



## South Florida Ecosystem Restoration

Nicole Bramstedt

everglade: a tract of low swampy land characterized by clumps of tall grass and numerous branching water ways.

Everglades: a swampy and partly forested region in southern Florida, mostly south of Lake Okeechobee (Urdang, 1968).

### Program Description

The Everglades Program is a joint project administered by Ecosystem Restoration Department and the office of Ecosystem Planning Coordination under the Everglades Forever Act of 1994. The Ecosystem Restoration Department and the Ecosystem Planning Coordination are agencies organized under the state of Florida Department of Environmental Protection. Previous programs were employed in 1947, 1970 1986 and 1992. The plan for the present project is continued through 2014 (SFWMD, 1998). The overall goal of the Everglades Forever Act (EFA) is to protect the remaining Everglades ecosystem and to repair damage caused by drainage for the use of agriculture and development.

Specific goals of the Everglades Program are:

1. to improve the quality of water entering the Everglades
2. to improve the volume, timing and distribution of water entering the Everglades
3. to increase the spatial extent of Everglades wetland communities, and
4. to reduce the presence of exotic plant species in the Everglades (SFWMD, 1998).

The first three goals will be met by the Everglades Construction Project (ECP), which is the main project in the Everglades Program. The Everglades Forever Act considers constructed wetlands to be the best way to satisfy the first two goals because they lower phosphorus levels and improve water volume, timing, and distribution (Duggar). In response to the third goal, to increase the spatial extent of the Everglades wetlands communities, the South Florida Water Management District (SFWMD) completed a conceptual design in 1997 to begin land acquisition, the first step, a project that will continue until 2001. The SFWMD is responsible for the design, land acquisition of farms with degraded soil quality, construction, operation and maintenance of the Everglades Construction Project. In-house staff prepared designs and acquired land, contractors will construct the projects, and environmental groups and members of the public are making contributions of insight and guidance (SFWMD, 1998). Addressing the exotic plant species, goal number four, the SFWMD helped to form a state and federal interagency task force, the Exotic Pest Plant Council. This task force, draws upon the experience of the area scientists and resources managers to bring much needed coordination and focus attention on funding public awareness and legislative needs (Davis and Ogden, 1997).

The Everglades Program is funded by a combination of federal, local and state money according to the nature and location of each project. Costs were determined in February of 1994 to include plan completion in 2005 and operation and maintenance costs through 2014. Progress reports are available for each project and include both construction and financial reports (SFWMD, 1998).

#### Encouraged or Discouraged Practices

Any disturbance to the natural water movement in the Everglades is discouraged. Past agricultural drainage has diminished habitat of the wetland plants and animals. In order to understand the scope of the Everglades conversion, it is necessary to understand the brief history of the present configuration of the Everglades. In 1945 there was a severe drought followed by an unusually rainy and hurricane riddled year in 1947. Property damage was estimated to be fifty million dollars (Duggar). In order to avoid future damage the U S department of Agriculture Soil Conservation Service did an extensive survey of the Everglades and created three land use systems to manage the water. The land use systems were divided as follows; the area of organic soil dominated areas used predominately for agriculture was designated the Everglades Agricultural Area; to the east and south, the Water Conservation Area, and the southern tip as the Everglades National Park (Davis and Ogden, 1997). Under the control of a system of canals, dikes, and pumping stations the water was managed evenly to avoid flooding, salt-water intrusion, fires caused by over drainage, and provide large areas for water storage (Davis and Ogden, 1998). In 1970 a drought brought the realization of the stress that this water controlled system was causing on the natural system. Studies showing the depletion of the soil by agriculture combined with the desire to restore the natural system resulted in the "Save the Everglades" campaign in 1986 (Duggar; Davis and Ogden, 1997). This program gave rise to the Everglades Forever Act passed in 1994 which attempts to retain the Everglades National Park and to restore any ecosystems that are economically possible.

Because of this historical need for water management the Everglades National Park and Water Conservation Areas have lost their natural characteristics. The specific areas of attention are:

1. loss of transitional glades for habitat and water purification;
2. unnatural nutrient levels from agricultural runoff ;
3. modification of flow pattern;
4. un-natural pooling and over-drainage;
5. accelerated land subsidence caused when natural anaerobic muck undergoes rapid oxidation of the soil after drainage;
6. abandonment of wading bird nesting areas;
7. un-natural and reduced flow of fresh water to Florida Bay;

Therefore the following practices are now being implemented by the government and environmentalists to reverse the impacts of historic and current land use.

1. The SFWMD has constructed wetlands in which cattails will be used to remove seventy-five percent of the phosphorus from the water flowing through. The use of nonnative cattails to utilize phosphorus from the runoff cleanses the water for the re-introduction of native flora (Holloway, 1994).

2. Working with the best management practices, farmers in the Everglades Agriculture Area are controlling erosion, reducing phosphorus runoff, and making more efficient fertilizer applications. Since the majority of the winter crops for the United States are grown here the Everglades Agriculture Area is understandably a major component in the quality and flow of the water to Southern Florida.

3. Where possible the natural flow patterns are being reinstated by allowing the water to flow again unmanaged. In some cases this unmanaged flow will be in large sheets up to fifty miles wide and one hundred miles long where the underlying limestone naturally absorbs the water that is released during the dry season (Duggar).

4. As much as possible without causing problems in the residential and agricultural lands water delivery is now including transitional zones, which allow gradual phased operation rather than the abrupt shifts in water delivery that proved harmful for wildlife nesting habitats (Davis and Ogden, 1997).

5. Where possible some areas of the marsh are allowed to periodically dry out only every two or three years according to historical rainfall patterns which allows the natural cycle of muck building to occur (Davis and Ogden, 1997).

6 & 7. The improvements in bird nesting areas and increased flow of fresh water are both positive results of the above modifications and continue to be improved. However, since the development of the Everglades resulted from continual change such as periodic fires and floods the complete restoration would require the natural diversity to continue. This is not possible, so discussion will continue as to which features of the Everglades require the more immediate rescue.

#### Site Selection:

Sites are chosen according to restoration feasibility, cost-effectiveness, and whether or not the habitat, if restored, will likely be used by endangered flora or fauna. Endangered or threatened species include the Florida panther (*Panthera* sp.), the American crocodile (*Crocodylus* sp.), the Snail Kite (*Milvinae* sp.) and southern Bald Eagle (*Haliaeetus leucocephalus*). Site selection becomes difficult when governmental groups disagree on the importance of restoration emphasis. The U.S. Fish and Wildlife Service, for example, favors single-species management as observed in their excitement over the Snail Kite while the Everglades National Park and an Audubon report favor entire ecosystem approaches to managing endangered species (Davis and Ogden, 1997).

#### Program Assessment:

To evaluate a restoration program there must be measurable indicators of success. The presence of certain species may provide insights into restoration success. In order to be of value in predicting the health of the community these indicators should: 1. demonstrate habitat specificity that can be used in studying its population and behavior; 2. be high on the food chain; 3. be visible and therefore easy to study; 4. show measurable repeated habits; 5. be reasonably cost

effective to study (David, 1995). Waterfowl and waders fit these criteria (David, 1995). The fact that there are waterfowl and waders present in the newly restored areas shows that some of the habitat has been restored effectively. Further study of these birds will be used as a guideline in evaluating the success of the restored habitat.

Monitoring vegetation in restored areas has been used as an evaluation tool. When beginning the restoration of the Kissimmee River, a twelve mile section was first monitored to assess the feasibility of the project (Holloway, 1994). Other experiments done prior to restoration are being used for comparison in the future restorations. A few of the plants studied for the project were *Cladium jamaicense* which used to be abundant in the Everglades and *Typha* (cattails) which thrive on the increased phosphorus levels (Newman, 1996). Certain species of vegetation performed better with longer flood duration such as *Sagittaria lancifolia*, *Nymphaea odorata*, and *Utricularia* spp. *N. odorata* and *Utricularia* spp. performed better when the depth of water increased (Weller, 1996).

Also included in evaluations of the Everglades are comparisons to other experimental managed ecosystems in South Florida. Water quality and quantity, predators and prey and vegetation are being assessed to see if they will become similar to pre-restoration conditions. There are also success evaluations being done on the quality of the water flowing within and out of the Everglades.

#### Program Critique:

There are two main conflicting paths when doing restorations: one is to employ trial and error and the other is to be guided by clearly defined goals (Holloway, 1994). Both paths have their place in the restoration of the Everglades since restoration depends on the cooperation of so many groups such as agriculture, development and recreation, trial and error must be used to find ways of integrating civilization and nature. The results of trial and error will help in the formation of future goals of the program. Other portions of the program are guided by the clearly defined goals of the Everglades Forever Act. Hopefully, as the program progresses there will be more information available on the results of their evaluation of success. This can be useful not only for the Everglades but for other large-scale wetland restorations. In the words of John Ogden, a National Park Service senior ecologist for the Everglades National Park, "We can't return to what we had a hundred years ago. But we can restore the natural functioning of the Everglades (Cohn, 1994)."

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