

## About Southeast Florida Coral Reefs

Florida's coral reefs came into existence 5,000 to 7,000 years ago when sea levels rose following the last Ice Age. Reef growth is extremely slow; an individual colony grows 1/2 inch to 7 inches (1 cm to 18 cm) a year, depending on the species. Stony corals are the major reef architects. Polyps, the living portion of corals, extract calcium from seawater and combine it with carbon dioxide to construct the elaborate limestone skeletons that form the reef backbone.

Though corals are classified as animals, microscopic plants live within the animal tissues in a symbiotic relationship. The animals benefit from the energy that the plants provide through photosynthesis. The plants are protected within the coral tissues and gain nutrients from the animal's wastes. Coral reefs create specialized habitats that provide shelter, food and breeding sites for numerous plants and animals. They are the basis for a dynamic ecosystem with tremendous biodiversity.

Coral reef development occurs only in areas with specific environmental characteristics: a solid structure for attachment; warm water temperatures; clear waters low in phosphate and nitrogen nutrients; and moderate wave action to disperse wastes and bring oxygen and plankton to the reef. Most of Florida's sport fish species and many other marine animals spend significant parts of their lives around coral reefs.

Southeast Florida's reefs form the northern extension of the Florida reef tract. Generally, the reefs occur in a series of one to three discontinuous reef lines (terraces) that parallel the shoreline, extending north from Miami-Dade County to Martin County. Different reef organisms characterize the type of habitats found along southeast Florida reefs, typically transitioning from a cover of algae and small octocorals nearshore to numerous octocorals and varied hard coral populations at the outer reefs. The various reef architectural and compositional components create an environment that is ecologically diverse and productive; one that supports all of the other aquatic plants and animals that make southeast Florida reefs their home.

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### ***Southeast Florida Coral Reef Initiative Vision Statement***

To develop an effective strategy to preserve and protect southeast Florida's coral reefs and associated reef resources, emphasizing balance between resource use and protection, in cooperation with all interested parties.

## Program Partners

The Southeast Florida Coral Reef Initiative was developed through the collaborative effort of many government agency, non-government organization, university and private partners representing:

- Biscayne National Park
- Broward County Audubon Society
- Broward County Environmental Protection Department
- Broward County Extension Education / University of Florida IFAS
- CCI Consulting Engineers Inc.
- Coastal Planning and Engineering Inc.
- Coastal Systems International
- College of Charleston
- Cry of the Water
- Diving Equipment and Marketing Association
- Environmental Defense
- Florida Department of Environmental Protection
- Florida Fish and Wildlife Conservation Commission
- Florida International University
- Florida Keys National Marine Sanctuary
- Florida Outdoor Writers Association
- Florida Sea Grant
- Florida Sportsman Magazine
- Greater Fort Lauderdale Diving Association
- Harbor Branch Oceanographic Institute
- International Game Fish Association
- Lighthouse Point Saltwater Sportsman Association
- Marine Industries Association of Florida
- Martin County
- McMaster University
- Miami-Dade County Environmental Resources Management
- National Coral Reef Institute at Nova Southeastern University
- National Oceanic & Atmospheric Administration
- Ocean Engineering
- Ocean Watch Foundation
- PADI Project Aware
- Palm Beach County Department of Environmental Resources Management
- Port Everglades
- Port of Miami
- Port of Palm Beach
- Reef Environmental Education Foundation
- Smithsonian Institute Marine Station
- South Florida Diving Headquarters
- South Florida Water Management District
- Tetra Tech
- The Nature Conservancy
- The Ocean Conservancy
- Tropical Audubon Society
- University of Georgia
- University of Miami
- University of North Carolina, Wilmington
- University of South Florida
- U.S. Army Corps of Engineers
- U.S. Coast Guard/Marine Safety Office
- U.S. Department of Agriculture/Natural Resources Conservation Service
- U.S. Environmental Protection Agency
- U.S. Geological Survey
- Vone Research

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## Florida's Local Action Strategy

In 1998, the United States Coral Reef Task Force (USCRTF) was established by Presidential Executive Order #13089 to lead efforts to preserve and protect coral reef ecosystems. The USCRTF is comprised of representatives from federal, state, territorial and commonwealth agencies responsible for various aspects of coral reef conservation. During the eighth meeting of the USCRTF, held in Puerto Rico in 2002, the *Puerto Rico Resolution* was adopted, calling for the development of Local Action Strategies (LAS) by its member agencies. These LAS are three-year, locally-driven roadmaps for collaborative and cooperative action among agency and non-governmental partners which identify priority actions needed to reduce key threats to coral reef resources.

### **SOUTHEAST FLORIDA CORAL REEF INITIATIVE: Florida's Local Action Strategy**

The state of Florida contains a substantial portion of the United States' coral reef ecosystems and is committed to the preservation and protection of the biodiversity, health, heritage, and social and economic value of coral reef ecosystems and the marine environment. With guidance from the USCRTF, the Florida Department of Environmental Protection and the Florida Fish and Wildlife Conservation Commission coordinated the formation of a team of interagency marine resource professionals, scientists, non-governmental organizations and other interested stakeholders. The Southeast Florida Coral Reef Initiative (SEFCRI) Team first gathered to develop a LAS in May 2003, targeting coral reefs from Miami-Dade County, through Broward and Palm Beach, to Martin County. This region was chosen because its reefs are close to an intensely-developed coastal region, with a large and diverse human population. Even though local reefs are exhibiting the same signs of degradation that have been documented in other parts of the world, prior to development of the SEFCRI, there was no coordinated public education or management plan proposed for reefs located north of the Florida Keys.

The SEFCRI Team is divided into four subteams, each focusing on one of four recognized threats to local reefs: a lack of public awareness and appreciation; impacts associated with fishing, diving and other uses; land-based sources of pollution; and, maritime industry and coastal construction impacts. From May 2003 through November 2004, many stakeholders participated in the development of Florida's LAS through the use of a facilitated process, including public review and input.

The SEFCRI is intended to be a flexible, living process that evolves in response to the state of the coral reef ecosystem and the progress of implemented projects. Although the projects included in the LAS would ideally be completed within a three-year period, it is recognized that project implementation and success is dependent on securing appropriate levels of support.

#### **More information is available from:**

<http://www.dep.state.fl.us/coastal/programs/coral>

<http://www.southeastfloridareefs.net>

<http://www.coralreef.gov>

<http://www.coralreef.noaa.gov>

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## Economic & Social Benefits of Southeast Florida Reefs

In addition to supporting a diverse assortment of marine life, coral reefs drive an important economic engine in southeast Florida. Reefs support a thriving tourism industry, as well as recreational and commercial fisheries, and provide shoreline protection. The economic benefits derived from coral reefs decline when reefs are negatively impacted by human activities. Recent studies have revealed the following:

- In southeast Florida, 28 million person-days are spent using natural and artificial reefs annually<sup>1</sup>. (A person-day is defined as one person participating in an activity for a portion or all of a day.)
- Reef-related expenditures generate \$1 billion in income to Broward County and sustain 36,000 jobs annually<sup>1</sup>.
- Reef-related expenditures generate \$614 million in income to Miami-Dade County and sustain 19,000 jobs annually<sup>1</sup>.
- Reef-related expenditures generate \$194 million in income to Palm Beach County and sustain 6,300 jobs annually<sup>1</sup>.
- Reef-related expenditures generate \$5.8 million in income to Martin County and sustain 182 jobs annually<sup>2</sup>.
- Reef-related expenditures generate nearly \$4 billion dollars in sales in the southeast Florida region annually<sup>1</sup>.
- Florida's commercial fishing fleet brought in \$180 million worth of seafood in 2002. Coral reef ecosystems provide nursery habitat for important recreational and commercial fisheries<sup>2</sup>.
- Recreational boating employs 110,000 people in Broward County and nearly 7,000 people in Palm Beach County<sup>3</sup>.
- Each meter of reef is estimated to protect \$47,000 in property values by mitigating the effects of coastal erosion and storms<sup>4</sup>. It has further been estimated that the cost of destroying 1 kilometer of coral reef ranges from \$137,000 to over \$1 million over a 25-year period when taking into account the benefits derived from fisheries, shoreline protection and tourism<sup>5</sup>.

Southeast Florida reefs have the potential to provide many additional social benefits. Scientists are isolating and using fluorescent proteins found in coral to study biological processes associated with AIDS, Alzheimer's disease, cancer, and other diseases<sup>6</sup>. Other coral compounds are being studied in an effort to develop medicines to combat serious diseases like cancer. More recently, corals have been used for bone grafting<sup>7</sup>. Corals are also credited with removing, fixing and recycling atmospheric carbon dioxide, excessive amounts of which contribute to global warming.

### References

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## Southeast Florida Reef Conservation Tips for Everyone

**Educate yourself, stay informed and spread the word.** Participate in training or educational programs that focus on reef ecology. Find out about existing and proposed laws, programs, and projects that could affect coral reefs. When you further your own education, you can help others understand the fragility and value of the world's coral reefs. Share your knowledge with others.

**Be an informed consumer.** Only buy marine fish and other seafood when you know they have been collected in an ecologically sound manner. Ask store managers where their seafood comes from and how it was collected. Find out if the exporting country has a management plan to insure the harvest was legal and will be sustainable over time. Check out the Monterey Bay Aquarium Seafood Watch website for more information: <http://www.mbayaq.org/cr/seafoodwatch.asp>

**Be a smart consumer.** Shells and coral found in stores were once part of living animals on a reef. These animals are usually destroyed to create the products made with shells and coral. If you purchase aquarium fish or corals, make sure they are native to your area and aquaculture-raised and harvested. Non-native invasive marine animals and plants can be accidentally introduced into the environment, disrupting the natural balance of the reef ecosystem. Look for the Marine Aquarium Council (MAC) stamp of approval and visit <http://www.aquariumcouncil.org> to learn more. Learn and observe fishing regulations, visit <http://www.floridaconservation.org> for more information.

**Hire local guides when visiting coral reef ecosystems.** This will help you learn about local resources, and protect the future of the reef by supporting the local economy.

**Be a wastewater crusader!** Make sure that sewage from your boat and home is correctly treated. Excess nutrients in wastewater harm coral reef ecosystems.

**Don't use chemically enhanced pesticides and fertilizers.** Although you may live thousands of miles from a coral reef ecosystem, these products end up in the watershed -- the area that drains to a common waterway, such as a stream, lake, estuary, wetland, and ultimately, the ocean.

**Recycle.** This helps keep trash out of the oceans and also out of landfills where it can have an adverse impact on the water quality of our rivers and oceans.

**Conserve water.** Use less water to decrease the amount of runoff and wastewater polluting the ocean and harming coral reefs.

**Become a volunteer!** Participate in community coral reef protection and monitoring programs. Volunteer for a reef, beach or shoreline cleanup. If you do not live near a coast, get involved in protecting your watershed.

**Support conservation initiatives and organizations that protect coral reefs.** Many groups have coral reef programs, and your support will make a big difference. See the program partner page for a partial list of organizations.

**Report dumping or other illegal activities.** Help be the eyes and ears of the reef! Your involvement can make a big difference. Contact the Florida Department of Environmental Protection by calling 1-800-320-0519 to make a report.

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## Southeast Florida Reef Conservation Tips for Recreational Users

**Use navigational charts to locate coral reefs.** Every year, inattentive boaters run aground, destroying coral colonies that are hundreds of years old. When boating, refer to nautical charts to see if you are boating in a known reef area. From the water's surface, reefs appear golden-brown. If you see brown, you may hit a reef. Remember: Brown, brown, run aground; blue, blue, sail on through. Visit <http://chartmaker.ncd.noaa.gov/staff/charts.htm> for more information.

**Tie up to mooring buoys or anchor in sand.** If you are boating near a reef, use mooring buoy systems when they are available. If no moorings are available, be cautious when anchoring your boat. Do not deploy the anchor directly on a reef. Anchors can crush, dislodge and kill fragile corals and other living reef organisms. Reefs are usually composed of coral and sandy areas; be sure to anchor in the sand.

**Be a marine debris crusader!** In addition to picking up your own trash, carry away the trash that others have left behind. More than just an unsightly nuisance, beach litter poses a significant threat to the health and survival of marine organisms, which can swallow or get tangled in beverage containers, plastic bags, six-pack rings, fishing line, fishing tackle and other debris. Do not dispose of trash or other debris in the water. Be sure to pump out your sewage only at marina pump-out stations and dispose of trash in designated areas.

**If you dive or snorkel, don't touch!** Take only pictures and leave only bubbles. Keep your fins, gear, and hands away from the reef. Contact with the reef can hurt you and will damage delicate coral animals. Disturbed sediments can smother and kill corals, so take care to stay off the bottom and avoid kicking up sand.

**Don't collect souvenirs, grasp or stand on living coral, or harass marine animals.** If you see environmental disturbances or damage at your dive sites, report them to the Florida Fish and Wildlife Conservation Commission's 24 hour Law Enforcement Dispatch Line at 1-888-404-FWCC (3922). Remember, your interactions with coral reefs and their inhabitants can have lasting results. Use caution and have a great experience!

**Avoid trolling for fish above a reef.** Anglers should avoid shallow coral reefs when trolling. Hooks can injure and scar coral, leaving it vulnerable to infection by microscopic organisms that can lead to death.

**Use caution when catching lobster near coral reefs.** When harvesting lobster, avoid touching coral reefs. Never use chemicals near a reef. If you use traps, avoid placing the traps on reefs. Traps break coral and damage the surrounding habitat when the traps are pulled.

**Follow fishing regulations.** Fish and marine invertebrates, like lobster, crabs and shrimp, are integral to maintaining healthy reef ecosystems. Learn and observe fishing regulations, seasonal closures and bag limits. Visit <http://www.floridaconservation.org> for more information.

**Support reef-friendly businesses.** Ask what your dive shop, boating store, tour operator, hotel and other coastal businesses are doing to protect coral reefs. This is especially important in coastal areas with reefs. Let them know you are an informed consumer and care about reefs.

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## Threats to Southeast Florida Reefs

Coral cover on many Caribbean reefs has declined up to 80% over the past three decades<sup>1</sup>. Southeast Florida reefs, which are a part of the greater Caribbean reef system, are being monitored for diseases, bleaching and other problems associated with human activities. Research stations in the Florida Keys have revealed at least a 37% loss of coral cover since 1996<sup>2</sup>. Since corals are very slow-growing, this loss represents a serious and significant threat to local coral ecosystems.

Large coastal infrastructure projects, like installation of pipes, cables and outfalls for public utilities, can contribute to shoreline erosion and can damage coral habitat by increasing turbidity. Beach nourishment projects, in which great quantities of sand are transmitted from offshore to onshore, can cause severe impacts to reefs. Sediments can smother corals and reduced water clarity deprives corals of the light they require for photosynthesis.

Dredge and fill projects, and construction of seawalls and docks, can negatively impact seagrasses, mangroves and other benthic communities that are important to the entire coral reef ecosystem. These projects can either directly impact corals by destroying them during construction, or they can result in indirect impacts like reducing the amount of available light when a new dock shades the seafloor.

Runoff from residential, industrial, and agricultural areas containing contaminants like fertilizers, silt, chemicals, and debris are carried through storm drains to Florida's waterways. Sewage discharges from waste treatment facilities, boats and developed land areas contribute to coral diseases and death. Even treated sewage contains high nutrient levels which trigger algal blooms that smother reefs; and may also contain bacteria and viruses which threaten the health of both the marine environment and humans. Pollution from people who live many miles from the reefs can destroy coral as liquids and solids eventually make their way downstream to the ocean through our numerous inland canals and waterways.

Physical contact from fins, hands, or equipment of boaters, divers, snorkelers and fishermen can damage delicate corals. Abandoned, improperly discarded, or lost fishing gear like line, nets and traps cause physical damage to reef systems. Ships and other vessels that run aground or drop anchor on reefs can dislodge, overturn and crush corals.

A 2001, comprehensive, site-specific, scientific assessment of fisheries and marine habitats in Biscayne National Park documented that fishery resources are in a significant state of decline, primarily as a result of recreational overfishing. The study revealed 77% of 35 fish stocks analyzed (including groupers, snappers, grunts, and barracuda) are overfished according to Federal definitions; and some stocks appear to have been chronically overfished since the late 1970's<sup>3</sup>. Recreational fishing in south Florida increased 444% from 1964 to 1998<sup>3</sup>.

In 2005, two species of coral (*Acropora cervicornis* and *Acropora palmata*) that live in south Florida waters and throughout the Caribbean were proposed for protection under the federal Endangered Species Act, a powerful law that has never been used before to protect coral, and a strong statement that coral reefs are threatened<sup>4</sup>.

A lack of public awareness and appreciation regarding the significance of coral and how it can be harmed is another threat to reefs. Increased public knowledge and community involvement in reef issues can help to decrease many of the threats to coral reefs.

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