

IV. The South Florida Ecosystem Restoration Initiative

In September 1993, five Federal departments and the Environmental Protection Agency signed a 5 year Interagency Agreement on South Florida Ecosystem Restoration. This agreement formally established the South Florida Ecosystem Restoration Task Force (Task Force). State agencies, local governments, and tribes were added to its ranks in 1996. The Task Force has initiated a plan (called the Initiative) aimed at implementing consistent policies, strategies, plans, programs, and priorities to address South Florida Ecosystem environmental concerns. The Initiative's purpose is to restore and maintain ecosystem elements most resembling natural, healthy functions of a complex balanced aquatic system, where human activities occur in support of these healthy natural conditions. To attain this purpose, some of the identified objectives of the Initiative are:

- Restore and sustain healthy ecosystem conditions in Florida Bay, adjacent estuaries, and coastal waters of the South Florida Ecosystem.
- Maintain the health and biodiversity of the coral reef ecosystem associated with Florida Bay, Biscayne Bay, and the Florida Keys.
- Manage the hydrological conditions in the remaining undeveloped and potentially restorable lands in a way that maximizes natural processes.
- Develop and manage the hydrology of the Kissimmee River, Lake Okeechobee, the Everglades, and associated waters in a way that maximizes ecosystem restoration goals while providing appropriate consideration for the needs of urban, rural, and agricultural users.
- Ensure that any plans or permits for development are fully coordinated among affected governmental agencies and are compatible with the restoration of the South Florida Ecosystem.
- Restore and maintain the biodiversity of native plants and animals in the upland, wetland, estuarine, and marine communities of the South Florida Ecosystem.
- Recover species that are threatened and endangered.

Various state and federal agencies are the partners for restoring the South Florida Ecosystem and will take the lead in carrying out the comprehensive South Florida Ecosystem Restoration Initiative. Success or failure of the Initiative will largely determine the future of the Kissimmee River, Lake Okeechobee, the Everglades, Florida Bay, Biscayne Bay, and the natural resources of South Florida.

The State of Florida, through the SFWMD and the Florida Department of Environmental Protection, is undertaking South Florida ecosystem planning efforts through the Everglades Forever Act of 1994, provisions of the 1991 Settlement Agreement, and 1992 Consent Decree. The SFWMD has also been given responsibility for additional activities to restore Florida Bay (under the Florida Bay Emergency Interim Plan). The general goals of the State's comprehensive Everglades program are to develop management actions to address water quality, water quantity, and exotic plant issues in the Everglades ecosystem.

The Federal 'restudy' of the COE's Central and Southern Florida (C&SF) Project is an integral feature of the South Florida Ecosystem Restoration Initiative. The C&SF Project provides flood control and water supply for agricultural and urban users in the Kissimmee River-Lake Okeechobee-Everglades drainage. It also provides a water supply to Everglades National Park and is intended to prevent salt water intrusion into aquifers in South Florida. For more than 40 years, the C&SF Project has fulfilled its purposes. Unfortunately the project has adversely affected much of the ecology of South Florida and Florida Bay by frequently making the

Florida Bay estuary into a hypersaline 'lake'. The purpose of the restudy is to determine if the C&SF Project could be modified to restore the ecology of South Florida while retaining original project benefits. The Service has been made responsible for several aspects of the South Florida Ecosystem Restoration Initiative by the Interagency Task Force. The Service has coordinated a South Florida Ecosystem Team and was given responsibility for the following tasks (IWG 1994):

- Identify existing monitoring programs and ensure that they are compatible.
- Develop and support a multi-pronged approach to controlling harmful exotic species.
- Map species distributions and key habitat associations and develop strategies to protect species that are not currently well-protected.
- Develop a strategy to recover the threatened and endangered species of South Florida.
- Conduct research and other field investigations to restore the structure of native floral and faunal communities.
- Initiate projects to improve habitat for flora and fauna native to the South Florida Ecosystem.
- Initiate and sustain routine, system-wide monitoring of wading bird populations in South Florida, and use the Fish and Wildlife Coordination Act to address the critical needs of wading birds in projects proposed by other Federal agencies.
- Use disturbed sites to develop wildlife corridors.
- Enforce laws and develop educational materials to prevent human disturbance of nesting areas and den sites.

The Service's South Florida Ecosystem Plan lays out resource needs and project plans to fulfill the tasks listed above.

V. Fish and Wildlife Service Ecosystem Subregions and Resource Issues

This section portrays South Florida resource issues from the Fish and Wildlife Service management perspective. The ecosystem is subdivided into eight subregions (Figure 2), and specific issues are identified within each subregion.

A. Kissimmee River Drainage, including Lake Wales Ridge

The Kissimmee River Drainage Basin extends for more than 100 miles from an area just south of Orlando to Lake Okeechobee and includes numerous interconnected lakes and the Kissimmee River. The drainage forms the headwaters of the Everglades and provides a critical water source for Lake Okeechobee. Over the years, the watershed has been altered by ditching, draining, and channelization; ultimately affecting the timing, release, and amount of water entering the Everglades. Efforts to restore the historic water levels of the drainage have been underway since 1992.

The Lake Wales Ridge is an ancient beach terrace system that rises sharply along the western edge of the Kissimmee River Drainage Basin. The ridge was formed at the southern tip of a much smaller peninsular Florida 2.5 million years ago. This ancient sand ridge contains a large number of endemic plants and animal species found nowhere else on earth. The Lake Wales Ridge NWR was established to protect this unique ecosystem.

The Kissimmee Drainage and the Lake Wales Ridge are connected hydrologically. Numerous sinkhole lakes are scattered along the 100-mile-

long Lake Wales Ridge. These surface lakes recharge the aquifer and provide an important water source for the Kissimmee River system and Lake Okeechobee

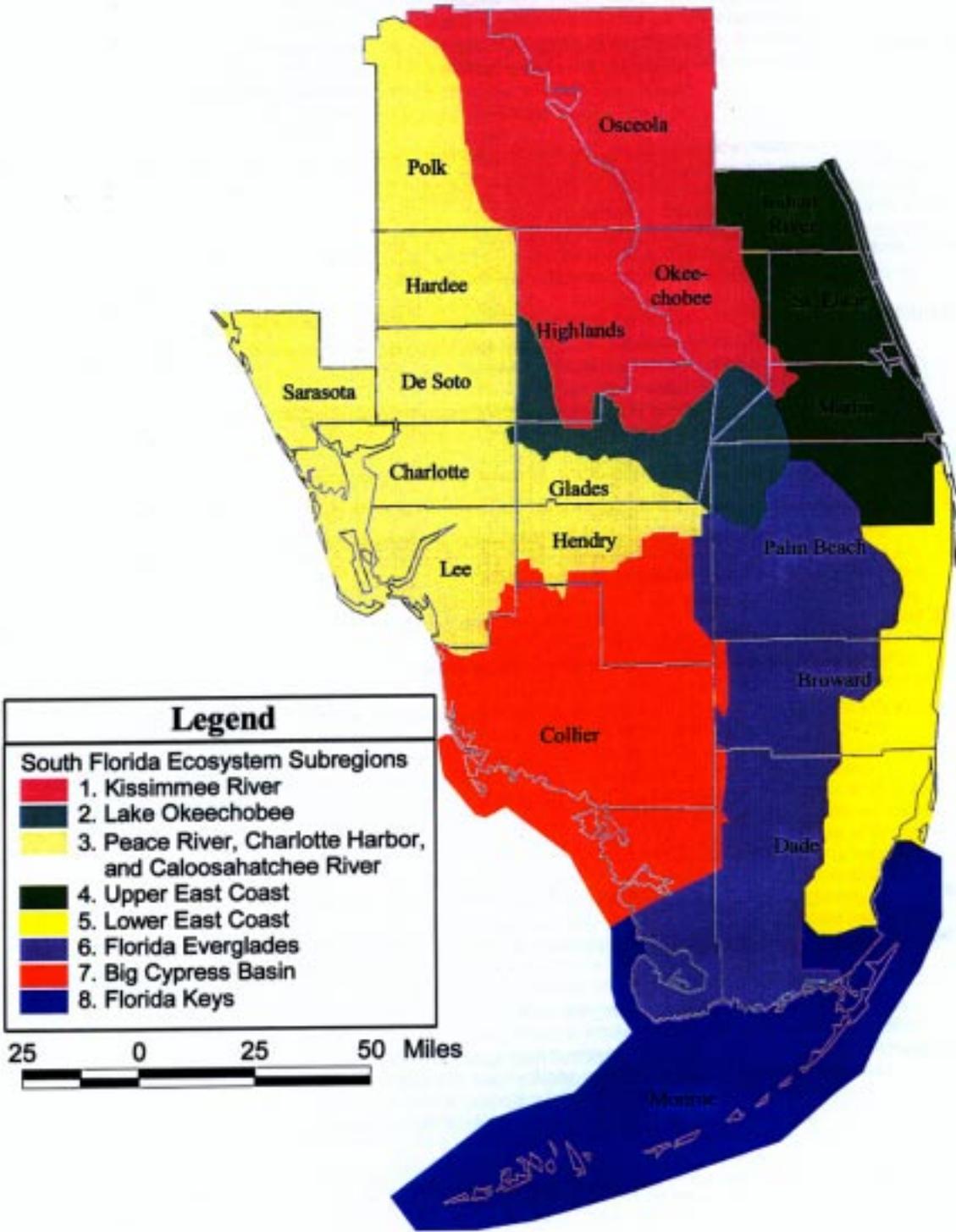


Figure 2. South Florida Ecosystem Subregions.

1. Issues

Exotics

Thirty-four species of exotic plants, including water hyacinth, water lettuce, Brazilian pepper, cogon grass, *Melaleuca*, Hydrilla, and tropical soda apple have been identified as threats.

Public Use

Pleasure boating, fishing, waterfowl hunting, water-skiing, airboating, and jet-skiing are on the increase throughout the length of the Kissimmee Basin. Aquatic recreational activities create disturbances to wading birds and waterfowl. However, natural resource based tourism, including hunting and fishing, has the potential to support efforts to protect and manage natural areas. Off-road vehicle trails on upland sites along the ridge have impacted some protected plants while opening sites to other uses such as hunting and off-road driving.

Wetland Protection

The COE's C&SF Restudy is addressing the Kissimmee River Drainage Basin.

Water Quality

Nutrient loading and turbidity from dairy operations are the continuing focus of management activities by the SFWMD and Florida Department of Environmental Protection. The principal concern is the eutrophication of Lake Okeechobee. Concern also remains over the effects of pesticide runoff from citrus operations on the aquifer.

Contaminants

Toxics in the environment arise primarily from water quality perturbations.

Habitat Loss

This is the most serious problem affecting the Lake Wales Ridge NWR. Further loss and fragmentation of this habitat could lead to the extirpation of some plant species all together and have a deleterious effect on the recovery of other species.

Lack of Knowledge

A budget has not been approved for staffing or managing the Lake Wales Ridge NWR. Expertise within the Service for the management of ancient scrub is currently unavailable.

Public Attitudes

The scrub ecosystem is underappreciated by the public. The uplands are typically recognized only for their potential for allowing increased urbanization and agricultural use. Natural resource agencies need to educate the public, particularly hunters and fishermen, on the importance of protecting and managing natural areas. Political leaders and chambers of commerce need to recognize the economic importance of protecting natural areas to the regional economy.

Air Quality

Prescribed burning may affect air quality.

Land Use

Urbanization, agriculture, and mining are ongoing issues that affect ancient scrub and short hydroperiod prairie habitats. A narrow window of opportunity exists to acquire several key parcels on the Lake Wales Ridge before they are developed by competing land uses.

Fire Regime

Fire is a critical management tool in the long-term preservation of scrub habitat. Changes in land use, particularly urbanization, surrounding publicly-owned scrub lands may ultimately affect the fate of these scrub communities by eliminating this management practice.

Law Enforcement

The full scope of law enforcement activities should be performed to eliminate the unlawful take of migratory birds, threatened and endangered species, and other native wildlife and plants.

B. Lake Okeechobee, including Fisheating Creek and Taylor Creek

Lake Okeechobee is the second largest freshwater lake within the contiguous U.S.; measuring 700 square miles (576,000 acres) in area, with a 150 square miles of littoral zone. The lake is shallow with a mean depth of 9 feet, subtropical, and eutrophic. Its storage capacity of 1.05 trillion gallons makes it the center of South Florida's water supply and flood control system. Lake Okeechobee provides water for a variety of consumptive demands, including urban drinking water, irrigation for agricultural lands, and recharge for wellfields. Habitat conditions inside and outside the lake

also depend on this water supply. The lake's littoral zone supports recreational sport fishery, commercial fishery, wading bird breeding and foraging, resident and migratory waterfowl, and endangered species. Lake Okeechobee is an important source of freshwater to the Everglades, and discharges control the ecology of the St. Lucie and Caloosahatchee estuaries.

1. Issues

Exotics

Exotic plant pests include *Melaleuca*, Australian pine, water hyacinth, water lettuce, *Hydrilla*, torpedo grass, and Eurasian water milfoil. Cattails are native invasive pests. *Melaleuca* was estimated to cover 2,543 acres of the littoral zone in 1992, and it is now being aerially herbicided by SFWMD. To date, the principal emphasis of aquatic plant management programs has been to maintain waterways open for navigation and recreation. However, such activities can adversely affect non-target species, and these activities must be conducted carefully.

Public Use

Lake Okeechobee is identified in the North American Waterfowl Management Plan as a waterfowl habitat area of major concern. Resident species include the Florida mottled duck, wood duck, and fulvous whistling-duck. Migratory waterfowl include 40 percent of the entire Atlantic flyway population of ring-necked ducks and as many as 280,000 lesser scaup in the open water areas of the lake. The Florida Game and Fresh Water Fish Commission conducts waterfowl research on the lake, including habitat use patterns, aerial census, and banding. Management includes installation of wood duck nest boxes around the lake, but none of the littoral zone is currently managed specifically as waterfowl habitat despite extensive waterfowl hunting on the lake. The renowned recreational fishery has an estimated asset value of \$99 million. The most commonly caught game fish is black crappie. The sunfish, catfish, and largemouth bass are also highly desirable game fish caught in the lake.

Wetland Protection

Direct elimination of wetlands through dredging and filling is unlikely to occur inside the Herbert Hoover Dike, which surrounds the lake. However, the water regulation schedule is the principal issue in maintaining or enhancing the extensive marsh in the littoral zone. When water levels exceed an elevation of 15.5 feet, water begins to stack up against the dike, leaving no room for outward expansion of the marsh, as would occur without the dike. Extended periods of high water above 15.5 feet will drown vegetation in the littoral zone, prevent germination of plants such as willow and the endangered Okeechobee gourd, reduce the normal cycle of drought and fire, and will adversely affect fish and waterfowl. However, a water regulation schedule most suitable for the Lake Okeechobee littoral zone may not be the most beneficial for the estuaries or the Everglades. Environmental tradeoffs must compromise with the parameters imposed by flood control, water supply, and navigation in order to select a water regulation schedule.

Water Quality

Phosphorus loading from dairy farms, other agricultural activities, and municipal sources is the principal water quality concern for the lake. Best Management Practices (activities to reduce stormwater pollutants) are being applied to dairy operations and, although monitoring indicates a reduction in nutrient loading from Taylor Creek and Nubbin Slough, continued eutrophication of the lake is a serious concern. Algal blooms are considered to be a natural occurrence in Lake Okeechobee, but the frequency and intensity of these blooms appear to have increased due to human activities. The 1986 bloom was intense enough to cause the death of thousands of apple snails along the western shore. (This area is part of the critical habitat for the snail kite, which consumes apple snails.) The blooms' causative agent has not been clearly identified. Some studies implicate external nutrient loads as the cause, but wind-induced resuspension of lake bottom sediments plays a significant role in triggering algal blooms. Some researchers believe that higher lake stages will increase the frequency of algal blooms.

<i>Contaminants</i>	The principal issue involves nutrient loads as discussed above. Restoration of abandoned agricultural lands has been proposed for Kreamer, Torry, and Ritta Islands along the southeastern shore of the lake. Removal of levees and planting of native vegetation is proposed, with possible management of moist soil plants on portions of the islands as waterfowl habitat. However, additional sampling is needed to ensure that pesticide residues (e.g., DDT and DDE) from 1970's farming operations are at low enough levels to allow restoration without exposing fish and wildlife to harm.
<i>Habitat Loss</i>	The COE has proposed reinforcement of Herbert Hoover Dike to reduce seepage and the threat of failure during high water periods. Any such work should be designed to minimize loss of littoral zone habitat. The littoral zone is also threatened by changes in water regulation. The SFWMD proposes to acquire 43,872 acres around Fisheating Creek through the Save Our Rivers (SOR) program. Fisheating Creek is extremely important to foraging wading birds during periods of high water levels in Lake Okeechobee. The remainder of the Fisheating Creek drainage (beyond the boundary of the SOR project) sustains dairy farms and citrus groves and is impacted with an undefined rate of habitat loss. The uplands surrounding Fisheating Creek are essential habitat for the threatened Audubon's crested caracara.
<i>Coastal</i>	High volume discharges to the St. Lucie and Caloosahatchee River estuaries cause increased turbidity and color and an unfavorable salinity regime. These events have a direct adverse impact on seagrasses by reducing light penetration necessary for photosynthesis, destroying fish and invertebrate habitat, and altering salinity levels favorable to a variety of estuarine plants and animals. Reduction in the frequency and duration of these high volume discharges, and provision of minimum freshwater flows during dry periods, are elements in the Environmental Performance Measures that will be used to evaluate changes to the water regulation schedule for the lake. However, environmental tradeoffs must be resolved among water regulation alternatives most favorable for the estuaries, the lake's littoral zone, or the Everglades.
<i>Lack of Knowledge</i>	More information is needed on lake dynamics, phosphorus cycle, and use of the area by migratory birds and threatened and endangered species. Estimates of future demands for agricultural and urban water supply and water volume needed for the Everglades must be continually updated.
<i>Public Attitudes</i>	There is a need to educate the public on the complexity of managing Lake Okeechobee for a variety of purposes and the major environmental issues, such as the habitat values of the littoral zone, the ecological problems associated with exotic vegetation and eutrophication, and the relationship of the lake to environmental conditions in the estuaries and the Everglades.
<i>Air Quality</i>	This is not of critical concern, due to a lack of major industry. However, research has shown that some of the mercury that occurs in surface waters is transported there atmospherically. Burning of agricultural fields and electricity production via burning of sugarcane waste produces airborne particulates that are deposited in surface waters. The electricity co-generation plant using sugar cane waste has recently been permitted by the state to switch to waste tires as additional or replacement fuel.
<i>Land Use</i>	Urbanization is occurring in the area surrounding Fisheating Creek, and agricultural runoff is degrading water quality.
<i>Fire Regime</i>	The network of canals and levees creates a major barrier to wild fires.
<i>Law Enforcement</i>	The full scope of law enforcement activities should be performed to eliminate the unlawful take of migratory birds, threatened and endangered species, and other native wildlife and plants.

C. The Everglades

The region once generally known as the Everglades stretched from Lake Okeechobee to Florida Bay and nearly coast-to-coast. Due to artificial draining, development, and farming, its size has been reduced by about half.

It currently consists of Arthur R. Marshall Loxahatchee NWR (147,261 acres, which includes all of WCA 1), WCA 2 (134,400 acres), WCA 3 (585,600 acres), and Everglades National Park (about one million acres excluding Florida Bay). Part of a Miccosukee Reservation and a village, and a Seminole Reservation are also located in the Everglades.

The Everglades area that was lost was set aside for agriculture in the early 1900's and includes 700,000 acres between Lake Okeechobee and the remaining Everglades. This was an area of extremely fertile but seasonally flooded soil, crucial to the downstream Everglades because of the sheet flow it allowed from the lake. This broad sheet flow, along with the flat terrain, seasonal flooding, oligotrophic characteristics of the water, and the subtropical climate combine to make the Everglades unique in the world. It is widely known as the "River of Grass" because of the dominant grass-like vegetation (e.g., sawgrass, spikerushes) and its slowly flowing water. The sheet flow has been greatly reduced and the water from the lake now flows through five major canals that carry water through the Everglades Agricultural Area (EAA) and the WCAs to Everglades National Park and the Atlantic coast. The COE and the SFWMD operate and maintain hundreds of miles of canals and levees that now control the surface water in the Everglades.

The Everglades is vital to replenishing the Floridan and Biscayne Aquifers; to supplying surface water to much of South Florida; to carrying essential nutrients and clean, fresh water to the estuaries; and to supporting an extremely rich and diverse assemblage of wildlife and plants. Many migratory birds from all over North America depend on the Everglades during the year. Changes in the hydropatterns and water quality, as well as the loss of land, are the major threats to the Everglades.

1. Issues

Exotics

Plant species that need intensive control are *Melaleuca*, Brazilian pepper, Australian-pine, and Old World climbing fern. *Melaleuca* affects several hundred thousand acres of upland and wetland habitat throughout the Everglades (primarily eastern), including sawgrass and cypress habitats. Brazilian pepper affects at least 100,000 acres of mangroves in Everglades National Park, as well as tens of thousands of acres elsewhere in the uplands and freshwater parts of the Everglades. Australian-pine inhibits sea turtle nesting on Cape Sable and Highland Beach; it is also a nuisance in the southeastern Everglades and along canals throughout. Old World climbing fern is a serious threat to the Arthur R. Marshall Loxahatchee NWR and will likely spread to other Everglades areas. Biological controls should be pursued posthaste. Exotic animals of particular concern are fish (e.g., ciclids, tilapia, walking catfish, and oscars), feral hogs, and armadillos. Exotic aquatic plants clog the canals, interfering with flood control and navigation. Native cattails are out competing sawgrass and slough vegetation and causing vast monocultures.

Public Use

Public use of WCA's 2 and 3 includes off-road vehicles, such as airboats and swamp buggies. This impacts the habitat and disturbs wildlife. Hunting camps in WCA's 2 and 3 contribute to pollution. The effect of hunting and fishing should be considered. However, Native American (Miccosukee and Seminole) rights, including hunting and fishing, should be supported.

Wetland Protection

The boundaries of the Everglades are being encroached upon by development and agriculture. Every effort should be made to expedite the acquisition of the East Coast Water Preserve Area as a buffer. Other lands in the Everglades should be purchased for restoration instead of converted to agriculture or rock mining. Hydropatterns have been disrupted by canals and levees and should be restored as closely as possible to pre-drainage conditions.

Water Quality

Discharge containing nutrients and pesticides, primarily from the EAA and secondarily from east coast development, has degraded Everglades water. A major multi-agency cleanup -- primarily of nutrient removal -- is underway and should remain an Everglades priority. The effects of pesticides are unknown and should be investigated. Mercury contamination

is present in most areas of the Everglades and threatens wildlife and human consumers of wildlife.

Contaminants

The contaminants are mostly water-borne (see *Water Quality* above). Lead shot from previous years of hunting and lead sinkers from fishing are probably common in WCA's 2 and 3. Ash from burning agricultural fields affects the Everglades.

Habitat Loss

Severe habitat loss is occurring within the Everglades due to exotic plant and cattail invasions, as well as to hydrologic changes to the system (e.g., decreased hydroperiods, flooding of tree islands). Much of the original Everglades is outside of the public lands (e.g., Pennsuco Wetlands), and these lands are rapidly being developed. Land acquisition is a priority.

Coastal

A major concern is the effect on the estuaries from the change in the quantity and timing of the freshwater flowing from the interior. Also, the spread of Australian-pine along the coastal regions of Everglades National Park interferes with sea turtle nesting. Concern exists for a rising sea level, because of the shallow slope of the coast. Finally, the storm-related loss of mangroves is serious in parts of Everglades National Park.

Lack of Knowledge

A critical answer yet to be determined is the numerical criteria for the Class III standard for phosphorus in the Everglades. Extensive research is underway but will take at least 5 years to conclude. Researchers need to ascertain where the mercury is coming from, if it can be reduced, and if so, how. The most efficient way to control exotic plants can be determined. Research to expand on Best Management Practices for farmers in the EAA would ameliorate the problems of water discharge into the Everglades.

Public Attitudes

Negative attitudes towards the restoration of the Everglades exist in the EAA because of the perceived threat to the economy. Heavy development pressure on the East Coast is causing water managers to resist restoration attempts because of their fear of losing water supplies for their constituents.

Air Quality

This is not perceived to be a critical concern. However, research shows that much of the mercury that ends up in the Everglades is transported there atmospherically, such as via incinerators. Vehicle emissions in Dade, Broward, and Palm Beach counties contribute to poor air quality. Burning agricultural fields produces airborne particulates over the Everglades.

Land Use

Land use concerns within the Everglades involve the fate of the existing canals and levees, which could be altered to promote a more natural sheet flow of water. Outside of the Everglades, the concerns include the use of agricultural versus public land for the stormwater treatment areas and development of land along the edge of the Everglades. Exponential population growth rates at the edges of the Everglades are causing intense pressures on its resources.

Fire Regime

The network of canals and levees places major barriers to natural fires. The artificial alteration of water levels in the Everglades has caused extreme high and low levels, both of which change fire patterns. For example, anthropogenically-enhanced droughts in the late 1980's caused severe muck fires. Suppression of fires has led to fuel buildup. The presence of exotic plants, such as *Melaleuca* and old world climbing fern, cause fires to burn hotter and in different patterns than with the native vegetation. Reintroduction of prescribed burns is difficult in these situations. Increasing air and water quality concerns and regulations further restrict burning activity.

Law Enforcement

The full scope of law enforcement activities should be performed to eliminate the unlawful take of migratory birds, threatened and endangered species, and other native wildlife and plants. The remoteness of the area makes it inviting for illegal activities, such as poaching and drug trafficking.

D. Peace River, Charlotte Harbor, and Caloosahatchee River

This subregion stretches from the headwaters of the Peace River in Polk County to the southern end of Estero Bay in Lee County. The watershed, or inflow area, is approximately 4,300 square miles and covers all or part of Polk, Manatee, Hardee, Highlands, Sarasota, DeSoto, Charlotte, and Lee Counties. The three major rivers comprising this watershed are the Myakka, Peace, and Caloosahatchee Rivers. The Charlotte Harbor Estuary is a Y-shaped system, 30 miles long and 7 miles wide with a total surface area of approximately 270 square miles. It is the nation's 18th largest estuary and the second largest open water estuary in Florida.

1. Issues

Exotics

The three primary invasive exotic plant species are *Melaleuca*, Brazilian pepper, and Australian-pine. Additional nuisance exotics include downy rosemyrtle, cogon grass, tropical soda apple, carrotwood, water hyacinth, water lettuce, hydrilla, and Eurasian water milfoil. Problems with feral hogs, cats, and dogs occur in the Charlotte Harbor area.

Public Use

Public use of the waterways includes pleasure boating, jet-skiing, water-skiing, commercial and recreational fishing, waterfowl hunting, canoeing, and kayaking. Upland recreation includes camping, hiking, bird watching, bicycling, upland game hunting (squirrel, rabbit, deer, hog), and off-road vehicle use. Adverse boating impacts include propeller scarring and dredging of seagrass beds, manatee collisions, and disturbance of nesting, feeding, loafing, and roosting shorebirds and wading/water birds. Off-road vehicle use in scrub and hydric pinelands can lead to destruction of rare and endemic plant and animal species.

Wetland Protection

The Southwest and South Florida Water Management Districts are acquiring land throughout the major watersheds of this area (Peace, Myakka, and Caloosahatchee Rivers). The Charlotte Harbor National Estuary Program (CHNEP) (1996) is identifying historic, current, and future threats to the local watersheds and will develop a management plan to address these threats. Phosphate mining near the headwaters of the Peace River is degrading historic marshes, streams, and drainages – requiring extensive restoration by the mining companies. Residential and tourist-related development of coastal and riparian zones is destroying or eliminating functioning wetland systems.

Water Quality

Surface and ground water quality problems in the Charlotte Harbor watersheds include pollution from agricultural and urban runoff, point source discharges, and septic tank system loadings. Freshwater releases from Lake Okeechobee through the Caloosahatchee River reduce salinities in the lower Charlotte Harbor system. Large fuel oil barges regularly travel between the Boca Grande storage tanks and the Florida Power and Light Company plant on the Caloosahatchee River. A major fuel oil spill would contaminate Pine Island Sound, lower Charlotte Harbor, Matlacha Pass, and the lower Caloosahatchee River, significantly degrading or destroying the mangrove forests, seagrass beds, and associated fauna. Phosphate mining operations along the upper Peace River have increased phosphate loads. Increased development along the Estero River watershed has increased urban runoff into Estero Bay.

Contaminants

Water quality contaminants affect the Charlotte Harbor estuary and surrounds. Mosquito control in this area involves the use of larvicide on federal and state lands and adulticide in other areas. The effects of these chemicals on non-target fauna need further analysis. Additionally, mercury contamination of aquatic and upland animals has been documented in southwest Florida. The source of this contamination needs to be identified.

Habitat Loss

Western Lee and Charlotte Counties have undergone extensive habitat loss and fragmentation due to residential and tourist-related development. Along the Peace River, phosphate mining radically degrades habitat, and, even when restored, questions remain about the comparable value of the restored habitat versus “natural” areas. Extensive acreage of citrus groves in the eastern portion of these counties creates biological deserts with little or no wildlife value. Former native rangeland is being converted to

residential communities. Development, cumulative impacts of docks and boats, and the invasion of exotic species have degraded and/or eliminated coastal and interior wetlands and upland scrub and pine habitats.

Coastal The effects of high volume freshwater releases from the Caloosahatchee River on salinities and nutrient levels needs to be evaluated. Australian-pines along the shoreline adversely affect sea turtle and shorebird nesting areas. Due to the public popularity of these trees, removal of Australian-pines will be controversial and will require extensive public education. Beach renourishment and armoring can alter coastal habitat and adversely effect the fauna (e.g., sea turtles) dependent on them.

Lack of Knowledge Additional research is needed on the water quality and contaminant problems. Water and wading bird nesting and roosting sites need to be inventoried and monitored regularly. Mercury levels need to be closely monitored and sources identified.

Public Attitudes There is substantial public support for acquisition of conservation lands in this area. Lee County voters passed a dedicated property tax referendum in November 1996 to purchase environmentally sensitive lands. However, negative attitudes toward regulating boating speed in critical manatee areas has hampered manatee protection. Additionally, local politicians tend to support increased residential and commercial development for economic reasons. Also, the general public has little knowledge of the problems caused by invasive exotic plants. Consequently, public support for the control of these nuisance species is often lacking.

Air Quality The Florida Power and Light Company has a large petroleum-fueled electric generating plant on the Caloosahatchee River that produces air emissions. A trash incinerator in east Lee County also produces air emissions that need to be monitored as a possible source of mercury contamination.

Land Use Urbanization of former agricultural areas, high density residential development of coastal areas, construction of golf courses, and conversion of native rangeland to citrus groves and winter vegetable farms are some of the threats to maintaining a functional ecosystem in this area.

Fire Regime Residential development within pine flatwoods has created hazardous wildfire interface conditions. To complicate fire management, prescribed burning near residential communities is becoming more unpopular.

Law Enforcement The full scope of law enforcement activities should be performed to eliminate the unlawful take of migratory birds, threatened and endangered species, and other native wildlife and plants.

E. Big Cypress Basin, including Ten Thousand Islands and the Corkscrew Regional Ecosystem Watershed (CREW)

The Big Cypress subregion includes all of Collier and portions of Lee, Hendry, and Monroe Counties. The more than 1,009,000 acres of connected wetlands feature the CREW, Corkscrew Swamp, Camp Keais Strand, Okaloacoochee Slough, Fakahatchee and Picayune Strands, Belle Meade, and a major portion of Big Cypress National Preserve. The system encompasses mostly cypress, pine, and hardwood forests, as well as prairies and sloughs that drain into the Ten Thousand Islands and Rookery Bay estuarine systems.

1. Issues

Exotics There are approximately 45 plant species of concern, including *Melaleuca*, Brazilian pepper, Australian-pine, downy rosemyrtle, cogon grass, Old World climbing fern, Eurasian water milfoil, water hyacinth, water lettuce, hydrilla, and other invasive aquatic vegetation.

Public Use Problems exist with airboating and wildlife poaching in the Ten Thousand Islands, off-road vehicles in Big Cypress National Preserve, and disturbance of archaeological sites and wading bird colonies in these areas.

<i>Wetland Protection</i>	Land conversion to agriculture is degrading water quality and impacting hydroperiods. Efforts are underway by land conservation organizations to acquire sensitive wetlands and restore hydroperiod. The Belle Meade and South Golden Gate Estates areas are examples.
<i>Water Quality</i>	Discharge to Ten Thousands Islands NWR has been drastically altered in terms of location and volume. Rainfall is being flushed too quickly and groundwater recharge is not occurring. Former sheetflow in the Golden Gate Estates area has been channelized, eliminating waterfowl from this area. Overpumping is being conducted in the “normal” dry season, and agricultural runoff is suspected of degrading water quality in sensitive wetlands.
<i>Contaminants</i>	Mercury contamination has been documented in the Florida panther. Chemical endocrine disrupters in the environment are also potentially detrimental to the panther. Other concerns include mosquito spraying in western Collier County and agricultural runoff.
<i>Habitat Loss</i>	A significant portion of Collier County’s natural lands have been protected; however, threats to strategic habitat corridors, buffer areas, identified panther habitat, and the watersheds still exist. Further losses can be expected west of I-75 to urban development — development associated with the new Gulf Coast University, expansion of the Southwest Florida Airport, and conversion to agriculture north of Alligator Alley.
<i>Coastal</i>	Monitoring of natural resource areas is needed on Marco Island, Marco Shores, Hoor’s Island, Keewadin Island, and Ten Thousand Islands NWR, to determine effectiveness and protection and restoration effects.
<i>Lack of Knowledge</i>	More information is needed on water quality, quantity, optimal hydropattern, and groundwater recharge. Baseline data on inventories of flora and fauna, and coordination of existing information are also needed. Wood stork populations are declining; information on bioenergetics and other data are needed for recovery. More information on population numbers, habitat use, and relation to the core population is needed for the panthers in the CREW and on private lands.
<i>Public Attitudes</i>	The public seems to lack appreciation for southwest Florida, and there seems to be a pro-development attitude in Lee and Collier Counties.
<i>Air Quality</i>	An incinerator and a generator in Lee County may be causing mercury contamination in this area.
<i>Land Use</i>	The major concerns are increased urbanization, development of golf courses, conversion of habitat to agriculture, and water quality and quantity.
<i>Fire Regime</i>	Conflicts are anticipated because of expansions of residential areas.
<i>Law Enforcement</i>	The full scope of law enforcement activities should be performed to eliminate the unlawful take of migratory birds, threatened and endangered species, and other native wildlife and plants. Airboating and poaching in Ten Thousand Islands, off-road vehicles in Big Cypress National Preserve, disturbance of archaeological sites, and disturbance of wading bird colonies are law enforcement problems requiring attention.

F. Florida Keys, including Florida Bay and the Reef Tract

The Florida Keys subregion, including Florida Bay and the coral reef tract, is located in Monroe County at the foot of the Everglades and South Florida. It consists of almost 200 miles of subtropical islands surrounded by the Gulf of Mexico and Florida Bay to the west and Atlantic Ocean and reef tract to the southeast. This unique area began forming 100,000 years ago when the sea level was 25 feet above its present level and covered the Florida Keys. Along this submerged platform, coral reefs developed in a band from present day Miami to the Dry Tortugas. Fossil remnants of reef organisms form the exposed limestone bedrock of today’s Middle and Upper Keys. What has evolved is a combination of marine and tropical

upland habitats that support a wealth of biological diversity and habitats, some found nowhere else in the world.

Ecologically, the Florida Keys represent a truly unique vestige of the natural heritage of the U.S. The climate is tropical and the Keys contain the U.S.'s northernmost stands of plant communities dominated by species native to the West Indies. Because of the geographic isolation of the Keys, there are numerous endemic plants and animals. There are four identifiable natural community types of primary importance in the Keys: freshwater wetlands, hardwood hammocks, mangrove wetlands, and pine rocklands; all four are found on refuge lands. These four community types are habitat for almost every one of the terrestrial endangered species found in the Keys.

Freshwater wetlands, the rarest of the four, are confined to less than 700 acres in the lower Keys, of which a small percentage lie within refuge boundaries. This lowland habitat type provides freshwater for animal life found on the refuges. The uplands of the Florida Keys harbor disappearing tropical habitats such as the West Indian hardwood hammocks and pine rocklands. Of approximately 8,300 acres of Keys hardwood hammock, over 7,500 acres are unprotected. There are more than 120 species of hardwood trees, shrubs, and plants that grow in these unique, dense uplands. Only about 1,000 acres of an estimated 2,250 acres of pine rocklands are protected.

Shoreline habitats, such as mangrove wetlands, transitional wetlands, and beach habitats are also found in this region. These habitats are all critical nursery areas for aquatic life and shelter the coasts from erosion. Over half the acreage in the three Lower Keys refuges is vegetated by red and black mangroves. Mangrove wetlands are excellent filters of runoff and are found along coastlines and in transitional wetlands. Mangrove communities produce much of the essential nutrients to support the organisms comprising the low end of the food chain, provide nursery areas for many commercially valuable fish, including interjurisdictional species such as snook, tarpon, ladyfish, gray snapper, sheepshead, red drum, and spotted seatrout, and support both large and small food webs. In addition, other interjurisdictional fish species are found in the mangrove zone such as crevalle jack, jewfish, sharks, gag grouper, nassau grouper, lane snapper, dog snapper, sand seatrout, black drum, spot, and Atlantic croaker, as well as pink shrimp.

The Florida Keys' coral reef tract is one of the world's major barrier reefs. It extends the length of the Keys, from Biscayne Bay to the Dry Tortugas and not only provides aesthetic value, but shelter and food for an amazing diversity of animals and plants, as well as economic value through tourism. The shallow waters of Florida Bay, in particular, contain seagrass beds that are vital to the fish and aquatic life there.

1. Issues

Exotics

Species of concern include Brazilian pepper, *Melaleuca*, Australian-pine, Asiatic colubrina, leadtree, knickerbean, and non-native grasses. In Great White Heron and Key West NWR's, much of the affected area is on offshore islands where treatment is difficult. Much of the exotic vegetation on the highway connecting the Keys lies on private property, which makes treatment problematic. Recent survey efforts concluded that 493 acres of the National Key Deer Refuge, Great White Heron NWR, and Key West NWR lands were infested with exotic vegetation. Feral hogs are also present on Little Pine Key. Feral cats are the primary predators of the endangered Lower Keys marsh rabbit. Imported fire ants attack young sea turtles and endangered endemic rodents. Black rats may eat the young of endangered rodents and outcompete them for habitat.

Public Use

The carrying capacity of specific areas needs to be addressed. The high level of public use throughout all of the Keys (uplands, Florida Bay, reef tract) is the source of many other critical issues. Many problems are associated with illegal uses and commercial use particularly in the backcountry islands. Beach use causes disturbance to shorebirds and damages their loafing and feeding areas. Personal watercraft use,

recreational fishing, parasailing, diving, and snorkeling continue to be increasing problems.

Wetland Protection

There has been substantial restoration of wetlands, such as the Harrison Tract at Crocodile Lake NWR and Port Pine Heights Mitigation Project within the National Key Deer Refuge. The potential for these areas to be hydrologically flushed needs to be restored. Freshwater areas are critical for mammal species. Invasion of exotic vegetation in the restoration areas is a problem. Saltwater wetlands are important nursery areas for reef fish and feeding and roosting areas for wading birds. Although restoration of some areas is underway, much more is needed, such as filling of mosquito ditches and unused canals. Wells associated with residential development are lowering the freshwater lens, making this water unavailable to wildlife and subject to saltwater intrusion.

Water Quality

This area is affected by nearshore water quality issues of Florida Bay and the Keys reef tract. Alterations of historic water flow through this subregion create water quality problems ranging from loss of seagrass in Florida Bay to coral die-off in the sensitive reef tract. Hydrologic flushing of this area needs to be restored. Nearshore water quality is impacted by nutrient loading from upstream and local sources. Sewage treatment plants, septic tanks, cesspits, and live-aboard vessels represent the most common and widespread sources of pollution and water quality degradation in the Florida Keys. Boaters in shallow waters and divers stir up the sediments.

Contaminants

Mosquito spraying may be harming insect populations in North Key Largo, such as the endangered Schaus swallowtail butterfly. Possible water table contamination from a landfill inholding at Crocodile Lake NWR may be a problem. Lead from firearm ranges is also a known contaminant.

Habitat Loss

The primary threats to habitats in the Florida Keys' uplands are development, fragmentation by infrastructure, and invasion of exotic vegetation. Wetland restoration is helping to reverse existing habitat loss. In the Crocodile Lake NWR, loss of adjacent tropical hardwood hammock habitat for residential purposes is the largest problem. Loss of seagrass in Florida Bay and coral die-off in the reef tract are also problems associated with commercial and public uses.

Coastal

Some natural erosion has been exacerbated by human use and boat wakes, particularly on backcountry islands.

Lack of Knowledge

More information is needed on the carrying capacity for use of these areas, particularly for commercial use. Information is also needed on the extent of exotic plant invasions and the role of fire in pine rocklands. Baseline data for water quality and faunal and floral inventories are also needed.

Public Attitudes

This is a major problem for this area because there is pressure to use these areas in a traditional but non-compatible manner. Several other issues include resentment over any government regulation, a lack of appreciation for the natural resources, and little sense of stewardship.

Air Quality

This is not believed to be an issue as there are no major industries.

Land Use

The primary problem is increased human population growth, with its subsequent residential and associated commercial development and landfill activities. In the backcountry waters and coral reef communities, a primary problem is increased competition for support and space between species, including humans, and the resulting damage and problems.

Fire Regime

The interruption of natural fire patterns is a serious problem in the pine rockland community. More information is needed on the natural cycle of fire in pinewoods, which has been suppressed in many areas due to nearby developments. This leads to a buildup of fuel, increasing the likelihood of more destructive fires.

Law Enforcement

The full scope of law enforcement activities should be performed to eliminate the unlawful take of migratory birds, threatened and endangered species, and other native wildlife and plants. Traffic enforcement and prevention of illegal feeding of Key deer are critical to the survival of this species.

G. Upper East Coast

The Upper East Coast region, which includes Okeechobee, St. Lucie, and Martin Counties, covers over 1,100 square miles and has an average elevation of 20 feet. The regional climatic conditions include average seasonal temperatures ranging from 64° to 81° F and an average annual rainfall of 51 inches, with 72 percent of the annual rainfall occurring during the May to October wet season.

The region is characterized by three east-to-west physiographic zones: (1) the Atlantic Coastal Ridge, (2) the Eastern Valley, and (3) the Osceola Plain. The Atlantic Coastal Ridge, made from relict beach ridges and sand bars, parallels the east coast and varies in width from several hundred feet to several miles. Ranging in elevation from sea level to 86 feet, the ridge contains most of the urban population in the region. The Eastern Valley, approximately 30 miles in width and 15 to 30 feet in elevation, contains most of the freshwater wetlands (shallow lakes and marshes) in the region. Agriculture is the predominant land use in the valley and the Osceola Plain (which runs through western St. Lucie and Martin Counties at an average elevation of 40 feet). A wide variety of natural vegetative communities exist throughout the region, including coastal dunes, coastal strand, maritime forest, oak scrub, hardwood hammock, and pine flatwoods. Hobe Sound NWR contains many of these habitats.

The region also encompasses the Indian River Lagoon, the St. Lucie Estuary, and the drainage basins for the C-23, C-24, C-25, and C-44 canals. The Lagoon is a linear estuarine system that encompasses more than a third of Florida's east coast. The system extends 156 miles from Ponce de Leon Inlet in Volusia County south to Jupiter Inlet in Palm Beach County. The Indian River Lagoon contains more species than any other North American estuary due to a combination of climatological and physiographical features that occur nowhere else. The Lagoon is located in a zone where tropical and temperate climates meet; thus, the floral and faunal species that prefer a warmer climate overlap with those species that tolerate cooler weather. The St. Lucie Estuary connects a 775-square mile watershed with the Lagoon and the Atlantic Ocean.

Wetland habitats are a vital component for the biodiversity of the region. Numerous freshwater wetlands and streams progress into riverine systems and saltmarshes that are connected directly to the Indian River Lagoon. The combination of freshwater and saltwater wetlands, mangrove communities in particular, contribute valuable cover, foraging areas, and reproductive habitats for many fish and wildlife species. Submerged aquatic vegetation, consisting of both seagrasses and algae, is another biologically rich community that supports much of the lagoon's biodiversity. Submerged aquatic vegetation performs numerous functions, such as stabilization of sediments, prevention of resuspending particulate matter, and affording refuge for juvenile fish and invertebrates while providing foraging opportunities for larger predators. With seven species present, the diversity of seagrass in the lagoon is greater than that found in any other coastal estuary nationwide. Seagrasses are also a critical resource for the West Indian manatee, a marine mammal that depends on them for a major part of its food supply. Juvenile green sea turtles also forage on seagrasses in the Lagoon.

1. Issues

Exotics

Exotic plant pests include *Melaleuca*, Brazilian pepper, Australian-pine, and inkberry. Australian-pine on the coastal beaches interferes with sea turtle nesting. Exotic animal pests include feral hogs, stray/feral cats, armadillos, and fire ants.

Popular activities include beach use, boating, recreational and commercial.

<i>Public Use</i>	fishing, aquaculture (clam farming), shellfish harvesting, fisheries stock enhancement, camping, and hiking. Threats include residential and commercial development, lack of non-destructive public access across dunes to beaches, presence of docks and marinas, and lighting along the beaches during sea turtle nesting season.
<i>Wetland Protection</i>	Land acquisition is needed to protect wetlands. Major threats to wetlands include residential and commercial development (dredge and fill), as well as the alteration of mangroves (trimming and/or removal).
<i>Water Quality</i>	The primary threats to water quality include saltwater intrusion, timing and volume of freshwater discharges, point source loadings from wastewater treatment plants and industrial discharges, stormwater runoff, agricultural runoff, and nonpoint source loads dispersing from septic tanks.
<i>Contaminants</i>	Untreated sewage, as well as elevated concentrations of copper, lead, and zinc, are found in sediments in the Lagoon. Also of concern are the release of carbon monoxide, carbon dioxide, and hydrocarbons from the fuel exhaust of boats. Mercury is prevalent in some freshwater wetlands in the region. Contaminants may play a role in the occurrence of fibropapillomas on green sea turtles.
<i>Habitat Loss</i>	Residential and commercial development are the primary contributors to the loss and fragmentation of all habitat types within the region. Corrective actions include reconnecting mosquito impoundments to the Lagoon to increase the fisheries habitat and enhancing the foraging habitat for wading birds.
<i>Coastal</i>	Beach renourishment and armoring can alter coastal habitat and adversely affect the fauna (e.g., sea turtles) dependent on them.
<i>Lack of Knowledge</i>	More information is needed on beach mouse biology, ecology, and distribution; effectiveness of fishery replenishment zones (sanctuaries); effectiveness of manatee speed zones; migratory bird populations in the region; and the causes of the green sea turtle fibropapilloma disease.
<i>Public Attitudes</i>	Several issues include the public's opposition to the manatee speed zones, resistance to protecting habitat for Florida scrub-jays and red-cockaded woodpeckers, and the desire to alter mangrove-fringed shorelines.
<i>Air Quality</i>	Information is needed on the potential effects of power plants, resource recovery units, and incinerators within the region.
<i>Land Use</i>	The primary force driving residential and commercial development in the region is the growing human population. A concurrent increase in the demand for recreational facilities, such as golf courses and marinas, exacerbates the effects of development.
<i>Fire Regime</i>	Fire is an important requirement for the adequate management of public lands, such as Jonathan Dickinson State Park and the Hobe Sound NWR.
<i>Law Enforcement</i>	The full scope of law enforcement activities should be performed to eliminate the unlawful take of migratory birds, threatened and endangered species, and other native wildlife and plants.

H. Lower East Coast

The Lower East Coast region consists of the eastern parts of Palm Beach, Broward, and Dade Counties. It contains the highest human population concentration in Florida. The Atlantic Coastal Ridge, rising to 36 feet above sea level and ranging from 2 to 10 miles wide, is the dominant topographic feature. This limestone ridge parallels the coast and historically kept the Everglades' water from flowing freely to the ocean. Occasional breaks in the ridge (in the form of rivers, springs, and transverse glades) historically allowed water to flow from the Everglades to the ocean during the wet season. Currently, canals have replaced the rivers, levees have blocked the flow, and the water table has been reduced enough to suppress the springs. The ridge habitats include hardwood hammocks, sand pinelands, and oak scrub.

Very little native vegetation remains because of development and exotic plant infestations, although the ridge contains a high number of endemic and listed plant species.

Most of the coast is protected by barrier islands, separated from the mainland by waterways and mangrove-lined lagoons. These islands, as well as the sandy beaches off the mainland, are traditional nesting areas of loggerhead, green, and leatherback sea turtles. Beachfront property is prime real estate for hotels and condominiums, leading to the deterioration of the nesting beaches and the coastal scrub habitat.

Biscayne Bay is a 40-mile-long subtropical lagoon in Dade County. Most of it is included within Biscayne Bay National Park and is thus largely protected. However, contamination from a nearby landfill, heavy boating and fishing traffic, and destruction of the mangroves that line the bay have contributed to the reduced health of the bay. Lake Worth is a 20-mile-long lagoon that receives Everglades water through the West Palm Beach Canal. Pulsed flushes of turbid freshwater disrupt the biotic balance of the lagoon; also heavy boating traffic and dense shoreline development with consequent urban runoff seriously impact lagoon health.

A wetland corridor still exists in the Loxahatchee Slough and River area. The river is relatively pristine and is the only federally designated Wild and Scenic River in Florida. The area is contiguous with the J.W. Corbett Wildlife Management Area, the Dupuis State Forest Reserve, and West Palm Beach's Water Catchment Area.

Agriculture is a major industry in the Lower East Coast, particularly in the parts of Palm Beach and Dade Counties west of the ridge. Citrus, vegetables, nursery plants, and sugarcane are important crops. Water control is necessary to keep fields from flooding and keep them irrigated as necessary. Rock mining is an important industry in the region, particularly in Broward and Dade Counties. Much discussion has occurred regarding using the retired quarries for water storage.

Water supply is a major issue in the Lower East Coast region, as such the SFWMD is developing a water supply plan. More than four million residents must be supplied with potable water and farmers must irrigate their crops; yet to keep enough water stored for these uses in the Everglades would risk damage to the ecosystem or increase possible flooding of residents during storms.

Most of the exotic plant and animal pests in Florida were originally introduced into the Lower East Coast region, partly because Miami and Ft. Lauderdale are primary ports of entry, partly because of the thriving pet-trade industry, and partly because the climate is conducive to their survival. *Melaleuca*, air-potato, tilapia, oscar, and various lizards are some examples. Both plant and animal species are further liberated into the environment by hurricanes.

1. Issues

Exotics

A state or federal policy regulating the importation of exotic species into the state is needed to reduce the arrival of alien plants and animals into Miami and Ft. Lauderdale. The U.S. Department of Agriculture quarantine facility in Ft. Lauderdale should be both federally and state funded. Dade, Broward, and Palm Beach Counties should coordinate the control of exotic plants.

Public Use

Tourism is one of the largest contributors to the economy. Recreational saltwater fishing and boating, water-skiing, and beach visitation are major activities, drawing tourists from around the world. Boating conflicts with the protection of manatees. The beaches of Miami and Ft. Lauderdale are among the most crowded in the state, which interferes with nesting sea turtles. "Lights out for turtles" programs, which benefit hatching sea turtles, have not been successful enough; better cooperation is needed by beachfront owners.

Wetland Protection Many of the original wetlands have been drained and those remaining must be protected. The wetland system of the Loxahatchee Slough/Loxahatchee River needs greater protection with buffer areas. Mangroves along the Lake Worth Lagoon, Biscayne Bay, and so on need stringent protection from cutting. Water supply, which has been coming primarily from neighboring wetlands, should be evaluated for more efficient methods of re-use. Water supply is a serious problem now and will increase in severity with increasing population pressures, especially since the demand for water is highest during the dry season. Solutions must be found to provide clean water for human use without shortchanging the environment.

Water Quality Water that is pumped from urban parts of the Lower East Coast into the Everglades, such as the S-9 Basin in Broward County and the smaller water control districts, should be free of excess nutrients, pesticides, and other contaminants prior to discharge. Water managers must keep coastal groundwater at a level that prevents salt water intrusion. Agricultural operations in Dade and Palm Beach Counties also contribute contaminants to surface water and groundwater. Best Management Practices are being considered for the prevention of excess contaminants arising from urban and agricultural stormwater sources near the Everglades under the initiative of the Southern Everglades Restoration Alliance. Mercury has been found in popular fishing lakes. Rock mining in all three counties contributes to disturbance of the groundwater.

Contaminants Airborne contaminants are present from motor vehicle exhaust and incinerators. Pesticides, fertilizers, and heavy metals are present in the surface waters and sediments. Mosquito spraying is also conducted.

Habitat Loss Substantial areas of former Everglades have been converted to uplands by drainage. Historically, in wet years, standing water could often be found east to the Atlantic Coastal Ridge. The ridge has also lost substantial land, although this is due to development. The ridge contains ecologically valuable scrub habitat, and very little remains, particularly in Dade and Broward counties. Emphasis should be placed on preserving the remaining coastal scrub for such species as Florida scrub-jays and gopher tortoises. Restoration of drained wetlands should also be emphasized.

Coastal Residential and commercial development along the coast has made this area extremely vulnerable to damage by tropical and winter storms. Armoring of coastlines interferes with sea turtle nesting. Construction along the remaining undeveloped beaches should be minimized or prohibited to reduce potential losses of life or property and to protect coastal wildlife. Beach renourishment projects become necessary when the natural movement of sand is prevented; these projects can alter coastal habitat and adversely affect the fauna (e.g., sea turtles) dependent on them. Pulsed freshwater discharges from the West Palm Beach, Hillsboro, North New River, and Miami Canals disrupt the natural balance of the estuaries and lagoons and should be minimized.

Lack of Knowledge More information is needed on the role of incinerators in local contamination, on methods of re-using and storing water, on the effect of coastal development on sea turtle populations, on environmentally-friendly methods of beach protection, on the role of rock mines on groundwater, on habitat restoration of fire-adapted habitats without using fire, and on methods to protect the subregion's endangered species.

Public Attitudes Attitudes are extremely dichotomous in the Lower East Coast area, due to the unusual proximity of urban dwellers, farmers, fishermen, tourism, environmentalists, low income families, and high income families. The area includes many foreigners, both tourists and residents, who may be unfamiliar with the local problems. This may also be true of the many people who retire here from other states. The popularity of managed communities (e.g., retirement villages, gated communities, and condominiums) has caused large population centers to place more responsibility on fewer leaders (e.g., officers on a condominium's board) and less on themselves. Some of the wealthiest communities in the country are in the Lower East Coast, and their influence is significant. Any issue

proposed for public comment is likely to attract a wide variety of positions and will not likely be easily resolved. Water supply and flooding issues are two of the most contentious ones, as well as crime and rampant development.

Air Quality

Since the counties have failed to meet federal air quality standards, all passenger vehicles in the three counties are required to comply with exhaust standards. Local incinerators are suspected to be the source of some of the mercury in the Everglades.

Land Use

Land use planning to protect and buffer pristine areas is critical. The increased population pressure on this region is staggering. Currently, more than 30 percent of Florida's residents live in the tri-county area, and the population is expected to increase exponentially. Population control is needed so that planning can keep pace with growth. Agricultural operations should be encouraged to continue, because these lands will assist with groundwater recharge and buffering of pristine areas. However, farmers should emphasize Best Management Practices.

Fire Regime

Fire is an integral part of the pinelands and oak scrubs. Due to the proximity of undeveloped lands to developed lands, naturally-caused fires are rarely allowed to burn and prescribed burns are rarely permitted. Subsequently, other methods of accomplishing the function of fire should be utilized.

Law Enforcement

The presence of two of the largest ports of entry in the southeastern U.S. (Ft. Lauderdale and Miami) opens the door for a multitude of illegal activities, including ones that spread to neighboring subregions. The proximity of these ports to remote locations (the Everglades and coastal waters) facilitates activities such as wildlife and drug trading and illegal immigration. This subregion has the highest crime rate in Florida. Wildlife-human interactions (e.g., "nuisance" alligators) are common. Due to the overwhelming caseload, law enforcement officers must prioritize and overlook some incidents. Additional support for law enforcement activities is essential for protecting the remaining resources of the area.

