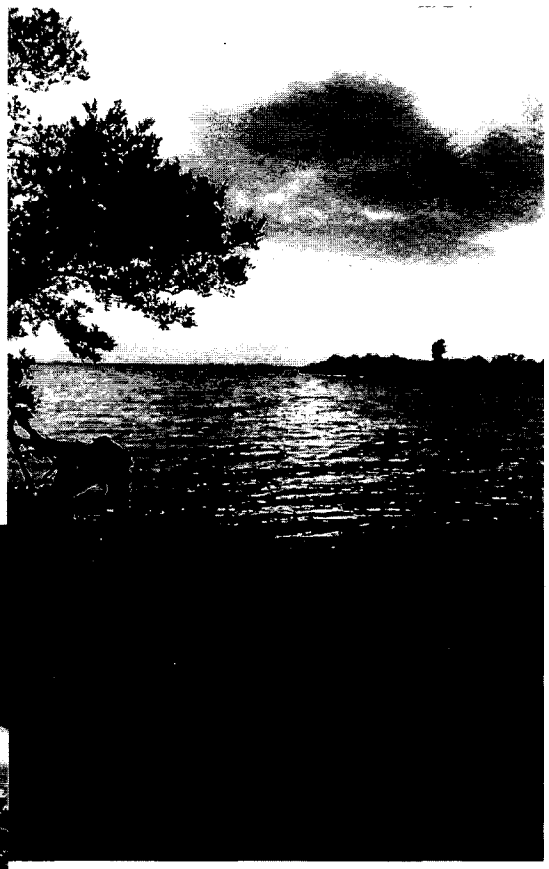
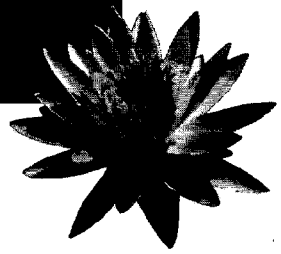
SWIM

Environmental Progress Through Partnership





TASK 3.1.08

A Publication by the five Water Management Districts and the Department of Environmental Protection

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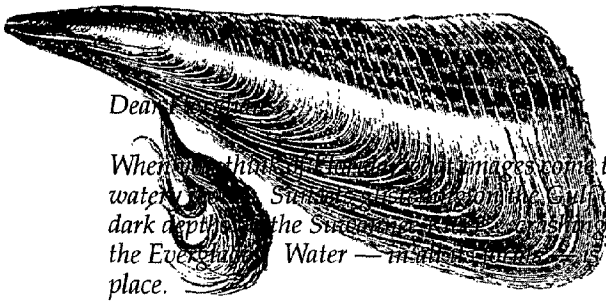

Dear [illegible]

When you think of Florida, what images come to mind? If you're like most of us, the Florida you treasure is a water[illegible] Sunset [illegible] the Gulf of Mexico..... crystal clear springs in the panhandle.... the tea-dark depths of the Suwannee [illegible] crashing surf off the Atlantic coast.... the rippling grasses that make up the Everglades. Water — in [illegible] — is what brought many of us to this southern paradise in the first place.

But Florida's bountiful waters — its lakes, rivers, and estuaries — were among the first resources to suffer from the massive population influx of the middle part of this century. By the 1960s, many of our state's most precious waterways were in jeopardy. The effort to clean up Florida's surface waters began with the passage in 1972 of the federal Clean Water Act. That legislation focused on removing the greatest sources of pollution fouling our nation's waters — sewage and industrial waste.

But by the late 1980s, it was clear broader restoration and protection was needed. In 1987, the Florida Legislature enacted the Surface Water Improvement and Management program, or SWIM. SWIM's premise was new — water bodies should be looked at as systems, not isolated wetlands or water bodies. Their salvation was not as simple as buying land or stopping major sources of pollution — a whole array of partners and actions was envisioned. Water management districts and the Department of Environmental Protection would work with federal, state and local governments and the private sector to create and carry out plans for priority water bodies — plans that spoke to restoring habitats, stopping or slowing down sources of pollution, and preserving the natural systems that support valuable living resources.

The projects funded through SWIM are targeting clean up some of our state's most troubled water bodies, like Tampa Bay, Lake Okeechobee, Lake Apopka, and Lake Jackson. SWIM is also working to preserve and protect systems in good condition, like the Suwannee River, for future generations. You'll read about them in this report. Perhaps most significant, SWIM funding does not stand alone. In many areas, SWIM dollars bring in additional funding — from federal and local governments, regional agencies, and even the private sector.

Improving the quality of Florida waters is an ongoing process that requires dependable funding, and SWIM still has no dedicated funding source. Each year, it must compete with other issues for its share of funding. And each year, that share is increasingly unreliable.

Restoring Florida's waters deserves a long-term investment. I hope you will support the SWIM program and its priceless legacy.

Sincerely,

Virginia B. Wetherell

Virginia Wetherell, Secretary
Department of Environmental Protection

Jerry A. Scarborough, Executive Director
Suwannee River Water Management District

Samuel E. Poole III, Executive Director
South Florida Water Management District

Douglas E. Barr, Executive Director
Northwest Florida Water Management District

Peter G. Hubbell, Executive Director
Southwest Florida Water Management District

Henry Dean, Executive Director
St. Johns River Water Management District

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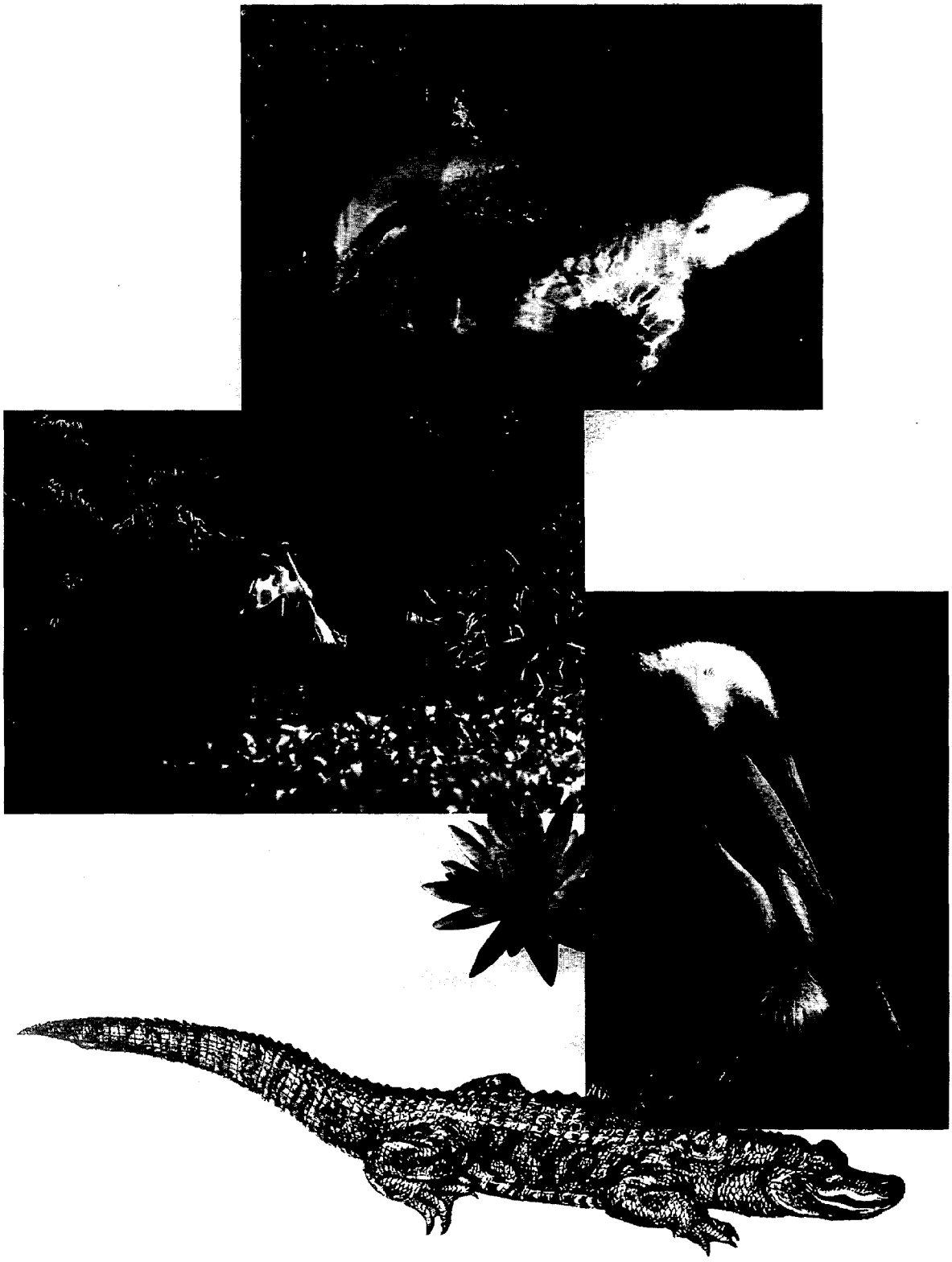


Water is the essence of Florida. With nearly 11,000 miles of coastline, Florida's very geography is defined by water. The state contains thousands of lakes, and hundreds of rivers measuring more than 10,000 linear miles. Our state owns more offshore land than any other state — 6.4 million acres — and 3 million acres of estuaries, open water and wetlands.

Americans love water, and Florida is the most water-loving state of all. More than 76 percent of our population lives in coastal counties. Tourists list our coasts as the state's number one attraction. Recreational and commercial fishing revenues come to more than $7 billion each year, making Florida's one of the most valuable fisheries in the nation.

When people began flocking to Florida in the 1940s and 50s, they gravitated toward water, settling along rivers, estuaries, and lakes. Farmers and developers thrived on the abundance of water they found in south Florida, enough for drinking, irrigation, fishing and swimming. It seemed the state's water resources were inexhaustible.

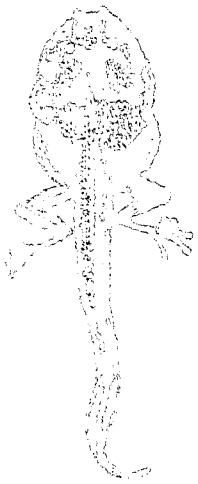
By the 1960s, it was clear they were not. Some of our state's most precious resources — Tampa Bay, Biscayne Bay, Lake Apopka — no longer functioned as natural systems. Fish died, birds and other wildlife disappeared, and the smell was enough to drive people away.

The first push for clean water came from our national leaders, with the passage in 1972 of the Clean Water Act. The

nation's waters, Congress said, should be fishable and swimmable. The Act focused on removing the primary source of pollution — raw sewage and industrial waste, which had been dumped into rivers, bays and estuaries. The Clean Water Act resulted in many successes. Lakes, rivers and estuaries began to regain their health and birds and other wildlife began to return.

By the 1980s, it was apparent that cleaning up sewage was not enough to return our surface waters to complete health. Ironically, when that major source of pollution was being controlled, other sources became more evident. The rainwater running off our increasingly urban lands contained great amounts of sediments and pollutants — fertilizers, yard wastes, pesticides, herbicides, metals, oil, and gasoline. The result: sediments began filling in lakes, water clarity was reduced, excess nutrients made aquatic plants grow faster, affecting the levels of oxygen and sunlight. Fish and other animals died, fisheries were destroyed, birds could not feed their young. In other areas, farms and dairies added pollutants like pesticides, fertilizers and animal waste. Both fertilizers and animal waste are high in nitrogen and phosphorus, which led to excess plant growth — in lakes and rivers as easily as on the farm. At the same time, wetlands and open lands — the natural purifiers of surface waters — were disappearing at an alarming rate. When state legislators took a serious look at our state's water bodies in the mid-1980s, they saw major problems remaining:

- While Tampa Bay had come a long way under the Clean Water Act and other federal programs, it was still struggling.
- Phosphorus levels in Lake Okeechobee had doubled since the beginning of the decade, causing an algae bloom that covered a quarter of the lake's surface.
- Lake Apopka no longer functioned as a natural system. The number of viable recreational fish camps surrounding the lake had dropped from 21 in 1956 to only one in 1987. While practices such as release of sewage, cirtrus packing wastes, and muck farming had caused the lake's original problems, stopping the flow of waste was not enough to reverse them. Something more had to be done.
- More than 900 pipes over 12 inches in diameter were draining millions of gallons of untreated stormwater directly into Biscayne Bay.
- The lower St. Johns River was contaminated with coliform bacteria and heavy metals from faulty septic tanks and stormwater runoff.



A New Approach to Water Management

In the late 1980s, it was determined the state had to do more to protect and restore its priceless surface waters. While "point" sources — sewage and industrial wastes — were being controlled, "non-point" sources — pollutants that enter water bodies in less direct ways — were still a major concern. In 1987, the Florida Legislature created the Surface Water Improvement and Management program, or SWIM, to deal with the problems remaining in the state's surface waters. The thinking behind SWIM was clear. "It is the duty of the state," the Legislature said, "to enhance the environmental and scenic value of surface waters."

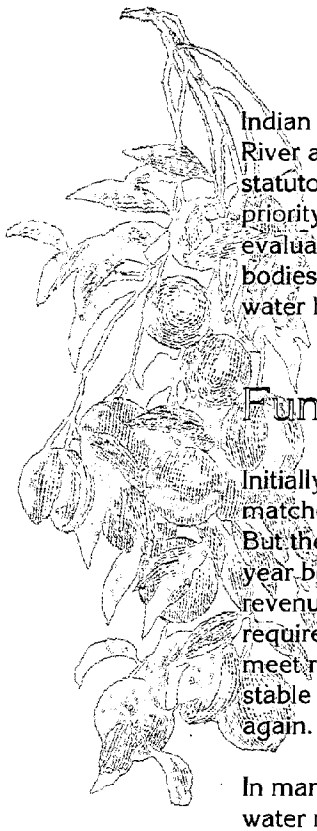
If there is one word that describes SWIM best, it is partnership.

SWIM is different from other natural resource protection programs. It is a program that uses public participation to identify priority water bodies of statewide concern. It is the only program that addresses a waterbody's needs as a system of connected resources, rather than isolated wetlands or water bodies. To accomplish this, SWIM meshes across governmental responsibilities, forging important partnerships in water resource management.

If there is one word that describes SWIM best, it is partnership. While the state's five water management districts and the Department of Environmental Protection are directly responsible for the SWIM program, they work in concert with federal, state, and local governments and the private sector. All the partners contribute — with funding or in-kind services. In fact, in many areas, state-appropriated SWIM dollars are not the biggest part of program funding. Several water management districts have put more resources in SWIM than they receive from the state, and SWIM dollars have been used as match to secure federal grants.

SWIM develops carefully crafted plans for at-risk water bodies, and directs the work needed to restore damaged ecosystems, prevent pollution from runoff and other sources, and educate the public. SWIM plans are used by other state programs, like Save Our Rivers, to help make land-buying decisions, and by local governments to help make land-use management decisions.

Since its inception, SWIM has made great strides toward improving the quality of a number of troubled water bodies and increasing our understanding of healthy water bodies. The initial legislation identified specific water bodies that would fall under SWIM — Lake Apopka, Tampa Bay, the



Indian River Lagoon System, Biscayne Bay, the St. Johns River and Lake Okeechobee. Subsequently, the legislature statutorily established the Everglades as another SWIM priority. Today, through public comment and professional evaluation, water management districts identify the water bodies they believe need special protection. Twenty-seven water bodies now are receiving attention from SWIM.

Funding SWIM

Initially, money for SWIM came from state general revenues, matched by funds raised by the water management districts. But the Legislature's original commitment of $15 million a year began to erode by 1990. In 1993, a new source of revenue was adopted — the Advance Disposal Fee (ADF) required on non-recycled food containers. As companies meet recycling goals, the ADF will not be an adequate or stable source of revenue, and SWIM funding is in question again.

In many cases, SWIM's shrinking funding has meant that water management districts have had to increase their share of dollars to continue successful protection and restoration programs. In the St. Johns River Water Management District alone, the state's share of SWIM funding fell from 80 percent in 1987/88 to less than 50 percent by 1992.

Non-point Pollution:

While some sources of pollutants are easy to pinpoint — the release of sewage and industrial wastes, for instance — others are more subtle. These "non-point" sources of pollution sometimes do not flow through a pipe. Instead, they flow over the ground into rivers or lakes, or seep into the aquifer. The more land that is covered with paved and other impervious materials — such as roads, parking lots and buildings — the greater the amount and speed of runoff. Clearing land — and thus increasing the amount of erosion — also can increase runoff filled with pollutants and sediments that reaches surface water bodies.

The most common sources of "non-point" pollutants are:

Urban runoff, which contains:
- Fertilizers
- Pesticides
- Herbicides
- Oil and gasoline off roadways
- Yard and animal wastes
- Heavy metals
- Sediments from road and other construction

Agricultural runoff, which contains:
- Fertilizers
- Pesticides
- Herbicides
- Animal waste
- Sediment

Other non-point sources:
- Leaky underground storage tanks
- Leaky septic tanks
- Landfills

The Emerging Role of Florida's Water Management Districts

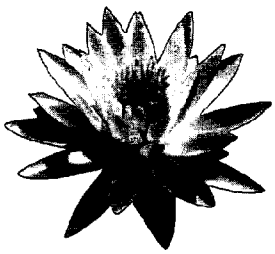
The creation of Florida's water management districts was the result of more than 40 years of evolution in the practice and philosophy of managing water and related natural resources. One of the first efforts of the state in the area of water management was creation in the late 1940s of the Central and South Florida Flood Control District in an attempt to mitigate the effects of a series of crises: hurricanes that had swept through the region in the 1920s and 40s, flooding local communities, followed by years of drought and groundwater withdrawals which left coastal wellfields contaminated by saltwater. Another hurricane, this time on the west coast, led to the establishment of a second type of water management district in the Tampa Bay region in the 1960s.

By the 1970s, it had become clear that the management of water resources would have profound effects on the state's ability to support its rapidly expanding population. The Water Resource Act, passed by the Legislature in 1972, created a total of five "water management districts," the original two flood control districts and an additional three agencies in the northern part of the state. The districts were given the responsibility of dealing with regional water quantity issues, like managing surface water and issuing permits for wells. While the state set their general direction, each district also had a governing board, appointed by the governor, to make decisions based on the needs of the area. Over time, the districts' responsibilities grew. Managing stormwater runoff and protecting isolated wetlands were added to some of the districts' duties in the early 1980s, and today the emphasis is on planning all aspects of water resource management — from flood control to maintaining water quality (both surface and ground water) and managing natural systems. With the passage of the SWIM program, the water management districts began to plan for the protection, restoration, and management of the state's wetlands, springs, rivers, lakes and estuaries.

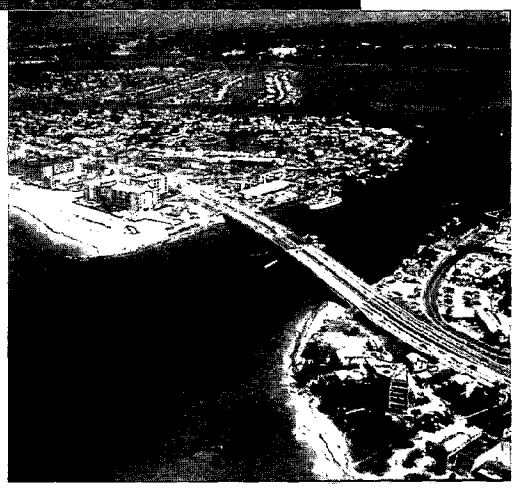
As we move toward the 21st century, water resource management is driven by the need to protect functioning natural systems, restore degraded systems, and integrate urban and agricultural landscapes into their surrounding natural environments. Modern water management means preserving, as much as possible, the connections within and throughout ecosystems and between people and the environment.

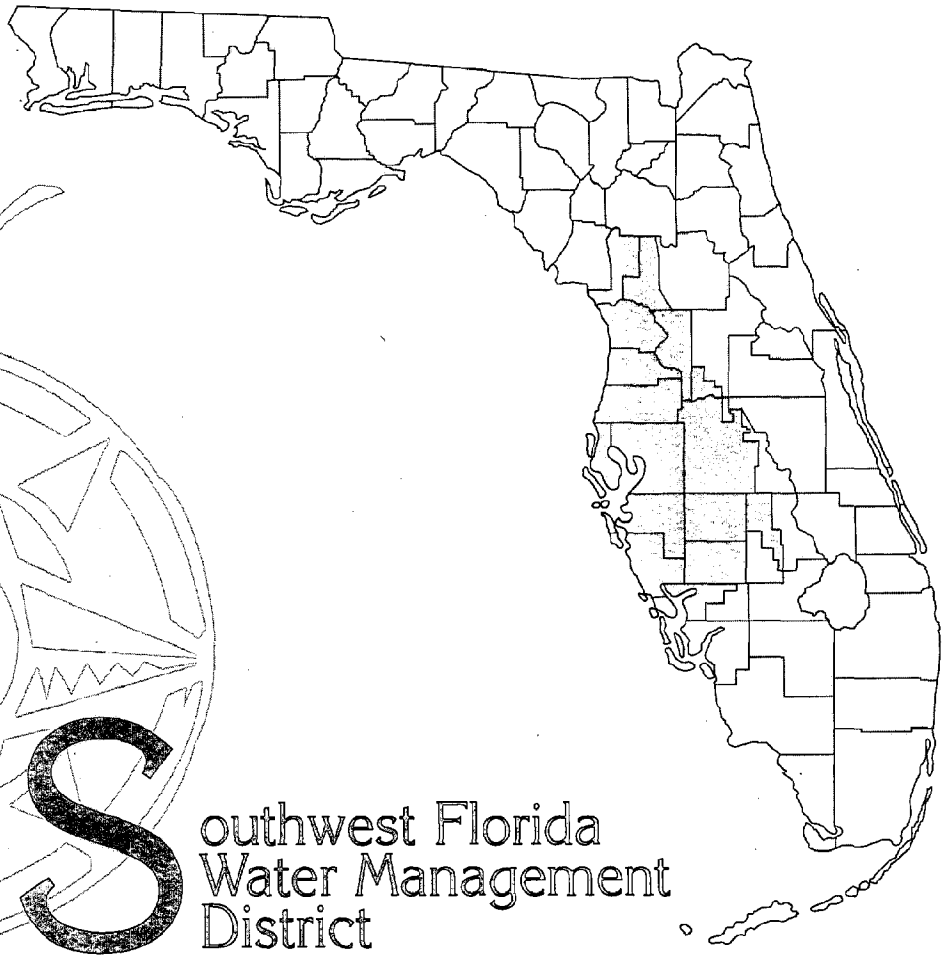
The Four Goals of the SWIM Program

1. **Water quality protection.** SWIM's primary goal is to ensure that surface waters are clean enough to support wildlife and recreation. SWIM plans focus on not just preventing water quality problems, but repairing damage caused by pollution and development.
2. **Natural systems protection.** Natural systems associated with many surface waters are altered so that these water bodies cannot perform their functions. SWIM plans focus on managing and protecting the natural systems that maintain clean water, and healthy plants and animals.
3. **Cooperative activities.** Developing and addressing broad goals for natural system protection requires participation of local, state, and federal agencies, and private parties. SWIM works through partnerships between all levels of government as well as business and environmental interests.
4. **Watershed management.** Land, water, air, and living resources are linked and cannot be effectively managed in isolation from one another. SWIM uses watershed management approaches to consider linkages between resources in protecting and restoring water bodies. Also, SWIM provides information to local governments to help them make land use decisions to protect surface waters.



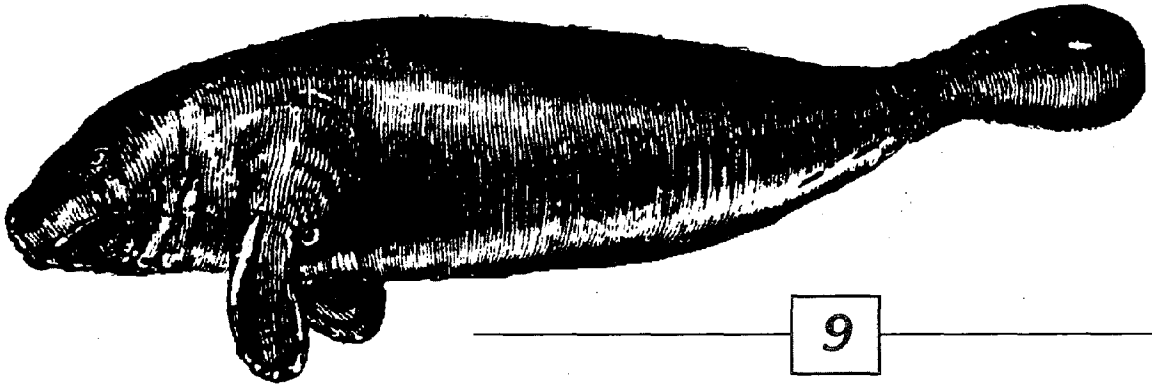
The communities surrounding Tampa Bay have long been a destination for tourists and new residents, and years of abuse have taken their toll on this precious resource. Restoring the Bay's function is an ongoing priority of the Southwest Florida Water Management District.





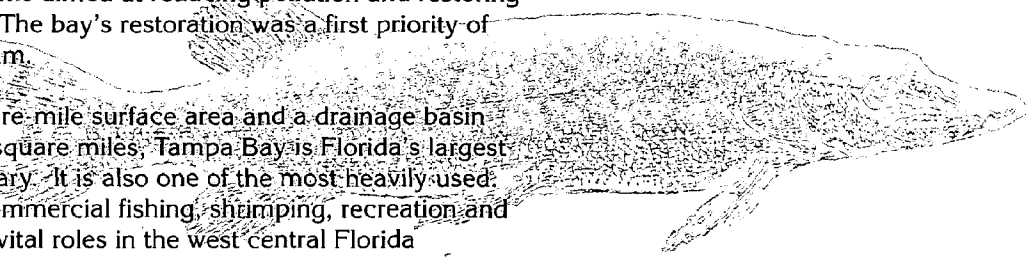
Southwest Florida Water Management District

The Southwest Florida Water Management District covers just over 10,000 square miles of Florida's southwest coast. Bounded by the floodplain of the Withlacoochee River on the north and Charlotte Harbor on the south, the district includes all or part of 16 counties. The district's SWIM priority list includes nine water bodies with approved plans. They are a diverse group, ranging from extensive estuarine systems to fresh water lakes and springs. By far the largest — and the most endangered — is Tampa Bay, the district's first restoration priority. Other restoration projects include Lake Thonotosassa, the site of the one of the largest fish kills in Florida, and Banana Lake, once identified as the most polluted lake in Florida. Today, thanks to the SWIM program, these lakes are on the way back to health. SWIM plans also cover Rainbow River, Crystal River/Kings Bay, and Charlotte Harbor. Many of the projects are cooperative ventures with other agencies, local governments, and private industry.

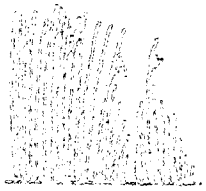


The Comeback of Tampa Bay

When legislators began to consider water quality issues in the 1970s, Tampa Bay was one of their primary concerns. Since that time, the bay has become the focus of national, state, and local programs aimed at reducing pollution and restoring natural habitat. The bay's restoration was a first priority of the SWIM program.

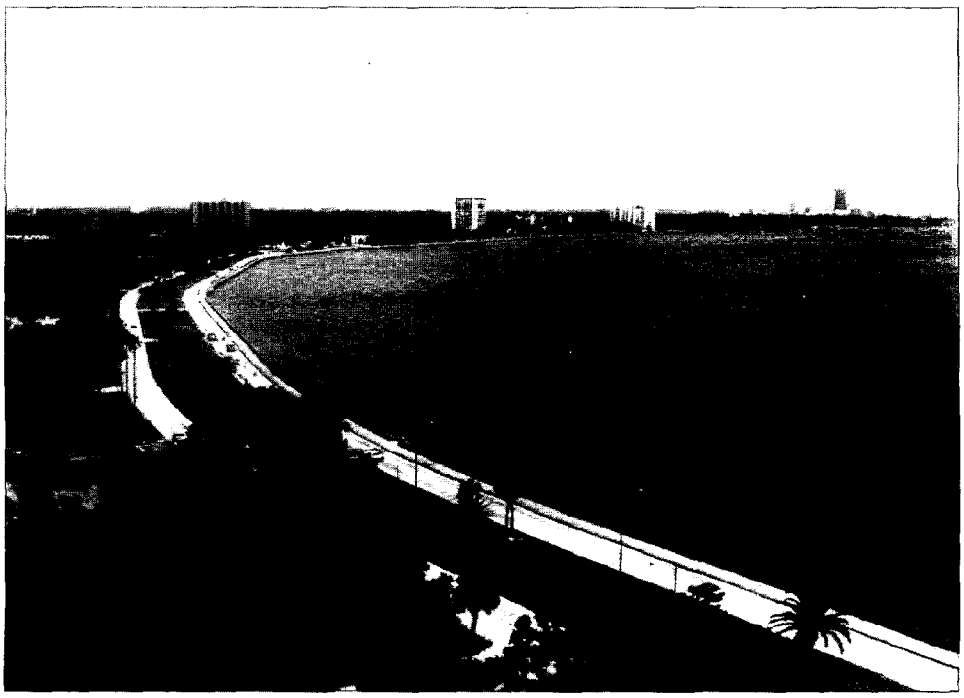


With a 398-square-mile surface area and a drainage basin covering 2,200 square miles, Tampa Bay is Florida's largest open-water estuary. It is also one of the most heavily used. Port facilities, commercial fishing, shrimping, recreation and tourism all play vital roles in the west central Florida economy.



Since the beginning of the century, the aquamarine waters of the Gulf of Mexico have drawn people from all over the world. In many cases, these tourists later became residents. Between 1940 and 1970, the population of the Tampa Bay region more than doubled. The St. Petersburg-Tampa area was one of the state's first true urban areas, with all the opportunities and challenges that designation implies. Decades of shoreline development, pollution from stormwater runoff and urban and industrial discharges, took their toll on the bay. By 1988, 44 percent of the Bay's mangrove and marsh habitat was gone, along with more than 80 percent of its seagrasses. Fisheries had declined and shellfish harvesting had virtually ended.

A 1990 clean up attracted 4,000 volunteers from Hillsborough and Pinellas Counties. They collected more than 83 tons of plastic, glass, paper, and other marine debris!



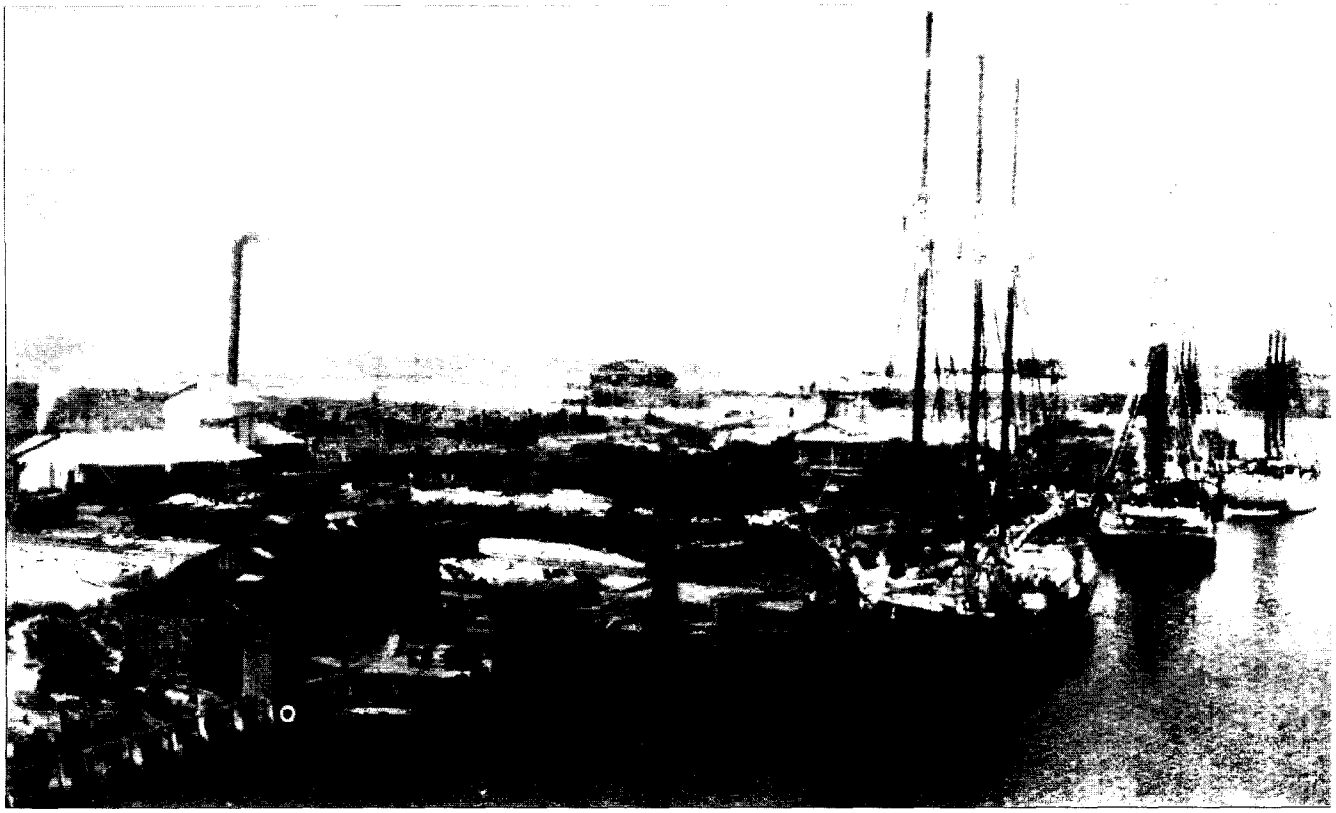
Many agencies and citizens have been working to identify the Bay's problems and solutions for its restoration. The City of Tampa's Bay Study Group began studying the Bay's plant and animal life in the 1970s. The National Oceanic and Atmospheric Administration Status and Trends program, in conjunction with the Department of Environmental Protection, analyzes bay sediments for toxicity. The Tampa Bay National Estuary Program works with state, regional, and local governments on long-term environmental monitoring and management projects. The Tampa Bay Regional Planning Council's Agency on Bay Management brings together more than 50 public and private groups and individuals to work on bay management activities.

SWIM activities in Tampa Bay focus on restoring habitat, reducing the effects of stormwater runoff, and working with local governments to acquire land. Since the program began in 1987, SWIM has created more than 40 treatment areas for stormwater runoff, replacing lost shoreline habitat and restoring coastal areas damaged by development. Local governments have worked in concert with SWIM on nearly all of these projects, particularly on innovative combined stormwater/habitat enhancement projects.

Cleanup of the Bay will be a lengthy process that requires the efforts of a host of agencies, programs, and people. But results are already being seen. Water quality is improving and seagrasses are making a comeback. In 1990, studies showed 500 acres more seagrasses than in previous years. An *additional* 730 came back by 1992.

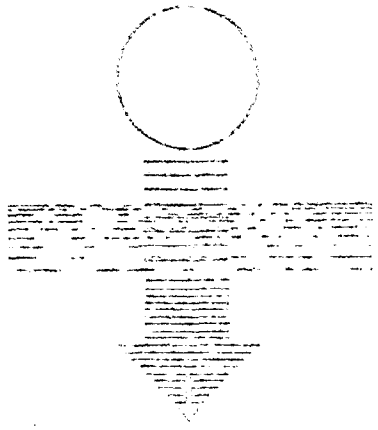
SWIM has also concentrated on restoring habitat in the bay. Working together, SWIM, local governments, and state agencies have undertaken 25 habitat restoration projects. All have been constructed on public land and involved reestablishing a habitat mosaic of wetland vegetation and uplands. Examples include E.G. Simmons Park, Mangrove Bay, Cockroach Bay, and many others.

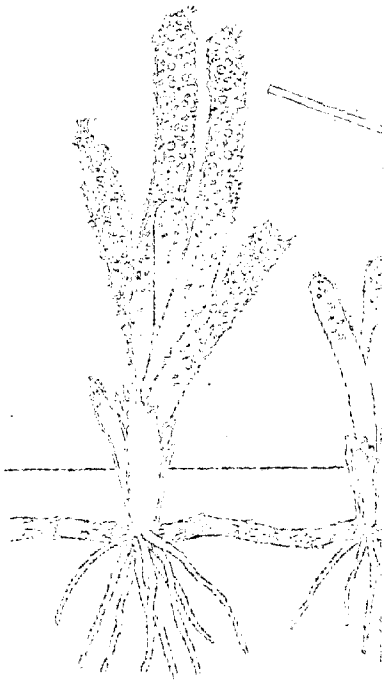
Public education has been a key ingredient in the SWIM plan for Tampa Bay. Bay cleanups, publications, conferences, and television programs have raised awareness about the Bay's

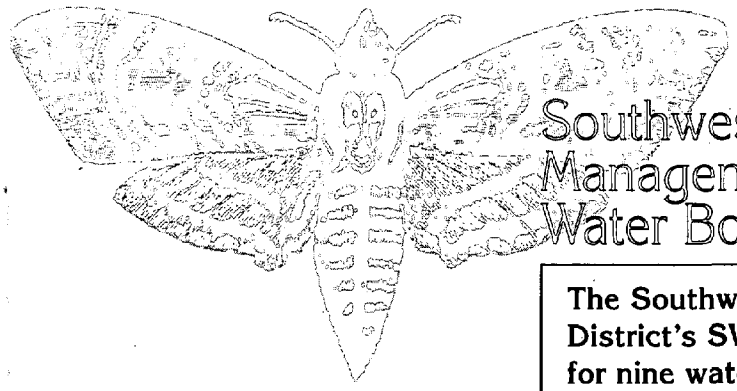


problems — and solutions. A 1990 cleanup attracted 4,000 volunteers from Hillsborough and Pinellas Counties. They collected more than 83 tons of plastic, glass, paper, and other marine debris!

The "SWIM team" concept of public participation has continued to grow. An all-volunteer Citizens Water Quality Monitoring program conducts weekly water quality sampling in and around Tampa Bay and its tributaries. Other "citizen scientists" measure the success of individual habitat restoration projects. The Southwest Florida Water Management District's SWIM program has been so successful in generating citizen support that it earned a Davis Productivity Award from Florida TaxWatch in 1990.







Southwest Florida Water Management District: Priority Water Bodies and SWIM Goals

The Southwest Florida Water Management District's SWIM program has developed plans for nine water bodies. Here's some of what the program is doing:

Tampa Bay
- Restoring wetlands and seagrass habitat
- Removing sources of non-point pollution
- Protecting freshwater flow to the bay
- Coordinating bay management with other agencies

Rainbow River/Blue Run
- Managing public use
- Controlling aquatic plants
- Controlling sources of excess nutrients

Banana Lake
- Providing follow-up protection for previous restoration efforts

Crystal River/Kings Bay
- Controlling sources of excess nutrients
- Improving stormwater controls
- Identifying sources of septic tank pollution

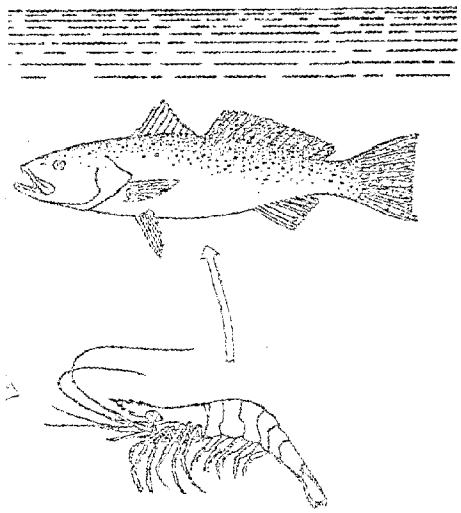
Lake Panasoffkee
- Analyzing and mapping sediment accumulation
- Controlling sources of excess nutrients

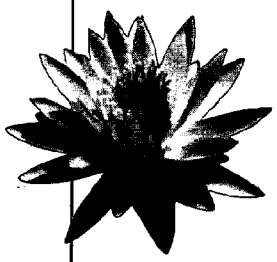
Charlotte Harbor
- Removing sources of non-point pollution
- Protecting freshwater flow to the harbor
- Monitoring water quality
- Coordinating harbor management with local governments

Lake Tarpon
- Controlling aquatic plants
- Controlling sources of excess nutrients

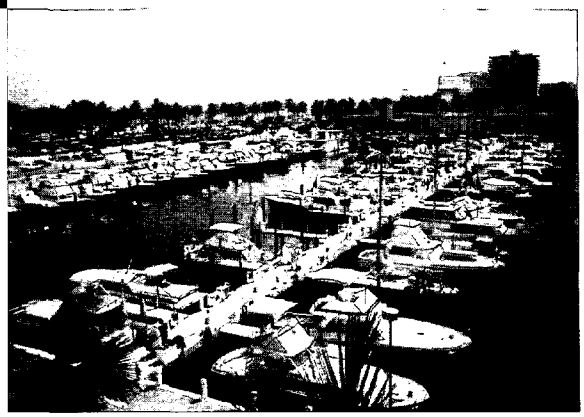
Lake Thonotosassa
- Controlling point and non-point sources of excess nutrients
- Restoring wetland habitat
- Enhancing recreational fishing

Winter Haven Chain of Lakes
- Controlling stormwater runoff





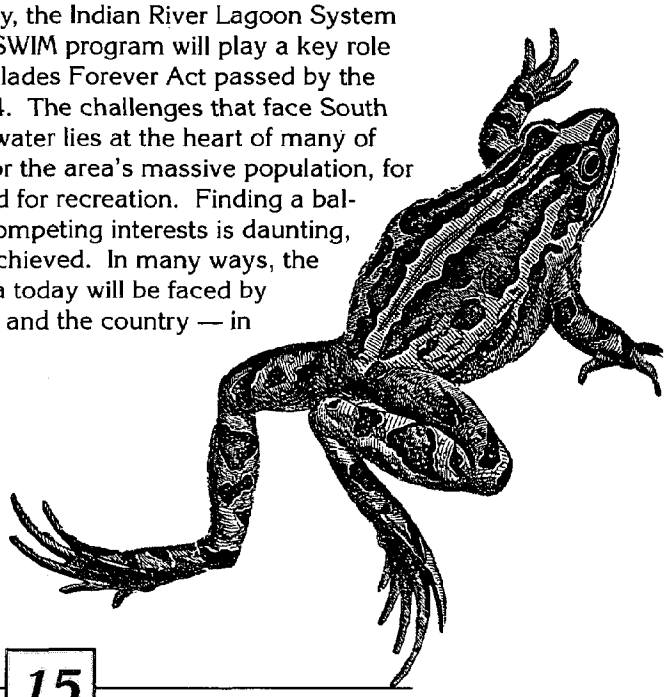
The Everglades System, which includes the Kissimmee River and Lake Okeechobee, is the key to South Florida's water supply. From Miami to the Keys and throughout South Florida,



the Everglades keeps the salt of seawater from intruding into the freshwater drinking supply. Maintaining the system's delicate balance is the job of the South Florida Water Management District.

South Florida Water Management District

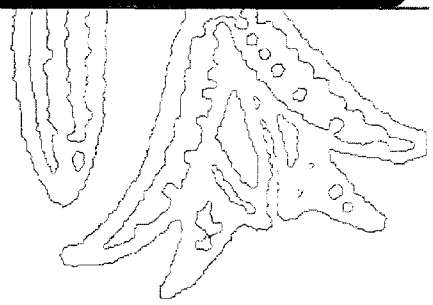
Covering more than 17,000 square miles at Florida's southern tip, the South Florida Water Management District manages and operates 1,400 miles of canals, levees and water control structures, stretching from the Kissimmee River basin to the Florida Keys. The district's SWIM priority list includes some of the state's largest and most famous water bodies — Lake Okeechobee, Biscayne Bay, the Indian River Lagoon System and the Everglades. The SWIM program will play a key role in implementing the Everglades Forever Act passed by the Florida Legislature in 1994. The challenges that face South Florida are complex, and water lies at the heart of many of them — water is needed for the area's massive population, for agriculture, for wildlife, and for recreation. Finding a balance among these often competing interests is daunting, but the balance must be achieved. In many ways, the issues facing South Florida today will be faced by many areas of the state — and the country — in the years ahead.



Lake Okeechobee: Seeking a Natural Balance

Agriculture and development, two of the strongest industries in Florida, are also the two largest users of fresh water. In South Florida — for decades, the state's most populated region — maintaining the quality and quantity of water needed for agriculture and communities is a constant challenge. The South Florida Water Management District's SWIM program is an active player in the area's water issues.

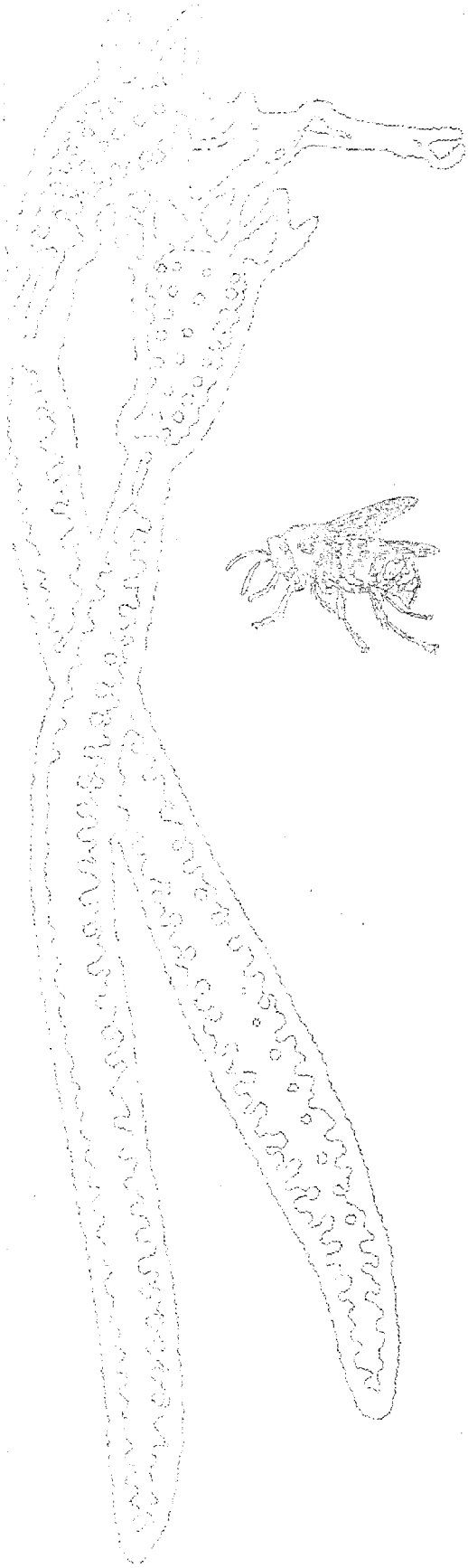
Possibly its "biggest" challenge is Lake Okeechobee. Lake Okeechobee lies at the heart of water circulation in South Florida. Given that position, it's not surprising that the big lake also has been at the center of controversy and conflict. More than any other body of water in the region, Lake Okeechobee is expected to be all things to all people.



This 730-square-mile lake is the largest freshwater lake located wholly within Florida. Even though the lake is shallow — averaging only about nine feet deep — it can hold more than one trillion gallons of water. This storage capacity is used to supply drinking water to lakeside communities, irrigation water for agriculture, and a water source for South Florida's ecosystems. The lake has been regulated to supplement and protect coastal water supplies in times of drought and is used as a receptacle for floodwater from surrounding farm fields and rural communities.

Unfortunately, its holding capacity means that Lake Okeechobee has been managed as a reservoir for maximum water storage, rather than as a natural lake with natural seasonal fluctuation and a broader shoreline community. Changes that made it a better storage facility — such as the construction of dikes to control flooding from its rim — eliminated much of the lake's marshy shoreline and took away its ability to cleanse itself, contributing to serious water quality problems. Beginning in the 1970s, a number of government and water conservation programs — including SWIM — have sought to ease the problems caused by rigid water control measures.

Lake Okeechobee's primary problems are caused by drainage from the agriculture that surrounds the lake. Runoff from agriculture contains high levels of phosphorus, a nutrient that may cause the lake's aquatic plants to grow too quickly. In addition, torpedo grass and melaleuca, both exotic species, have taken hold on the lake's south and west rims. These

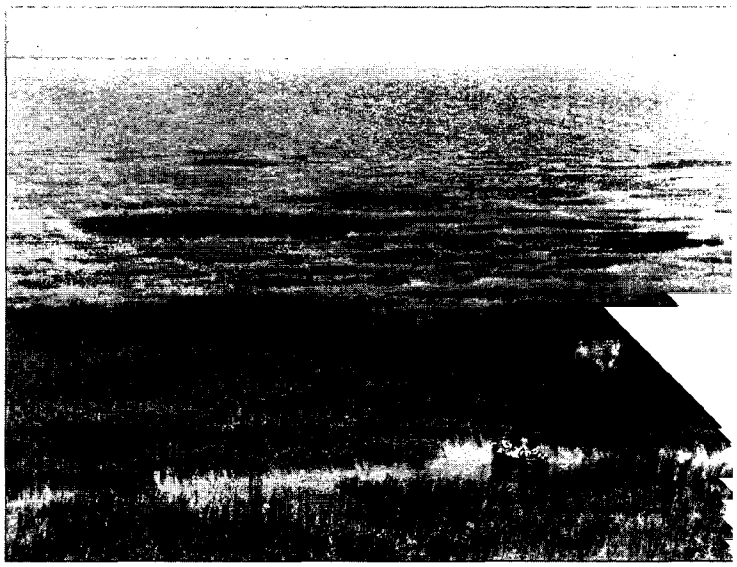


exotic species are threatening to displace native plant communities, which may affect the balance in the lake's plant and animal communities.

Since adoption of Lake Okeechobee's SWIM plan in the late 1980s, a great deal of progress has been made, including the reduction of phosphorus from agriculture as required. A Department of Environmental Protection dairy rule, focusing on best management practices, took effect in 1988. Many dairies now channel their wastewater into specially constructed lagoons filled with vegetation to remove phosphorus. Dairy operators confine operations with barns, fences and other structures that shelter and control the herds' movement, keeping livestock away from waterways. They also have reduced the amount of fertilizer used on pastures and reduced phosphorus in dairy feed.

The Okeechobee SWIM program developed a program to regulate nutrients from all other agricultural uses in the basin. Phosphorus is carefully monitored at the point of discharge from a farmer's land. If the discharge does not meet an acceptable nutrient level, the district and DEP can advise better corrective measures. The trend for nutrients in surface water in the Okeechobee basin is improving. The ongoing programs and continued research will help surpass any further actions needed to maintain a decline in nutrients to the lake.

SWIM has participated in efforts to control melaleuca, a species of exotic tree around the lake. Contol programs began in August 1993, with a three-year project to cut mature trees, spray the stumps with herbicide, and root out seedlings. The district hopes to increase cost-sharing on this project with the Department of Environmental Protection and the U.S. Army Corps of Engineers.



South Florida Water Management District: Priority Water Bodies and SWIM Goals

The South Florida Water Management District's SWIM program has developed plans for four water bodies. Here's some of what the program is doing:

Lake Okeechobee

- Identifying the effects of nutrient input
- Controlling exotic plants, especially melaleuca and torpedo grass
- Investigating and reporting on state water quality standards throughout the lake, and at inflow structures and other tributaries
- Monitoring nutrient discharges from agriculture

Florida Everglades

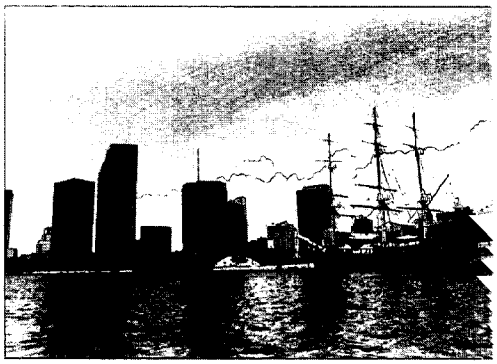
- Monitoring water quality and water levels to protect native vegetative communities and controlling exotic plants
- Addressing mercury contamination
- Controlling stormwater runoff
- Improving fresh water flow
- Educating the public to increase support for protecting the Everglades

Indian River Lagoon System

- Upgrading inadequate stormwater systems to improve water quality
- Reconnecting mosquito control impoundments to the Indian River Lagoon to restore biological function and productivity of fisheries
- Restoring biological productivity to the St. Lucie Estuary by better managing freshwater inflows from contributing basins
- Assessing the effects of septic tanks on the lagoon system

Biscayne Bay

- Restoring sheetflow to mangrove wetlands
- Eliminating sewage contamination from storm drains
- Improving stormwater treatment systems
- Protecting seagrasses and other submerged habitat
- Identifying priority stormwater discharge sources



The Indian River Lagoon System: Protection through Local, State and Federal Collaboration

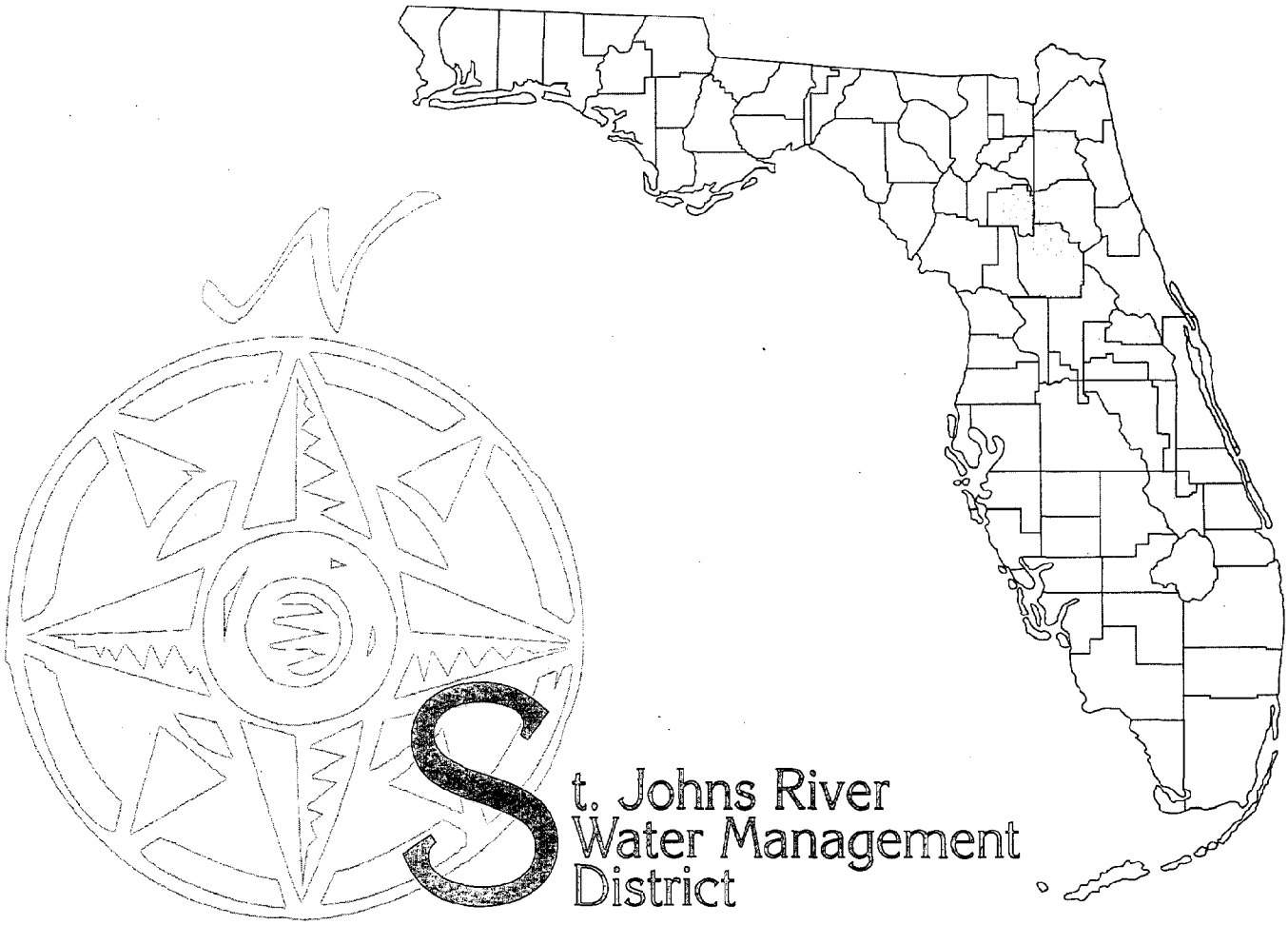
A broad-ranging partnership in the Indian River Lagoon initiated by the SWIM programs of the St. Johns Water Management District and the South Florida Water Management District is working to protect this water body — an estuary of state and national significance.

The 156-mile-long Indian River Lagoon makes up 40 percent of Florida's east coast. It isn't a river, but an estuary where freshwater from the land and salt water from the ocean mix, creating an environment which serves as a nursery for a wide variety of marine life. The Lagoon is a national treasure, home to more than 4,300 different species of plants and animals, including snook, redfish, tarpon, and nearly one-third of the manatees in the United States. The lagoon accounts for $300 million in commercial fishing revenues, a $400 million annual sportfishery, and provides half of the east Florida fish catch, and 90 percent of the Florida clam harvest.

The productivity of Indian River Lagoon depends on adequate supplies of good-quality water from its tributaries — Turkey and Sebastian Creeks, Eau Gallie River, St. Lucie River, and Loxahatchee River. The SWIM program has launched a series of watershed management projects in these areas to restore historic flows and control urban and agricultural runoff.

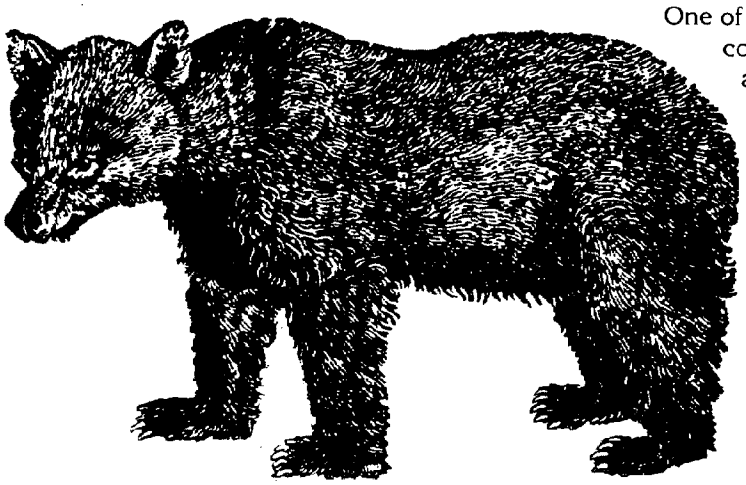
Since 1954, more than 40,000 acres of salt marshes and mangrove swamps along the lagoon were diked and flooded in an effort to eliminate mosquito-breeding grounds. This action also unfortunately eliminated the marshes as natural nurseries for fish, birds, and other animals. One of the most ambitious SWIM efforts is in reconnecting more than 100 mosquito control impoundments to the Indian River Lagoon System, a move that will partially restore the ecological function of the historic salt marshes. The project began in 1993 and should take five years. As of mid-1994, 15 impoundments totaling 5,719 acres had been reconnected. Over 20,000 additional acres of impounded marshes are slated for rehabilitation in Brevard, Volusia, Indian River, St. Lucie, and Martin Counties. Partners in the reconnection project include the two water management districts, mosquito control districts in five counties, the Florida Department of Health and Rehabilitative Services, and the U.S. Fish and Wildlife Service.

The fourth largest and most severely polluted lake in Florida, Lake Apopka has accumulated muck as deep as 49 inches in some areas. Today, the lake is the focus of an intensive clean up program by the St. Johns River Water Management District.



St. Johns River Water Management District

The St. Johns River Water Management District manages ground and surface water in a 19-county area of northeast and east central Florida. While the 310-mile long St. Johns River is the core of the district's major drainage basin, the area also encompasses five other rivers, 56 springs, and about 3,500 lakes. An estimated 3.3 million people live within the district's boundaries, an area of 12,400 square miles. Its SWIM program focuses on four water bodies — Lake Apopka, the Upper Oklawaha River, the lower St. Johns River, and the Indian River Lagoon System (in a cooperative effort with the South Florida Water Management District).

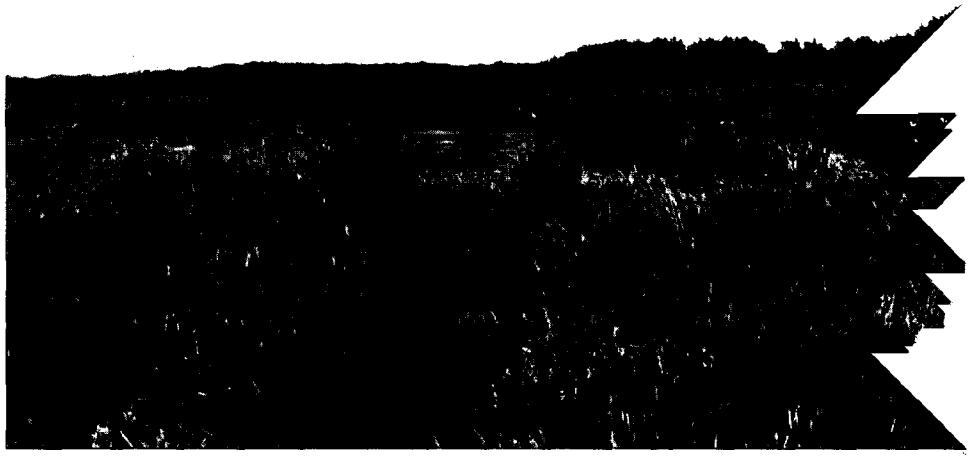


One of the program's first efforts was correcting septic tank problems along the lower St. Johns River. A septic tank inspection and enforcement program conducted by Clay County, and partially funded by SWIM, was so successful that Doctor's Lake — a large lake connected to the river — has been reopened for swimming.

Lake Apopka: The Long Road Back

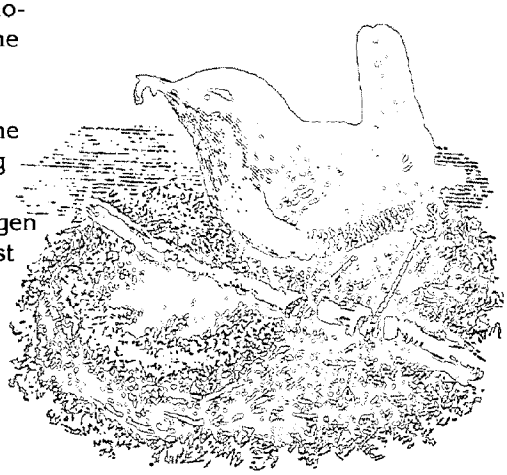
Until the mid-1950s, Lake Apopka was a major destination for fishermen seeking trophy-sized game fish. Today, it is drawing scientists and environmentalists from around the world who are eager to see how Florida's fourth-largest lake is being restored through the efforts of the St. Johns River Water Management District's SWIM program.

Located 15 miles northwest of Orlando, Lake Apopka was long renowned as a largemouth bass fishing lake. Today, after years of pollution from agricultural activities, only one of the 21 fish camps that dotted the lake in 1956 remains open today, and recreational activity on the lake is all but non-existent. The reasons — the sportfish are gone and pollution has turned the lake a sickly green color.



The centerpiece of Lake Apopka's SWIM restoration will be a 5,000-acre, Marsh Flow-way System being developed from former agricultural lands. An overabundance of phosphorous and nitrogen, elements common in fertilizer and animal waste, is the principal cause of the lake's degraded condition. These nutrients feed blue-green algae, which give the lake its color. Functioning much like a swimming pool filter, the flow-way removes suspended sediments that are rich in phosphorous and nitrogen from the lake as water passes through the grassy marsh in a shallow sheet flow.

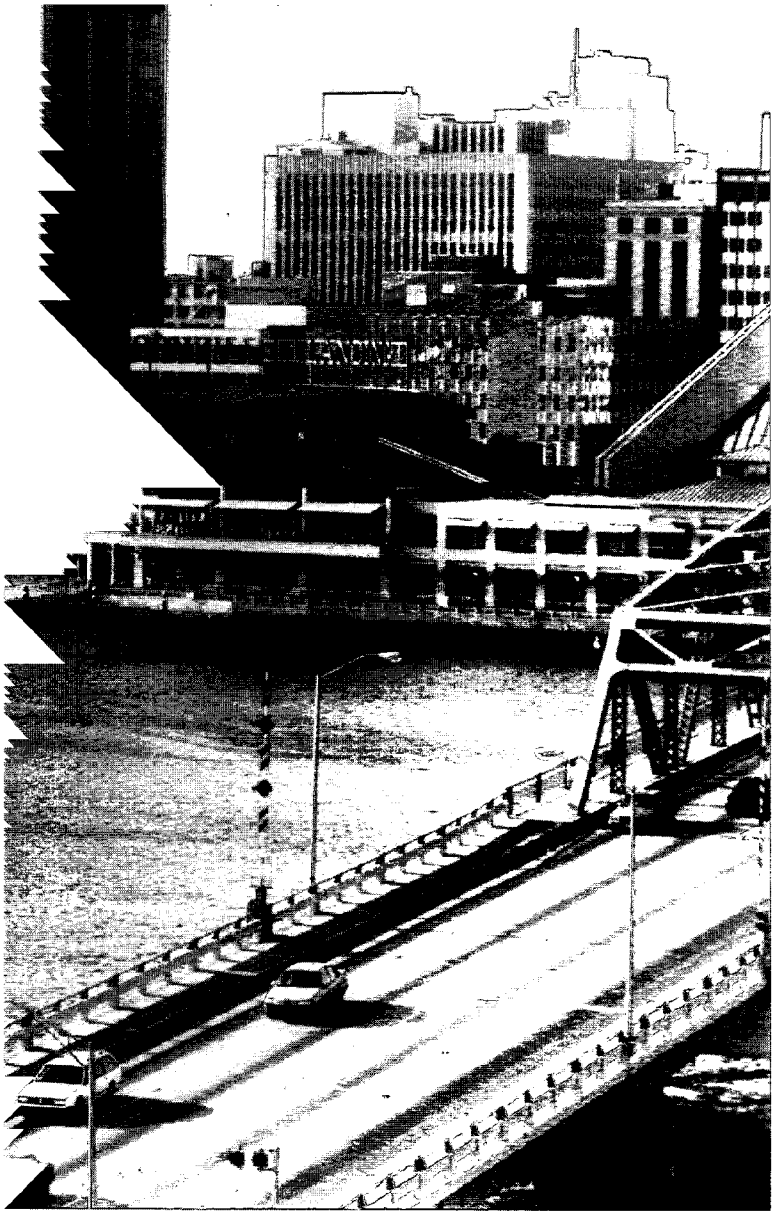
An 1,850-acre demonstration project constructed to test the feasibility of the larger system already has had a promising effect on water quality and clarity. Initial tests show the marsh is removing nearly half of the phosphorus and nitrogen from the water — exceeding designers' projections. Almost all suspended solids are removed.

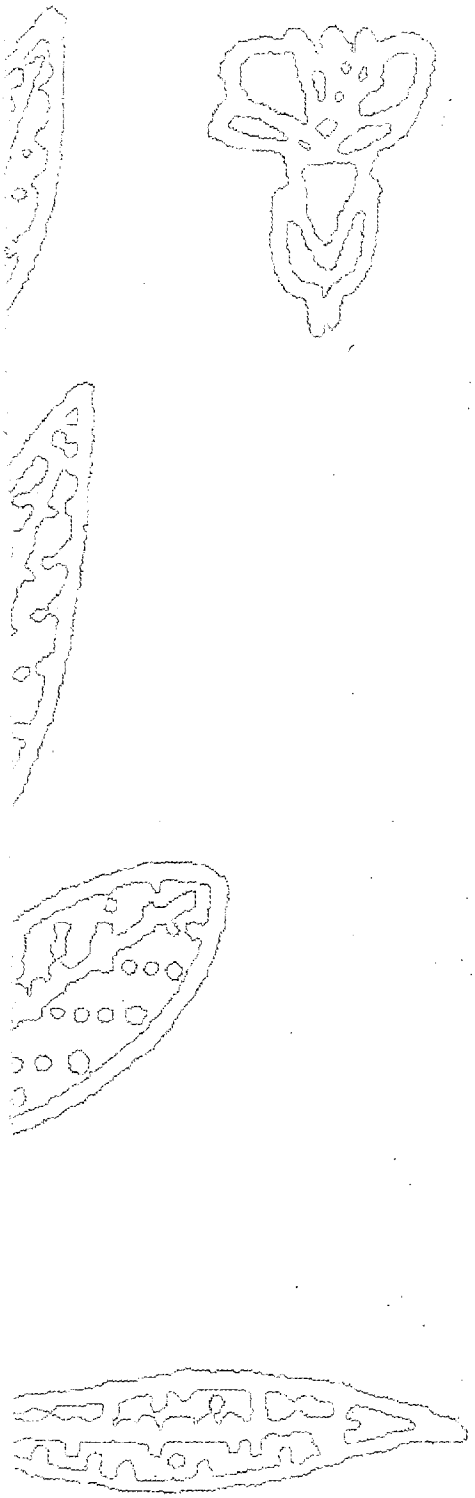


Lake Apopka's Marsh Flow-way project's natural filtering process is having a visible effect on water quality and clarity. Initial tests showed the marsh is removing nearly half of the phosphorus and nitrogen from the water – exceeding designers' projections.

SWIM is pilot-testing two other projects designed to supplement the marsh flow-way's restoration of the lake. The first involves planting aquatic shoreline plants that help filter the water and provide food and shelter for small game fish. Native plant species, including giant and softstemmed bullrush, fragrant water lily, southern naiad, spatterdock, knotgrass, eel grass, and pondweed, are being planted at 25 sites totalling 15 acres around the lake.

The second project involves removing the millions of gizzard shad (a so-called "rough" fish, not a game fish) from the lake and finding a market for them. If successful, this method could provide an annual economic boon of about $1 million. Harvesting the fish would also cut 10 metric tons of phosphorus and 35 metric tons of nitrogen from the lake each year, lowering the amount of nutrients available for the problem algae. The key is finding a consumer market for the fish, so district staff are working with the Department of Agriculture and Consumer Services to find a way to move shad from the bait bucket to the dinner table.





St. Johns Water Management District: Priority Water Bodies and SWIM Goals

The St. Johns River Water Management District's SWIM program has developed plans for four water bodies. Here's some of what the program is doing:

Lake Apopka

- Fully implementing a large-scale marsh restoration project
- Restoring vegetation near the shoreline
- Removing gizzard shad from the lake
- Increasing public awareness to support restoration efforts

Indian River Lagoon System

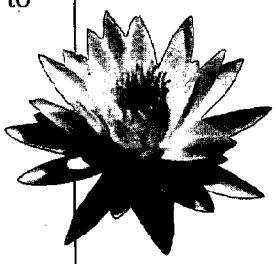
- Restoring wetland and seagrass habitats
- Removing nonpoint sources of pollution
- Managing freshwater flows to the lagoon
- Maintaining intergovernmental working relationships

Lower St. Johns River

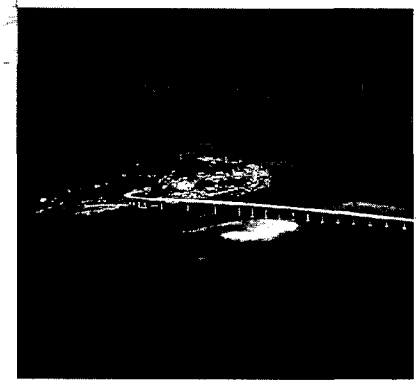
- Working with farmers and local officials to reduce agricultural and stormwater runoff
- Increasing public awareness and participation
- Monitoring water quality and analyzing trends
- Analyzing fish for toxic chemicals
- Mapping and analyzing contaminated sediments

Upper Oklawaha River Basin

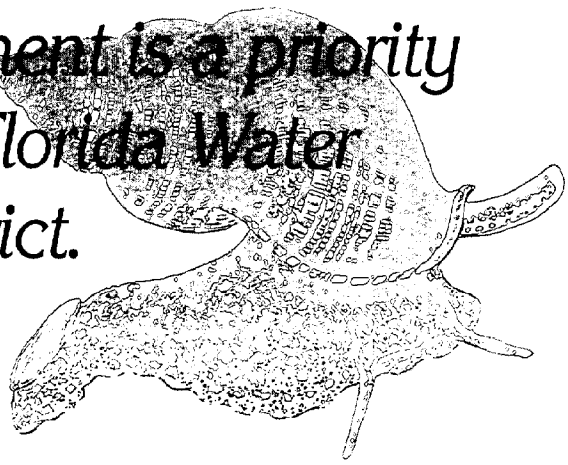
- Helping local governments develop environmental protection ordinances and comprehensive plan review
- Coordinating activities with local governments through the Upper Oklawaha Basin Board
- Educating the public to increase awareness and support of protection efforts
- Converting approximately 16,000 acres back to native wetlands and marshes
- Controlling nutrient levels by:
  - Reducing agricultural discharges
  - Adopting nutrient loading limits
  - Controlling septic systems
  - Developing marsh flow-ways to filter lake waters
- Adopting more natural schedules for fluctuation and discharge from the headwater chain of lakes

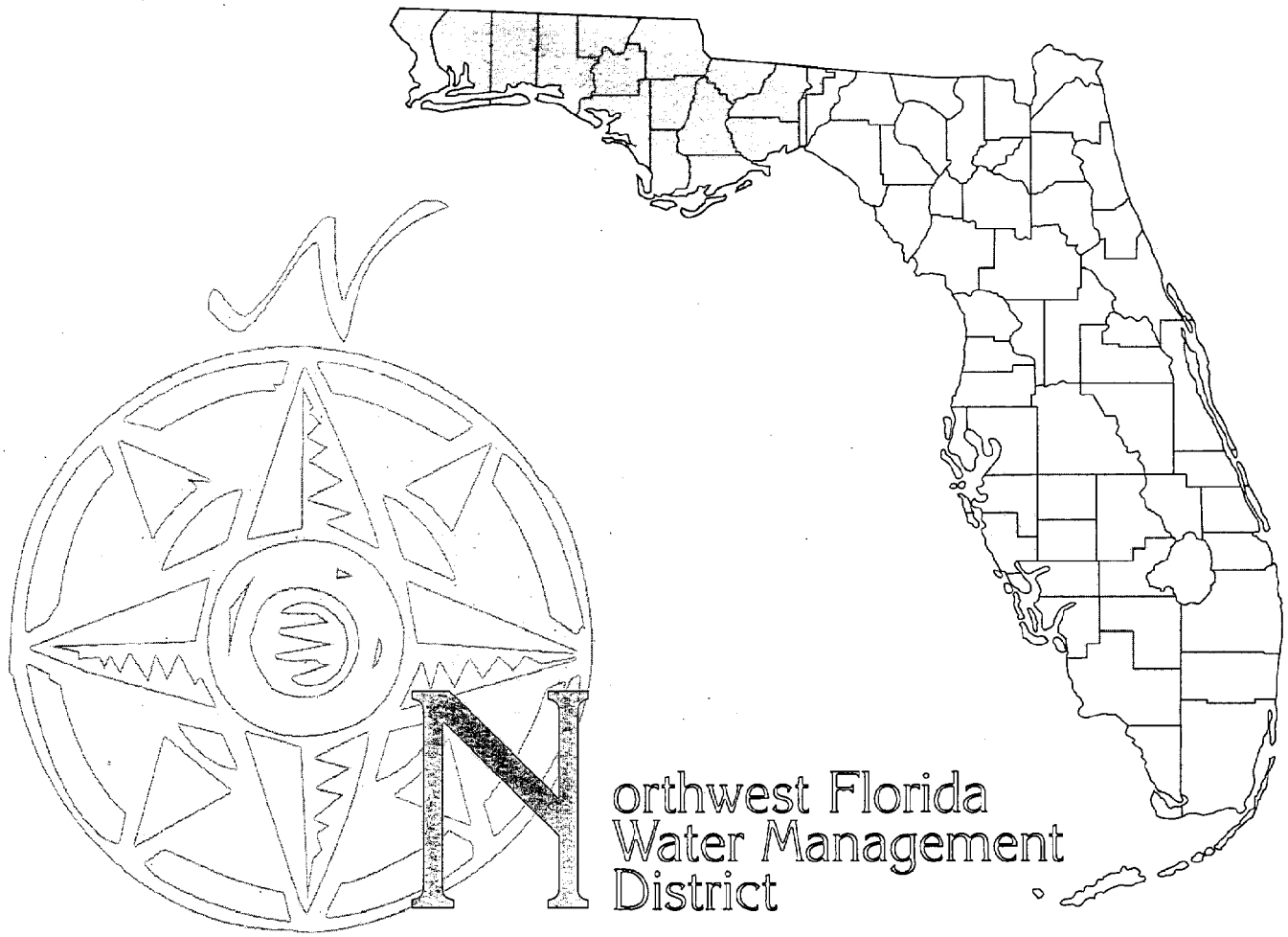


From the seafood industry of Apalachicola Bay to sport fishing on Leon County's Lake Jackson, the surface waters of

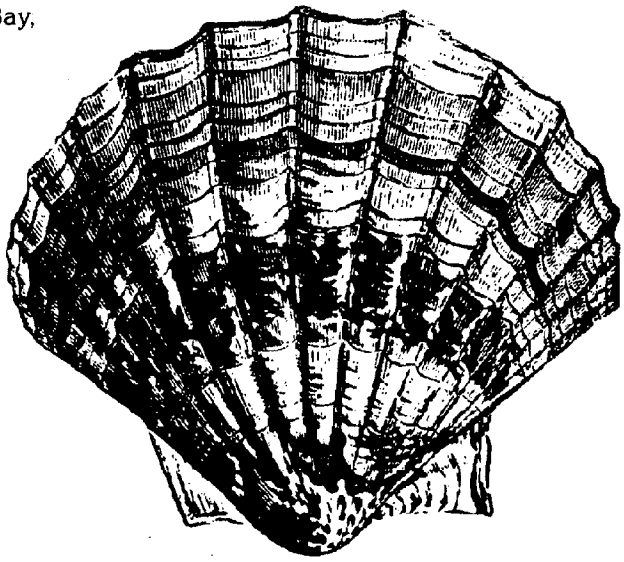


Florida's panhandle are an important source of many residents' livelihoods. Protecting these waters from the effects of development is a priority of the Northwest Florida Water Management District.





The Northwest Florida Water Management District manages water resources in an 11,200 square-mile area that covers 16 counties, from the St. Marks River Basin in Jefferson County to the Perdido River Basin in Escambia County. The district's SWIM program already has helped a variety of surface waters in the Panhandle, including Leon County's Lake Jackson, the Apalachicola River and Bay, Deer Point Lake near Panama City, and Pensacola Bay.



Lake Jackson: Weathering the Storm(water)

Just north of Tallahassee, SWIM funds are being used to protect one of the state's best known recreational fishing spots, Lake Jackson, from the effects of stormwater runoff.

Lake Jackson, designated a State Aquatic Preserve and Outstanding Florida Water, is well known to fishermen for its largemouth bass and to local residents for boating and watersports. The lake's watershed provides habitat for many species of wildlife, including bald eagles, ospreys, ducks, great blue herons, foxes, alligators, and turtles.

Water comes in to the lake from rainfall, stormwater runoff, and several creeks, including Megginnis Arm, Timberlane Creek and Ox Bottom Creek. But, because Lake Jackson is a "closed basin," water leaves the basin in only two ways — through evaporation and slow seepage into the ground. This means that contaminants that find their way into Lake Jackson stay there. The lake's bottom has a system of sinkholes that are connected to the Floridan Aquifer through a network of spaces in the underground rock. These sinkholes periodically open up, draining most of the water from the lake. The sinkholes have naturally plugged themselves after each natural drawdown, allowing the lake to refill.

Lake Jackson faces a serious threat from extensive urban and residential development in the southern portion of its watershed. Shopping malls, an Interstate interchange, and a vast array of businesses and residential areas all have sprung up around the lake during the past two decades. This rapid rate of development has led to increased stormwater runoff, resulting in contamination of the lake by fertilizers, sediments, pesticides, herbicides, heavy metals, oil, gasoline, and wastes from malfunctioning septic tanks.

The Northwest Florida Water Management District's SWIM program, in cooperation with federal, state, and local government agencies, has undertaken several projects aimed at improving water quality in Lake Jackson. Most focus directly on treating stormwater, the single greatest threat to the lake's health. The District's Megginnis Arm Stormwater Treatment Facility uses a large detention pond, a sand filter, and manmade marshes to clean up the stormwater flowing into the lake. The SWIM program recently expanded this facility to increase its stormwater storage capacity. SWIM funds also were used to construct the new I-10/Megginnis Creek Pond Facility, completed in 1993, as a cooperative project of Leon County, the Department of Transportation, and the SWIM program. SWIM plans call for construction of three more regional stormwater treatment facilities over the next few years, and correction of a number of smaller problems in the drainage network.

Other District activities include dredging approximately 112,000 cubic yards of degraded sediments from Megginnis Arm. This effort substantially increased water quality and clarity in this portion of Lake Jackson. An initial cooperative SWIM effort involving federal, state, and local agencies planted 12 acres of wetlands around the lake and provided several thousand elementary, middle, and high school students with an opportunity to learn about surface water treatment and protection of natural systems.

Saving Lake Jackson — and the largemouth bass and other wildlife that call it home — is a cooperative effort of the SWIM program, the Lake Jackson Action Team (a citizen group), the City of Tallahassee, Leon County, and a number of state and federal agencies. Though the lake has been harmed by development, SWIM is helping it "weather the storm."

Northwest Florida Water Management District: Priority Water Bodies and SWIM Goals

The SWIM program has undertaken several projects aimed at improving water quality in Lake Jackson. Most focus directly on treating stormwater, the single greatest threat to the lake's health.

The Northwest Florida Water Management District's SWIM program has developed plans for four water bodies. Here's some of what the program is doing:

Lake Jackson

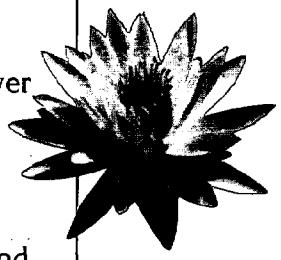
- Preserving undisturbed portions of the lake
- Restoring polluted portions of the lake by expanding the Megginnis Arm stormwater treatment facility
- Constructing additional stormwater treatment facilities
- Removing degraded sediments

Apalachicola River and Bay System

- Ensuring Florida's interests are addressed in this river system, which descends to the Gulf through Georgia, Alabama, and Florida
- Evaluating the effects of proposed alterations to freshwater flow
- Rejuvenating old spoil sites and planning for the proper disposal of dredged material
- Maintaining buffer zones throughout the watershed to prevent degradation through intensive land use

Deer Point Lake

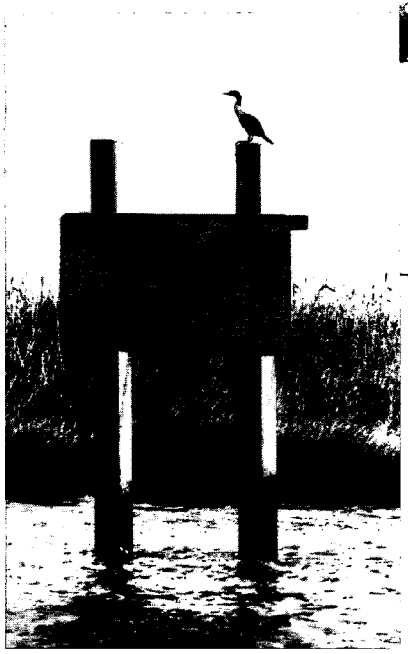
- Controlling stormwater pollution
- Preserving critical areas such as wetlands, floodplains, and springs
- Providing baseline data for future water quality, biological, and land-use/land cover assessments



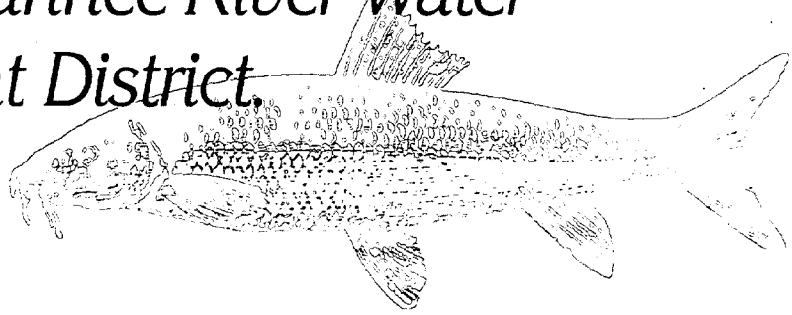
Pensacola Bay

- Controlling stormwater discharge
- Restoring wetlands, including seagrass and saltmarsh planting, and refurbishing oyster bars
- Accelerating shoreline acquisition

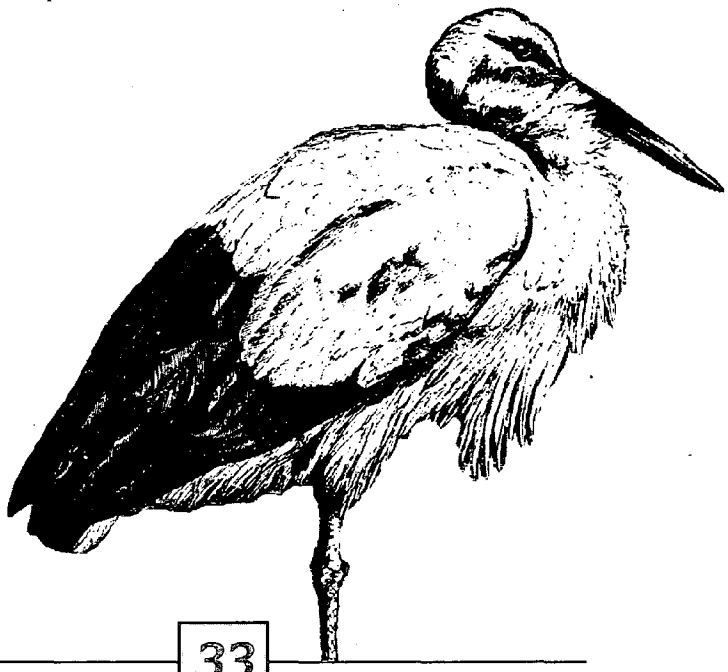
The tranquil Suwannee River wends its way from the black waters of the Okefenokee Swamp through the vast



pine and hardwood forests of north central Florida, 245 miles south to the Gulf of Mexico. Its relatively unspoiled beauty is protected by the Suwannee River Water Management District.

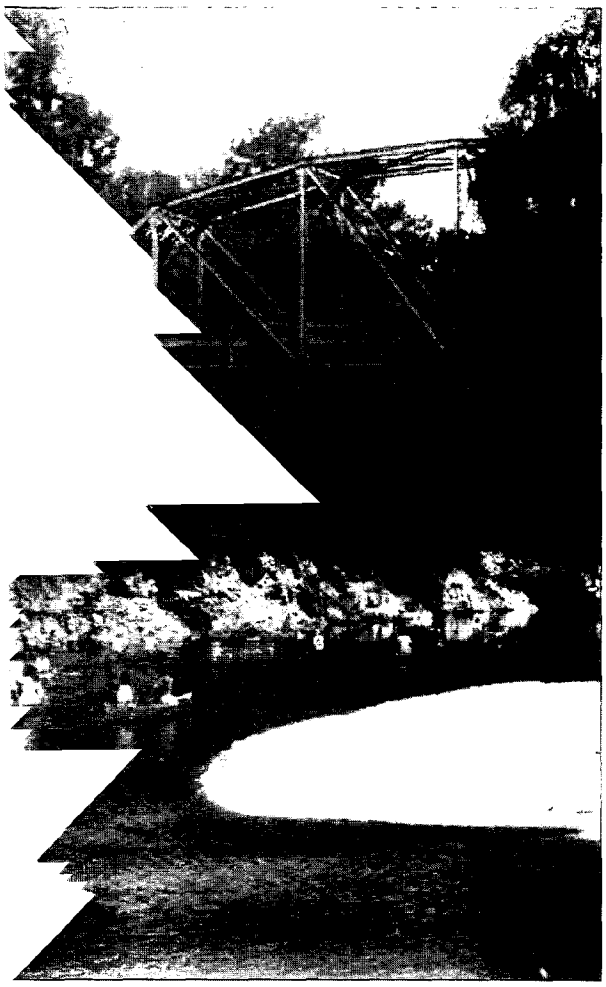


The Suwannee River Water Management District covers 7,640 square miles in north central Florida, an area that includes all or part of 15 counties and a total population of about 250,000 people. The district's low population means that its surface waters are relatively unspoiled, and SWIM program funds are spent primarily on prevention programs, like water quality monitoring and public education.



The Unspoiled Suwannee River

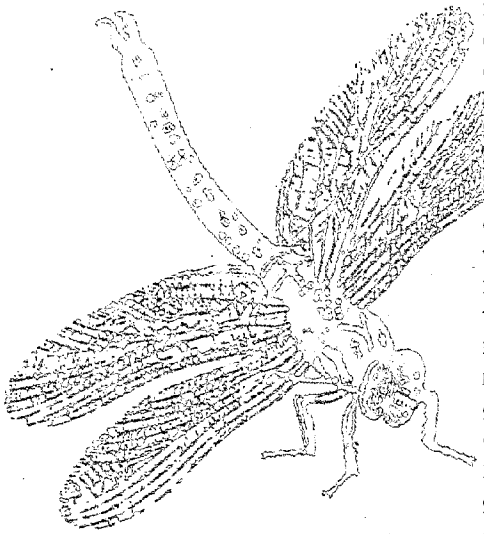
Most Floridians are familiar with the setting of their state song, at least by name. What many don't know is that the Suwannee is one of Florida's most unspoiled rivers. As one SWIM educational exercise for children puts it, "If Seminole Indians returned today and walked along the Suwannee River, they would recognize many of the places where they used to hunt and fish." That claim would not be true for many other Florida rivers. The relative health of the area's surface waters means that the Suwannee River Water Management District's SWIM money is used primarily for prevention programs, rather than restoration.



The SWIM program is the main source of water quality and biological monitoring in the region.

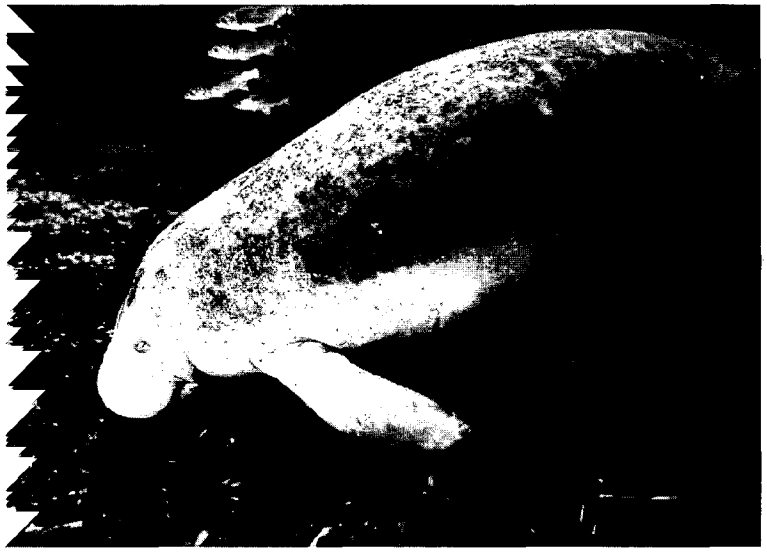
The source of the Suwannee is the Okefenokee Swamp. Two major tributaries, the Alapaha and Withlacoochee Rivers, drain south Georgia and join the Suwannee in Florida. From its headwaters in the Okefenokee, the Suwannee descends 245 miles, mostly through hardwood hammocks, pine flatwoods, and bottomland hardwood swamps, to the Gulf of Mexico at the small fishing town of Suwannee. Above White Springs, the Suwannee begins to cut through the underlying clays and limestones, most notably at Big Shoals, Florida's largest rapids. As the river cuts deeper into the limestone of the Floridan Aquifer, numerous springs add clear ground water to the tannin-stained river.

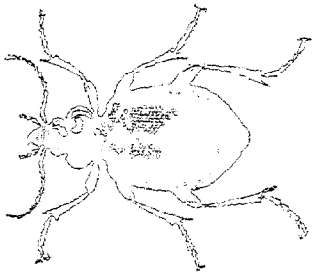
The Suwannee's current good health does not mean it is immune to contamination. The very things that make the Suwannee so beautiful also make it vulnerable. Agricultural and forestry practices in the Suwannee basin can cause erosion as well as pollution from fertilizers and pesticides. Animal wastes may also cause pollution. Many of the streams that feed into the Suwannee are easily damaged by heavy use. The area's tranquility has attracted new residents in recent years, raising concerns about septic tanks and fertilizer runoff. Over 40,000 platted lots now exist in and



near the 100-year floodplain of the Suwannee and its tributaries, but only about 25 percent are developed. If the remaining lots are developed, there may be adverse water quality impacts.

SWIM activities along the Suwannee focus on monitoring surface water quality, developing a geographic information system data base, educating the public about the river, and collecting information about the plants and animals found within the river system. The SWIM program also provides the means to begin establishing of minimum flows and levels for the Suwannee. Looking ahead to insuring proper development, the program has developed specific rules for development within the 100-year floodplain. It has put together geographic information system (GIS) data on soils, land cover, topography, floodplain boundaries, and land ownership in the Suwannee River System floodplain and assisted local governments on their comprehensive plan elements that affect the river system. The District's SWIM program has worked with the Department of Health and Rehabilitative Services to assess whether septic tanks in the town and the 10-year floodplain of the Lower Suwannee and Santa Fe Rivers are operating as permitted. The program has also helped to coordinate the successful effort to bring a sewage treatment plant to Suwannee. Concerns about the future health of the Suwannee River led, in 1988, to the formation of the Suwannee River Task Force. This group, made up of representatives from state agencies, industry, environmental groups, and local government, developed 44 recommendations, and is now called the Suwannee River Coordination Committee. Besides admonitions against discharging wastewater within the river's hundred-year floodplain and encouragement to acquire more riverfront land for conservation and public recreation, the Task Force commended that the SWIM program should receive continued financial support.





Suwannee River Water Management District: Priority Water Bodies and SWIM Goals

The Suwannee River Water Management District's SWIM program has developed plans for six water bodies. Here's some of what the program is doing:

Suwannee River System

- Monitoring 24 stations in the only regional surface water quality and aquatic biological monitoring network in North Central Florida
- Establishing limits for the pollution load the river can tolerate without losing water quality
- Helping local governments protect the river basin through their comprehensive plans
- Determining minimum flows and levels needed to maintain water quality and eco-integrity
- Developing a GIS database for mapping purposes

Santa Fe River System

- Monitoring surface water quality and aquatic biology at ten sites
- Determining minimum flows and levels needed to maintain water quality and eco-integrity
- Developing a GIS database for mapping purposes

Coastal Rivers System

- Monitoring surface water quality and aquatic biology at eleven sites
- Developing a GIS database for mapping purposes
- Monitoring timber industry activities in the basin

Alligator Lake

- Helping local governments acquire the land needed to create a stormwater control system for lake restoration

Aucilla River System

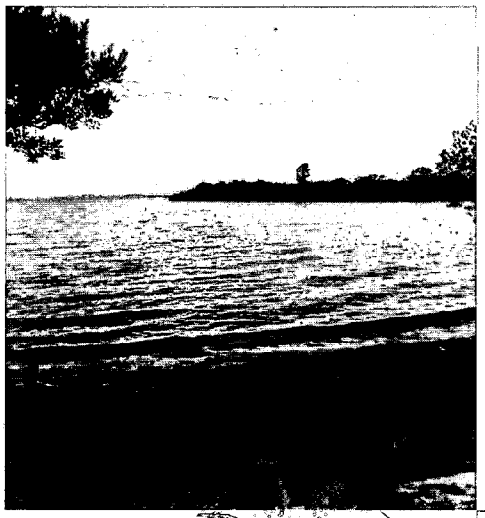
- Monitoring surface water quality and collecting biological data at two sites
- Developing a GIS database for mapping purposes

Waccasassa River System

- Monitoring surface water quality and aquatic biology at one site
- Developing a GIS database for mapping purposes

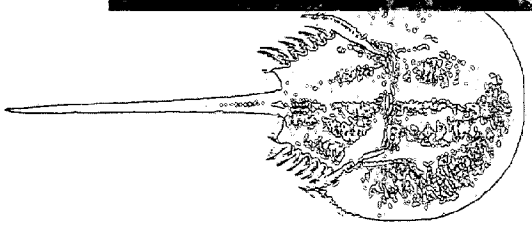
The Future of SWIM

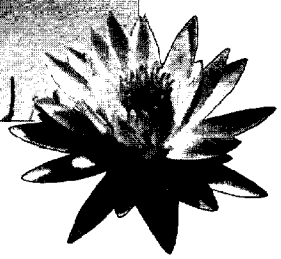
The 1987 Florida Legislature created the Surface Water Improvement and Management Program to fill a serious gap in the state's environmental protection programs. It was not enough, legislators knew, to buy land. It was not enough to stop sewage and industrial wastes from flowing into our surface waters. We needed to take the next step — to reduce the pollutants entering our waters in more subtle ways. To help farmers to limit pollution caused by fertilizers, herbicides, and pesticides. To control stormwater more effectively. To work with local governments to ensure developments that protect these resources. To educate people about how their actions — the use of fertilizers, pesticides, and other toxic compounds — affect our lakes, rivers, and estuaries. To restore already polluted waters.



SWIM does all these things and more. Its emphasis on partnerships means that federal, state, and local programs are working together to protect and restore our surface waters. Its creative use of state funds means that many more dollars — from local governments, federal programs, and even private sources — are available to help reduce the pollution of our state's waters and to restore those water bodies that need serious help.

As Florida looks to the future of its environmental programs, SWIM has an integral role to play. Its continued funding is essential to the health of all Florida's surface waters.





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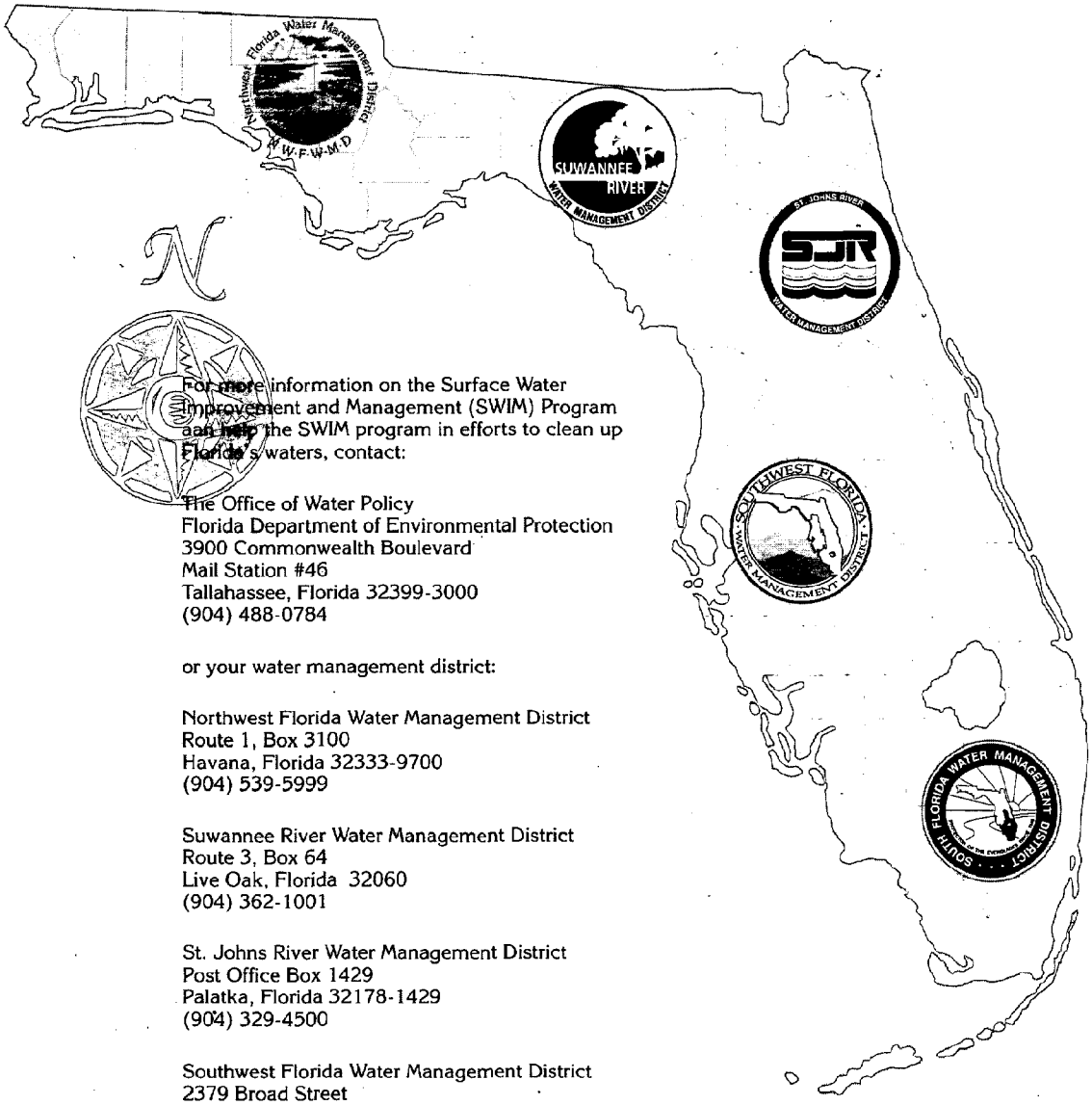

For more information on the Surface Water Improvement and Management (SWIM) Program and help the SWIM program in efforts to clean up Florida's waters, contact:

The Office of Water Policy
Florida Department of Environmental Protection
3900 Commonwealth Boulevard
Mail Station #46
Tallahassee, Florida 32399-3000
(904) 488-0784

or your water management district:

Northwest Florida Water Management District
Route 1, Box 3100
Havana, Florida 32333-9700
(904) 539-5999

Suwannee River Water Management District
Route 3, Box 64
Live Oak, Florida 32060
(904) 362-1001

St. Johns River Water Management District
Post Office Box 1429
Palatka, Florida 32178-1429
(904) 329-4500

Southwest Florida Water Management District
2379 Broad Street
Brooksville, Florida 34609-6899
(813) 985-7481

South Florida Water Management District Post Office Box 24680
West Palm Beach, Florida 33416-4680
(407) 686-8800

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