

**A COMPREHENSIVE PLAN**  
**TO MAINTAIN CAPTIVA'S BEACHES**

**CAPTIVA EROSION PREVENTION DISTRICT**

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## **PART I - THE DISTRICT**

### **History**

The CEPD was created in 1959 by an act of the Legislature. During the period between 1959 and 1981, the Board was active in helping residents construct structural solutions to erosion, and installing experimental structures to prevent erosion damage.

The Captiva Erosion Prevention District, as we know it today, was reestablished by the Florida Legislature in 1981 as a beach and shore preservation authority.

### **Authority and Responsibility**

The Captiva Erosion Prevention District is an independent special district with taxing authority. The boundaries of the District include all of Captiva Island, from the centerline of Blind Pass to the centerline of Redfish Pass, and extend 300 feet into the Gulf of Mexico and Pine Island Sound.

The District has all the powers and duties of a beach and shore preservation authority under the provisions of Chapter 161.32, F.S. These include:

- Developing and executing a logical and suitable program for comprehensive beach and shore preservation.
- Constructing and maintaining erosion prevention projects.
- Exercising jurisdiction, control and supervision over erosion prevention projects within the District. This includes making and enforcing rules and regulations.
- Establishing rules for its government and proceedings.
- Purchasing, holding, leasing and disposing of real estate and personal property, such as offices and equipment.
- Borrowing funds.
- Exercising the power of eminent domain.
- Entering into contracts and agreements with other governments.
- Contracting for the services of consultants such as engineers, attorneys and accountants. Hiring employees and agents.
- Exercising other legal powers and duties of a government, including the ability to sue and be sued, enforce its rules and regulations, receive and accept grants, and pay its debts.

### **Structure**

The Captiva Erosion Prevention District is governed by an elected board of five Commissioners, each of whom is a qualified elector residing within the District. Commissioners are elected to four year terms and receive no compensation. The Board sets the policies of the District, and employs a District Administrator to carry out day to day operations.

## **PART II – THE SHORE PROTECTION PROGRAM**

### **Overview**

The Captiva Shore Protection Project is an on-going beach nourishment program that mitigates erosion of the island by periodically placing sand dredged from offshore sources onto the beach. Performance of the beach is monitored and assessed annually. Maintenance nourishment projects are constructed to replace sand lost to erosion over the nourishment cycle - the interval between scheduled beach nourishment projects. Based on experience to date, the nourishment cycle for the Captiva Shore Protection Project is approximately eight years. Other aspects of the Shore Protection Program include the Emergency Maintenance Plan and the District's participation in hurricane evacuation route protection, natural resource protection and the management of Blind Pass and Redfish Pass.

### **Project History**

Between 1961 and 1981, a number of structures and a small fill project were constructed in response to erosion. A beach fill, in conjunction with construction of a groin field, placed 107,000 cubic yards of material from the bay side of the island onto the beach in 1961. Structures built in the 60's and 70's included over 100 groins and several sandbag breakwaters. In 1972, a rock groin was constructed at Blind pass by Lee County to protect the bridge and the evacuation route. A terminal rock groin at Redfish Pass was built in 1977 as part of an erosion control project that later placed sand on South Seas Plantation.

In 1981, South Seas Plantation constructed a beach nourishment project consisting of the placement of 655,000 cubic yards of fill dredged from the Redfish Pass ebb shoal. The fill area extended from Redfish Pass south for 1.9 miles. The project also included upgrading of a terminal groin at Redfish Pass. The funding for this private initiative was provided by a municipal services taxing unit (MSTU) of property owners within South Seas Plantation.

Initial construction of the current island-wide Shore Protection Project took place in 1988/1989, with the placement of 1.6 million cubic yards of sand dredged from the Redfish Pass ebb tidal shoal. The fill extended along 4.6 miles of Captiva Island. This project also included a 100' extension of the terminal groin that had been constructed by Lee County at Blind Pass.

The first maintenance nourishment of the Shore Protection Project was completed in 1996, placing 817,300 cubic yards of sand on 4.8 miles of Captiva Island, and an additional 237,100 cubic yards on 0.74 miles of Sanibel Island, for a total of 1,054,400 cubic yards. Fill was dredged from offshore borrow areas.

## **Design**

Project design includes an evaluation of previous designs and beach performance based on the results of annual monitoring and borrow area investigations for each nourishment. A design report is developed to determine the required beach cross section needed for storm protection and the amount of additional fill (advance fill) needed to allow for erosion between nourishments. Since the CEPD intends to pursue long-term permits, this report will address multiple maintenance projects. Final design includes the development of plans and specifications for bidding each beach nourishment project.

The project area includes all of Captiva Island, and approximately the northern 6,000 feet of Sanibel Island. Sand is dredged from offshore borrow areas and placed on the beach in a specific cross section. This cross section provides storm protection and recreation beach.

Beach nourishment projects are designed to maintain the integrity of the design beach section by the placement of a sufficient volume of sand, known as advance fill, seaward of the design section. The design section is defined as the cross section needed to provide a protection against upland damage. The advance fill volume is consistent with the projected erosion during the time interval between the periodic renourishment projects, known as the nourishment cycle. As a result, the established level of storm protection is designed to be maintained over the nourishment cycle.

## **Borrow Area Resources**

Borrow areas are offshore sand sources consisting of deposits of material with a grain size similar to the existing beach, and a low proportion of silts and clays. Borrow areas are developed through geotechnical investigations that identify and map sand deposits meeting the criteria for beach nourishment. Beach nourishment fill is dredged from these borrow areas and brought to the beach using hydraulic or hopper dredge techniques. In line with policies to utilize a long-term permit approach, borrow areas with a sufficient volume of sand to construct two scheduled maintenance nourishment projects and one emergency maintenance project are identified. Therefore, borrow area resources will be updated after every other beach nourishment, or approximately every sixteen years.

## **Monitoring**

Monitoring studies are performed to track the performance of the beach nourishment project, and to identify erosion and accretion patterns within the project limits and along adjacent shorelines. The District's monitoring program also maintains an updated baseline from which to assess the actual storm damage from major storms in order to qualify for FEMA funding. Monitoring studies are used as planning tools, estimating the timing of the next periodic maintenance project and refining the project design needs and advance fill. The monitoring program currently consists of the following:

Beach and hydrographic surveys of DEP profiles R84 to R109 on Captiva Island, and DEP profiles R110 to R120 on the northern 11,000' of Sanibel Island.

Color aerial photographs of the Captiva and northern Sanibel shorelines at an approximate scale of 1" = 1,000'.

A comprehensive coastal analysis and monitoring report, detailing results of monitoring performed.

Bathymetric surveys of the Blind Pass and Redfish Pass ebb tidal shoals are performed in alternate years.

### **Economic Planning**

An economic plan is developed for each maintenance nourishment project to assess the project costs. The assessment is based upon the appraised value properties and their benefit category.

### **Permitting**

Permits are required from both State and Federal agencies for construction of the beach nourishment project. The permit review process addresses both the engineering and environmental protection issues related to the project. Permits grant the authority to place a specific volume of sand, taken from a specific borrow area, in a defined project area.

Since future beach nourishment projects will consist of periodic maintenance, the District has determined that a long-term permit approach will be the most cost effective option for obtaining necessary permits. Therefore, permit application will identify multiple nourishment project over a period of approximately 15 - 25 years, and will include sufficient borrow area resources for several projects.

### **Funding**

The Shore Protection Project is eligible for funding by Federal, State and County sources, based upon the level of accessibility by the general public and its protection of upland resources.

#### **Federal Funding**

Federal participation in the project area was authorized as part of the Lee County erosion control project in 1970. Federal interest in the Captiva Island segment was confirmed by the U.S. Army Corps of Engineers through a summary Report in 1987. Authority for the local sponsor to construct the project was provided by the Secretary of the Army through a local cooperation agreement with the CEPD in 1988.

In 1999, the authority for Federal participation was extended to 50 years from the date of initial construction. This means that the Federal government may appropriate funds to share in the project related costs, on a reimbursement basis, through 2039.

The Federal interest in each maintenance nourishment project is justified through an update of the General Design Memorandum (GDM). The GDM establishes the technical, economic, and environmental parameters of the project, and the Federal share of costs. The Federal share of project cost is a function of the amount of eligible shoreline in the project area. Storm protection and recreation benefits provided by the project design must be greater than the cost projected. Eligibility is a function of public accessibility and the protection of public resources.

The Federal share of project costs is appropriated by Congress through the Energy and Water Resources Appropriations Act, as part of the Federal budget process.

The Federal share of project costs are reimbursed by the U.S. Army Corps of Engineers (USACE) through a Project Cooperation Agreement (PCA). This agreement summarizes the authorities and project parameters established in law and in the GDM, as well as defining the method and schedule of payments of Federal funds.

#### State Funding

The project area has been designated as a critical erosion area by the State, which allows the State to participate in project funding. The State shares in project costs for the eligible portions of the project. Eligibility is a function of public accessibility and the protection of public resources.

The State share of project cost is appropriated by the Florida Legislature as a part of the State budget process. The State share of project cost is reimbursed by the Florida Department of Environmental Protection through a funding contract.

#### County Funding

The local share of funds for the project currently includes an assessment to Lee County as a property owner, which has historically been funded by bed taxes. County funding is addressed through an interlocal agreement.

#### Captiva Funding

The District's operating costs are funded by the residents through ad valorem taxes. Ad valorem taxes are assessed and levied for the CEPD by Lee County to pay for the maintenance, operation and other corporate purposes of the District.

The local share of funds for beach projects is provided by the residents of Captiva through special assessments. The levy of such assessments requires approval of a referendum. General obligation bonds are issued to pay project costs. Bond costs are

then retired through the payment of special assessments and reimbursements by State and Federal agencies. Based on an economic analysis of the project, the nature and extent of benefits expected to accrue from the project are allocated to recipients by benefit categories or zones of comparable benefits. Areas of equal benefit are placed in the same zone.

### **Emergency Maintenance Plan**

In December, 1998, the Board adopted the Captiva Island Emergency Maintenance Plan. This plan addresses the planning and actions needed to respond to major storm damage to the shore protection project. Planning issues to position the District for immediate response are described including permitting, plans and specifications, and funding options. Actions to implement the plan are defined and described. The Emergency Maintenance Plan should be reviewed annually, and updated as needed.

### **Public Beach Access and Parking**

Public access to the beach is available at a number of locations throughout the project area. Specific types of accessibility make the Shore Protection Program eligible for State funding. Generally these include public parking, pedestrian access points, and hotels. Public parking areas include:

#### **Turner Beach Park**

Located on both sides of Blind Pass, Turner Beach Park provides a total of 59 metered parking spaces (32 spaces on Captiva, 27 spaces on Sanibel). This park also includes restroom facilities.

#### **Captiva Road Parking**

Located at the end of Captiva Road adjacent to South Seas Plantation, this area provides 45 metered parking spaces.

In addition to public parking areas, there are a number of areas that provide pedestrian access. These include street ends at Laika Lane, Wightman Lane, Andy Rosse Lane, and the Captiva Road parking area; a pedestrian access near the cemetery at the end of Captiva Lane; northern Sanibel from Blind Pass to Bowman's Beach; and the area where Sanibel-Captiva Road (SR 867) abuts the beach.

Area resorts also provide beach access and parking for their guests.

### **Hurricane Evacuation Route Protection**

Captiva Drive (SR 867), is the designated evacuation route for Captiva Island, and is the only road access to and from the island. Throughout much of the length of the island, this road parallels and directly abuts the beach. Historically, parts of Captiva Drive have been threatened by erosion, and have been closed due to undermining from beach

erosion. Protection of the evacuation route is an important goal of the shore protection project. Maintenance of the design section provides a buffer that protects Captiva Drive from undermining.

### **Natural Resource Protection**

The Captiva Erosion Prevention District is involved in and endorses a number of programs to protect natural resources on Captiva and in the region. Included among these are:

Sea Turtle monitoring is performed annually by the Sanibel Captiva Conservation Foundation, a non-profit organization. Nesting patterns are monitored for both Sanibel and Captiva Islands by volunteers. The nesting data is utilized by the District in its planning for the Shore Protection Program.

The District has included dune revegetation in its beach nourishment project plans to reestablish or enhance dune areas damaged by erosion. In addition, the District encourages property owners to plant native vegetation on the dune and in adjacent areas and to remove exotic plant species. As part of its regulatory function, the District reviews coastal planting plans on private property and requires appropriate plant diversity.

### **Clam Bayou**

Water quality monitoring and reopening as needed are a nourishment project permit condition. Water quality is monitored twice a year by the City of Sanibel. Water quality reports are submitted to the Florida Department of Environmental Protection by the District. Excavation to reopen Clam Bayou is scheduled when water quality falls below state standards. To date, excavation of the Clam Bayou entrance has been performed by the City of Sanibel and paid for by the District.

### **Blind Pass**

Blind Pass is located between Captiva Island and Sanibel Island. Historically, the pass opened and closed naturally, at a number of locations near the northern end of Sanibel Island, in response to storm events and erosion patterns. The 1921 opening of Redfish Pass impacted Blind Pass, capturing a significant portion of the tidal prism, thus restricting water flow through the pass. The littoral transport of sand from north to south could, therefore, be captured at the inlet, increasing erosion on northern Sanibel and southern Captiva. Since 1972 with the construction of a bridge and abutments, the pass has not functioned naturally; bridge construction stabilized the inlet location.

A terminal groin at the south end of Captiva Island was constructed in 1972 to protect the road and bridge abutments at Blind Pass. The groin was reconstructed and extended in 1988 to help stabilize a beach nourishment project on Captiva Island. The cap rocks of

the groin were left unsealed, allowing some sand to move through and around the structure.

As part of the 1996 beach nourishment project, additional sand was placed on Captiva's beaches to allow movement of sand through and around the groin to Sanibel Island. The beaches south of the pass along the first mile of Sanibel Island were also nourished to provide recreational beach and protection for the hurricane evacuation route. The nourishment project helped to reinstate the littoral movement of sand around the inlet, and to mitigate for the effects of road and beach improvements since 1972.

The Florida Department of Environmental Protection, in partnership with Lee County and the District, sponsored an inlet management study of Blind Pass in the early 1990's. This study, to evaluate the erosion impact of the pass on adjacent beaches and recommend corrective measures to mitigate identified impacts, resulted in the Blind Pass Inlet Management Plan [Study] (1993).

At the encouragement of the State, a technical review committee was established which included Lee County, the West Coast Inland Navigation District, the City of Sanibel, the Florida Department of Environmental Protection, and the District. The technical advisory committee adopted a summary of findings report and recommended implementation plan in 1998. The report identified the area of influence for Blind Pass. Within this area, which is 6,000 feet to the north and 10,000 feet to the south of the pass, the annual erosion impact of the pass was estimated at 37,250 cubic yards. The recommended implementation plan included by-passing sand equal to the inlet impact through beach nourishment of southern Captiva and northern Sanibel from all acceptable sources; and developing an interlocal agreement to address the long term management of Blind Pass. These recommendations are currently under study by the Florida Department of Environmental Protection.

In 2000, Lee County, the City of Sanibel, and the District entered into an agreement to provide for a method for allocation of future costs and responsibilities associated with Blind Pass. Through this agreement, the District and County will place sand, if needed, on the northern 6,000 feet of Sanibel Island with each regularly scheduled Captiva Island beach nourishment project. The maximum volume of sand placed will be the equivalent of 25,000 cubic yards per year. The City of Sanibel will be responsible for the cost of sand placed in other areas or beyond the maximum amount.

Blind Pass closed in 1999. In response, the District, in partnership with Lee County, the West Coast Inland Navigation District, the City of Sanibel, and the Florida Department of Environmental Protection, designed a project to restore tidal flow in the pass, placing the excavated material on Sanibel Island at the south end of Bowman's Beach Park.

### **Redfish Pass**

Redfish Pass was cut through the barrier island by a hurricane in 1921, forming the islands of North Captiva and Captiva. During the early stages of Redfish Pass, tidal

currents transferred large amounts of sand from adjacent shorelines to rapidly developing flood shoals inside the pass and ebb shoals offshore of the pass.

Since its initial opening in 1921, the beaches adjacent to Redfish Pass have been impacted by a large number of storms. There is evidence that the opening of Redfish Pass in 1921 captured a significant portion of the tidal prism of Blind Pass, which has affected the beach processes in the area of both passes. Beaches both north and south of Redfish Pass exhibited significant erosion through the mid-1950s. There was a general accretion trend both north and south of the inlet within a few thousand feet of the inlet through the 70s. The 1980s and 90s have seen the beaches adjacent to the inlet in North Captiva erode, while beaches on Captiva Island have been stabilized by a beach restoration project and the construction of a terminal groin and the placement of a rock revetment on the north end of Captiva Island.

Portions of the ebb shoal of Redfish Pass were used as a borrow area for 1981 and 1988/89 beach nourishment projects, providing approximately 655,500 cubic yards and 1,595,000 cubic yards, respectively, for the projects. The 1981 project placed sand along 10,000 feet of beach immediately south of Redfish Pass, while the 1988/89 nourishment placed sand along the entire island, approximately 4.7 miles in length.

South of the inlet the erosion area has progressively expanded since 1921 and moved south and currently affects all of Captiva Island (4.7 miles). North of the pass, the southern beaches of North Captiva Island have eroded rapidly in the 80's and 90's threatening homes. The north interior shoreline of Captiva Island has likewise experienced recent erosion. The effect on shorelines north of the inlet extends 1.2 miles north of the pass. The total quantity captured by the inlet each year is approximately 75,000 cubic yards.

The Florida Department of Environmental Protection, in partnership with Lee County and the District, sponsored an inlet management study of Redfish Pass in the early 1990's. This study, to evaluate the erosion impact of the pass on adjacent beaches and recommend corrective measures to mitigate identified impacts, resulted in the Redfish Pass Inlet Management Plan [Study] (1995).

At the encouragement of the State, a technical review committee was established which included Lee County, the West Coast Inland Navigation District, the North Captiva property owners, the Florida Department of Environmental Protection, and the District. The technical advisory committee adopted a summary of findings report and recommended implementation plan in 2000. The report identified the area of influence for Redfish Pass and a recommended implementation plan currently under study by the Florida Department of Environmental Protection.

## **PART III - GOALS, OBJECTIVES AND POLICIES**

### **GOAL AREA I: Shoreline Protection**

MANAGE THE SHORE PROTECTION PROGRAM TO PROVIDE PROTECTION OF UPLAND PROPERTY AND FACILITIES ON CAPTIVA ISLAND FOR PUBLIC HEALTH, SAFETY, AND WELFARE.

#### **Objective I.A**

Mitigate erosion and storm damage to preserve the shoreline of Captiva and protect upland property.

##### **Policy I.A.1**

The CEPD assumes management responsibility for the beach maintenance program including the decision of when to undertake maintenance projects, which maintenance projects to undertake and their design and permitting.

##### **Policy I.A.2**

The CEPD will establish and maintain an efficient planning and operational program directing that maintenance projects will be automatically undertaken as needed.

##### **Policy I.A.3**

The CEPD will pursue long-term permits for maintenance of the shore protection project.

##### **Policy I.A.4**

The CEPD will initiate periodic maintenance beach nourishment projects when any of the following conditions are present:

- (a) Volumetric loss: beach nourishment will occur when there are 800,000 cubic yards left from the initial beach restoration, or about 4/7 of the original 1988/89 placement.
- (b) Loss of beach: beach nourishment will occur when the advanced fill has eroded back to the Federal design berm width of 40 feet.

##### **Policy I.A.5**

The CEPD will not engage in emergency repair to isolated washouts. This is considered to be the responsibility of the property owner, and the repairs must be consistent with the beach management plan and all government permitting regulations.

Policy I.A.6

Existing terminal structures will be maintained to reduce erosion losses from the island.

Policy I.A.7

The CEPD will comply with all permit requirements imposed for the Beach Management Project.

Policy I.A.8

The shore protection program will be designed and managed to minimize adverse impacts of beach maintenance on adjacent areas.

**Objective I.B**

Conduct a monitoring and research program to: investigate causes and solutions for excessive erosion in specific areas; investigate ways to conserve sand and reduce annual erosion rates; and evaluate alternative technologies to beach nourishment for beach maintenance.

Policy I.B.1

The CEPD will undertake beach monitoring to evaluate the performance of the restoration project and to determine the need for maintenance projects.

Policy I.B.2

The CEPD will monitor significant areas of excessive erosion and significant washouts and investigate the causes and solutions for such excessive erosion.

Policy I.B.3

The District Engineer will provide the Board with an assessment of the anticipated date of the next maintenance project and its cost each time the beach is monitored.

Policy I.B.4

After the results of each performance monitoring are presented, the Board will review, update and adjust the objectives of the beach maintenance program

**Objective I.C**

Protect property and facilities on the island that are essential to public health, safety and welfare, including but not limited to hurricane evacuation and the public water supply.

Policy I.C.1

The Emergency Maintenance Plan will be reviewed annually, and updated as necessary.

Policy I.C.2

Special attention will be paid to problems that arise in the in the area where Captiva Drive (SR 867) abuts the beach to maintain the viability of the hurricane evacuation route and water mains.

**Objective I.D**

The CEPD will seek support for beach maintenance by residents and property owners of Captiva.

Policy I.D.1.

Voter approval, and the approval of property owners will continue to be secured for beach nourishment projects.

Policy I.D.2.

The CEPD will investigate methods to keep residents informed of District activities, including the potential for a newsletter and annual report.

**GOAL AREA II: Natural Resource and Recreation Protection**

MANAGE THE SHORE PROTECTION PROGRAM TO PRESERVE THE RECREATIONAL VALUE OF CAPTIVA'S BEACHES AND ITS NATURAL RESOURCES, INCLUDING FISH, WILDLIFE AND VEGETATION

**Objective II.A**

Determine environmentally sensitive means of implementing the beach maintenance program.

Policy II.A.1

The CEPD will continue to encourage property owners to remove exotic vegetation from the dune area and to plant appropriate native species.

Policy II.A.2

The CEPD endorses and encourages the existing sea turtle monitoring efforts of the Sanibel Captiva Conservation Foundation.

Policy II.A.3

The CEPD will comply with environmental requirements of permits issued for the shore protection program.

Objective II.B

The shore protection program will endeavor to provide and maintain equitable recreational benefits to residents and property owners of Captiva.

**GOAL AREA III: Cost and Funding Protection**

ALLOCATE THE FINANCIAL COSTS OF BEACH MAINTENANCE SUCH THAT THEY ARE IN PROPORTION TO BENEFITS RECEIVED, AND PAID FOR IN PROPORTION TO THEIR BENEFITS.

**Objective III.A**

Pursue a cost efficient and effective beach maintenance program using accepted economic and engineering principles.

Policy III.A.1

The CEPD will undertake economic studies to assess the economic impact of the beach and to determine beach use and benefits.

Policy III.A.2

There will be sufficient local contribution to the cost of the maintenance program to continue local management responsibility.

Policy III.A.3

The CEPD will establish a beach maintenance revolving account to help meet the anticipated design and permitting costs to be reimbursed from special assessments and reimbursements from government grants.

**Policy III.A.4**

The Captiva share of the cost of renourishment will be paid in arrears by special assessment.

**Objective III.B**

Secure as much Federal and State and County funding for beach maintenance as is practical.

Policy III.B.1

County, State and Federal regulations governing funding of beach projects will be monitored. The CEPD will work to enable Captiva's goals to be understood and its needs recognized.

Policy III.B.2

The CEPD will enter into agreements with other units of government, such as Lee County, the State of Florida and the Federal Government that provide for appropriate financial support for beach maintenance.

Policy III.B.3

The beach maintenance program will be coordinated with the Lee County Comprehensive Plan.

Policy III.B.4

Continue the Emergency Maintenance Plan to qualify Captiva Beach Nourishment Projects for FEMA funding to replace sand after a storm event.