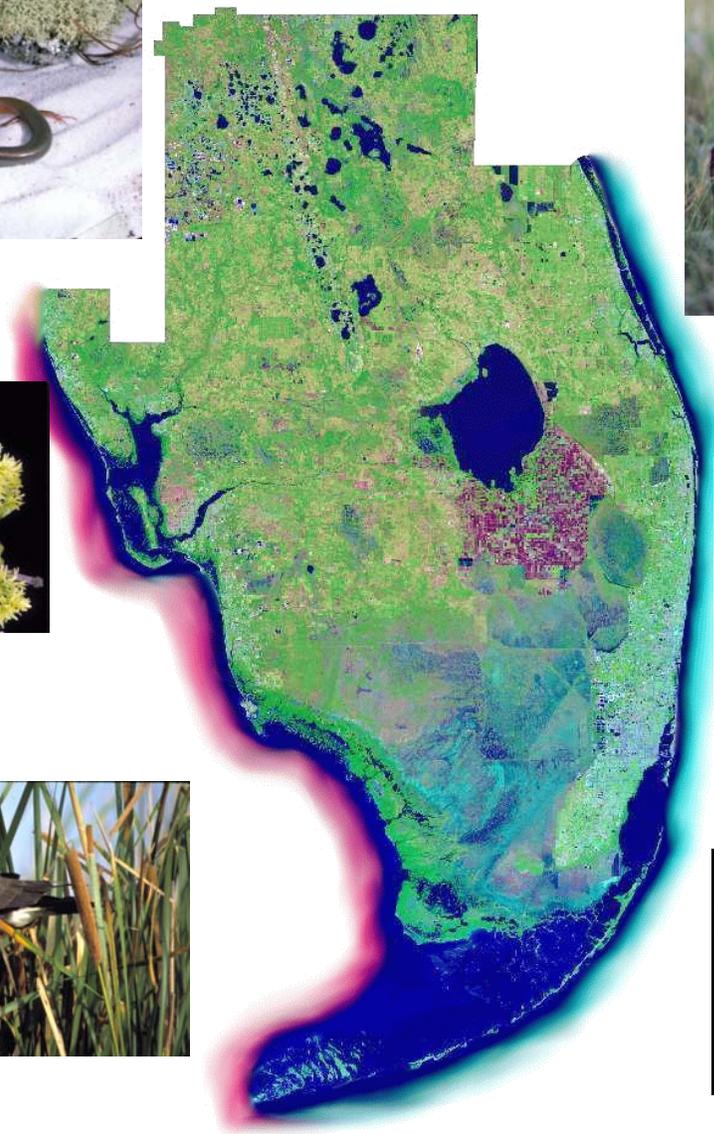


DRAFT
Roadmap to Recovery: An Ecosystem
Strategy for Recovery of Natural Resources
in South Florida



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An Ecosystem Strategy for Recovery of Natural Resources in South Florida**

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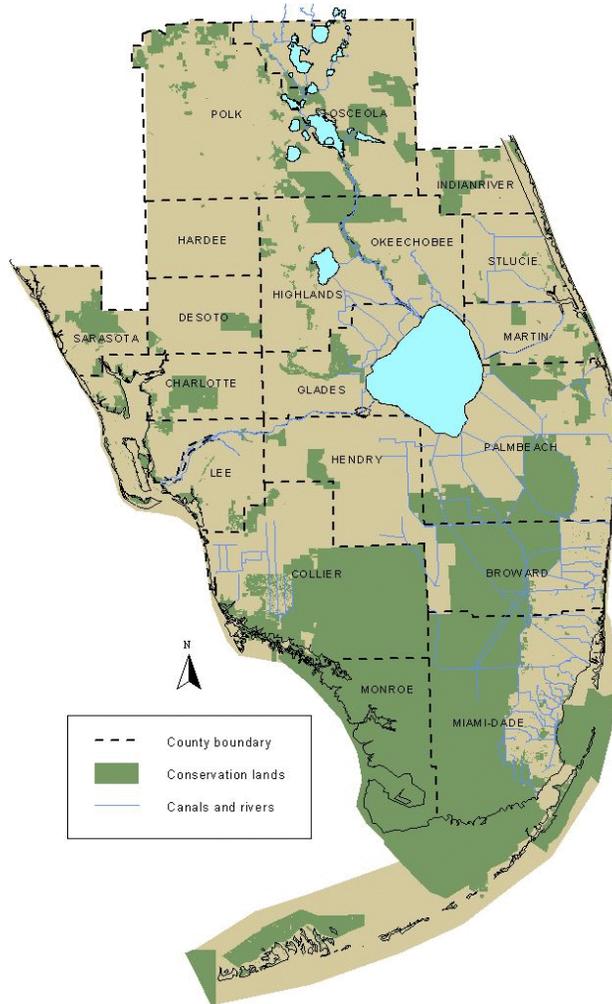


The mission of the U.S. Fish & Wildlife Service, working with others, is to conserve, protect, and enhance fish and wildlife and their habitats for the continuing benefit of the American people

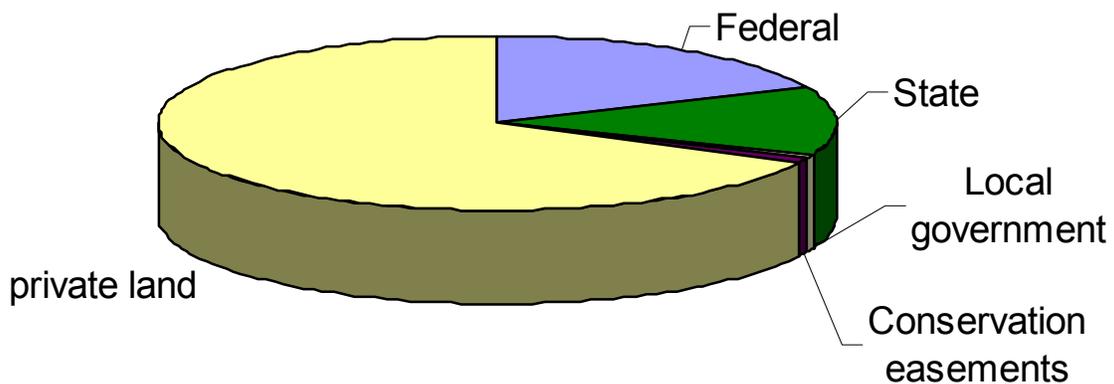
THE SOUTH FLORIDA ECOSYSTEM

Composed of 19 counties and over 25,000 square miles, this ecosystem includes nearly the entirety of the greater Everglades watershed, and portions of the Caloosahatchee, and Peace River / Myakka River watersheds. Habitat for 68 Federally listed species, 13 candidate species, and 23 unique ecological communities occur within these bounds.

The majority of the land in south Florida is in private ownership. However, there are many acres of publicly-owned conservation lands, including Everglades National Park, several National Wildlife Refuges, and numerous lands administered by State and local governmental agencies.



Land Ownership in South Florida



MISSION STATEMENT

Implement a habitat-based, multi-species plan through science, partnerships, and public outreach to accomplish recovery of self-sustaining populations of threatened and endangered species and restore the ecosystem upon which they depend in south Florida.

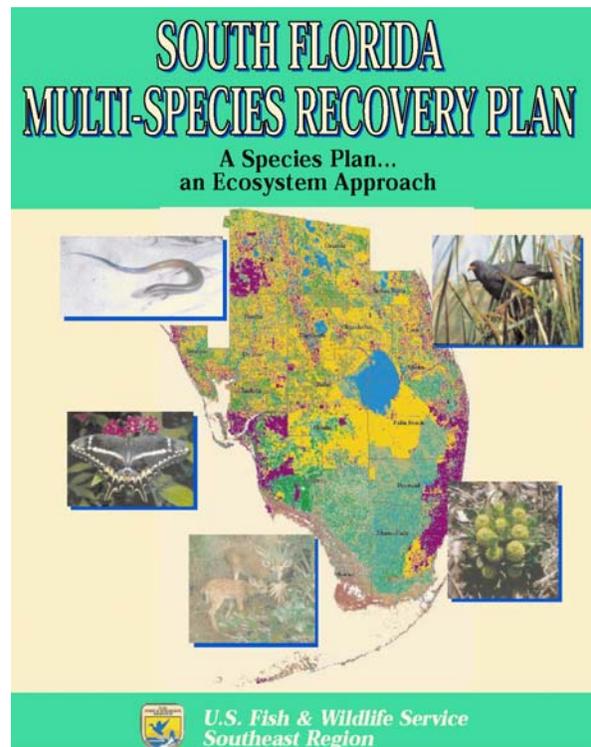
Goals

- 1) Recover threatened and endangered species in south Florida.
- 2) Preserve and restore ecosystem function and integrity within south Florida communities to maintain or improve their natural diversity and prevent the need for additional species listings.

The South Florida Multi-Species Recovery Plan (MSRP): A Species Plan . . . an Ecosystem Approach

Completed in 1999 as the official recovery plan for the threatened and endangered species of south Florida. It goes far beyond the scope of traditional recovery plans by taking an ecosystem approach that addresses the full diversity of habitats that are home to 68 endangered and threatened species.

In addition to detailed information about the life history, habitat needs, and appropriate management for each listed species, the MSRP provides recovery goals and recovery criteria that serve as a yardstick to measure recovery accomplishment for each species.



Working to achieve common goals The South Florida Ecosystem Restoration Task Force was established in 1993 to “coordinate the development of consistent policies, strategies, plans, programs and priorities for addressing the environmental concerns of south Florida.” This team includes representatives of Federal, State, Tribal, and local governments that are involved in addressing environmental concerns in south Florida. The Task Force recognizes that accomplishing endangered species recovery is one component of restoring the south Florida Ecosystem. The MSRP provides guidance to the Task Force and other Florida managers on how to accomplish recovery, and addresses important considerations that can be incorporated into projects to protect threatened and endangered species.

TAKING ACTION

The MSRP identifies over 2,500 species-specific, community-specific, or location-specific actions to accomplish recovery. Those specific actions address an array of local and regional issues affecting listed species. The following themes encompass the high-priority recovery issues in south Florida.

Southwest Florida Coastal Corridor

The Fish and Wildlife Service and the Florida Department of Environmental Protection provided funding to the Friends of Rookery Bay and The Nature Conservancy to initiate a project to establish a network of conservation lands along southwest Florida's coast. When completed, this corridor will connect to a similar conservation corridor in North Florida. Species that will benefit from this project include the wood stork, hawksbill sea turtle, Audubon's crested caracara, Cape Sable seaside sparrow, Everglade snail kite, eastern indigo snake, Florida panther, and West Indian manatee.

Land Acquisition and Habitat

Protection For many of the threatened and endangered species in south Florida, additional habitat needs to be protected, either through acquisition, conservation easement, or other agreement, to ensure that there's enough land for species to persist, and for natural processes that maintain the ecosystems to occur. Establishing strategic reserves that protect high-quality habitat patches and critical linkages between patches can provide high-quality wildlife habitat in fragmented areas where conservation of large, contiguous habitat patches is no longer feasible.

Restoration Development and land use patterns have substantially altered the natural processes that shape the south Florida landscape. Restoring natural vegetative community structure, species composition, disturbance regimes, and ecological processes is another essential component of restoring south Florida. As land managers adopt natural lands management regimes or acquire additional lands, returning land and vegetation characteristics to more natural conditions is usually a first step. In the most extreme cases, this can only be accomplished through the complete re-establishment of an entire plant and animal community, while in other cases, it may only consist of changing the structure of existing vegetation structure on a site. Once restoration is achieved, normal management regimes that are appropriate for the particular community can be adopted.

Invasive Species Management With an increasingly mobile human population comes an increase in threats from exotic species. A wide variety of non-native plants, animals, and even insects have permanently changed the face of Florida. These exotic species will continue to interfere with natural processes that are critical to the maintenance of the south Florida ecosystem. Developing effective means to manage these species is essential as there is no end to this threat in sight.

TAKING ACTION

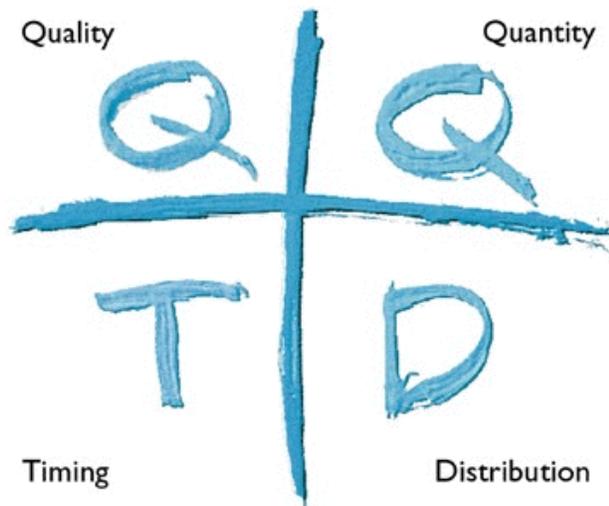


Fire Management Most of Florida's unique upland systems depend on frequent, and often intense, fires to maintain the vegetation community and the threatened and endangered species that depend on it. Habitat fragmentation and urbanization have severely reduced the frequency of natural fires, and have increased the cost, safety, and difficulty of using prescribed fire. Prescribed fire is **ESSENTIAL** to maintaining Florida's unique ecosystems.

Hydrologic Management Increased urbanization has caused a need for protection from the frequent flooding that occurred naturally, and increased water demand for household use, agriculture, and industry. Balancing the hydrologic needs of people and ecosystem management has led to ever-increasing complexity in managing water to meet the many conflicting needs.

Getting the Water Right

The Comprehensive Everglades Restoration Program (CERP) is a multi-agency effort working to restore natural hydrologic function in the greater Everglades system. The CERP works to mend the natural system while maintaining water supply and flood protection for the residents of south Florida. The CERP is composed of 68 sub-projects which endeavor to maximize restoration benefits to the ecosystems of south Florida while also meeting the water needs of an ever increasing human population in the region.



TAKING ACTION

Pollution, Contamination, and Water Quality With the ever-increasing human population in Florida comes an ever-increasing challenge of ensuring the quality of water, air and soils. Pollutants are a product of our society, and we must develop innovative measures to control them. Water quality is an essential component of a healthy environment for the plants, animals, and people of south Florida. The CERP has led the charge to “get the water right,” and this task includes protecting water quality. But water quality is only one part of the issue. Natural bio-geochemical cycles in south Florida provide chemical linkages between water, air, and soils, such that we must work to assure the “quality” of all components of our environment.

Recreation Vehicle traffic, foot traffic, and wildlife-related recreation take a toll on natural areas and their ability to support healthy natural communities. Carefully managing the impact of a growing human population on conservation lands is critical to maintaining ecosystem function and effective conservation programs. Well-managed public recreation is beneficial to both ecological integrity and recreational enjoyment.

Regulation Through sections 7 and 10 of the Endangered Species Act, the Service has the opportunity to review and provide input on the effects of land alteration on listed species. Avoiding or minimizing significant habitat alteration is essential to ensuring the survival and recovery of listed species in the wild.

Improving Information

Exchange A growing obstacle to effective management of natural lands in Florida is a lack public support. Land managers find themselves with more close neighbors, people more often find themselves in close contact with wildlife, and resource managers and scientists find themselves interacting with an increasing variety of interested parties. Providing information about resource management issues and the needs of wildlife management is essential to building support for effective programs.

MERIT

A Multi-species/Ecosystem Recovery Implementation Team (MERIT) was appointed with the purpose of overseeing implementation of the MSRP. MERIT members represent Federal, State and local governmental agencies, Miccosukee and Seminole tribes, academia, industry, and the private sector. This group has been instrumental in guiding recovery implementation in south Florida, and will continue to provide input and build partnerships among south Florida resource managers to accomplish recovery of the South Florida Ecosystem.

TAKING ACTION

Status Assessment For many threatened and endangered species, the first step towards recovery is ensuring an accurate and thorough inventory of their location, numbers, health, etc. Many rare species and the ecosystems upon which they depend in south Florida are difficult to locate, and surveys and documentation are needed to fully assess the status, recovery potential, and needs for these species. Verification of ecological community mapping is also needed.

Species Propagation, Translocation, and Augmentation With increasing losses of habitat area, fragmentation of remaining habitats, and impacts to remaining habitats, species recovery and ecological restoration may be best achieved by venturing outside the realm of the natural world. Recent innovations in species propagation, translocation, and augmentation have resulted in more successful and efficient methods to effectively manage these populations of endangered and threatened species.

Key Largo Woodrats: On the Brink

In 2001, the Service initiated a captive propagation program for the endangered Key Largo woodrat. The Key Largo woodrat has declined to a level where extinction may be imminent, and the cause remains unknown. A cooperative program involving the Service, Texas A&M University, Florida Park Service, Florida Fish and Wildlife Conservation Commission, Lowry Park Zoo, and the U.S. Geological Survey is under way. A captive propagation and repatriation plan was developed to guide captive breeding and recovery-related research and management.

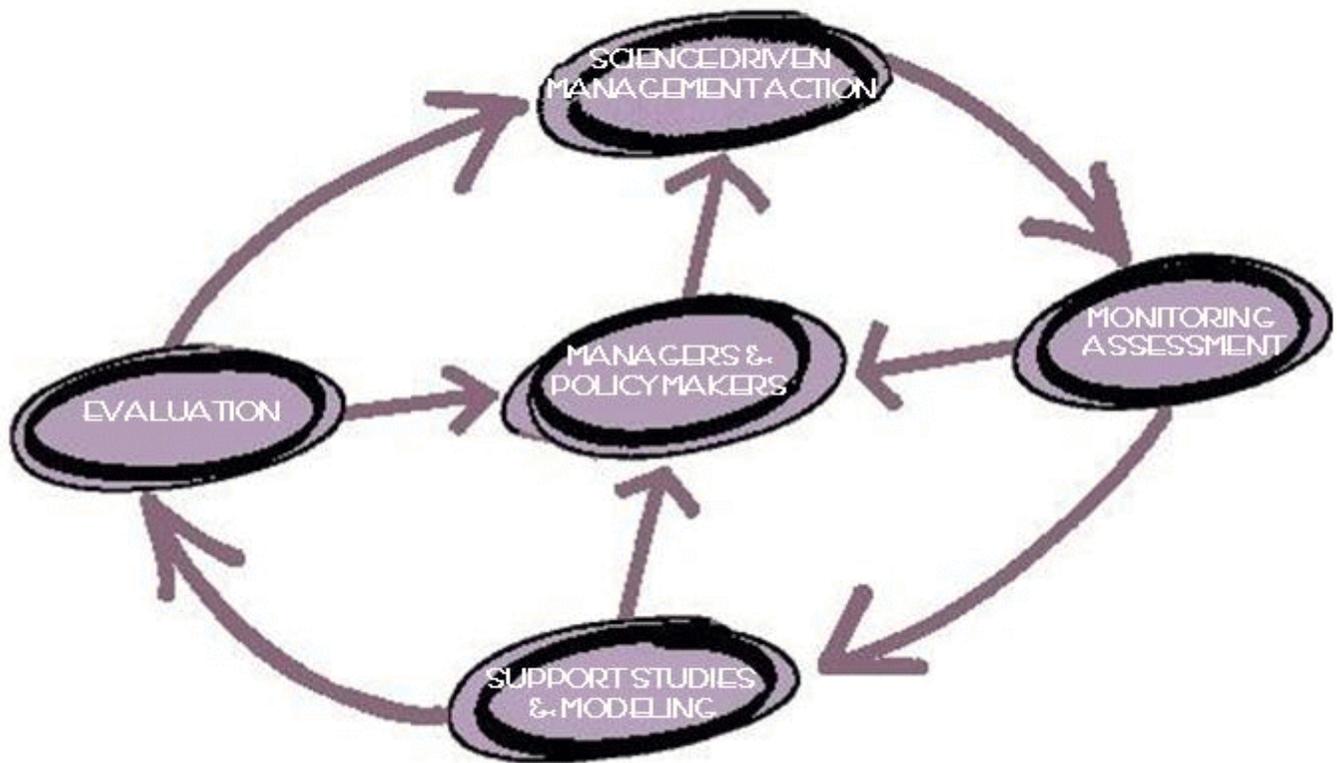


Species Management Threatened and endangered species are an integral component of a healthy South Florida Ecosystem. The rarity of these species often makes developing effective conservation programs difficult. Focusing on an individual species, its biology, or interaction with the environment is needed to develop effective conservation strategies. Studies of population genetics and demographics are also necessary. We are finding that these same studies often shed light on the processes that influence ecological communities.

TAKING ACTION

Monitoring All of the factors previously discussed increase the complexity of developing and implementing effective ecosystem management plans. Detailed monitoring is needed to track species populations, document results of management actions, and evaluate levels of human use, exotic species impacts, and other threats. Effective monitoring is a keystone component of adaptive management. Better monitoring results in better, faster, more effective achievement of management objectives.

ADAPTIVE MANAGEMENT



THE PROCESS

The Service has been delegated responsibility for spearheading recovery efforts for endangered and threatened species under the Endangered Species Act, but the Service can not accomplish recovery alone. The MSRP is the tool in south Florida that provides information to other agencies and organizations so that everyone can work together toward recovery. Nearly every natural resource management action that takes place in Florida can play a role in achieving recovery.

Below, we outline a process to help managers incorporate consideration of endangered and threatened species recovery into all actions they take. This process does not have to increase the complexity of implementing actions, but merely facilitates incorporating recovery into routine activities, when used in conjunction with the resource-based information in the MSRP.

- Evaluate effects - evaluate the effects of any project both on existing on-site resources, and off-site resources that may be secondarily affected.
 - Assess potential impacts to species that are on-site.
 - Assess potential impacts to habitats that species may use in the future in a restored or modified condition.
- Incorporate design features into projects that maintain existing habitats or restore more normal or more beneficial conditions for natural communities.
- Incorporate funding mechanisms to ensure management and maintenance of on-site and off-site habitats, species, and communities.
- Incorporate monitoring of project effects on species, habitats, and ecological processes.
 - Monitoring results can be used to adjust management approach, using the principles of adaptive management.
 - Monitoring results and cumulative effects of a project, both positive and negative, should be incorporated into measures of recovery accomplishment. Positive impacts contribute to recovery, and should be considered relative to the recovery criteria specified in the MSRP.
- Formulate recommendations for project modifications that can be incorporated into future projects and operations of existing projects.
- Share information with other agencies/organizations, and maintain frequent communication to provide mutual benefit and optimize effort.

Evaluating Multi-species Impacts

The Service initiated a project with University of Florida scientists to develop an evaluation tool that will allow resource managers to evaluate impacts of alternative project designs on threatened and endangered species, other wildlife resources, and the ecosystem. Tools like this will help to streamline the process of designing effective restoration and recovery projects, as well as minimizing impacts to development projects.

STANDARDS AND PRINCIPLES

We have identified several principles that must be applied to all recovery actions. Application of these principles ensures that efforts remain focused, efficient, effective, and most of all, scientifically defensible.

Ensure effectiveness: ensure that losses of species, communities, or ecological components does not occur.

Intelligent Tinkering

"If the biota in the course of aeons, has built something we like but do not understand, then who but a fool would discard seemingly useless parts? To keep every cog and wheel is the first precaution of intelligent tinkering."

Promote and utilize sound science: utilize the best available information and the sound application of the scientific method in all aspects of endangered species recovery and management.

Utilize technology: seek innovative solutions to accomplish recovery and facilitate scientific advances.

Integrate advances: incorporate information gained into recovery plans, and update current needs, priorities, and information.

Applying the 4C's

Consultation, communication, and cooperation, all in service of conservation – offer the vision for building partnerships with stakeholders to address issues that transcend individual agency or organization boundaries.

Coordination and partnership: work with our sister agencies in Federal, State, and local government to facilitate accomplishment and maximize efficiency, and involve all parties in advancing science in recovery and restoration.

Emphasize efficiency: Emphasize actions that maximize benefit to the ecosystem, communities, and individual species and that are cost-effective (work smart).

STANDARDS AND PRINCIPLES

Common ground: While resource managers have different missions, recognizing opportunities to achieve multiple compatible goals while staying true to individual agency/organization missions maximizes benefit by leveraging financial and human resources.

WORKING WITH PARTNERS	USFWS	USACE	WMDs	FWC	DEP	DOACS	Local government	Tribes	Universities	NGOs	Private
Acquisition	X		X	X	X	X	X				X
Restoration	X	X	X	X	X	X	X	X			X
Fire management	X	X	X	X	X	X	X	X			X
Hydrology management		X	X		X						X
Pollution control	X		X		X						X
Education	X	X	X	X	X	X	X	X	X	X	X
Invasive species	X	X	X	X	X	X	X	X			X
Status assessment	X			X	X	X	X	X	X	X	X
Population augmentation	X			X		X			X		
Species management	X			X	X	X	X	X	X	X	X
Recreation	X	X	X	X	X	X	X	X			X
Regulation	X	X	X	X	X	X	X	X			
Monitoring	X	X	X	X	X	X	X	X	X	X	X

Feedback: Monitoring the progress of recovery and restoration actions is essential to update priorities, measure progress, and assess remaining needs and threats. Monitoring and evaluation is a part of effective adaptive management and the process of sound science.

Hold your ground: To fully realize the ecological benefit of previous land acquisition, restoration, and recovery actions, we must continually invest in resource management actions such as prescribed fire, exotic plant control, and hydrologic management that, at a minimum, maintain the current resource condition.

South Florida Ecosystem - Maintaining the Status

The natural rate of change in the South Florida Ecosystem is very rapid. We must continually undertake management actions to just maintain the status quo.

CONFLICT RESOLUTION

“The land is one organism. Its parts, like our own parts, compete with each other and co-operate with each other. The competitions are as much a part of the inner workings as the co-operations. You can regulate them--cautiously--but not abolish them. “

Aldo Leopold - 'The Round River'

The process of change has already occurred in south Florida, and will continue to occur across the landscape as development continues. The resources that are present on the landscape today are the product of both current resource conditions and past changes. Both restoration and development projects continue to alter the ecosystem that supports the current species assemblages as sites that are currently occupied become less suitable for an individual species, while other areas become more suitable. In historic times, species naturally occurred within those regions that provided the requisite resource conditions, and the system varied only with respect to natural perturbations.

As humans began to modify the south Florida landscape, entire regions became unsuitable for native species. In addition, natural conditions were altered, and areas that provided optimal habitat characteristics for a particular species may have been so altered that they no longer provide conditions that benefit that species. Those species that were able adapted to the changing conditions, either by occupying new areas or abandoning former ranges. Today, as we embark on efforts to restore more natural conditions, species will again have to either adapt or move, and this often results in a perception of conflicting management needs on a site.

When making decisions, managers must consider the following factors for each species of concern:

- **Resilience** - The ability of a species or population to naturally adapt to changes and impacts at a site that may result from habitat alterations. Population size should be considered when evaluating resilience, because at low population levels a population that is normally resilient may be less able to respond to changing conditions.
- **Rate of Recovery** - The rate of a species' population growth, generation time, and demography all play a role in determining if and when populations of a species will reach “normal” densities on restored sites.
- **Mobility** - Different species have different abilities to shift their distributions as the availability of resources shifts across the landscape, or to relocate to sites where suitable habitat conditions have been restored. In the most extreme cases, suitable habitat may be available, but a species may not be able to establish self-sustaining populations in these sites without intervention from resource managers in the form of translocation or augmentation.

CONFLICT RESOLUTION

- **Magnitude** - The magnitude of an effect on a population, both in terms of the deviation from “normal” conditions and the proportion of the species or population affected must also be considered. A project that impacts an entire population or species distribution will result in longer recovery times for the species affected and different threats than if only a portion of the distribution is affected, even if a species or population is resilient, mobile, and capable of rapid recovery.

Evaluating these factors will provide managers with an index of relative risks to existing species and populations that will aid in minimizing detrimental impacts and directing remedial efforts.

The American Crocodile: A South Florida Success Story in the Making

This large, shy, endangered reptile lives within the secluded, brackish, mangrove-lined bays of south Florida. Development within the sensitive mangrove estuaries, human disturbance, and killing of crocodiles brought the population to a low of approximately 200-300 individuals. Today, as many as 1,000 crocodiles roam south Florida, and over 50 nests are reported each year. Land acquisition, research, and monitoring have all played a crucial role in working to restore crocodile numbers. Florida Power and Light’s Turkey Point nuclear power plant, Everglades National Park, the Service, and the Florida Fish and Wildlife Conservation Commission have all adopted proactive management strategies that have led to the observed population growth. As much as 80 to 90 percent of remaining crocodile habitat in south Florida is protected, as well as all of the major nesting areas. The Service is currently considering downlisting the crocodile in Florida from endangered to threatened due to the success of conservation programs in Florida.



Key Deer Recovery: Persistence Pays



The Key deer is the smallest subspecies of white-tailed deer, and inhabits only a few islands in the lower Florida Keys. Habitat loss and hunting for sport were two of the primary threats to the deer. Hunting was restricted in 1939, but the deer population continued to decline until the National Key Deer Refuge was established in 1957. At that time, the total population was estimated at only 25 deer. Today, the Refuge encompasses over 8,500 acres that includes the core of the deer's range. Other measures that have aided in recovery include minimizing barriers to deer movement and minimizing injury and death resulting from collisions with cars. Today, the population is estimated at 700 - 800 deer. Starting in 2003, Key deer will be translocated from the core population to other islands within the deer's range to augment smaller, more isolated populations. If successful, these translocations will result in a large, widely-distributed Key deer population that may meet criteria for reclassification from endangered to threatened.



U.S. Fish & Wildlife Service

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