and others have extensive mangroves. This development would provide an interviewer a unique data base for questioning individual homeowners on their valuation of their particular shoreline, with mangroves or without mangroves immediately in front of their homes. As all the houses are similar, it would give the interviewer the opportunity to find out how the variable shorelines are perceived by the homeowners.

This relatively recent and well recorded pruning could be used to suggest performance criteria for future pruning projects. In some of these shoreline areas, there are no mangroves or dead mangroves. Two causes for no mangroves or dead mangroves are over-pruning and erosion. The mangroves create a complex matrix of interconnected roots into a dense mat that holds soil and prevents erosion. When this fringe matrix of roots is broken, erosion occurs; and more than just one tree can be lost by removing one link in this protective mangrove chain. This medium energy shoreline can become a high energy shoreline during storms which can turn the tranquil bay into a rough four foot chop of wind whipped waves. During these times, much damage can occur to mangroves and upland property. If this explanation for the loss of mangroves is accurate, then great care should be taken by pruners to maintain the continuity of the mangrove mat of interconnected roots. Where this mat is narrow or thin, no pruning should occur, and revegetation should be attempted to reinforce the mat. Further, when planning beaches in or passages through this mangrove fringe, a subsequent loss of adjacent mangrove areas should be expected. In many locations throughout the bay, this phenomenon of uprooted plants next to adjacent areas of sand is obvious. This theory would be a good argument in favor of using docks for access through narrow mangrove fringe areas rather than making passages through them. The reasoning for this would be much the same as for beach dune overwalks: the continuity of the vegetation and roots would not be broken and will be more resistant to storm surges.

The pruned mangrove area at Tidy Island development presents some problems related to mangrove maintenance. The large areas of the shoreline that do not have mangroves might be revegetated because of the gradual slope and the fact that mangroves were once there; but now this shoreline is exposed to medium energy wave action with little protection from erosion. It is apparent in these revegetation situations that it is a difficult and expensive process at best when compared to the ease of taking a little care when doing the initial pruning. Revegetation of this fringe area will add to the wildlife habitat, scenic, and erosion control values here.

Another question at this and many other sites is how permitted pruning

should be handled within sites that have had major alterations of the mangroves in the past. Once a major pruning has occurred, in excess of the pruning guidelines, should additional pruning be allowed? The scenario at Tidy Island is an example: the developer negotiated with the local and state government agencies for mitigation and pruning guidelines, and a deal was made. After this, the individual homeowner bought the property and asked the local government for a permit to trim the mangroves that have already been trimmed. The homeowner received the permit, and the trees were pruned twice, violating the state regulation intent. In cases where mangroves have been damaged by pruning, further pruning activity should be restricted and revegetation required.

A major problem that arises when developments are constructed in remote locations, like Tidy Island, is that the homeowners complain about the sand gnats and mosquitoes that naturally occur there. These mangrove areas are then sprayed with insecticides that effect not only the mosquitoes and gnats, but crustaceans and animals that feed here. The mangrove extents that we have remaining are periodically sprayed with insecticides by helicopter; the birds and fish that rely on these areas to produce food are ultimately poisoned. If the people of Sarasota Bay do not realize the park-like importance of these mangrove areas, we will be missing snook, spoonbills, and wood storks along with the mosquitoes; we may even be causing physical damage to the humans here.

This is a modern problem with no easy solution; management plans for designated wildlife areas might help to clarify the issue. Another interesting approach would be to limit the quantities and use of herbicides and pesticides by our city, county, and state agencies. Are tidewater mosquitoes and sand gnats a

health problem, or are they just a comfort problem? Should designated wildlife areas be sanctuaries for the food as well as the fish and birds? Human labor could clear brush from ditches rather than using herbicides that will eventually end up in the bay. Some mangrove extents could be designated as sanctuary areas with management policies specifically restricting the use of herbicides and pesticides. Swatting mosquitoes and providing jobs for people may be creative ways to improve the environment.

Just south of the Tidy Island development, between it and the El Conquistador development near Bayshore Gardens, is the largest natural mangrove fringe area left on Sarasota Bay. This mangrove fringe is affected by the agricultural use of the Manatee Fruit Company on the upland side and is subject to regular discharge from the Manatee County Sewage Treatment Plant. It is obvious that the next plan for this upland area will be homes, lots of homes. This beautiful, extensive mangrove fringe and the uplands that are not yet developed present planners with the possibility of planning a large area of the bayshore from scratch with no houses presently built near the fringe. Careful planning could improve the quality of the bay in this area by removing the agricultural areas and causing the Sewage Treatment Department to alter the discharges into the bay. This extensive mangrove fringe would be a good area for people interested in the future of the bay to concentrate environmental planning efforts; nowhere else on the bay is there such a large scale opportunity to save valuable original mangrove fringe shoreline.

Many of the plans of "what we would do differently" if we could lay out the

whole Sarasota Bay shoreline again could be incorporated here while allowing the land owners economic return for their property investment. One plan suggested recently by the Sarasota Bay Project of the National Estuary Program could be implemented here to everyone's advantage. The creation of vegetated drainage ponds (i.e. interceptor swales) between the housing development and the bayshore could provide an attractive visual effect with the utilitarian values of a place for stormwater runoff and other drainage to be monitored and to settle out heavy metals and other pollutants before the water enters the bay. This plan together with a nature trail on the bayshore could help ensure the public health and safety while providing access areas to the waterfront.

It is useful to compare this mangrove fringe shoreline with the developed shore to its north and south. Both Tidy Island and El Conquistador were developed about 1980, with a narrow mangrove fringe in front of each development project. The property that extends 2.5 miles between these two developments has a deeper mangrove fringe that is in some places over 400 feet wide between Mean High Water Line and the seaward edge of the mangroves. The mangrove fringe and uplands between these two projects will most likely be a development of the 1990's. With the diminishment of most of the other similar mangroves areas, it would be sensible to try to preserve this mangrove fringe intact with a xeriscaped buffer between it and the uplands. Upland, above the Mean High Water Line, are native pine flatwoods and oak hammock that could be protected as an attractive nature park. Inland from these native woods are agricultural fields that lend themselves to development construction. The owners could be encouraged to retain a xeriscaped natural park

buffer by giving them the possibility for the same number of units, allowing increased density upland, in the field areas. Zero-lot-line and multi-story developments have become commonplace, and the tendency to build these types of structures will increase in the future. (The most recent developments just south of this land area already have six story buildings without the buffer area and with a reduced mangrove fringe.) The initial development costs can be kept down by leaving the mangrove fringe alone and by using natural landscaping in the shoreline park area. Government money might even be available to help with this landscaping by installing vegetated drainage ponds.

The coastline of these mangroves is very shallow (under 3 feet) for more than 1000 feet offshore. This shallow area is populated by seagrass on a substrata of mud and sand with scattered flat rocks and oyster bars. With these conditions, there would have been little chance of obtaining a permit for a deep water access point to the bay by dredging even 20 years ago. Further, nowhere on Sarasota Bay is there an example of a dock that would be long enough to reach the deep water here. The few areas left to develop on the Sarasota bayshore are mostly problem areas, with difficulties in obtaining standard deep water access. They have become refuges for the wildlife of the bay. White pelicans, eagles, herons, ibis, egrets, ospreys, wood storks, kingfishers, spoonbills, songbirds, and other animal species rely on these areas for their survival.

A new type of development can emphasize these features while the wildlife help sell home sites. It has been happening for years with Flamingo Cay, Pelican Cove, Sandpiper Beach, and other projects named after the wildlife they usually

displace. New multi-story buildings, set back 300 feet from these mangrove fringe areas, will get the breeze that is so desirable and the most beautiful sunset vistas over the top of a healthy stand of mangroves, rich with wildlife activity. This is a vision of health and prosperity with win-win solutions in the 1990's. Nature walks can take the adventuresome to exotic places deep in the mangrove woods. A few access points can be established on the shoreline where canoes and shallow draft boats could be beached. Humans adapting to nature can make the development of this area successful.

Contrast this view of working with nature in this area of the bayshore to the traditional plan for development in the 1970's and 1980's. Which seems more anachronistic? What would the resultant damage to nature mean to the bay system and the homeowners who would ultimately inhabit this development? How much front end money would have to be spent on the traditional assault on this extensive mangrove fringe? What would the construction costs of cement seawalls and extensive docks be? How many people would have to be paid off and taken to dinner, and how much would the interest on the bank loan cost? Have we learned anything from the past years of developments bankrupt from high interest rates on high initial construction costs and developers who leave town with an economic and ecological mess as a legacy? This is the challenge to the developer of the 1990's: to do something different, with vision, bold enough to meet the needs of public health and welfare by working within the regulations set by the state legislature.

Of all the areas on the bayshore investigated in my survey, this was one of
two places I saw a bald eagle. I saw it twice, roosting in the tall dead trees towering above the shoreline here. The eagle was perched above the mangroves with a large flock of white pelicans (30 to 50) using the beach in front of the perch. These magnificent sights are available daily to anyone who walks this remote area of the Sarasota Bay shoreline. This area belongs to you, the public, and will reward you with views not available anywhere else on Sarasota Bay. It will take you a half day walking in front of the mangroves just to see most of this shoreline. Any serious exploration into the mangrove interior would take weeks to see most of this magnificent mangrove acreage and some of the wildlife it supports.

To reach this area by boat, you will need a canoe or shallow draft skiff to get up to the mangroves at high or medium tide. A large boat could be anchored well offshore, and you could wade in. There are many rocks and oyster bars on the bottom to damage the boat motor and propeller, so, great care should be taken on entering this area by boat. Although you can walk the entire shoreline in bare feet, tennis shoes will help avoid problems with sharp rocks, oysters, and pneumatophores while you are exploring. Another caution is that, unfortunately, treated sewage laced with insecticides and herbicides enters the bay along this fringe.

This extensive mangrove fringe is over 2.5 miles long and over 400 feet deep in some places, with rich detrital pond systems supplying the bay with nutrients. A soup-like mud covers the mangrove areas and settles in these ponds where it is gradually released to feed and fertilize the biota of the bay. The grass flats offshore receive this fertilizer, and the fish feed on the detritivores that are actively breaking down the leaf meal, twigs, and other debris that fall from the

trees. Seasonal rains periodically aid in the measured release of these nutrients. The high interactivity of these natural systems illustrates the complex web of life that is the basis for a healthy bay.

Upland of this extensive, beneficial mangrove fringe is a large area of agricultural land divided into fields surrounded by ditches that drain the runoff directly into the bay. There does not seem to be any system for monitoring the runoff from these ditches, such as catchment ponds or other simple means of checking and treating the water before it reaches the bay. These fields probably use heavy insecticides, herbicides, and fertilizers that should have an enormous effect on the bay into which they are draining. The owners of these fields should be responsible for their effluent along with the county that produces it, so that it does not degrade the surrounding environment. Without safety systems, these agriculture fields along with the sewage treatment runoff are probably one of the biggest causes of pollution to the bay. Imagine herbicide indirectly dumped on grass flats, insecticides coming into contact with crustaceans, and nitrogen rich effluent from the sewage treatment plant added to the bay system on a regular basis. It is in this remote area of Sarasota Bay where the most endangered wildlife and the heaviest pollution meet daily.

There are <u>two small mangrove islands near each other about 1,500 feet off</u> <u>the north shore of this mangrove extent</u>. About 50-75 feet in diameter, these islands consist of 15 foot tall black and red mangroves on a broad base of oyster and sand substrata. <u>The only other islands off this fringe shoreline are at the point where</u> <u>Long Bar begins to reach out into the bay. Here a group of islands have formed</u> with little or no upland, covered almost exclusively with 25 feet high black and red mangroves with detrital pond systems throughout. The largest of these islands is almost 1,300 feet long and 400 feet at the widest with small islands around the southern perimeter and to the north. The water surrounding these islands is very shallow (less than 2 feet at high tide). There does not appear to be any bird nesting activity, but it is heavily populated by roosting herons, egrets, ibis, and other birds. There were many raccoon footprints here; and raccoons would discourage nesting. Although there are osprey throughout the bay, this Long Bar point, near these islands, seems to have more than any other area on Sarasota Bay.

Where the development of El Conquistador meets this beautiful mangrove fringe area, Long Bar reaches out in the bay. Here the shallow waters of the north bay are divided from the deeper waters of the south bay by this large natural sand bar feature. This phenomenon changes the shoreline to one that is more dynamic to the south, with more wave action and higher incidence of slope gradient change. The mangrove fringe farther south is narrow and only reaches a large extent on this shoreline near the entrance to Bayshore Gardens and the Holiday Inn at Bowlees Creek. Here the grass flats, oyster bars, and shallows extend far out into the bay, just south of Long Bar, helping to reduce the wave energy and to harbor mangrove growth. From here south, to the Ringling Bridge, the mangroves form only a small fringe where they have been left. Historical photographs show there was little mangrove fringe growth on this southeast shore of the open, large, and deep part of the bay even in 1900.

At El Conquistador and immediately south are some condominium-type developments built in the 1980s. These multi-story buildings are built very close to the mangrove fringe. Dock walkways between the condominium buildings and the

mangroves connect the buildings. These "dockways" could be extensive with scenic view platforms and benches built over and around native vegetation as is done in the state park areas. The best design plan for the development of the extensive mangrove fringe to the north of El Conquistador would be similar to these existing developments only with a larger setback, a natural buffer, and an increased emphasis on xeriscaping with native vegetation.

The uplands landward of the narrow mangrove fringe, south of Long Bar Point, has been heavily developed down to the spoil island off the point to the entrance to Bayshore Gardens Marina. Some small amounts of mangrove fringe has been left although some areas have none. It seems there was some original narrow mangrove fringe along the shore here that was removed, where there is only beach today. Along this beach, Spartina alterniflora (salt marsh cordgrass) has established more prominently than in other areas of the bay, and young mangroves have established themselves or have been planted. This area will probably revegetate itself if left alone; it could also be helped by individual homeowners or homeowner associations that want the benefits mangrove fringes provide.

Throughout the bay, it is evident that mangroves will establish themselves best where they once grew. If the natural conditions were right in the past, they can again be conducive to new growth. Each individual homeowner here should take the responsibility for cultivating and establishing a new mangrove fringe where the old one existed. It can take as little effort as just letting nature take its course and not destroying new mangrove growth. These homeowners will be rewarded by growing something that is not as temperamental as some of the exotic ornamentals; they will have storm and erosion protection for their waterfront property; they will have increased bird and wildlife activity in front of their houses; they will have the satisfaction that they are helping the bay, and along with that, a good conversation topic while having drinks at sunset. Small individual actions can start a positive cumulative effect that will help the environment of Sarasota Bay and make people feel good about themselves.

The buildings here have been constructed close to the mangrove fringe, removing the natural plants associated with the mangroves and replacing them with exotic vegetation of grass and ornamentals. The slope on the shore is fairly steep from an elevation of about 5 feet, so any fertilizer or pesticides applied here will leach or drain directly into the mangrove areas. These resilient mangroves are a buffer and a filter helping to protect the bay from the damage of these fertilizers and pesticides where they remain or have been planted. In this area of the shoreline and throughout the bay, nature areas and mangrove areas are synonymous. Where there are few mangroves, they become more precious habitat, like an oasis, more heavily inhabited by birds, fish, and other animals.

To sum up this area of the shoreline (<u>El Conquistador to the spoil island off</u> <u>the Bayshore Gardens Marina entrance</u>), it can be said that over 50% of the mangrove fringe has been removed; the newer multi-story developments to the north have the most mangroves left. The older single family homes on the south part of this shore look as if they were built in the 1970s as a development. Here, heavy equipment must have removed the mangroves and graded the shore while dredging the offshore channel; the few remaining mangroves look like they were an

oversight, and some have grown since the original shoreline alteration. **Mangroves are relatively slow growing:** a 5 foot tall mangrove tree takes about 5 years to grow in optimum conditions, and a 10 foot tree takes about 10 years. Most of the trees here are 2 to 5 feet high with a few 10 to 15 feet that must have been overlooked.

Another feature of interest is that there is a natural scallop to the coastline where it has not been altered. These points of land often are rock outcroppings with eroded beaches between them and are a feature of most natural coastlines which is generally not replicated where humans have altered the shore.

The spoil island off the point of the entrance to Bayshore Gardens Marina was made from the dredging of channels into Bayshore Gardens. Around the perimeter is a partial fringe of red, black, and white mangroves that are 20 to 30 feet tall with Australian pine and other upland plants in the interior. These human-made islands could be altered to support more mangrove growth by lowering some of the elevations to add to the mangrove area of the bay. More likely, the exotic species of trees could be removed as part of a maintenance policy, and native vegetation could replace it: buttonwood and cedar could replace Australian pine and Brazilian pepper. Work done to clear Australian pines or to clean dead trees from the beaches will disturb the wildlife and cost taxpayers dollars. The spoil islands can be used now, as they are, and programs for improvement for human recreation values could be implemented over a 10 year period. These spoil islands have a high potential for public use as they are close to population centers, but isolated. They often have some white sandy beaches for sun bathing that replicate the gulf beaches. It would be well worth the money spent to monitor these island resources to the bay system

and to study how their recreational and natural values can be enhanced.

These spoil islands are high priority nature areas. They have a healthy mangrove fringe from 20 to 30 feet tall with the associated wading bird populations of herons, ibis, and egrets in profusion. The large dead Australian pine trees serve as roosts for the sentinel ospreys. There is something magical about a little island offshore of your home. It can be your real or fantasy get away; and it probably provides countless residents of this area with this intangible, but real value. Those few who visit these local get aways enjoy all the features of a deserted island, right in the back yard of Bayshore Gardens.

Upon rounding the point where this island is closest to the shore, there is every variety of mangrove shoreline and altered shoreline imaginable. <u>The</u> <u>Bayshore Gardens area</u> shoreline is remarkable for its variety of contrasts, ranging from block houses with sterile, treeless yards and seawalls to houses set well back from the water bordered by full, healthy mangroves. In this varied area, there are mangroves growing anywhere they are given half a chance. And where these are growing they improve their surroundings by softening the hardness of the seawall and rip-rap, by adding continuity to the scenery. Some of the seawalls have very shallow water offshore and are old and need replacing. These homeowners would save money and benefit their local environment by letting the seawall fall down and the mangroves establish on their own. This might even be aided by removing or breaking up the wall, reestablishing a natural slope, and revegetating with mangroves. Any of this could be done a little at a time with little or no cost to the homeowner and no depreciation of lifestyle or land value.

Local city and county agencies, along with state agencies, could help the

situation if they make a point of facilitating replacing old seawall with mangroves as well as making it difficult for someone to receive a permit to remove mangroves and install a seawall. For example, when homeowners apply for a permit to repair or replace their seawall, they could be informed that it would take 1 month to 1 year for their request to be reviewed and be advised that the alternative of taking out the seawall and replacing it with mangroves could be facilitated immediately. **These regulatory and zoning approaches are the least expensive and quickest way to effect mangrove protection.** Along with education, they should be the basis for a best management strategy for mangroves.

It is apparent in these contrasting conditions that the options must be well studied by the residents. The value of the neighbor's mangroves in adding privacy from boat traffic or a direct view of the neighbor's home across the canal should be appreciated. On the left hand side going in the Bayshore Gardens Marina channel is a beach, then a long stretch of red, black, and white mangroves from 5 to 25 feet tall, forming a solid fringe on the shoreline. Some are growing on a sandy shore with a steep slope, and others are growing directly on rip-rap. Most likely a natural mangrove formation where the mangroves were left to establish themselves, this area is a stark contrast to the solid seawall and homes of the opposite shore. Without the mangroves, this scene would not have the aesthetic value, and the white houses, concrete, and rip-rap would offer no relief. If only these few mangroves are left and a few of these shoreline alterations allowed to return to their natural state, Bayshore Gardens will remain true to its name and a pleasant boat trip into the year 2000. On the left, as you leave the marina channel entrance, there is

some altered shoreline that looks as if rip-rap has recently covered mangrove fringe destruction. A healthy "pelican island," about 50 feet in diameter and consisting mainly of 15 feet tall red mangroves, is just offshore of this east Bayshore Gardens Marina entrance point and serves as an important wildlife refuge. Oyster bars, profuse in this embayment, play an important role in protecting the seagrass habitat by limiting boat traffic.

The embayment formed between the spoil islands off Bayshore Gardens and the Holiday Inn entrance is very shallow with grass flats and many oyster bars. There are three main channels here, and you better be in one if you don't know your way around this area. There is a variety of altered shorelines, with a few mangroves on the north shore of this embayment. The next bayou on the left on this north shore at Bayshore Gardens has a large number of healthy, tall, black, red, and white mangroves (up to 25 feet high) on the eastern shore and houses with seawalls on the western shore. Here would be a good place to implement docks offshore of unpruned mangroves as can be seen at Sigma Fish House in Cortez. This system would provide the privacy the mangroves allow as well as giving an access point to the water for boating, along with wilderness and buffer values. This should be much less expensive than the traditional method of destroying the mangroves, paying for a seawall, then putting in a dock (and then having to live in the sterile, seawalled environment). The rest of this north shore is mostly seawall: few mangroves are left. The beaches that were formed here provide good access to the water for the residents, but could have some more mangrove growth.

This is one of the most heavily populated areas of Sarasota Bay, and it is obvious that many people enjoy the quality of this bayside environment every day.

From the fisherman to the people sitting on the park bench to the boaters: these people, who appreciate this environment, need to take a stand on preserving it. **These mangroves act as a giant filter for the surrounding environment; remove them and the environmental quality that is enjoyed here today will disappear proportional to the number of mangroves that are destroyed.** A subtle suggestion in talking to a neighbor about a proposed seawall repair could help that homeowner save money and save nature. Reporting violations is another way of protecting the resource. If you have a favorite area and someone is pruning or removing mangroves from it, report the violation; it should be stopped by local government agents without your having to confront the person. If there is no violation, it will help anyway by encouraging local agencies' attention to these matters.

On the eastern coast of this embayment, the fringe on the northern part of the shore has black, red, and white mangroves growing to 25 feet. Even with the development that seems probable for the uplands here, the impact could be softened by leaving the beautiful native pine trees, cabbage palms, and cedars along with the mangrove fringe intact. The amount of destruction to an environment is directly proportional to the quantity and quality of the intrusion into that environment. This solid mangrove fringe shoreline runs south until it reaches the causeway to the large mangrove island offshore. Here a high priority nature area exists with 25 to 35 foot mangroves growing under an old eagle nest and fringing a bayou. If a development was delicately put in place here and in other high priority nature areas in this embayment, homeowners would have "nice" neighbors in the herons, ibis, and song birds and would be helping to save them.

The large island, connected by a causeway to the mainland, juts out into the embayment from the eastern shore and has some large extents of red, black, and white mangroves reaching 25 to 35 feet high. Because of its large size and high habitat values, this island and the fringe mangrove areas should be considered a high priority nature area that offsets the heavy population surrounding it. If these areas could be provided a public access (through parking areas and boat ramps) and advertised through educational programs, the public would take more interest in preserving and protecting them.

The extensive mangrove fringe that surrounds this shoreline begins at Bayshore Gardens to the north and continues around the entire island with few interruptions to the Bowlees Creek Marina to the southeast. Mostly mangrove, this large island would make a good park, protecting the mangroves and natural habitat and providing an access and recreational values for the public. If the monies for government acquisition are not available, careful regulation and encouragement of environmentally sensitive development could effect a positive result with upscale housing in a natural setting. The initial costs for development would be lower without mangrove destruction and seawall construction, and the result would be more desirable. "Dockways" can provide an access to the water with mangrove habitat between the dock and the homesites. This long shoreline of mangrove fringe should be carefully monitored as it is ripe for development and provides high nature values to the surrounding, densely populated area.

There is an equally valuable area to the south of the causeway going out to this island. The bayous here, to the north and south of this causeway, are fringed with mangroves 25 to 35 feet high and heavily populated by wading birds like ibis,

egrets, and herons. At least five osprey use this embayment and the mangrove islands. The shoreline on the north side of the channel into the Holiday Inn and Bowlees Creek has a fringe of 5 to 25 feet tall red, black, and white mangroves continuing around the mainland property on the way to the marina.

Just at the entrance to the marina, a large bayou has a healthy uninterrupted mangrove fringe of trees 10 to 20 feet tall that would be good to monitor. Again, houses and successful development should go hand and hand with preserving these black, red, and white mangroves. Brazilian peppers could be removed and docks placed offshore of these mangroves to provide access for the development homeowners. As you round the point to arrive at the marina, mangrove destruction is evident at the Bowlees Creek marina site; it appears rip-rap has replaced mangroves. These areas where mangroves have been destroyed exist as examples that the mangrove laws are not being enforced. Revegetation should be required and will make the marina site a more attractive place.

The peninsula that projects out from the bridge at State Road 41 bisects the Bowlees Creek Marina and the Holiday Inn Marina and Hotel. This low lying peninsula has mangroves around its entire fringe and offers a good buffer to the surrounding intense use of the marinas and seawalled residences. Here is a possibility for a public access point with a boat ramp, parking, picnic tables, and signs informing the public about the nature preserve and spoil islands accessible by boat or canoe. It should be a high priority project to secure some of the nature areas here at the mouth of Bowlees Creek and to provide for public education and access points. Whether these small local parks are called preserves, sanctuaries, or nature areas, they will provide high values to the public. If these areas are not defined,

described, and protected with management policies proscribed, they will be whittled away by surrounding development and cumulative effects.

In these days of economic recession, the government needs to be diligent in the regulation of these protected mangrove areas. Without raising taxes, by enforcing laws already in effect, government agents can improve the quality of life for the public and save money that will have to be spent later to correct environmental problems.

Most environmentally sensitive pieces of property must have a negotiated agreement with the city and county before building is permitted. In the early stages of planning, the government agency could lead the developer into environmentally acceptable scenarios of land development with land trades and conservation easements worked into the deal. Here, the large, beautiful piece of mainland property could be allowed a financially profitable development plan in the uplands, leaving the mangrove fringe and locating docks offshore for water access. The large mangrove island could be deeded to the government in exchange for increased usage zoning for upland property, or houses could be fit into the area without destroying mangroves. The mangrove areas protected here will enhance the value of the upland development and surrounding areas in the future. In either case, diligent work by government employees could facilitate environmentally sensitive solutions to future development.

Acquisition is not the only way to preserve wilderness areas. It is far more economical to protect these areas with more stringent zoning codes based on the concern for public health and welfare. Enforcing mangrove laws is good economic sense, in the short run and the long run. It will cost very little compared to other projects being pursued by local governments. The results of enforced mangrove laws would be 100% certain, positive improvement of the environment. There is no argument on the point of the value of mangroves. Yet, other areas of environmental concern with questionable value, including beach renourishment, are hotly pursued while mangrove laws are debated more than enforced.

Leaving the Bowlees Creek channel, on the left hand side is <u>the southern</u> <u>point of this embayment and a large spoil island which has a partial mangrove</u> <u>fringe</u> around the perimeter of mostly black and red mangroves growing to 25 to 35 feet tall. There are naturally eroded beaches; Brazilian pepper and Australian pines are growing on the interior uplands. Two ospreys were observed perched in the tallest tree here. This is another deserted island for those people who want a quiet get-away easily accessible by boat or canoe.

These two spoil islands and the natural mangrove areas of this embayment combine to make a valuable natural resource area. An overall environmental plan for this region including mangrove law enforcement, public access and information, pollution testing, and monitoring mangroves could be pursued for very little expense. This whole embayment- with one spoil island to the north near Bayshore Gardens, the central mangrove extents and large mangrove fringed bayou areas, Bowlees Creek mangroves, and the spoil island off the southern point of the embayment- has integrity as a nature area. A plan for the preservation and perpetuation of this valuable mangrove habitat would be timely.

There are many areas that need to be protected throughout the bay. The area you will probably be most concerned about is your area, the area near your house or where you like to fish. You can make a difference in what happens in this most important environment to you. Careful monitoring of the mangroves can help to keep your area of the bay healthy; you are in the best position to stop mangrove destruction by reporting it.

North Sarasota County Line South to the John Ringling Bridge: Sarasota City Mainland,

This is the last large extent of mangroves as we go south of the Bowlees Creek area on the Sarasota shoreline. The next large extent is the embayment at St. Armands Key and City Island. There are a few concentrations of mangroves on the Sarasota County-Sarasota City mainland shoreline, but mostly seawall and rip-rap. The ratio of seawalled rip-rap shoreline and unvegetated beaches to mangroves is at least 95% altered and unvegetated with less than 5% mangrove (based on my survey). Seagrass flats and a sandbar run offshore from 500 feet to 1000 feet the length of this shoreline, except where they were removed by dredge and fill activities south from New College to south of Stephens Point, where they resume at 500 feet offshore and gradually diminish until they disappear near the Van Wezel Auditorium.

This area of the Sarasota Bay shoreline has potential for revegetation. The sites here are a variety of hardened shorelines and unvegetated beaches with different physical features that present varying degrees of difficulty in revegetation.

The most difficult area for revegetation has deep water (over 3 feet) off the seawall or rip-rap, for example, Stephens Point, just south of the Ringling-New College complex of buildings. Here, high wave energy, houses built close to the seawall, and other factors make it difficult to vegetate with mangroves. Other places on the shoreline with shallow water offshore, a barrier sand bar, and mangroves already established on the shoreline nearby could be easy to augment. These considerations and others on these possibilities are discussed in the following section on revegetation.

Another observation on the mangroves of the mainland, Sarasota shoreline is a consideration of the boat ramp between Van Wezel Auditorium and the Sarasota Library. This little oasis of mangroves, which appears to be human-made, functions well as a nature area among the tall buildings and large parking lots. It is an example of the possibilities of an environmental engineering project adding to the bay system and providing multiple uses as a boat ramp for the public, habitat for the wildlife, a filter for air, water, noise, and other forms of pollution, and a landscaping feature for the surrounding developments. For more discussion of environmental engineering possibilities see the next section on revegetation.

John Ringling Bridge Causeways, Coon Key, St. Armands Key, and City Island

At the Ringling Bridge, there are causeways connecting the bridge to the mainland on one side and to another bridge at Bird Key on the other side. These human-made causeways present a problem for revegetation. The mainland-

Ringling Bridge causeway is mostly hardened seawall and rip-rap with little beach area. The wave energy here is medium to heavy, and the slope of the beaches is medium. There is some possibility for vegetation on this dynamic beach, but few mangroves are growing here now. Across the bridge at Bird Key, an isolated black mangrove has established itself on the causeway beach, a popular wind surfing beach and public recreation area. Vegetation of mangroves here could add to wildlife habitat area, improve the scenery, help prevent erosion, and be compatible with its current public use. Models for our causeways can be seen in Tampa and St. Petersburg, where these locations are partially vegetated by mangroves and heavily used for public recreation. Problems of medium slope and medium wave energy could be overcome using modern techniques for establishing mangroves in difficult locations. Light rip-rap, sisal or burlap mats, or other forms temporarily stabilizing the beach can allow the mangroves protection while establishing

West of Bird Key is Coon Key, attached to St. Armands Key by a causeway which has about 600 feet of partial mangrove fringe shoreline consisting of 20 to 25 feet tall black, red, and white mangroves with Australian pine trees outcompeting them. Sandwiched between two large seawalled areas, this partial mangrove fringe softens the view of the shoreline. A policy of maintaining the fringe by removing exotic trees is currently the best hope for improving this mangrove area. Where there are areas without mangroves, revegetation should be easy, as there is beach with natural mangrove growth and low wave energy here. The removal of the row of Australian pines will allow more light into the existing mangroves, make way for the newly vegetated ones as they begin to grow, and open a bay view for the public.

These causeway areas are under the supervision of the state DOT (Department of Transportation). The DOT or county and city governments should lead the way in the removal of exotics and in nurturing the mangroves. In these close-to-the-road causeway circumstances, the tall Australian pines could easily be a safety hazard during hurricanes, as they can blow over onto the road. Because of their possibility of blocking traffic in emergency situations and their competition with the desirable mangroves, the removal of these Australian pines should be a high priority. Current DOT policy is to leave the mangrove areas alone and to remove only those trees that endanger the flow of traffic. Including the removal of exotic species that are crowding native plants in the DOT maintenance plan would help to cultivate these causeway mangroves and improve the local environment.

Continuing north from the Coon Key causeway area is a solid seawall shoreline. Because of the deep water off the seawalls and houses that are close to the water, there is little possibility of vegetating this shoreline. The solid seawall continues under the small bridge to City Island, at the north end of St. Armands Key, around St. Armands Key to <u>the causeway to Lido Beach</u>. Here a fringe of about 150 feet of black, red, and white mangroves, 10 to 20 feet tall, is mixed with exotics. A good maintenance plan for the state DOT would be to remove the exotics and nurture the mangroves.

Pansy Lagoon, a unique embayment between St. Armands Key and Lido Key is a quiet body of water with about 50% mangroves and natural shoreline and 50% seawalled or pruned mangrove shoreline, with homes upland. "Slow," "no wake," and "manatee area" signs at the entrance and shallow water discourage fast boat traffic. This is a good example of how a few signs at the constricted entrance of an embayment can secure and protect the area as a passive recreation and nature area. There are three ways for the general public to reach this area: the public beach to the west (with parking at Lido Beach), the causeway area, or by boat. Access points could be improved by increasing parking areas, formalizing pathways, and adding informational signs. Both on the west beach side and the causeway side of this small bay, exotic Australian pines and Brazilian peppers pose the biggest problems to the health of the mangroves.

Compared to the cost of revegetation, it is a bargain to remove the upland Australian pines and Brazilian peppers competing with the mangroves. A 10 to 20 foot buffer strip with the exotics moved away from the mangrove fringe would give the native mangroves room to expand and more sunlight. This path could also provide a public access. 20 to 30 foot tall mangroves should be thought of as a valuable resource and investment of time and energy. Their value can be estimated by considering the expense of recreating them. When you consider there are few disadvantages to protecting mangroves by removing exotics, it should be high on the list for mangrove maintenance.

There are some pruned mangrove areas to the north of this small bay's shore with homes immediately upland. These homeowners have asserted their own personalities, applying different pruning approaches to the mangrove fringe. These could be compared in aesthetic and productivity values to the state regulations in a study of varieties of pruning approaches. This small bay would be a good designated park area with a compromise intended to accommodate the individual homeowners while providing the public access points to a public owned area. The

local governments and DOT should work toward removing exotics where they are out competing native mangroves.

On the Sarasota Bay side of the causeway between St. Armands Key and City Island, the mangrove fringe on the east side of the causeway consists of large black, red, and white mangroves 20 to 35 feet tall. These trees are a beautiful asset to the bayshore as habitat for the wildlife and in combination with the wildlife make the scenery here spectacular. The removal of exotic Australian pines and Brazilian pepper crowding out mangroves here is important to preserve the preferred native mangroves, sea grapes, cabbage palms, and buttonwoods and to improve the aesthetic and landscaping values. There are some dead mangrove trees here and small beach areas that might be left as they are or revegetated.

This causeway and part of the City Island area are human-made; today, they provide a desirable habitat for wildlife, valuable recreation area for the public, and beautiful homesites for property owners. The mangroves and seagrasses stabilize these areas, making them ecologically productive and a desirable place for humans to live. With the advances in the environmental sciences and networking of people in the environmental fields, it is not difficult to project successful engineering that could create positive human-made environments incorporating good water circulation and mangrove and seagrass vegetation in the future. These areas in the past were created to accomplish what humans wanted. Will we be bold enough to create new forms of positive construction in the future, using native vegetation and modern environmental planning; incorporating our new desires and concern for a healthy environment?

Natural land forms are difficult to identify in the Sarasota Bay area.

Humans have left their mark almost everywhere: dredge and fill, channelization, and disturbed areas frame what wilderness is left. By selectively choosing ecologically successful models from past human-made land forms, we can proceed forward not as a reaction to the past but with a foundation for creating the future.

The complexity of natural systems makes reaching definitive answers in environmental engineering elusive. Deciding what is right will always be a problem. The present, with advances in information storage and access capabilities, provides us with possibilities only dreamed of in the past. Using science, technology, and information to weigh comparables, we can arrive at consensus conclusions that can be carefully pursued. Saving mangroves and seagrasses and eliminating exotic species where they compete with native species are examples of consensus conclusions that are not contested today and are being pursued carefully. In the future, we may find correctly engineered canals or interceptor canals with mangrove vegetated shorelines to be positive additions to our bay system and pursue them with incentives to developers.

Old growth and new growth differentiate our mangrove areas. Mangrove trees 30 feet tall and taller represent old growth, at least 20 to 30 years old and sometimes 100 years old. Generally, new growth is smaller mangroves. Our treatment of these old and new growth areas should reflect a respect for old age. Leaving these old growth areas intact and cultivating new growth can provide the wildlife and humans with a viable future on Sarasota Bay.

Farther down this shore is a pruned area and a long seawalled area. There could be a little revegetation here, but it is mostly sea wall. Next are the Sarasota Bay Project, National Estuary Program office and revegetation site. In this area,

many of the ideas that have come from state environmental agencies were put into effect. Australian pine trees and Brazilian pepper were removed, and heavy machinery made several ponds at the correct elevation for Spartina and mangroves to colonize. The ponds were vegetated, and "dockways" were built to provide the public with an access point so they can view their tax dollars at work. This large project was completed in a short period of time. Less extensive applications of these ideas would help in the areas we have been discussing in this same neighborhood. Just to remove some of the exotics where they are competing with native vegetation on public owned property would help protect the mangrove trees that are protecting us. To remove a buffer of 10 to 20 feet of exotics away from the inside mangrove fringe west of Pansey Lagoon would provide a public access and help protect mangrove areas.

The 20 to 25 foot tall black, red, and white mangrove fringe of the National Estuary Program site continues along the shoreline at Mote Marine Laboratory. Here the mangroves provide landscaping, scenery, habitat, an exhibit, and shade for public use values. The Mote Marine Laboratory shoreline illustrates how the mangroves can be cultivated to provide the many values they offer. Around the corner, the Ski-A-Rees have cultivated healthy black, red, and white mangroves 10 to 20 feet tall. This fringe continues and gets larger at the boat ramp. The public park area near the boat ramp is a good place to gain an access to the mangroves, with plenty of public parking and beautiful, 20 to 30 foot mangroves with pelicans, ibis, herons, sea gulls, and other water birds in profusion. Farther east, there is a wind surfing beach with some mangroves could be removed here, and

signs could inform the visiting public about mangroves.

On the south side of City Island, the National Estuary Program, Mote Marine Laboratory, the Ski-A-Rees, The Bird Sanctuary: The Pelican Man, the boat launching ramp, and the wind surfing beach further east provide access points to mangroves that provide the public with many values each day.

On the north side of City Island, there is a long seawall from the Sarasota Sailing Squadron west to Mote Marine Laboratory on New Pass. <u>There is a beach</u> from Mote Marine Laboratory to the bridge with a few mangroves growing there. This beach could be vegetated; some of the exotics competing with the mangroves could be removed. There is seawall from the bridge to the Gulf beaches on this south side of New Pass and little possibility of vegetating with mangroves.

South Longboat Key at New Pass, North to Anna Maria-Longboat Key Pass.

There are few if any mangroves on the Gulf shore of south Longboat Key at New Pass. As you go east around the shoreline, there is a spit of land called Lighthouse Point which forms an embayment. This embayment has a healthy fringe of 5 to 25 feet tall black, red, and white mangroves around most of its shoreline with the docks of Sands Point in between. When you are even with the end of Lighthouse Point, this mangrove fringe stops, and a beach continues in front of the Charthouse restaurant to the seawall at the bridge between Longboat Key and City Island. These beach areas at Lighthouse Point and in front of the Charthouse restaurant have few mangroves and could be revegetation sites; this area is semiprotected and there appears to have been a history of mangrove growth here. The mangroves that are growing in this lagoon should be carefully monitored and cultivated.

On the bay side of the Longboat Key-City Island bridge is a large extent of mangroves called Quick Point, a valuable area with high habitat values for wildlife and great potential for public education and recreation. The Town of Longboat Key owns this property and is currently pursuing plans for a park here. An intermediate plan could include removal of some of the numerous exotic Australian pine trees and installation of a parking area, some foot paths, and information signs. These initial projects would cost very little and encourage careful planning of the final park. Quick Point has large red, black, and white mangroves to 35 feet tall on the bayshore and mangroves that grow up to the roadside on Gulf of Mexico Drive. There are two small embayments and mangroves throughout this property.

North of Quick Point is the Tangerine Bay development, which has had extensive land moving work done on the interior; it is hard to tell what was on this property before construction began. Here is an example of a recent project that bull-dozed a large area and imported almost all of its landscaping. This has nothing to do with modern environmental planning which uses as much native vegetation as possible. Future developments should be required to keep native vegetation or to include some percentage of native vegetation in the landscaping plan. There appears to be some revegetation planned for the bayshore, where some mangroves were removed. Mangroves can be cultivated to enhance any new development and should be appreciated as an asset to the landscaping and scenery as well as a addition to the local environment.

From the Longboat Key Marina, north of Tangerine Bay, solid seawalls with canals and houses built close to them predominate. This development, Country Club Shores, completed around 1960, is a dredge and fill project with fingers of seawalled land and dredged canals. With houses built close to the seawalls, there is little possibility of revegetation and no mangroves here. The homeowners of Country Club Shores and other seawalled communities should be especially appreciative of the mangroves remaining on the bayshore that offset seawalled development.

Beyond the north end of Country Club Shores is Arvida Bay Isles, a large project (over 4 miles of shoreline) developed in the early 1970s. The main feature here is the interceptor canal that was dredged through the mangroves. This south part of the Bay Isles development has mostly seawalls and rip-rap on the Longboat Key side; the islands of mangroves offshore of the canal are isolated mangrove fringe shoreline. They would be an interesting study area to observe the effects of isolating mangrove fringe areas in this way with a dredged canal.

The mangroves of these isolated islands are red, black, and white from 5 to 35 feet tall with some exotic Australian pine intrusion. The islands vary in size from small (1 foot) to large (200 feet by 1000 feet). A best management policy should be pursued to maintain these remnants of the fringe including exotic tree removal and excluding pruning of these offshore mangroves. This is a case where the original dredging of the interceptor canal was not done where it should have been planned, dredged landward of the mangroves. Instead, it was dredged through the mangroves, violating the intent of the laws and legislation passed in 1971 to protect the mangroves. Today, pruning is being done on these offshore

islands, further depreciating the natural resource of mangroves.

The Arvida Bay Isle development has been described in scientific studies of Sarasota Bay as an area of serious environmental damage (<u>Tampa and Sarasota</u> <u>Bays: Issues, Resources, Status, and Management</u>, February 1989, p 196). Most of the native oak and pine upland was cleared with heavy land moving machinery; a golf course and other human development displaced the native plants. In addition, a large area of the mangrove fringe was destroyed by dredging an interceptor canal through the mangroves rather than upland of them. A large marina, advertised as the latest and last marina of its type in Florida, was constructed where there was no historic embayment. This raises the question of why it was allowed here at this late date. In addition to the destruction to the natural environment, Indian mounds were destroyed and used as fill for home sites at the northeast point of this canal (Luer and Almy 1979).

Offshore of this northeast corner of the Arvida Bay Isles project is a finger that extends north into the bay surrounded by seagrass and shallow water. This finger, about 1,500 feet long and 100 feet wide, extends out into Sarasota Bay in the approximate location where a historic pass existed. Probably a natural formation with part of an Indian mound at its base, it has little upland with a few exotic Australian pines. Red and black mangroves predominate here as they do throughout the bay. (My estimate of mangrove proportions for the survey area are 45% black mangrove, 45% red mangrove, and less than 10% white mangrove.) They are 20 to 30 feet tall with some whites growing in with them in the upper elevations.

Basically, the Arvida Bay Isles development was one huge dredge and fill

project that took place at a late date and scraped clean one of the most beautiful natural oak hammock and pine flatwood areas imaginable. At least 90% of the original native landscape was cleared. What little bit is left can give an idea of the magnificence of what was destroyed: majestic 50 foot tall oak trees with endangered native orchids (Encyclia tampensis) hanging from the branches and another endangered orchid (Hexalectris spicata) growing in the ground, Indian mounds, pine flatwoods, hidden detrital ponds, all adding to the health of Sarasota Bay. What has replaced this is homes and golf courses which continually need water and fertilizers and pesticides, taking away from the health of the bay.

Several plans, intended to help the environment here, went wrong. To plan on an interceptor canal to save the mangroves and seagrass beds was a good idea. To dredge it through the mangroves defeated the purpose of protecting the marine environment. To plan for open space to offset human development was a good idea. To declare a golf course as open space defeated the purpose of offsetting the development. This just added two deficits to the environment, leaving little to offset or balance this environmental equation.

The whole idea here is balance. Current planning theory (according to the local city and county Comprehensive Plans) is that a development or your home should leave some nature to offset its impact on the environment. This is one reason why you can not build a house to the edge of the lot line (see setbacks under definitions in local city and county Comprehensive Plans). Today, planners require that large native trees be left on your property and that houses be built around them to maintain a balance between humans and nature. It is a type of moral and legal responsibility to achieve balance so you do not draw on the resources of others.

The whole Arvida Bay Isle development with its interceptor canal, golf course, marina, multi-story buildings, and zero-lot-line housing should be judged under these criteria. Did it achieve a balance offsetting its own development? Or do the cumulative effects of all these features contribute a major drain on the Sarasota Bay environment?

The mangroves remaining outside this canal are affected by erosion and the settlement of the sides of the canal to a natural slope; consequently, trees continue to fall into the canal and will need to be removed as this occurs. The maintenance of these offshore mangrove islands should be supervised; a best management policy should be declared and followed to protect and cultivate these valuable mangroves. Considering the history of damage here, pruning mangroves and spraying insecticides seems to be out of place on these offshore islands.

On the upland side of this interceptor canal, most of the shoreline is light rip-rap-beach which is rapidly becoming vegetated by mangroves. Some of these have grown to large heights since the canal was dredged, and some are left from the inside fringe after dredging a canal through the mangroves. A simple compromise could allow pruning to state guidelines of these shore side mangroves to suit the upland homeowners. The rip-rap-beach shores are excellent for vegetating, and the entire shoreline could soon have a new narrow mangrove fringe.

It is possible to vegetate some of the upland water bodies of this golf course and the other golf course on Longboat Key. These mangroves could be hedged to please the golfers while providing habitat for wildlife and offsetting some of the drain the golf courses cause on the environment. The health of some of the other isolated bodies of water here would be improved if mangroves were planted on the

pond fringe; the hydraulic engineering and design could be reviewed and modified to maximize the ponds' benefit to the environment. The large detrital pond could be managed and protected as a remnant original mangrove feature with the possibility of installing a dockway for the residents to view the interior of this high priority isolated nature area and its abundant wildlife.

Arvida Bay Isles is unique in its proximity to nature. It provides us today with a complex unnatural interceptor canal feature that will need to be managed in the future to protect the remaining mangroves. The interceptor canal with its riprap-beach design will be excellent for vegetation. Here small mangroves are being planted, and some are establishing themselves naturally. This will be a good place to practice hedging techniques under state pruning guidelines. The homeowners who live there now and will live there in the future should appreciate their unique opportunity to live among the mangroves. A best management plan for the whole development would be to cultivate these mangrove areas by limiting pruning, removing exotic species, and vegetating where there are no mangroves for the health and welfare of everybody.

Some of the houses built on this canal have incorporated a landward seawall a little above Mean High Water Line. With several examples around the bayshore, this new concept appears to be a compromise to satisfy the homeowners' desire for a seawall while leaving the state owned mangroves. In almost every case, the result does not live up to the intent. The mangroves are usually adversely affected, if not seriously damaged, and they are isolated from the natural interaction with upland plants that is essential to the mangroves' health. In addition to the damage caused by installing the seawall, the upland owners have pruned the remaining mangroves, further diminishing them.

This concept has several variations to the basic "solid seawall behind the mangroves" design. One variation uses railroad ties to create steps in the yard that can be xeriscaped or vegetated with grass and ornamentals, softening the effect and blending the landscaping into the natural mangrove setting. Another possibility would be to require a 10 foot buffer strip next to the mangroves to be xeriscaped with native plants as a transition into the mangrove areas. Here exotic landscaping plants will be set back from the saline environment, and the salt tolerant xeriscaping plants will act as a transition buffer. There are set back requirements on all sides of the homes; a shoreline construction set back could be implemented to maintain the health of the mangroves and the aesthetic values.

There are many examples of successful landscaping with native plants in the yards on this interceptor canal; railroad vine, buttonwood, sea grape, cedar, oak, and cabbage palms all have high aesthetic value in the landscaping scenes. Some are original plants; others were introduced to landscape after the houses were built. These plants provide the advantages of xeriscaping, adding to the natural environment; vigorous growth, little maintenance, and natural beauty are some of their characteristics.

West of north Arvida Bay Isles is an embayment. The east side of this embayment consists of fringe mangrove islands isolated from the shore by the dredged interceptor canal. These red, black, and white mangroves (25 to 35 feet tall) are healthy with little exotic intrusion. The biggest danger to these mangroves could be that maintenance dredging of the interceptor canal could cause further erosion, undermining mangroves while the

natural slope reestablishes itself on the canal sides. These isolated mangrove fringe islands continue on the east shore of the embayment until the seawalled Buttonwood Harbor canal to the south. There are no mangroves in this seawalled canal and little if any possibility of creating vegetated shoreline here in the future.

On the west side of this embayment, there is seawall north of the Buttonwood Harbor canal, then a stand of red, black, and white mangroves 25-30 feet tall. These continue around a small point into a small seawalled basin and then north to a large pruned area which consists of uniformly pruned, 25-30 feet tall, black, red, and white mangroves. These trees are pruned up and pruned down providing a view slot to the water which increases air circulation and allows the upland homeowner an open view of the water. The way pruning up and down for a view slot works is to prune the small trees down to a 6 foot hedge and to trim the tall trees up to 25% of their understory. This would meet state pruning guidelines and would allow windows for air circulation and a view.

The variety of pruning techniques are for aesthetic as much as for practical reasons. The real challenge to mangrove education is to change the aesthetic values of homeowners: to encourage them to appreciate the value of these trees and to look into the depth of the mangrove understory and thickets and recognize and appreciate the wildlife that lives there. Here they will see the bay filtered through trees and birds. Viewing the animal life in the mangrove understory can be an attraction in itself. Through knowledge, the strange can become familiar, and the familiar can be reassuring. Other benefits of the mangrove canopy are cool shade in the summer and protection from wind during storms.

One of the values of mangroves is they do not require any initial or maintenance expense. A seawall can be very expensive including the costs of permitting, removing mangroves, filling the property, and installing the seawall. Leaving the mangroves costs nothing unless they are to be pruned, which usually does not help the mangroves and is done because of various desires of the upland homeowner. To leave the mangroves in their natural state will save the cost of pruning. To reduce the amount of pruning helps the environment and saves money. So, the biggest expense incurred in mangrove maintenance would be if the mangroves were pruned beyond the state pruning guidelines. Not only would the homeowner face high labor and hauling bills but would also have to pay fines.

The west shore of this embayment provides a good area to compare possible scenarios for shoreline treatment that can be used as an example for the whole bayshore. There is about 50% mangrove shoreline and 50% altered shoreline (seawalled, rip-rap, etc.) on the west side of this embayment, which is about the proportions for the whole of the Sarasota Bay area surveyed here. Much of this seawalled, altered shoreline has little possibility of being revegetated, with houses too near the water's edge, and deep water from dredging offshore of the seawalls. There are some beautiful stands of mangroves left on this shore; these 20 to 30 feet tall black, red, and white mangroves offset the seawalled areas. The theory of cumulative effects is that if everybody were allowed to remove the mangroves, then the cumulative effect of this activity would be all seawall and no mangroves on the entire bayshore. Here, the right of precedence is that because one homeowner was allowed a seawall then it would be capricious for the government not to allow other homeowners the same

right. This concept is overridden by the theory of cumulative effects for the protection of the health and welfare of the community and the general public.

People living behind seawalls complaining about mangrove pruning violations could be considered hypocritical or selfish. But, these homeowners have rights that are no longer available unless historic seawalled property is bought. They not only have the right to be selfish about leaving the mangroves that are left but also logically should support their protection because they will benefit from increased home values and lower taxes because of a healthy environment and by the fact that their homes increase in value as their seawalls can not be replicated.

This shoreline continues north with alternate seawalls and mangroves. The mangroves are mostly 20 to 30 feet tall with some Australian pine and Brazilian pepper intrusion. <u>A little north of the large area where the mangroves were pruned up and pruned down is an area of heavy pruning in front of some condos</u>. This pruning can be compared to the natural shoreline adjacent to it. It appears to be less than 1/3 the height of the adjacent shoreline, with no canopy left. Determining whether this is a violation or predates the pruning rule would be valuable. This shoreline in general is indicative of the whole Sarasota Bay shoreline. There are some healthy mangrove trees, that have not been disturbed, growing to heights of 25 to 35 feet tall which should be appreciated by the people in the neighborhood as nature areas that soften and offset the hardened area that surrounds it. The residents of this shoreline are in the best position to monitor pruning violations and the destruction of mangroves and to report them.

North is the Longboat Key Youth Center property, which offers a great opportunity to increase environmental awareness and to provide an access point to

one of the largest mangrove extents on Sarasota Bay. Offshore of the Youth Center are the Town Islands that are almost exclusively mangrove islands including White Key to the north, which is the largest key, and six other keys including Whale Key down to the finger that extends north from the northeast point of Arvida Bay Isles. These mangrove islands are a great asset to the people of the area but are not easily accessable and do not provide recreation possibilities as do the spoil islands off Bayshore Gardens and Bowlees Creek. These islands, instead, can be enjoyed from the outside. Their value might be summed up in that they are "where the birds live." The values of filtering the air and water and providing wildlife habitat must suffice without the recreation values of going ashore and exploring. The shallow area around the islands is seagrass and is best visited at high tide with a shallow draft boat or canoe. Although there are few oyster bars and rocks here, care should be taken with outboard motors so that seagrass beds are not damaged.

The Longboat Key Youth Center offers the perfect place for a point of departure for these islands and with a small fleet of canoes could provide recreation for youths and adults. An environmental awareness course could instruct people in the value of mangroves and the types of wildlife that inhabit them and offer canoe trips around these islands. At the same time, some of the seawall on the shoreline of the Longboat Key Youth Center (that is falling into the bay with mangroves growing behind it) could provide an educational revegetation project and a beach for a public access point to the water. The bayshore here at the Youth Center seems almost ignored in favor of soccer and tennis. A bay and environmental awareness course would balance this and take advantage of this beautiful waterfront location and the availability of natural scientists in the Sarasota Bay area.

This embayment formed by Longboat Key to the west, Arvida to the south, and the islands offshore to White Key to the north has integrity as a marine park area and should be monitored and managed to preserve the values that it offers.

Continuing north on this west Longboat Key bayshore, seawall and mangroves alternate, about 50% to 50%. South of the Catholic Church property, there is a heavily pruned area (under 6 feet) adjacent to 30 foot tall mangroves. The large mangroves on the Mary Star of the Sea Catholic Church property could be preserved as they are with a native plant buffer in exchange for density trade offs on upland building rights. Then a long seawall goes north for about 2000 feet, after which large mangroves 25 to 35 feet tall continue past where White Key comes closest to Longboat Key. North of this point, a historic pruning site adjacent to unpruned mangroves provides material for a good field study. These mangroves were pruned about 20 years ago, cutting an area of the mangrove shoreline down to four feet high (about the level that it is easiest to cut with a chain saw). Once 25 to 35 feet tall, today they have grown back to 15 to 20 feet. An assessment of the damage caused and the loss to the environment over a 20 year period would produce evidence of a valuation of net loss to the environment at a specific site in a given time period.

North of the old pruned area (Longboat Harbor North) are seawalls with a few mangroves among them. After the seawall, about 3000 feet of this shoreline has some mangroves 15 to 25 feet tall and heavily pruned areas 2 to 3 feet tall. This 3000 feet of shoreline should be monitored and checked for pruning violations. When I say check for pruning violations, it is usually because the mangrove growth

appears to be large trees pruned below 6 feet in height. This pruning may have been permitted, but does not appear to meet the state regulations: specifically, no pruning of trees below 6 feet and only less than 25% of the understory of large trees.

After this pruned shoreline area is Town of Longboat Key Open Space: a beautiful fringe of black, red, and white mangroves 25 to 35 feet tall and over 2000 feet long with a small bayou in the north part. This shoreline can provide us with an example for macroscopic mangrove vegetation analysis. The healthy, tall fringe areas to the north and south of the pruned area indicate that there was once an extensive, continuous mangrove fringe along this shoreline. A look at historic maps and aerial photographs can confirm this supposition. This would mean that there has been extensive damage to the mangroves and that it should be an excellent area for revegetation as a historic mangrove area with small mangroves growing along the beach shoreline with low to medium wave energy.

North of this shoreline is an early dredge and fill project with seawalled fingers and three canals with little or no possibility of vegetation. Next, is a new project which has retained the mangrove fringe but constructed buildings close to it. <u>Cedars East is an example of the latest application of wetlands and mangrove laws</u>. Fringe areas of mangroves were left, but the whole site is densely built close to them. In addition to the impact of the buildings and construction, the developers applied for and received a permit to dredge a channel into a small bayou to allow boat docks for the residents. This is a double drain on the environment, with the upland owners insisting on getting maximum density and then requesting a concession to do something deleterious to the mangroves and the seagrass. A dock
on the bay, offshore of the property, would be more appropriate than dredging a channel through seagrasses and pruning mangroves to install bayou docks. A compromise could accommodate the upland homeowners and save some of the marine environment.

This is a good place to elaborate on the difference between the terms bayou and canal. "Bayou" is the affectionate and familiar term for canal which is more formal and rigid. A bayou has mostly mangroves; a canal has more seawalls than mangroves. It is a fine point that differentiates the two but an important one. You might swim down a bayou looking at birds; if you swim down a canal, the neighbors are going to be looking at you. Bayous are nurseries and food factories for fish; canals are comparatively sterile. Bayous have gradually sloping sides and small beach areas for an access; canals have steep concrete drop offs fringed with sharp oysters and barnacles with no access provided for. The soft, vegetated borders of the bayou create a less hostile environment than the seawalled canal with its hardened borders. There are sad cases of vestigial bayous such as Whitaker and Hudson Bayous which remind us of some of our paradise lost.

The next project north of Cedars East is Spanish Main. These two projects can be compared as adjacent projects constructed about thirty years apart. A development like Spanish Main is one of the worst possible scenarios for the environment. There is little if any of the native vegetation preserved; there is also a seawalled canal, created in part by dredge and fill, and the land area is taken up mostly by houses and pavement. In 30 years, we have advanced to the Cedars East scenario where most of the mangroves have been left on the bayshore and the bayou; some of the wetlands have been protected or replaced in mitigation, and

there will be little dredge and fill. This is progress, even if it has taken thirty years. What is more important than this individual example is that there is now a legal framework which supports these results. The tendency is for this progress to continue and for regulations to become more restrictive. We might project that a development thirty years from now will leave the mangroves untouched, give up a thirty foot xeriscaped buffer, reduce density more, and pay impact and development fees to be put toward environmental funds. This is all progress and will protect the citizens who have invested in property in this area.

North of Spanish Main is a finger of land 1800 feet by 200 feet extending into the bay. This peninsula consists of black, red, and white mangroves, most 10 to 20 feet tall with some 25 feet tall. On the inside of the mangrove fringe are some saltern areas. This Town of Longboat Key property and Open Space is valuable as a buffer for the area and as a place to visit by boat. It helps to balance out Spanish Main and Emerald Harbor developments in the local environmental equation. There is a small pruned area west of the base of this finger and then seawalls throughout the Emerald Harbor development, another example of 1960 dredge and fill that left no mangroves.

Two Emerald Harbor canals are all seawall; the long canal that extends to Cannon's Marina and around Emerald Harbor is part mangrove and part seawall. <u>There are some large mangroves, 20 to 30 feet tall, at the northwest corner of this</u> <u>canal (with Australian pine intrusion) across from Cannon's Marina</u>. There is a good example of a dock through the mangroves in this area and also another example of the "seawall behind the mangroves" technique. This technique seems bad anywhere it has been tried, damaging and diminishing the mangroves, then pruning them. This same idea with a lower seawall, set back another 10 feet, with a xeriscaped buffer may offer a workable compromise for the future development of this concept. The mangrove areas do much to make this canal a pleasant place to be.

The one-eigth of this canal that is mangrove helps the whole area, as a filter for noise, air, and water while providing habitat for wildlife. The more seawall there is, the more important the small mangrove areas are. In the harsh seawalled environment, they are oases to the birds and fish. Homeowners on these canals should consider their canal a small ecosystem, dependent on the mangroves to balance out the developed areas. With this concept in mind, people living on a canal should protect the few mangrove areas remaining in their immediate marine environment, their back yard.

These canals and bayous can be habitat for manatees. Imagine a manatee in an entirely seawalled canal. What would be there to make the manatee feel comfortable? Sharp barnacles and oysters on cement seawalls are poor habitat for manatees. Generally there would be few if any areas with seagrass, and without any mangroves it would be an alien world to the manatee and fish and wildlife.

As we leave the entrance to Cannon's Marina canal heading north, there is seawall and then a recent pruning project. Here half of the mangroves have been pruned up, leaving the canopy, and pruned down, leaving a hedge in what should be within state pruning guidelines; the other half has been pruned to a 6 foot hedge. The obvious question here is: What happened to the canopy of half of this pruning project? There is more pruning further up this shoreline toward the Buccaneer Inn. This would be a good place to monitor the pruned areas, as there are many. Before

the Buccaneer seawall are some 25 to 30 foot tall mangroves and then a long seawall with boat docks around the perimeter of the Buccaneer complex.

Between the southwest end of the Buccaneer dock and the road is a boat ramp and some 25 foot black and white mangroves and buttonwood trees. These terrestrial mangroves have been carefully pruned, and landscaping lights have been added to make a spectacular entrance to the Buccaneer Inn, day or night. At the road causeway, small red mangroves are trying to establish themselves in rip-rap. North on this western shoreline are some pruned mangroves and then some 20 to 30 feet tall black, red, and white mangroves. These large unpruned mangroves offset the marina at the Buccaneer Inn and provide a beautiful setting for the marina guests. Some few houses on this shoreline have pruned mangroves here. But, the problems arise through cumulative effects and precedence. If one person is allowed to surpass the pruning guidelines, then others follow in the area. It is important to be as consistent as possible enforcing the pruning law, so as not to be capricious.

This mangrove fringe continues around to Hideaway Bay. Here, it is 20 to 25 feet tall with exotic Australian pine intrusion as the main problem. Hideaway Bay was a mangrove pruning project I worked on 15 years ago. Using guidelines close to state pruning guidelines of today, these trees were pruned to attain a better view of the water. The trees have filled back in and are a good example of what present pruning guidelines will produce in 15 years if the mangroves are only pruned one initial time. A study of these early pruning projects could give valuable information on results of varieties of pruning application over time.

Recent pruning attempted at some of these homesites seems to be a violation

of aesthetics and the law. People pruning mangroves for the first time can uncover a world of questions when they try to apply the static state pruning guidelines to actual field situations. Add an owner who has something in mind that has nothing to do with the guidelines, and an assistant who does not care, and there are inevitable problems. Having someone prune who has plenty of mangrove pruning experience will allow the homeowner the freedom of not having to worry about the outcome. These experienced pruners should be recommended by the city and county agencies that are issuing the permits to help establish order in the pruning process. Their main concern would be to do too little rather than constantly striving to do too much. This would be an easy way to implement change in the present system that can make the pruning process work smoothly.

Hideaway Bay continues around to the north with large, 25 feet tall mangroves that form a peninsula opposite Penfield Street. Primarily red mangroves 25 feet tall that provide privacy and a buffer to the homeowners on Penfield, the peninsula is Town of Longboat Key Open Space. It is the best kind of open space in that it has no use to anybody beyond its filtering, wilderness, and aesthetic values. The current policy of the Town of Longboat Key and most other government agencies is to leave the mangroves alone. This means there is no cost to maintain these areas unless there are exotics to be removed. These areas, a bargain to the tax payers, are part of the little wilderness remaining.

The south Penfield Street bayou has the lush peninsula of town owned red mangroves on the south side and many homes with mangrove fringe shoreline on the Penfield side. This secluded mangrove bayou offers these homeowners privacy and beautiful wildlife views. The thin mangrove fringe has been left by most of the

homeowners and on the vacant lots where exotic Australian pines are competing with the mangroves for space and light. At the north end of Longboat Key, these exotic trees have become one of the major threats to the mangroves. A policy of removing Australian pines and Brazilian peppers would open up some of these thickly vegetated areas, providing more light for the homeowners and mangroves to enjoy.

On City Island-St. Armands Key, Longboat Key, and Leffis Key, there is a distinct and major problem of exotic tree intrusion into the mangrove fringe areas that differs from the minor problem of exotic intrusion in large mangrove areas with spoil piles. The thin fringe mangrove areas have plenty of upland ground that is better suited to the terrestrial Australian pine and Brazilian pepper. These trees are faster growing and seek sunlight. Stretching out above the mangroves, the tall, shallow rooted Australian pine trees often fall over from their own weight or blow down in heavy winds, destroying the mangroves and creating an ugly mess of tangled branches. In the large mangrove areas with exotic Australian pines intruding only on spoil piles, the exotics are limited by the saline environment that the mangroves live in and do not cause a major problem.

This distinction is important to make when considering exotic tree removal efforts. There are so many places where the exotic trees are competing with desirable mangroves that these are the best places to remove the exotics. To try to remove Australian pines from spoil piles in dense mangrove areas would be difficult and expensive. Large park areas like Coquina Beach, Beer Can (Greer) Island, and City Island-St. Armands Key have many large Australian pines that are providing shade and other important values to the public and wildlife. To avoid

confusion and disagreement, the exotics that are competing with desirable native plants should be targeted for removal rather than exotics in general. A 10 to 20 foot buffer could be cut from the Australian pines where they compete with the mangroves, thereby allowing great stress relief to the valuable native trees.

North of the Penfield bayou are three canal-bayous; that is, they have more seawalls than mangroves. The mangroves they do have provide a relief from these seawalled environments. The northernmost of these three canals has about half mangrove fringe and half seawalled shoreline, and the southern two have about 1/4 mangrove fringe shoreline and 3/4 seawall shoreline. These mangrove fringes are suffering from exotic Australian pine intrusion and a little mangrove destruction. Here, as on other canal areas with little mangrove fringe remaining, these few mangroves are of great importance to the health of the environment in that bayou. Homeowners should carefully monitor mangrove destruction and report it in order to keep the ecological integrity of their own back yard (canal).

There are a large variety of shoreline treatments along the canals and bayous. Often one particular treatment of the shoreline will proliferate in an area. One homeowner will try some new technique, and it will be copied by neighboring homeowners. In this canal area, mangroves have been removed, leaving only the largest trees and trimming them up, removing all the lower branches and leaving a little canopy. Then, small white rocks, about 10 inches in diameter, have been spread over the pneumatophores and stumps of the trees that were cut away. There are four or five locations where this technique has been applied by homeowners and it probably originated from one homeowner or one land moving company.

This example is important to study because it causes the results we see

around the bayshore: individual property owners whittling away at the mangrove population, following the examples of others. Precedence, networking of property owners in exchanging construction and tree trimming company phone numbers, and desires to extend property rights to the extremes perpetuate this activity. What this particular type of rock-shoreline-fill activity accomplishes is to remove over 3/4 of the mangrove biomass, adversely affecting the remaining 1/4 and creating an oyster and barnacle encrusted obstacle between the home and the bay. There is little area left for the wildlife, no gently sloping beaches to allow an access point; we now have an unattractive, alien, new type of hardened shoreline. This is certainly not as bad as the seawalls of the past, but shouldn't we be aiming for 3/4 of the mangroves to be left and creating a softer, more habitable type of environment for the future? New development construction techniques should be measured in terms of their ability to accomplish this intent that has clearly been confirmed by executive and legislative orders. It is important to root out the sources of the destruction of mangroves and stop them before they proliferate. Construction companies can be threatened with not allowing them to work in the community if they break the laws, and homeowners should be fined.

<u>The mangroves north of these canals are on an open bayou and are Open</u> <u>Space District belonging to the Town of Longboat Key</u>. This area has a thick fringe of mangroves 20 to 25 feet high, interrupted by pruning and removal in the middle, continuing on to near Gulf of Mexico Drive. At the base of this bayou, heavy Australian pine intrusion is a problem to the health of the mangrove fringe. As this is Town of Longboat Key property, it could set a good example by removing the exotic trees competing with the mangroves. Also there has been questionable

pruning and mangrove removal in the middle of this Open Space area. These Open Space areas are important buffers for nearby developed areas and should remain luxuriant. Mangrove pruning and removal in these areas is contrary to the intent of having a designated Open Space.

The next two canals to the north have about 1/4 mangroves and 3/4 seawalls, and there is a little pruning and Australian pine intrusion. The next bayou is almost completely covered over with mangroves and exotic vegetation. There are several of these bayou-ditches on Bishops Bayou that appear to be narrow bayous that were never completed. These show the tendency of all trees to grow toward light. In this and other bayou situations, the trees grow out toward the open water area where there is less competition for sunlight. The Australian pine trees are the tallest of these trees and stretch out over the tops of the mangroves to reach the sunlight. Leaning over the mangroves, the Australian pines are likely to blow over on them, crushing the mangroves and making an unattractive mess of twisted branches. There are many examples of this problem in the bayous of north Longboat Key.

This search for light also accounts for the appearance of white mangrove foliage on the outside of the thin mangrove fringe on bayous. The slope on these bayou edges is often very steep, reducing the zonation and elevation where the mangroves grow to only a few feet wide. The white mangroves are still the landward mangroves, growing around the Mean High Water Line, but the tree grows out over the water in its search for sunlight. This characteristic presents one of the few situations where pruning actually helps a mangrove. With steep slopes of about 45 degrees, these bayou shores are often undergoing the process of

erosion. The white mangrove trees can lean more than 45 degrees to get to the sunlight, and the combination of these two features causes these trees to fall into the water from their own weight and the erosion of the bank. In these conditions, pruning tall white mangroves so the roots can support a shorter trunk can induce stump sprouting and increase the longevity and health of the tree.

Bishops Bayou is a large bayou that was historically connected to Savarese Bayou to the north. A causeway from Gulf of Mexico Drive to the Village of Longboat Key separated these two bayous about fifty years ago. To reconnect these two bayous with a culvert would help the environmental quality and water circulation in both bayous. These environmental engineering projects should be carefully pursued to help the environment, especially where the condition was human-made.

Bishops Bayou is about 4/5 mangrove shoreline, dependent on where the mouth of the bayou is defined. It is a beautiful example of how the mangroves can remain in place and the homes can be built behind them. Birds are abundant, and the fishing is still good. There are some seawalls and pruning activity, but overall it is refreshing to see more mangroves than seawall. The cultivation of these trees over the years has paid off with the homeowners receiving the benefits of a beautiful natural surrounding.

Leaving Bishops Bayou, off the northern point, is a mostly red mangrove bird island about 100 feet by 75 feet and 25 feet tall. Probably a spoil island formed when the original channel was dredged, this is a good example of unnatural land forms that are a plus to the environment today.

As we continue north on the Longboat Key shoreline, there are a few

remnants of a narrow mangrove fringe: enough to speculate that this was a historic fringe area and that most of the mangroves have been removed. The shoreline can be characterized as a historic mangrove area with medium to low wave energy, so it should be possible to revegetate some of these areas with care. The mangroves that remain are a great asset to this shoreline, so they should be cultivated and augmented.

At the northeast point of Longboat Key is the entrance to Savarese Bayou which is about 1800 feet long and has a little over 1/2 mangrove shoreline and less than 1/2 seawalled shoreline. A historic mangrove fringe was removed where the seawalls exist today. This vital bayou has a large fish population and is frequented by manatees. A good balance has been established here with the mangroves benefiting the seawalled property. It is also a good time to review the condition of the whole Sarasota Bay area.

One half mangrove and one half seawall: a balance is achieved here. To remove any more mangroves would certainly threaten this balance. To add twice as many people would hurt the balance. To add twice as many people and remove more of the mangroves would definitely create a different condition from the vital one we see today. This is analogous to the present dilemma for Sarasota Bay. Today we definitely have a vital environment with clean air and water and fish and wildlife that populate the bay. No miracle of science will help us if we continue to destroy the health of our vital environment by allowing more mangroves to be removed. We should realize that one thing is certain: as more people move here, the

natural environment will become more important to offset the impact of the increase in human population. We are at the balance point with 1/2 mangroves and 1/2 seawalls on Sarasota Bay and Savarese Bayou; adding more population will aggravate our environmental condition and make the nature areas more important in the future.

Leaving Savarese Bayou, there are few mangroves on the north shoreline of Longboat Key until Beer Can (Greer) Island. The shore is dynamic here with frequent sudden changes in the slope and gradient which prevents the mangrove seedlings from becoming established by washing them away or covering them. The few mangroves that remain in these conditions have found a place that is artificially stabilized by rocks or other structures. An example of this is around the old bridge base, next to the existing bridge: here a few mangrove trees have been protected.

A large extent of mangroves in the embayment of Beer Can (Greer) Island has formed over the past fifty years and is a valuable habitat for wildlife including songbirds, wading birds, and snook at high tide. This peninsula, popularly referred to as an island, belongs to Manatee County, and has provided the public with high aesthetic and recreation values along with filtering the air and water. An access point is available from several parking areas on Longboat Key or by boat. Its isolated location makes it less frequented and more desirable because of its natural beauty. This is one of the many areas throughout the bay that need to be clearly recognized for the important values they offer to the environment and the public. Any plan for maintenance dredging of the pass should consider the importance of this public resource to the whole area. Recently, dredging the

channel too close to the island has caused severe erosion to its north point. A thin band of beach protects valuable mangroves and seagrasses that currently provide a nursery area for fish and habitat for wildlife and birds.

In this north Longboat Key pass area, Manatee County has great possibilities to cultivate a large marine park. Beer Can (Greer) Island, Coquina Beach, Leffis Key, Bird Island off Cortez, the spoil islands off Paradise Bay Trailer Park, New College-Tidy Island Preserve, Jewfish Key Preserve, and Sister Keys should be considered a related Manatee County marine park area. This could serve many purposes including preserving the nature areas and increasing the value as a recreation area. There does not have to be an overall management plan other than first declaring the whole area a marine park. Nothing needs to change other than the way people look at the area.

Bradenton Beach to Cortez Bridge

"Slow, No Wake Zone" signs at the Longboat Key-Anna Maria pass bridge could inform boaters to drive carefully and welcome them to the Manatee County Longboat Key-Anna Maria Pass Marine Park area. These overdue "Slow" signs will save lives in the future, acting as speed bumps to help people make the transition from wide open Gulf boating to cautious bay boating. The recent plan for a park at Leffis Key could include an information and education center for the entire marine park area. The Leffis Key site is currently of little public value, but has great potential for offering the public alternative forms of recreation from Coquina Beach. In bad or cold weather, there is little for visitors to do at Coquina Beach.

Leffis Key is well located for a park center, with a large parking area with an easy road access, two boat ramps, and several picnic areas near by. The key is connected to the mainland by a causeway and has been filled with spoil where Australian pines have become the dominant plant, intruding on the mangroves. A center for a Manatee County, Longboat Key-Anna Maria Pass Marine Park with picnic tables and a building could be placed in this spoil area without having to remove many native plants.

The fringe mangroves are primarily black and red, 20 to 30 feet tall, 100 to 400 feet deep in places, that surround the central upland. They are healthy and stable, but some erosion is taking place on the northeast shore. <u>Two small</u> mangrove islands are north of Leffis Key: one is 100 feet by 100 feet of 20 feet tall red and black mangroves, and the other is 200 feet by 300 feet of 25 feet tall red and black mangroves. <u>There is a healthy fringe north of Leffis Key on the Anna</u> Maria Island shore for 1.600 feet with red, black, and white mangroves from 15 to 25 feet tall. <u>To the south, the fringe is incomplete for about 400 feet with few mangrove trees</u>. There are some exotic trees competing with mangroves that need to be removed along the fringe and sites for revegetation along the southern shoreline.

The north part of this fringe is interrupted by a boat ramp. It is obvious that the ramp was built through the mangrove fringe to provide an access point for the public to the bay. The small area the ramp takes from the fringe is easily offset by the amount of surrounding protected mangrove fringe. A simplified mangrove pruning rule in solid fringe areas could allow pruning or removal of no more than

10% of the fringe area to allow the property owners an adequate access point to the bay while restricting any future pruning other than maintaining the access corridor to the bay. This boat ramp, a large bay corridor for the public, is effective in protecting the adjacent mangrove fringe bay shore.

North of the boat ramp, the mangrove fringe continues, 20 to 25 feet tall and 800 feet long, except where it has been pruned to 10 to 15 feet between condos and the bay. This is the last large stand of mangrove fringe on the Bradenton Beach shoreline with few remnants of the previous fringe. This 10% mangrove shoreline offers high aesthetic and wildlife values to the surrounding houses. There are many beaches between this area and the Cortez Bridge that offer a good opportunity to revegetate, as this is a historic mangrove fringe area with medium to low wave energy

Jewfish Key and Sister Keys

Jewfish Key and Sister Keys are islands in the middle of north Sarasota Bay with large mangrove extents. Jewfish Key is privately owned with a large mangrove preserve area on the east side to offset the developed area. This type of negotiated, mitigated settlement offers the public protected nature areas and reduced density at no cost to the government while adding taxpayers to help support the local government. Compared to the possibility of the government's acquiring these areas, this option has several advantages. Sister Keys is currently for sale by private owners and offers the alternatives of acquisition or negotiated density reduction along with setting aside a large nature preserve.

These two vital healthy islands, an important asset to the bay system, are the last mangrove areas on Sarasota Bay to be discussed in this survey. The future use of Jewfish Key was decided two years ago, and the future use of Sister Keys is in question now. The options of government acquisition or regulated private ownership offer a contrast that will be more common in the future as other areas of Florida become built out. Sister Keys is the last large island in the Sarasota Bay system to offer these alternatives.

It will be valuable to weigh the advantages and disadvantages of regulation and acquisition using these two islands as examples. Jewfish Key was zoned and platted for 40 homes around 1954 by Manatee County. The island remained in the ownership of one family for almost 30 years between that time and the late 1980s. This family desired to sell the island to regain the investment of time and money spent on its purchase and taxes. The Town of Longboat Key and other government agencies were offered the opportunity to buy the island and refused. A group of private owners bought the island in the late 1980s.

The use of Jewfish Key was negotiated with the zoning departments of the Town of Longboat Key and Manatee County, and an agreement was made to reduce the density from 40 units to 13 units and to require that the mangrove area on the east side of the island be set aside as a preserve. This agreement was attractive to the new owners who were interested in the nature and isolation this island offered as an alternative to city living. The public received a reduction in density on this property, new taxpayers, and a preserved nature area at no public cost. The alternative to this option would have been for the Town of Longboat Key, Manatee County, or the state to purchase the island for about 1 million dollars at the time it was sold and to have the liability of its upkeep and maintenance over the years. With a large amount of exotic Australian pine trees on the upland interior, this maintenance could be costly. Some important questions concerning acquisition are: What would the proposed public use of an island entail? Would the public use of an island include picnic tables and garbage cans with a park ranger or maintenance crews? Would the local or state government then be responsible for people who are bitten by raccoons or rattlesnakes? Would the government be responsible for removing the raccoons if they became a problem? Does the government want to assume all these responsibilities or just protect the natural environment?

Sister Keys now offers this same dilemma with an island that is physically quite different from Jewfish Key. Sister Keys is south of Jewfish Key and 2/3 to 3/4 mangrove area. The two large upland areas are isolated from deep water by the shallow, fringing grass flats. These upland areas have become populated by endangered species including sea oats and wire brush plant communities with gopher tortoises in abundance. The development of these keys would be very restricted under current regulations, if it is possible at all. The alternative to limited development would be the purchase of the island by state or local governments. This would present the same problems considered for Jewfish Key. What kind of park would it be? Would there be a ranger, sanitation and garbage facilities, picnic tables, and other necessary improvements? What would the expense of maintaining the island and the cost of liability to the government be? All these are important considerations concerning buying Sister Keys for a park.

Regulations that are already in place could preserve most of the island in its

present state while allowing private owners to build one or a few houses in a way that would have little if any impact on the native vegetation of the island. Of the four keys, only the largest one can be built on. This island has less than 1/3 upland that is not wetland and is mostly populated by endangered plant and animal species. What is apparent is that any home built on the island will need a deep water access point. The best place is the east side of the north tip of the island, which has a protected deep water (over three feet) access point providing easy passage to the intracoastal waterway, even at low tide, and is presently a favorite anchorage for pleasure boaters and people who are visiting the island by boat. Just upland of this spot is a large area of Australian pine trees that could be removed to provide space for one to five houses, without having to affect any native trees or plants adversely. A negotiated settlement could offer a unique opportunity to one or more people to have a home site like none other in the area and to help save the natural environment. The local and state governments could facilitate this by offering easy permitting incentives to build a dock and houses in this way, and environmentalists should be happy to see the island secure. At no cost to the public, all of the goals of the conservationists can be met, and free enterprise can thrive. Creative planning and thinking can provide for our future public, private, and environmental needs.

The mangrove areas are quite apart from this upland planning. Regardless of the upland plans, the mangroves should remain intact and unaltered. The Sister Keys has a large black mangrove forest on the southeast part of the main island and large detrital pond systems which extend far into the interior. These natural waterways are densely fringed by red mangroves and feed the black mangrove basin with tidal waters. The black mangrove basin forest displays scrub

characteristics resulting from nutrient deficiencies, hypersaline conditions, or a combination of both of these conditions. This area was cleared with a bulldozer around 1965 and there are still decaying wood piles remaining from the large scale mangrove destruction.

The entire perimeter of the Sister Keys is fringed with mangroves; the northeast point has the least amount of mangroves with heavy Australian pine intrusion. The dominant mangrove in the fringe shoreline of the large northern island is the black mangrove (90%, see the Mangrove Map aerials pages 30, 31, and 32 and the notes on Sister Keys) and the average height is 20-25 feet. The dominant mangrove of the fringe of the next largest island south is the red mangrove (95%, see the Mangrove Map aerial notes page 30) and the average height of these trees is 25 feet. These findings provide data that raise questions about the natural history of these islands and mangroves. Understanding the way the mangroves colonized these islands may help us to cultivate and manage them better in the future. What are the reasons for the predominance of one type of mangrove in a particular situation? In considering revegetation areas should we be concerned not only with whether it was a historical mangrove area, but also with whether the previous mangrove area was black or red?

I have concluded this survey with an interface of the text and the Mangrove Map. Both the text and the Mangrove Mapping are meant to provide data that will present questions. Hopefully they will encourage further interest in the subject of mangroves on Sarasota Bay and provide a base for future studies. Revegetation of the Shoreline of Sarasota Bay

The following is a brief list and ranking of typical shoreline types and

considerations of revegetation possibilities:

Types of seawalled shoreline:

1. deep water to seawall (over 3 feet)

2. shallow water to seawall (under 3 feet)

3. beach in front of seawall, shallow offshore

Condition of the seawall:

1. new

2. middle age

3. old and falling down

Types of rip-rap:

1. solid rip-rap to deep water (over 3 feet)

2. solid rip-rap to shallow water (under 3 feet)

3. rip-rap with beach, shallow offshore

Types of wave energy

- 1. high energy
- 2. medium energy
- 3. low energy

Types of beach slope:

- 1. steep slope
- 2. medium slope
- 3. gradual slope

Site mangrove history:

1. no history of mangroves at the location

2. mangroves growing in the area

3. historic mangrove site

If the site being considered has a 1. in these categories, it will be difficult to revegetate. If it has a 2., it will be fairly possible to revegetate. If it has a 3., it will be easy to revegetate.

1. = difficult to revegetate, expensive.

2. = possible to revegetate, less expensive.

3. = easy to revegetate, little expense.

These considerations do not take into account the human factors of whether

upland homeowners desire the revegetation or whether local and state government agencies feel strongly enough to encourage or enforce revegetation of mangroves. Further, it is not meant to be complete, but rather a guide. It is almost impossible, for example, to factor in the varying problems of storm effects on revegetation projects.

Any consideration of mangrove revegetation should begin with optimism. There could be a major local or state government revegetation plan for the whole Sarasota Bay shoreline which would include engineering, removing all but the most difficult seawalled shorelines with heavy equipment, grading these new beach areas to the most desirable slope and grade, and revegetating a shoreline fringe on a large scale with Spartina, red, black, and white mangroves and buttonwood and other associated native plants. Such a program would be costly and probably would incur the wrath of some of the homeowners and the public in general, who do not want the shoreline changed or do not believe in spending tax dollars in this way.

Another approach would be to single out the areas that would lend themselves best to revegetation of the shoreline fringe and to poll upland homeowners about such a project. If areas were found with desirable conditions and upland owners approved of the plan, these areas could be revegetated on a test basis. One of the reasons to pursue these test areas is to prepare for the future. With these test models implemented, we would be sure the technology would be going forward and we would be working toward solutions to inevitable physical damage to mangroves and the shoreline during severe hurricanes.

On a smaller scale, individual homeowners with sites that lend themselves to easy revegetation could be encouraged by local agencies to pursue shoreline

revegetation. This could be done in many ways. The local governments could make it easy for residents to do this in the permitting process. Homeowners applying for a seawall repair permit could be advised of shoreline revegetation techniques and advantages and offered incentives of inexpensive permitting and technical assistance. At the same time, the local government permitting agencies could raise the price of permits to do anything that might be deleterious to the health of the Sarasota Bay environment including installing seawalls, pruning mangroves, and other practices that will take away rather than add to the health of the environment. These higher permitting fees could be considered a type of mitigation for the damage done to the environment; this money could go toward environmental restoration projects and the incentives given to revegetate.

The best solutions to these environmental problems are currently being pursued by local and state agencies and environmental scientists. As it is a relatively new field of study and there are problems applying static models to dynamic, complex, natural conditions, it will be many years before the details of revegetation are worked out. The important thing now is that we are working on these timely solutions to present and future problems. The public should support these efforts and be understanding of difficulties that arise when trying to find solutions to these environmental questions where there is seldom one "right" answer as to what should be done. We are all in this together, trying to protect a natural resource that belongs to all of us.

A question presents itself when viewing older human-made canals, bayous, and ditches: Are they always negative? Could these human-made features add to the future of the mangroves and the environmental quality on Sarasota Bay if they

were not seawalled? We live in an area where there are models for almost every kind of shoreline treatment. We can choose the historic projects that have a positive effect on the environment and model future land use after these projects.

Current thinking by state and local agencies has been a reaction to past problems of construction abuses. The government policy today is to try to mimic natural systems and to restore the environment to its original state. This is conservative and based on the possibility of individuals taking advantage of the environment. Another useful perspective is to look at human-made land forms created in the past that are positive additions to the environment today. A little boat ramp area with mangroves and wildlife, spoil islands with their mangroves and recreational values, and large canals (dug 30 years ago with no seawall put in place) bordered with a vital mangrove fringe area with trees to 25 feet tall are some examples of human-made land forms that have added to the environmental quality of the bay. So, while looking at the possibilities of unscrupulous people destroying the environment for their own advantage, we should not ignore the possibilities of benevolent environmental engineering in the future.

Criteria should be established for approving and pursuing these environmental engineering projects, which will inevitably become more common in the future. A good beginning would be to require the approval of nature and environmental groups. The Audubon Society, the Sierra Club, Mote Marine Laboratory, the National Estuary Program Sarasota Bay Project, and other nature and environmental groups' unanimous approval of a project would provide a solid groundwork to proceed on an environmental engineering project. Otherwise, the project should be postponed for more consideration. Some local governments are

these areas be balanced with areas of indigenous native plants, we would have a sound basis for planning. To expand on this principle: people might be allowed and encouraged to build in higher density for convenience and to save in building costs in exchange for setting aside remaining land areas as common park and naturally landscaped area needing no fertilizers or pesticides and little maintenance. These new developments would draw people because of their nature elements, design features, and economic value.



pursuing these environmental engineering projects without the support of environmental groups, which puts the whole idea of environmental engineering in question and reminds us of the history of individuals using the system for their own advantage. These environmental engineering possibilities provide us with food for thought to be carefully pursued in the future.



Practical Solutions to Negate Mangrove Losses

Models

Models and comparables exist in many forms throughout the bay and in other bays around the state. It is for us to recognize and learn from these models and to apply the knowledge we gain from them in planning the future. Buckminster Fuller said we don't have an energy crisis, what we have is a thinking crisis. The inability to think clearly can be costly and inefficient. We can look at other areas of the country that have had similar growth problems and draw conclusions that may be applied to our present situation. In retrospect we can look back with 20-20 vision and see what general rules might have been applied in the planning process that would have made things better today, if they had been applied 10 years ago.

A model for Sarasota Bay (50% hardened shoreline and 50% mangroves) should be a bay that has achieved a balance between humans and nature. To the north, St. Petersburg is an example of overbuilding with the resultant environmental problems that go with it in Boca Ciega Bay (more than 80% hardened shoreline and less than 20% mangroves). One general concept of planning that could be evenly applied throughout a new community would be one of individuals offsetting their developed areas with equal amounts of natural areas. If we adjusted this general concept to include exotic plantings and lawns, golf courses, buildings, and paved surfaces in the developed areas and required that Passive

Passive positive contact breeds familiarity with nature.

As the wilderness areas decrease, the wild animals inhabit areas closer to humans and become more familiar with them. We can get closer to birds today than we could in the past because they have become accustomed to us not trying to hurt them. At the turn of the 20th century and as late as the 1950s, humans hunted spoonbills, ibis, egrets, and herons for food and for feathers. It is no wonder that they were hard to get near. Now, they have been conditioned by generations of friendly passive human behavior and have found niches where they can survive. We must realize the importance of these few natural areas and protect them. By cultivating the historic mangrove areas and creating new mangrove environments, we can nurture nature in the Sarasota Bay area. Today and in the future, more than ever before, we are the stewards of our environment.

Even one tree is habitat. During the course of the day, many animals will use its branches and understory as habitat and comb the roots and detrital mud for the small crabs and animals that live there. By nurturing the mangroves on your shoreline and protecting the ones that belong to all of us on other shorelines (below the Mean High Water Line), you can witness and participate in an immediate improvement in the local environment.

Wouldn't thinking of the whole bay as a park be a positive move? No matter what happens to the uplands, the mangrove areas (below the Mean High Water Line) already belong to the public as citizens of the state of Florida. As long as these large mangrove extents existing on Sarasota Bay stay healthy, this area will

be a healthy and vital place to live; when they are severely diminished, it won't be.



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Shell

It is difficult to imagine anything that goes better with the beaches than shell. It has been used successfully for thousands of years by humans on the west coast of Florida to alter the physical environment. Great shell mounds exist throughout this area to remind us of our predecessors.

Today shell has many uses around Sarasota Bay and is available locally through many convenient sources. Sold as "crushed, washed shell," the shell diameter is less than 1/2 inch. Used in driveways and around yards in landscaping plans, shell can prevent weeds from growing as a replacement for grass yards and requires little maintenance. After the initial application, shell can be maintained with one load used to dress the yard up once or twice a year. It has many advantages over pavement. It is permeable and lets water soak into the ground after rain storms. Utilities can be dug up, worked on, then re-covered with no sign of construction. It has an aesthetic appeal in that it goes with the natural Sarasota Bay seashore environment.

Shell can be used as fill near the mangrove environment with little harm to the mangroves. A modern Florida bayshore home can have mangroves cultivated, shell in the yard instead of grass, and irrigated islands of landscaping plants throughout. This would reduce the load on the environment in landscaping use of water, fertilizers, and pesticides on difficult to maintain grass lawns. Alternative sources of landscaping can be great conversation pieces and are more practical and economical than the standard landscaping practices.

Ditches

Mangroves have colonized many isolated places around Sarasota Bay, including human-made ditches and lakes that are connected to the bay. These areas are valuable for the same reasons the fringe and island mangroves are; they add to the wilderness areas and soften the development that surrounds them. These "civilized mangroves" show up in some of the least expected places. What is considered far from the saltwater may be connected by drainage ditches that fill with bay water at high tide. The mangrove seeds, or propagules, float in with the tide and establish themselves as if to claim the area for the bay. Along with the mangroves and associated saltwater tolerant plants come fiddler crabs and other littoral animals.

When taking stock of our mangrove extents, we should not forget these small, isolated mangrove areas. They are protected by the Department of Environmental Regulation under the same rules that protect the bayside mangroves. On Longboat Key and the mainland, there are many of these mangrove habitats that not only provide the values of mangroves but also delineate property that is wetlands. This unheralded service provides the public with more wilderness areas to offset rapid development. Care should be taken that these plants are not removed or isolated from the flow of bay water. These mangroves in ditches are an important factor in determining what amount of area will be developed and what will be set aside to offset this development.

Spraying these ditches with insecticides to kill mosquitoes will also kill the crabs and other small animals that are affected by these chemicals. When it rains,

these insecticides are washed directly into the bay, killing marine life. Local governments should be careful to monitor and limit their use of pesticides and look for alternative solutions. Government agency policy change can easily be enacted and can show immediate results with environmental improvement. For example, the DOT has great possibilities to help the local environment by cutting away the exotic Australian pine and Brazilian pepper which are competing with the mangroves in many causeway locations and by limiting herbicide and pesticide use.



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Seawalls

Seawalls are a part of life on Sarasota Bay's waterfront. They serve many functions in erosion control, separating land and sea, allowing low areas to be filled, creating land, and preventing runoff from draining directly into the bay. They are usually built of concrete but can also be built of metal and wood. The most common use for these seawalls was to create land. In the 1950s and 1960s, many development projects made land through dredge and fill. Often this was finger canal construction. Seawall fingers were built out into the bay through low mangrove land and over shallow seagrass beds. Then, deep canals were dredged between these fingers, and the fill from these canals was used to create high land inside the fingers.

Dredge and fill activities and the land they created were the backbone of the real estate market on Sarasota Bay in the 1950s and 1960s. In early 1970, legislation was passed restricting seawalled dredge and fill projects to prevent the further destruction of the marine environment and to protect state property and the public health and welfare. Today we are enjoying the mangroves and seagrasses that were saved by laws passed in the 1970s.

There are basically three types of seawall: seawalls with deep water offshore (more than 3 feet), seawalls with shallow water offshore (under 3 feet), and seawalls with a beach in front. Seawalls occur in environments with different wave energy dynamics that range from low energy (little wave action), to medium energy (medium wave action), and high energy (high wave action). These terms are relative and are specific to the Sarasota Bay conditions. Low energy occurs in

protected bodies of water with a short "fetch" (distance the waves travel), like bayous, canals, and small embayments; medium energy occurs when the shore is semi-protected by a short to medium fetch or by shallow barrier sand bars and seagrass flats; and high energy occurs when there are large, open bodies of water with the potential of heavy wave activity during storms.

Other considerations of seawalls include age and proximity to the house or upland structure. They have a life expectancy of from 10 to 50 years with major maintenance to be expected at 20 years. The proximity to the upland structure can vary with houses usually set well back from the water but often swimming pools, extensive landscaping, and boat davit structures are perched at the water's edge.

The human factor should be considered. Environments created by humans have reasons for their design and cause effects created by the circumstances. One possible psychological reason for the desire for seawalls is security. Humans are terrestrial and are intimidated by the sea. Strange creatures inhabiting the bay waters often sting or bite, reinforcing this fear of the water. Storm damage and the fury of the wind-whipped bay can cause a feeling of helplessness in homeowners. A logical reaction is to create a wall, drawing a clear line between the civilized, human held land and the uncivilized sea. Another possible reason for the desire for a seawalled bayside environment is human migration. Most Florida residents were not born here; they migrated from Ohio, New York, Michigan, and other northern locations. At their Florida home, they attempt to recreate the green fields of Ohio or the large grass yards of New York with which they have been familiar since their childhood. Mangrove trees with crabs crawling in the branches and tangled root systems only remind them that they are in a strange land far from home.

Seawalls, then, are built for physical and psychological reasons. They create their own physical and psychological effects on humans. But, seawalls are a hostile environment. They make the shoreline a sheer drop off of concrete, from 4 to 6 feet, with barnacles and oysters at the waterline. They are dangerous to both adults and children. To fall off a seawall is not a problem, unless you do not swim. To climb up after you fall in can be a difficult proposition even for healthy adults. It is most hazardous for small children, who might panic after cutting themselves on the barnacles and oysters. Wisely, parents scold young children who go near the seawall and warn them of the dangers. This builds an antagonistic mental wall between the child and the marine environment.

The natural shoreline is vegetated with mangroves with a gradual slope going from upland to the deep water offshore. These mangroves act as a natural, but not impenetrable, border between the land and sea. The water offshore is shallow and offers pleasant swimming conditions out to deep water. These conditions are conducive to developing a close relationship with the natural marine environment. Adults and children can interact with a passive natural environment that features not only harmless crabs, but beautiful birds that feed on these crabs. There is no need to protect the small children from the small dangers of these natural shorelines. Beaches for access to the bay can be created through the mangrove fringe and sharp shells and rocks removed so swimmers do not cut themselves.

As fear becomes knowledge, a whole new world can be opened up for the children of tomorrow. People swimming in their bayous and canals might find a new appreciation for the natural environment that is closest to them, their own back

yard. This can be a exciting scenario, making life on Sarasota Bay healthy and invigorating.

Not all seawalled shorelines lend themselves to this treatment, but many do, making a practical alternative for those who need to replace an old seawall with shallow water or a beach offshore, low wave action, and a house set well back. These homeowners will not be losing land when they remove their seawall; they will be gaining a natural seashore that can be a gateway to a healthy bay and a healthy life.

> Before I built a wall I'd ask to know What I was walling in or walling out, And to whom I was like to give offence. Something there is that doesn't love a wall, That wants it down.

> > Excerpt from "Mending Wall" by Robert Frost



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Commercial fishermen

Commercial fishermen were some of Florida's first European residents. The art of catching fish for trade goes back to the earliest humans here on the Gulf coast. Remains of fish at an early Indian site on Sarasota Bay indicate fish of similar size were probably caught by an early seine net. Today commercial fishermen continue to harvest a dwindling natural resource with nets.

Most of the commercial fishermen here are natives, born and raised on Sarasota Bay, with an intimate knowledge of its waters and history. They remember or have been told about the good old days and have witnessed everything here in between. Rugged individuals, they are hard to get together on issues but have formed a state wide organization to represent their interests, Organized Fishermen of Florida (OFF). Since 1983 over one million dollars has been spent from monies collected through a gill-net license fund that comes directly from the commercial fishermen. These monies have helped to sponsor many revegetation and habitat restoration projects and to provide salaries for three DNR positions. Any attempt to solve Sarasota Bay's problems should include the commercial fishermen as an important element and logical champions of a healthy mangrove and seagrass environment here to support future commercial fishery activity.
Marine Parks

The term 'critical marine habitat' is here taken to mean those identifiable areas which are vital to the survival of a marine species, at some phase in its life cycle, or of a marine habitat, community or ecosystem, because of the ecological processes that occur within it. These may be extensive communities, such as mangrove-sea grass-coral reef systems, or small areas, such as rookeries for seals, or unique areas, such as lagoons which are important as whale breeding grounds, or even terrestrial areas, such as watersheds which nourish an estuary.

G. Carleton Ray,

preface, p. 16

Other aspects of this problem are that 'parks' and 'reserves' are set aside by boundaries which are almost always ecologically 'leaky' and the very action of 'setting aside' raises conflicts with those who often would benefit most from marine conservation. Most notably, sport and commercial fishermen need more, not less, conservation action in order that the natural productivity on which they depend may be preserved. However, fishermen often stand against reserves in fear of losing 'rights'. Similarly, hotel and property owners fear losing property value.

G. C. Ray

It is particularly important to develop means by which marine conservation may be integrated into patterns of ecodevelopment, building from local knowledge and customs, and taking into account traditional uses of the sea. G. C. Ray,

p.26

An International Conference on Marine Parks and Reserves, 1976,

International Union for Conservation of Nature and Natural Resources,

The Gresham Press, Old Woking, Surrey, England.

108 The Values of Mangroves

Value_

Trees provide shelter for wildlife, improve the aesthetics of an area, help filter pollution, and act as visual and noise buffers in addition to controlling erosion and storm water and conserving energy. Figures from the American Forestry Association calculate the annual value of a 50 year old "urban tree":

Such a tree would provide \$73.00 worth of "air conditioning" by providing shade and giving off water vapors; \$75.00 worth of erosion and stormwater control; \$50.00 worth of pollution control by consuming carbon dioxide; and \$75.00 worth of shelter for wildlife, for a total of \$273.00. Taking the annual figure and adding 5 percent interest for 50 years, the value of a tree's contribution is \$57,151.00.

(Mangroves on Sarasota Bay have become "urban trees". This is one answer to "how valuable is a tree?")

109 The Tiger William Blake

Tiger! Tiger! burning bright In the forests of the night, What immortal hand or eye Could frame thy fearful symmetry?

In what distant deeps or skies Burnt the fire of thine eyes? On what wings dare he aspire? What the hand dare seize the fire?

And what shoulder, and what art, Could twist the sinews of thy heart? And when thy heart began to beat, What dread hand? and what dread feet?

What the hammer? what the chain? In what furnace was thy brain? What the anvil? what dread grasp Dare its deadly terrors clasp?

When the stars threw down their spears, And water'd heaven with their tears, Did he smile his work to see? Did he who made the Lamb make thee?

Tiger! Tiger! burning bright In the forests of the night, What immortal hand or eye, Dare frame thy fearful symmetry? Canaries

Manatees, spoonbills, wood storks, eagles, and other endangered species are like canaries to the miner. When they die off and disappear, we are in serious trouble. Macroscopic indicators like the presence of these endangered species and percentages of mangroves on the bay can show us when the quality of life here reaches a critical level. Demanding the preservation of these macroscopic indicators, we can save ourselves as well as the diversity and health of the environment on Sarasota Bay.

Sending money to the Cousteau Society, Green Peace, Save the Whales, and other good causes often diverts interest from the threatened species we have here. There is not a prettier or more exotic sight than the roseate spoonbill feeding on the grass flats at sunset. The pink and roseate colors of these spoonbills complemented by the hue of the late afternoon light can only be observed and not imagined. The form and precision of wood storks feeding in unison surpasses the greatest ballet. A kinder more gentle animal than the manatees that swim in these bay waters can not be found. One of the few remaining eagles in this area soars as a lone example that we are at the critical environmental level now.

What is the value of all this? It is the data base that the people of this area have to draw on. These intangible benefits enrich our lives even if we do not actually see them daily. Manatee bumper stickers, spoonbills in calender pictures, and eagles on everything constantly remind us of our rich natural environment. Children who see these animals in their natural environment have seen the greatest ballet and the most fantastic colors and have heard the greatest opera right here on

Sarasota Bay, expanding the limits of their data bases and the quality of all of our lives.

"And this, our life, exempt from public haunt, finds tongues in trees, books in the running brooks, sermons in stones, and good in everything."

William Shakespeare

It is also difficult to measure the value of enjoying a pretty day on a clean bay or catching your own fish dinner.



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Thinking_

You and I, like flying molecules within a microscopic area of space, must seek adjustments, alliances, dispensations, tolerances, mutual goals, mutual defenses, new rules of the game subscribed to by all, new opportunities of achievement underwritten by common consent, new sanctions for the violator, new compensations for the violated, new dreams, new dreads, new uncontested dross. The city forces upon all of us whatever reason man can mobilize. So we go forward. Or so like the pterodactyl, we vanish.

Robert Ardrey, The Social Contract

Our greatest product is thinking. Its product, technology, gives humans leverage to do amazing things. The biggest problem we have is incorrect thinking applied with the leverage of technology. The results of misdirected action can be devastating.

Today the Sarasota Bay area is at a juncture between the small town, sparsely populated past, and the large city, heavily populated future. An intelligent application of thinking and technology can maintain a healthy environment on Sarasota Bay and nurture both humans and nature. Failure to recognize the requirements of the ecological parameters we work within will be inefficient and costly and will have a detrimental effect on the present and the future population here. We must stop the destruction of the natural environment that belongs to the people of the area and the state of Florida during the inevitable construction of new buildings that will support one of the country's fastest growing populations. The extension of our thinking through planning and the lever of technology can produce a livable, healthy Sarasota Bay area for all of us for years to come. Macroscopic

Macroscopic analysis is an important approach in considering the big picture. 24,000 feet : 1 inch, 12,000 feet : 1 inch, 900 feet : 1 inch, and 200 feet : 1 inch give different perspectives on the same subject. The scale dictates the level of accuracy of the analysis. State and national agencies are more concerned with the 24,000 feet to 1 inch scale, the macro analysis of large areas. The local city and county agencies are on site making decisions at a 1 foot = 1 foot basis. The State Freshwater Fish and Game Commission may find only 5 acres or more of wetlands important in developing management plans when the city or county agents might be concerned with whether a branch is 3 inches or 4 inches in diameter.

The combination of these two perspectives is important in making decisions on management and regulation. The state of Florida has to make decisions on the basis of a large, widely varied topography which ranges from subtropical in the south to temperate in the northern part of the state. The mangroves are a dominant littoral species only in the southern part of the state and are replaced by marsh grasses north of Anclote Key (about 50 miles north of Tampa Bay). Their maintenance and protection is a regionally specific issue which does not apply in northern Florida. Further, mangroves grow only on coastal shores and their extent of diminution varies from area to area, making the issue of their survival of even narrower interest. Eagles

Traveling around the bay looking at mangrove areas, I saw an eagle three times. It is encouraging to know that Sarasota Bay is home to one or more eagles. (There are still remote areas left on the bay, and these are where the eagle(s) was seen.) One eagle was perched above the large mangrove fringe area between El Conquistador and Tidy Island in the tallest dead native pine tree. Later it was seen flying over that same coastline. Another day it was perched in the tallest, live, native pine tree on the Crosley Estate, near the airport, with two great blue herons sharing the same tree.

These tallest native and Australian pine trees, both dead and alive, serve as roosts and perches for eagles and other birds. Sometimes there are even nests of eagles and ospreys in these majestic settings. In fact, it was not uncommon to see every available tall tree on the horizon, above the mangroves, occupied by a raptor or other large bird. This is an example for public policy. We can allow these tall trees to be cut down, pay a biologist to do a study on why we are losing our raptor population, and then pay to have artificial nesting and roosting posts (platforms) built around the bayshore. Or, we can anticipate this problem and require some of these trees in open space be left as a matter of policy. It is our choice to be far sighted and preserve these arboreal features, or to struggle to recreate them at great expense to the public. Sometimes the "tree huggers" can have an economic impact on the community by preventing wasted energy and money from being spent and by not allowing destruction of the environment to occur that will have to be repaired. The cost of placing one of these platforms could run as high as

\$1,000.00, while regulation of tall tree destruction would be easy to put into effect at little cost and with high educational value to the public.

If we want the nature areas to continue in their vitality and the next generation of Sarasota Bay residents to be able to say they saw an eagle on the bay in the year 2000, we will have to have foresight.



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Politics, Law, and Bureaucracy in Mangrove Preservation and Restoration

Politics_____

The majority of the citizens in the Sarasota Bay area profit from mangrove regulations by enjoying the extended benefits the mangroves provide. Clean air and water are just some of the byproducts of these trees. From the fresh fish we catch or buy at the local fish market to the birds that fly and even the wholesome fresh air we breathe, the mangroves play a large part in making Sarasota Bay area a great place to live.

The vast majority of the voting public do not live on the water and do not have mangroves in their yard. Obviously it is to the advantage of these voters to preserve the few remaining areas for the ecological and recreational values they provide. The preservation of mangrove areas will save tax dollars that would have to be spent to correct the consequences of a deteriorating environment without mangroves.

Demographically, over 95% of the voters in the Sarasota Bay area do not live on the water. Of the less than 5% of the voting public that live on the water, less than half are anywhere near mangroves. Most of the waterfront homes that exist today already have seawalls; those homeowners will benefit with increased property values as seawalled property becomes unique because it can not be replicated. By restricting the building of new seawalls, old seawalled property will become the only way a new homeowner can get a house on the water with a seawall. Value comes from scarcity in a condition of demand; by flooding the market with new seawalled properties, both the ecological and economic values of the entire area will go down, further decreasing property values.

Of the less than 2.5% of the voting public that live directly or indirectly on or near mangrove waterfront, over half enjoy the mangroves and appreciate their value or have reached a point of balance in their relationship with them by moderately pruning. This leaves approximately less than 1% of the voting public that has even a remote interest in destroying mangroves. These homeowners are the people who are in the position of saving this most valuable asset to our environment.

In a democracy, public opinion creates laws and causes them to be enforced. It is a long process for this public to come to conclusions and find a united identity in common desires. In mangrove regulations and legislation, we have found this united identity that we can call public opinion. It is a desire for the public good of health and welfare and the protection of the environment. Around 1970, the studies of Eric J. Heald and William E. Odum established conclusive evidence that the mangroves were the basis for a healthy productive environment in the south Florida bays and estuaries. Built on over the past 20 years, their work has been firmly established as a cornerstone in our modern scientific understanding of our ecological bay system.

To support mangrove legislation is good political sense. As these areas are further diminished, they will be valued more by the public and the wildlife. Mangrove destruction does not go away; it is obvious what has been destroyed. Through aerial photography by individuals and government agencies, an extensive record of shoreline alteration has been compiled.

Today we have the capabilities to closely scrutinize these valuable areas through increasingly sophisticated technological advances in aerial photography, computer interfaces, and organized local government agencies. It is time for the public to insist on a healthy environment for ourselves and the generations of people and wildlife to follow.



Precedence

Precedence is a fundamental concept of individual rights in a democratic society. It is the concept that if one individual is allowed a right, then all individuals of that society should be allowed to exercise that right. For example, if one homeowner on a bayou is allowed to build a seawall, then all homeowners on that bayou should be able to exercise the right to build a seawall. This provides consistency in zoning matters and prevents permitting from being capricious. Theoretically this concept is correct, but in practice it can lead to cumulative effects that are not anticipated or desired by the society.

Cumulative effects is the principle that isolated or individual actions may be of little harm to society, but in combination with similar actions of other individuals, they can cause cumulative effects that will damage or destroy an environmental resource and threaten the social group. Considering the health and welfare of the society that contains the individual more important than the rights of that individual, cumulative effects outweighs the principle of precedence in public planning.

Concurrency is another concept that recently became a central concern of public planning when local governments were forming comprehensive plans for their communities. Concurrency is the principle that any increase in a community population must be backed up by the infrastructure of the community that will have . to support it. This means that houses can not be built without the sewer, water, roads, schools, etc. being in place to support or carry this increase in population; in other words, growth must be planned for.

The concurrency requirement for the environment would be not to overload it beyond its ability to carry the population. The physical requirements necessary for a society to exist must overrule the theoretical and philosophical rights of the individual within that society. A simplified model of this conclusion would be: several rats are in a sealed, air tight terrarium with just enough plants to produce the oxygen this rat society needs to exist. Somehow, with everything considered, there is perfect balance and harmony, with enough food and other requirements for survival in this terrarium. One of the rats decides to eat the plants that produce the oxygen that is necessary for the survival of the group in the terrarium. What are the group rights in this case? No matter how important individual rights are, at some point, they must give way to the rights of the health and welfare of the group to which that individual belongs.



Taking____

Pressure placed upon state and local treasuries by measures such as tax

reform will compel governments increasingly to resort to regulation rather than

acquisition. Whenever regulation of property rights is increased, taking is an issue.

"The issue of when a land use regulation becomes a taking has been extensively litigated in Florida. In Graham v. Estuary Properties, Inc., the Florida Supreme Court made several significant contributions to the analysis of this issue. It set out a six-factor test to determine whether a taking has occurred and applied that test to Lee County's denial of Estuary Properties' plan for development of a 6,500 acre parcel that encompassed 4,600 acres of mangrove forests.

Those factors are:

1) Whether there is a physical invasion of the property.

2) The degree to which there is a diminution in value of the property. Or, stated another way, whether the regulation precludes all economically reasonable use of the property.
3) Whether the regulation confers a public benefit or prevents a public harm.
4) Whether the regulation promotes the health, safety, welfare or morals of the public.

5) Whether the regulation is applied arbitrarily and capriciously.6) The extent to which the regulation curtails investment-backed expectations."

> "The Florida test for Taking" A critical analysis of Graham v. Estuary Properties, Inc. By Keith W. Bricklemyer The Florida Bar Journal February 1983

Balance_

Private rights vs. states rights or individual rights vs. public rights is the main dilemma in the issue of mangroves on Sarasota Bay. To find the point of balance in this dilemma is the goal. The public, in the form of city, county, and state governments, has hired technicians to study the question of when the destruction of the natural environment will negatively affect the public's health and welfare. Mangroves and wilderness areas in general have been reduced to about 20% of their historic extent around Sarasota Bay. At what point is the natural environment remaining after development too little, and what are the effects of this condition going to be? The majority of scientists and technicians tell us we are at that balance point and that inevitable population growth will continue to displace wilderness areas. Florida is one of the fastest growing states in the country, and Sarasota and Bradenton are among the fastest growing cities. What the scientists and technicians are telling us is that anything more we destroy will have to be replaced in order for us to enjoy the quality of the environment that exists now and to maintain the balance of civilization and natural environment.

While the cost varies, a recent estimate of the cost of replacing an acre of mangroves was conservatively put at \$100,000.00, with no guarantee it would be successful. The mangroves that exist today are of unquestioned value as habitat for wildlife, filters for air, water, and noise pollution, hurricane and erosion protection, and as scenery that is integral to a beautiful Sarasota Bay. The mangroves are just what the doctor ordered to offset the problems we have today and will have increasingly in the future, caused by the impact of human development on our

natural environment.



DER-DNR

In the state of Florida, the DER (Department of Environmental Regulation) has become the lead agency in mangrove regulation. The DNR (Department of Natural Resources) shares this responsibility in Aquatic Preserves. The DER, which focuses primarily on pollution control concerning waste, water, and air management, is centered in Tallahassee, and has six district offices. Composed of about ten counties, each DER district office monitors mangroves as wetlands.

As mangroves grow both above and below the MHWL (Mean High Water Line), DER monitors both the mangroves that grow in the water and just above the water as an agency concerned with pollution. DNR is the department of the state which monitors the state's property, that is, parks, beaches, and the bodies of water belonging to the state including bays, rivers, and adjacent Gulf and Atlantic waters. When reviewing the question of mangrove protection, it is important to begin at the source of regulation. The regulations must have a solid basis in the laws of the state and the country and not be capricious. By giving the responsibility for regulation of mangroves to the DER, the issue is confused. By giving the responsibility to DNR, the issue would be clearly defined in law with a long history of litigation. The state owns lands and water below the Mean High Water Line, and the property owner owns the land above the Mean High Water Line. It is important that the law has a strong base in litigation in order to be enforceable by a regulatory agency. Some of the mangrove regulatory problems that exist today seem to stem from this agency identity crisis at the state level.

Big Brother

It is past <u>1984</u>, <u>Brave New World</u>, and Big Brother is watching. Today we are faced with the dilemma of whether to embrace the new technology or to fight for our independence. Computers and their ability to store and process huge amounts of information have made the local and state agencies capable of monitoring the information load of today's large population centers. By monitoring the environment, the state and local governments plan to protect the interests of the colony against the deviation of the individual members of the colony. Old ideas of individualism seem archaic and atavistic in the new order.

Requiring permits for all mangrove alterations gives the town, city, county, or state information it can put in the public record for future reference and use as a data base. It would allow government agencies to differentiate between original mangrove growth, planted mangroves, pruning modifications, and other factors on a site-by-site basis. To plan on working outside this permitting process is to admit we are not interested in protecting the mangrove resource. It is as if zoning was not based on permitting. How could anyone hope to control something that is not monitored?

Current state laws offer pruning rules without requiring a permit. The rules are fine. They offer restrictive guidelines that allow homeowners the possibility of altering their shoreline less than 25% while protecting the mangrove resource. Yet, by not requiring a permit for this pruning, it is in effect saying "just kidding, we are really not serious about monitoring or protecting the resource." This causes confusion in both the government and private sectors. These same rules with

permitting required could be a sound basis for mangrove management. Some local government agencies have made rules more restrictive on pruning mangroves in response to the unenforceable state rule not requiring permits for pruning. In effect, this undermines the legal groundwork of the local agencies if they are contested on a mangrove violation.



Permitting

I have admiration for the local and state government employees who are trying to balance the realities of today with the idealism needed for the future.

As Florida becomes more crowded and the economy is depressed, it is obvious that the state and local governments will need to make each unit of government justify and support itself. The cost of issuing and monitoring permits should be reflected in the fees charged with a 20 percent profit tacked on. This would discourage home owners from getting the permits for activities that are deleterious to the environment and encourage the local governments to monitor and enforce laws that are best handled on a local level. A high permit fee could be seen as a type of mitigation to the city or county governments for a very real loss to the environment that will eventually have to be replaced at a cost to the public. Making the local building department mangrove monitoring and permitting division support itself through permitting fees can make it more energetic and efficient.

Example: a \$25.00 permit might incur an expense of \$250.00, considering the time of an agent driving to the site for the before and after inspection and the cost of office work, writing up the permits and keeping track of all the paperwork. A \$300.00 fee would compensate these real costs and provide surplus money for projects to improve the environment.

Chapter 17-321.010 Mangrove Protection, Policy and Intent

- (1) The department finds that:
- (a) Three species of mangroves border more than half of Florida's peninsular shoreline.
- (b) Natural mangrove vegetation protects the shoreline against erosion resulting from relentless coastal dynamics.
- (c) Each species of mangrove provides habitat for a diverse community of plants and animals, including endangered species, such as bald eagles, brown pelicans, and ospreys.
- (d) Mangroves play a fundamental role in estuarine nutrition by producing concentrations of organic matter which are utilized by marine organisms within the estuarine food web.
- (e) Over 90 percent of Florida's commercial fish species are dependent upon the nursery function of these dynamic estuaries.
- (f) These mangrove estuaries provide a dependable winter resting ground for a host of species of migratory birds.
- (g) These same species of mangroves are aesthetically appealing and can be incorporated into the landscaping of waterfront residences.
- (h) Waterfront homeowners can live in harmony with this natural waterfront fringe.

These statements are paraphrased from the policy and intent section of the Florida Department of Environmental Regulation Mangrove Protection Rule which presents the case for the preservation of the mangroves.

Prospero

Prospero

You do look, my son, in a mov'd sort, As if you were dismay'd. Be cheerful, sir. Our revels now are ended. These our actors, As I foretold you, were all spirits and Are melted into air, into thin air; And, like the baseless fabric of this vision, The cloud-capp'd tow'rs, the gorgeous palaces, The solemn temples, the great globe itself, Yea, all which it inherit, shall dissolve And, like this insubstantial pagent faded, Leave not a rack behind. We are such stuff As dreams are made on, and our little life Is rounded with a sleep. Sir, I am vex'd. Bear with my weakness; my old brain is troubled. Be not disturb'd with my infirmity. If you be pleas'd, retire into my cell And repose. A turn or two I'll walk To still my beating mind.

> William Shakespeare The Tempest: Act IV, Scene I

Mangrove Information Addresses and Phone Numbers

Florida Department of Environmental Regulation (DER)Interstate Business Center(Across from the State Fair grounds)Mangrove4520 Oak Fair Blvd., (off U.S. 301)enforcingTampa Fl. 33610623-5561Nan Baggett ext. 327Agents in the state is the s

Mangrove pruning rule and enforcing

Agents in monitoring mangroves

Fl. D.E.R. Tallahassee, Fl. Doug Fry 904-488-0130

Environmental mangrove specialist

Fl. D.E.R. Tallahassee, Fl. Jack Maynard 904-488-4805

Public relations

Florida Department of Natural Resources (DNR) Bayborough Harbor USF Campus St. Petersburg, Fl. David Crewz Mai Ken Haddad Cor Gail McGerry Cor 896-8626

Florida Department of Natural Resources (DNR) Aquatic Preserves Bill Torres 622-7364

Manatee County Planning and Zoning Karen Collins Doug Means 748-4501

Manatee County Pollution Control Gary Conchrin Tom Larkin Mangrove biologist Computer mapping Computer mapping

Environmental Administrator Environmental Planner

Mangrove pruning enforcement for Manatee County John Norrie Manatee County Stormwater Management 75th Street West Bradenton, Fl.

Sarasota County Dept. of Natural Resources Steve Sauers, Belinda Perry, John McCarthy 1301 Cattleman Rd. Sarasota, Fl. 378-6113

Sarasota County Department of Transportation Bill Watts Sarasota Bay 1"=200' Aerials 378-6180

Town of Longboat Key Planning Department Steve Schield Longboat Key, Fl. 34228 383-3721

Sarasota City Planning Dept. Melissa Dunlop 954-4195

U.S. Army Core of Engineers Joe Batchler Ron Rudcers- Engineer 840-0824

U.S. Fish and Wildlife Service P.O. Box 2676 Vero Beach, Fl. 32960 (305-562-3909) Joe Carrol Bob Turner Arnold Banner

Florida Game and Freshwater Fish Commission Judy Elert, Tallahassee, Fl. 904-488-6661

LANDSAT photographs for Sarasota Bay area

Florida Fish and Game Jim Beever 639-3515

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Mangrove Ecologist

Town building inspector dealing with mangroves

National Wetlands Inventory U.S. Fish and Wildlife Service 1-800-872-6277 893-3624 Becky Stanley

Habitat Designation

Florida Department of Transportation (DOT) State Regional Office John Hartly, Biologist Bartow, Fl. 813-533-8161 ex. 2625 Rick Kelly 904-488-4562

Roadside Maintenance

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Mote Marine Laboratory Ernie Estevez 388-4441

Mangrove specialist

New College Environmental Studies Program Julie Morris and Jono Miller 359-4390

Otto Bundy Nautilus Environmental Services Horticultural Systems Inc. 746-3270 hm. 776-1760 wk. Revegetation specialist

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Manatee Audubon June Boetcher 722-5902

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Bill Lewis Sierra Club 366-9498

Michael Saunders and Company Michael Saunders Lynn Don Lewis Tom Abbott Main Street Sarasota, Fl. 951-6660

Surveyors-Lombardo and Skipper Surveyors Jan Skipper, 722-4561 Cross Bob Professional Land Surveyors 746-1512 Benson Engineering 792-6161

Sound FX Chuck Chapman Sarasota, Fl. 351-3471

Macintosh Classic, Robby Hyatt, New College 355-9551, 355-8932 Chris Bertaut hm 355-0946

Michael Royal Pianist Extraordinaire 1097 Tarpon Ave. Sarasota, Fl. 34237 365-1687

Robin Lewis Lewis Environmental 889-9684

Mangrove Systems, Procter and Redfern Tampa, Florida 989-3431 Real Estate information

Waterfront property owner descriptions.

MHWL survey information

Video and audio repair and consulting

Computer assistance

Piano music for video

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Jack Cartlidge Fine Arts Dept., New College 359-4216

Tony Andrews Soc. Science Dept., New College 359-4380

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Thesis committee

Thesis committee

Thesis committee

Manatee and mammal research

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Carl Goodwin U.S. Geological Survey 228-2124

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Coastal ecology specialist

Some of the photography

Helicopter for aerial video

Environmental Law specialist

Thomas William Mayers P.O. Box 64 Lands End Longboat Key, Florida 34228 813-383-1542, 383-6598 Still and video photography; editing



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Mangrove Site Form

Site number	Date	Location	
	Ded	Plack	White
Mangrove extent	Rea	Black	white
Mangrove descriptio	n		
Uplands description_			
Onshore description	(substrate)		
Offshore description	·		
Revegetation possibi	ility		
Condition			
Terms and consideration	s:	<u> </u>	
Pruning- Freeze Damage	≔ (FD), Hedge under	6'= (H6), Selective limb	removal=
SLR, and "grazed" = (G)	•		
Ditching and spoiling- W	With spoil or without s	spoil, ditches connected	or isolated.
Exotics- Australian Pine	: (AP), Brazilian Pepp	er (BP), Punk (MQ), Or	mamental (0).
Galls, Bird use, Unexpla	ined mortality, and U	pland use and ownership).

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Considerations in the possibility of revegetation.

Type of seawalled shoreline:

- 1. deep water to seawall (over 3 feet)
- 2. shallow water to seawall (under 3 feet)
- 3. beach in front of seawall, shallow offshore

Condition of the seawall:

- 1. new
- 2. middle age
- 3. old and falling down

Type of rip-rap:

- 1. solid rip-rap to deep water (over 3 feet)
- 2. solid rip-rap to shallow water (under 3 feet)
- 3. rip-rap with beach, shallow offshore

Type of shoreline, (wave energy):

- 1. high energy.
- 2. medium energy.
- 3. low energy.

Type of beach:

- 1. steep slope
- 2. medium slope
- 3. gradual slope

Site mangrove history:

- 1. no history of mangroves at the location
- 2. some mangroves growing in the area.
- 3. historic mangrove site.

If the site being considered has a 1. in these categories it will be difficult to revegetate. If it has a 2. it will be fairly possible to revegetate. If it has a 3. it will be easy to revegetate.

1. = difficult to revegetate, expensive.

2. = possible to revegetate, less expensive.

3. = easy to revegetate, little expense.