



Florida's Ecological Network



Photo by Jane M. Rohling / USFWS

Vision

"In the 21st century, Florida has a protected system of greenways that is planned and managed to conserve native landscapes, ecosystems and their species; and to connect people to the land . . . Florida's diverse wildlife species are able to move . . . within their ranges with less danger of being killed on roadways or becoming lost in towns or cities. Native landscapes and ecosystems are protected, managed, and restored through strong public and private partnerships. Sensitive riverine and coastal waterways are effectively protected by buffers of green, open space and working landscapes. . . Florida's rich system of greenways helps sustain Florida's future by conserving its green infrastructure, by providing continuing economic benefits, by connecting people with their natural, historic and cultural heritage, and by improving the quality of life for people."



— Excerpted from *Florida Greenways Commission 1994*

Overview

The Florida Greenways Commission defined a "greenways system" as a "system of native landscapes and ecosystems that supports native plant and animal species, sustains clean air, water, fisheries, and other natural resources, and maintains the scenic natural beauty that draws people to visit and settle in Florida." Greenways follow natural land or water features such as ridges or rivers or human landscape features such as abandoned railroad corridors or canals. A healthy, well functioning system of greenways can support wildlife communities and provide innumerable benefits to Florida's people, as well. The Commission saw a healthy and diverse green infrastructure as the underlying basis of Florida's sustainable future. They identified two components to the statewide greenways system: the Ecological Network and the Recreational/Cultural Network (Figure 1). We focus here on the Ecological Network.

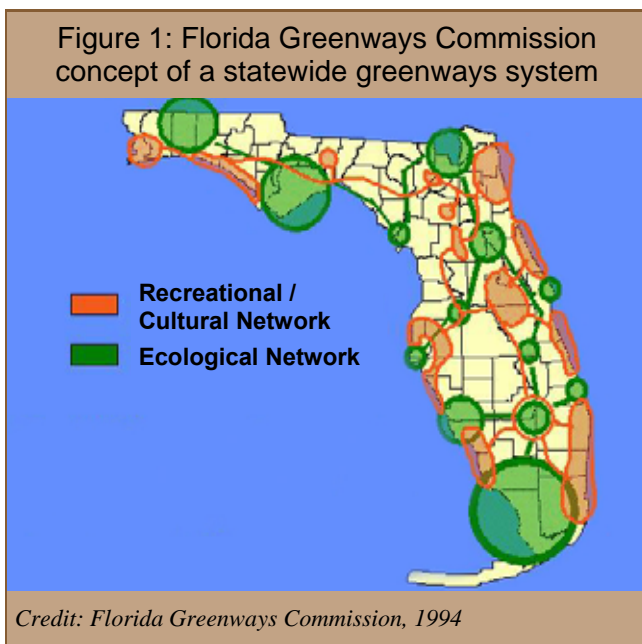
The Florida Ecological Network is envisioned as a system of interconnected lands protected for their ecological value to native wildlife and plants or for their provision of ecological services such as water quality

"The Commission's vision for Florida represents a new way of looking at conservation, an approach that emphasizes the interconnectedness of both our natural systems and our common goals and recognizes that the state's 'green infrastructure' is just as important to conserve and manage as our built infrastructure."

— Buddy MacKay and Nathaniel P. Reed, Chair and Vice Chair of the Florida Greenways Commission, in *Florida Greenways Commission 1994*

protection and flood prevention. Protection of these basic biological functions through the Ecological Network formed the basis for the development of the Florida Greenways and Trails System. Some of the lands in the network have already been preserved and some are designated for future conservation action.

The Recreational/Cultural Network is envisioned as a system of links between important recreational areas, ecological sites, population centers, and culturally and historically significant sites. Together, the protection of natural ecosystem values and functions and the provision of associated benefits to human populations makes a green infrastructure network.



Leadership

Leadership of efforts to design, protect, and manage a statewide greenways system in Florida has gone through three transitions, but the program has continued to flourish and seems only to grow stronger over time.

- 1) The Florida Greenways Commission (Commission) functioned from 1993 to 1995 with the support of 1000 Friends of Florida and The Conservation Fund. The Commission's main accomplishments were to assess the status of greenways in the state, develop a vision for state agency leadership of a greenways program, draft recommendations for proceeding with development of the statewide

greenways system, and obtain public input on proposed plans for the future of the program.

- 2) The Florida Greenways Coordinating Council (FGCC) functioned from 1995 to 1999 with the support of the state Department of Environmental Protection's (DEP) Office of Greenways and Trails (OGT). The FGCC developed a specific plan that would implement the statewide greenways and trails system as envisioned by the Commission.
- 3) The work of the Commission and the FGCC was taken up by the Florida Greenways and Trails Council (FGTC) in 1999 with the continuing support of OGT. OGT established an official greenways designation process. Since program inception, more than 700,000 acres and nearly 1,500 miles of land and water trails have been approved for designation by the FGTC. The Council has also adopted ten critical linkages, identified through the work of a team at the University of Florida, as high priority targets for protection.

All three commissions/councils and their lead organizations were supported by professors, staff, and students of the University of Florida GeoPlan Center, the Department of Landscape Architecture, the Department of Wildlife Ecology and Conservation, and the Department of Urban and Regional Planning. For the Commission, these cooperators developed a database of Florida's conservation lands and trails. Under the FGCC's auspices, University of Florida personnel used innovative GIS mapping techniques to define and identify the ecological and recreational hubs and links that could make up the statewide system. For the FGTC, University personnel developed and applied an objective method for identifying the lands of highest priority for protection in the Ecological Network.



Photo by Gary M. Stolz / USFWS

Highlights

- Program founders helped advance the concept of an integrated habitat conservation system and defined critical system components such as hubs, links, and sites.
- The GIS-based procedures used to identify the Ecological Network were later adapted for similar analyses by the states of Maryland and Virginia, the New Jersey Conservation Foundation, the Saginaw Bay Greenways Collaborative in Michigan, the Chesapeake Bay Program, and the U.S. Environmental Protection Agency (EPA) in the southeast United States. The Florida network design model is adaptable to the regional, state, or multi-state scale.
- The program was headed by a leadership forum reflecting the various interests in the statewide greenways system. The Florida Greenways Commission was a governor-appointed body representing state government, nonprofit conservation organizations, industry, recreationists, educators, and public and regional agencies. Members of the FGCC and the FGTC were appointed by the governor, the president of the Florida senate, and the speaker of the state house of representatives and included a prescribed number of representatives of business, the public, private landowners, conservationists, and recreationists.
- The statewide greenways program and its successive leadership forums were aided by strong and active support organizations that helped lead the effort. Specifically, the Florida Greenways Commission was supported by the Florida Greenways Program of 1000 Friends of Florida and The Conservation Fund. DEP's Office of Greenways and Trails supported/supports the FGCC and the FGTC. The work of the Commission and the Councils has also been supported by many non-governmental organizations, including The Nature Conservancy, the Florida Trail Association, Southeastern Trail Riders, Rails to Trails Conservancy, local land trusts, and public agencies, including Florida's water management districts, regional planning councils, and local governments.
- All phases of the program featured extensive public involvement and education, including a phase that sought comment on the design of the greenways system and another phase that sought input from private landowners whose land was included in the system. This emphasis on involvement and education built awareness of the greenways system and how greenways benefit nature and people.
- The system planning and design process was supported by public funds from the Florida Department of Transportation and Department of Environmental Protection and by private foundations. The effort also benefited from an undeterminable amount of contributed time by state agency and non-governmental personnel.
- Ten critical linkages between important protected areas in regions with heavy growth pressure were identified as the highest priorities for state protection.
- A process was developed for designating lands and waterways as part of the Florida Greenways and Trails System. Since program inception, more than 700,000 acres of public land and nearly 1,500 miles of land and water trails have been designated.
- The GIS modeling identified an interconnected ecological network that, if conserved, would result in significant gains in the quality, representation, and long-term persistence of native ecological communities in Florida.

“Just as we carefully plan the infrastructure our communities need to support the people who live there—the roads, water, and electricity—so must we begin to plan and manage Florida’s green infrastructure.”

— Buddy McKay, Former Lt. Governor and Chair, Florida Greenways Commission,
in *Florida Greenways Commission 1995*, p. 6

Background and Context

In 1991, The Conservation Fund and 1000 Friends of Florida, a statewide growth management advocacy group, came together to collaborate on the development of the Florida Greenways Program. Their goal was to create a vision and framework for a statewide greenways system.

Florida has an excellent history of conservation land acquisition dating back to 1963. The program in place in 1991, Preservation 2000, was a 10-year \$3 billion program with funding authorized on an annual basis and split among several land acquisition programs. The work of Preservation 2000 continues today as the Florida Forever program. With the Florida Greenways Program, the two nonprofits hoped to develop a method of integrating decisions about land acquisition among the various programs involved so as to maximize the benefits to natural systems and human communities. This would allow acquisition to be done proactively on a scientific basis rather than reactively under threat of development.

Ecologists Larry Harris, Reed Noss, and others at the University of Florida developed the concept of an integrated habitat conservation system in the 1980s to allow comprehensive planning for the protection of the state's irreplaceable habitat for native wildlife. Harris and other ecologists agreed that the primary cause of the loss of biological diversity in Florida was decades of land development and fragmentation and the resulting increases in isolation of wildlife populations. Protection of ecological connectivity through functional greenways is essential to counter the impact of habitat fragmentation.

Aside from development of a concept for the statewide system of greenways, the Florida Greenways Program involved extensive public education about what greenways are and how they benefit nature and people. 1000 Friends of Florida and The Conservation Fund were also successful in raising substantial funds from private foundations in support of the effort. In 1994, 1000 Friends of Florida led a team that secured public funding for the program through the Florida Department of Transportation.

These two nonprofit organizations sold the governor and his staff on their concept for the statewide greenways system, and in 1993, the governor created the Florida Greenways Commission, which took over guidance of the program. The 40 members of the Commission represented conservation nonprofits; recreation groups; state, regional, and local government agencies; educational organizations; working lands advocates; and the business sector. They were charged with assessing the status of Florida's greenways, developing a vision for a statewide system of linked green spaces and greenways, drafting recommendations for state agency leadership of the program, and collecting public input on proposed plans for the future of the statewide system of greenways. They were to deliver a report to the governor by the end of 1994.

In 1995, on the recommendation of the Commission, Florida's statewide greenway initiative became a government-based program guided by the gubernatorially and legislatively appointed FGCC. The Florida Department of Environmental Protection was designated the lead state agency for the program. In 1997 the FGCC created six Regional Greenways Task Forces to facilitate public review and input on the system modeling results and to promote the greenways concept.

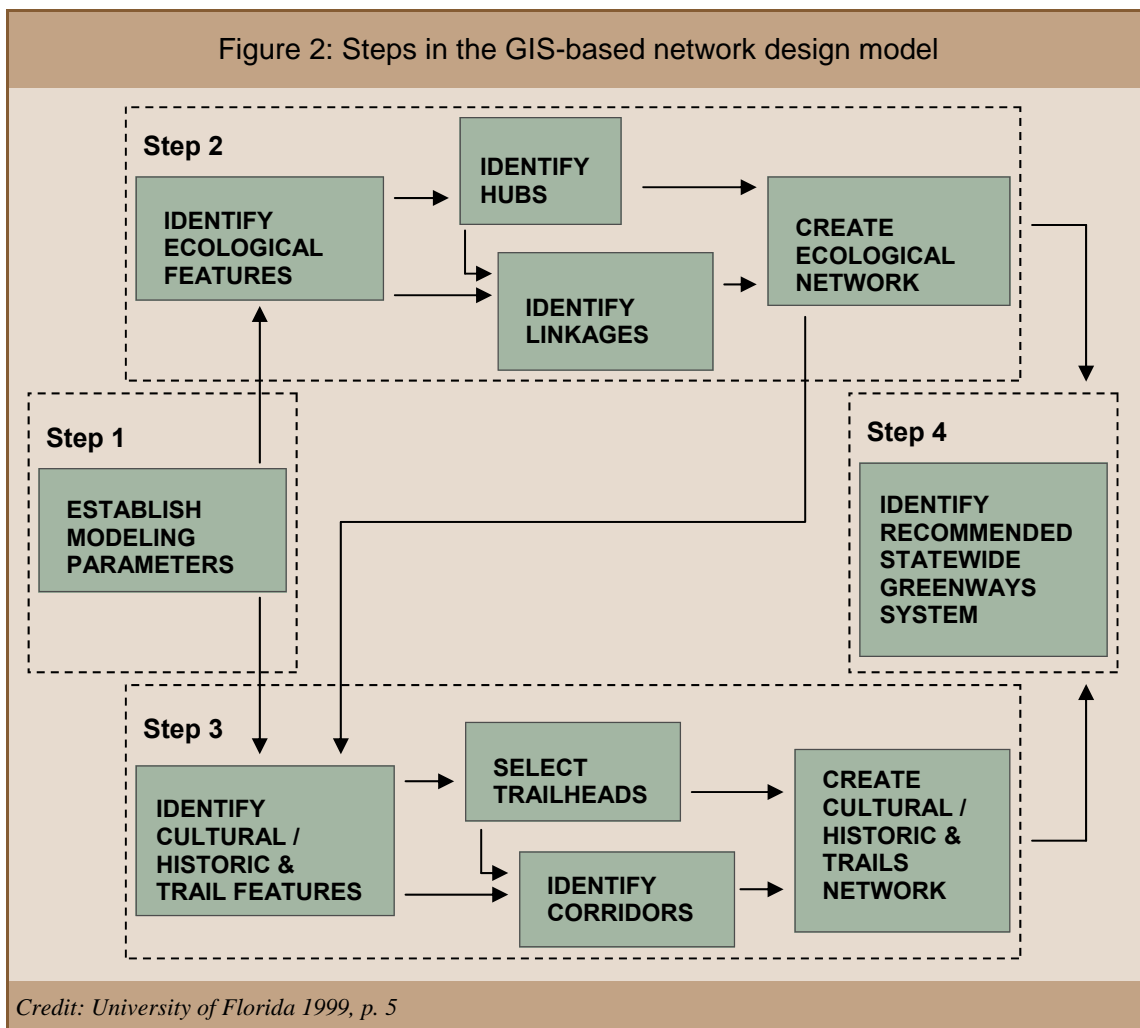
“One of the best hopes for protecting and restoring natural patterns of plant and animal life and the ecosystems that support them is the creation of a statewide, integrated conservation system. This integrated system would build upon the conservation of threatened or endangered ecosystem types, ‘hotspots’ of endangered species, and underutilized habitats, and connect them through a system of greenways that transcends landscapes. When considered from a statewide view, the system would facilitate their interconnection and emphasize the sense of place that is quickly disappearing for many Floridians.”

Florida Greenways Commission 1994, p. 42

Process of Designing the Ecological Network

The Florida Ecological Network, the ecological component of the statewide greenways system, was designed (Figure 2) by University of Florida personnel in consultation with the Commission and the FGCC on the basis of six strategies to conserve the state's native ecosystems and landscapes:

- identify and conserve an integrated, statewide system of greenways that encompasses the full range of Florida's native ecosystems and landscapes;
- use Florida's rivers, springs, lakes, and other inland and coastal aquatic features as strategic building blocks in the statewide greenways system;
- link a full range of regional landscapes through Florida's system of greenways that include publicly owned lands harboring native ecosystems and privately owned, highly managed forestry and agricultural properties;
- plan and manage the statewide system of greenways using the best information available about the requirements of Florida's native ecosystems and landscapes;
- address native ecosystem conservation and human use compatibility issues by developing greenway design and management guidelines; and
- undertake and/or support the research and monitoring efforts necessary to effectively plan and manage native ecosystems and landscapes within Florida's system of greenways.



The design goals for the Florida Ecological Network were to:

- conserve critical elements of native ecosystems and landscapes;
- restore and maintain connectivity among native ecological systems and processes;
- facilitate the ability of ecosystems and landscapes to function as dynamic systems; and
- maintain the evolutionary potential of the components of the ecosystems to adapt to future environmental changes.

In the first phase of development of the Ecological Network, a GIS-based design model was used to categorize both natural and built landscape features for their significance and compatibility with ecological conservation objectives. GIS data included natural areas and features; geological forms; soil types; watershed boundaries; wetlands; water bodies; floodplains; wildlife movement corridors; endangered species habitats; nature-based trails and parks; outdoor education sites; cultural and historical resource sites; distribution and type of built structures; existing and planned roads, railways, and trails; and political boundaries.

To identify the hubs in the Ecological Network, a composite map was made of the highest ranked ecological landscape features. Then parcels unsuitable because of a high density of roads or inappropriate land uses were removed. Next, a minimal area filter was selected and applied to identify areas large enough to support important wildlife species and essential ecological processes. To identify linkages among the hubs, first the lands providing a certain type of linkage, such as riverine habitat, were identified. Then a “suitability surface” was created to evaluate the ability of the lands between the hubs to serve as linkages. Next, the most suitable path between the hubs or sites was identified, and the link was optimized by adding other appropriate lands.

The University of Florida team used coarse and fine filters in designing the network so that it would support the greatest level of native biodiversity. The coarse filter identified and protected entire ecosystems or communities and all of the associated species. Fine filters targeted the habitat needs of specific threatened



or endangered species, such as the Florida panther. This type of analysis helped to ensure protection for species with particularly large or specific habitat requirements.

In the final ecological modeling step, these hubs and linkages were combined to create a preliminary design (Figure 3) for the Ecological Network, which included approximately 57% (22.8 million acres) of the state’s land and open water. Open freshwater, coastal waters, existing public conservation lands, and private preserves composed 53% of the Ecological Network (the five largest hubs were national parks and wildlife refuges, national and state forests, and U.S. Air Force lands), and proposed public conservation lands

Figure 3: University of Florida GIS-modeled statewide Ecological Network



Credit: University of Florida 1999, p. 7

composed 10%. Other private lands made up the remaining 37% of the network, approximately one-third of which were wetlands or within the 100-year floodplain. After the preliminary network design was finished, “human benefit areas” were added, such as lands connecting the trail network to cities and cultural sites.

The design results (Table 1) demonstrate that Florida's ecological network modeling approach was effective in identifying the land that should be conserved statewide. If a significant part of the network is ultimately protected, the greenways system planning effort will have succeeded in advancing strategic land conservation in Florida.

Table 1: Ecosystems in the Ecological Network

| Ecological community type | Total area (hectares) | Area in existing conservation lands (hectares) * | Area in Ecological Network (hectares) * | Increase in protected area suggested by Ecological Network (hectares) * |
|------------------------------|-----------------------|--|---|---|
| Coastal strand | 4,281 | 3,145 | 3,475 | 330 |
| Dry prairie | 519,895 | 133,334 | 422,050 | 288,716 |
| Pinelands | 1,651,235 | 413,066 | 1,076,578 | 663,512 |
| Sand pine scrub | 131,708 | 105,501 | 117,500 | 11,999 |
| Sandhill | 390,056 | 146,250 | 248,888 | 102,638 |
| Xeric oak scrub | 52,628 | 22,272 | 38,967 | 16,695 |
| Mixed hardwood-pine forest | 387,889 | 46,532 | 197,300 | 150,767 |
| Hardwood forest | 818,030 | 185,651 | 530,194 | 344,544 |
| Tropical hardwood forest | 5,872 | 3,313 | 4,210 | 897 |
| Saltmarsh | 195,710 | 121,584 | 182,616 | 61,032 |
| Freshwater marsh-wet prairie | 1,153,285 | 778,923 | 1,023,724 | 244,801 |
| Cypress | 621,504 | 253,454 | 546,964 | 293,509 |
| Mixed hardwood swamp | 1,076,484 | 276,915 | 864,698 | 587,783 |
| Bay swamp | 57,968 | 16,763 | 47,102 | 30,339 |
| Shrub swamp | 252,327 | 152,976 | 222,950 | 69,974 |
| Mangrove swamp | 229,012 | 198,100 | 221,703 | 23,603 |
| Bottomland hardwoods | 40,033 | 23,532 | 39,926 | 16,394 |

* Values are from 2000

Adapted from: Hctor et al., 2000

Refining the Ecological Network

Prioritization and Critical Linkages

As recommended in the FGCC's 1998 "Connecting Florida's Communities" report, ten critical linkages between important protected areas in regions with heavy growth pressure were identified by the University of Florida and adopted by FGTC as the highest priorities for state protection. The prioritization process included the following steps:

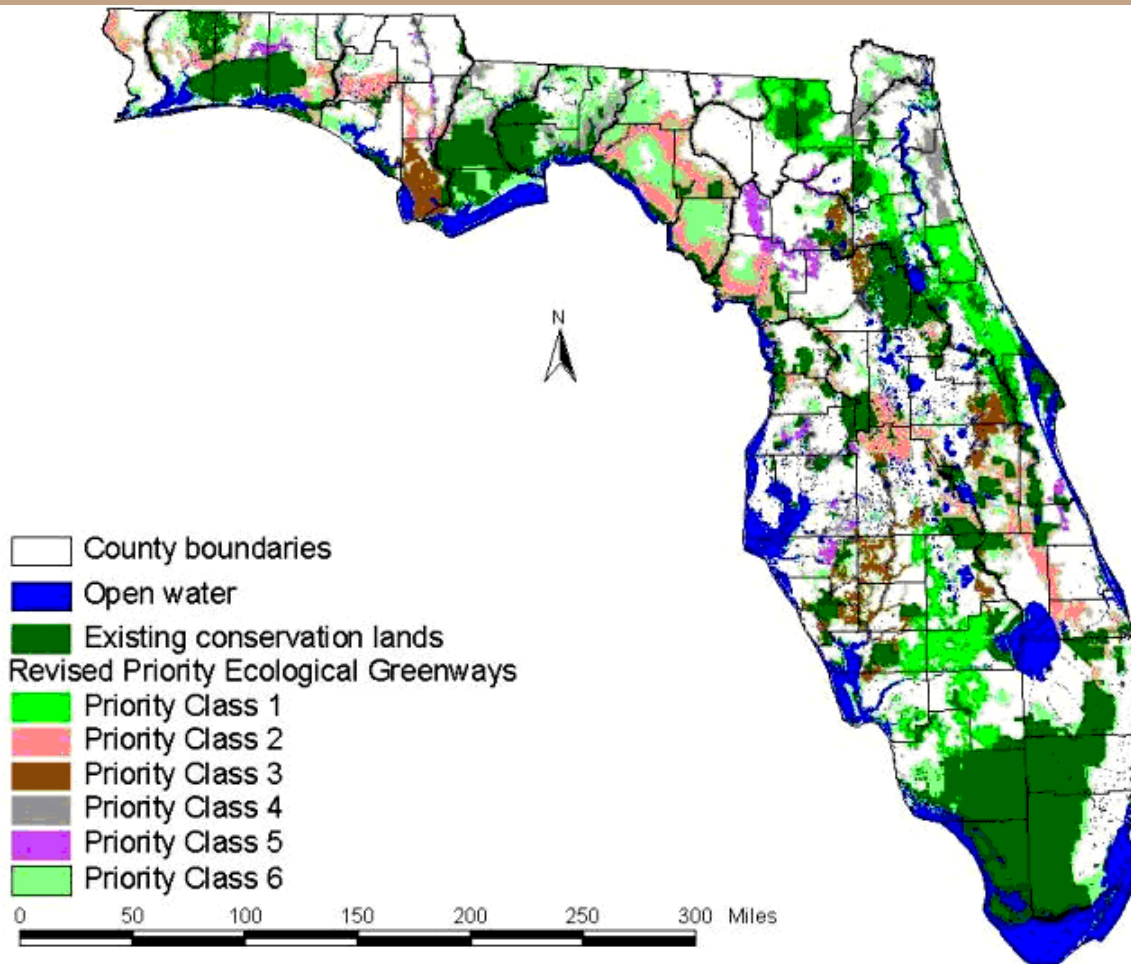
- meetings among state and regional officials to discuss criteria and data for selecting priorities;

- development by cooperators at the University of Florida of a GIS methodology to rank lands within the network for their relative value to statewide connectivity;
- application of additional filters to lands identified as high and moderate priorities to rank their potential importance as riparian corridors or to wide-ranging species such as bears and panthers; and
- identification of six priority classes.

The critical linkage identification process included the following steps:

- prioritization based on ecological criteria (Figure 4) and level of development threat (Figure 5), first

Figure 4: Ecological greenways prioritization results



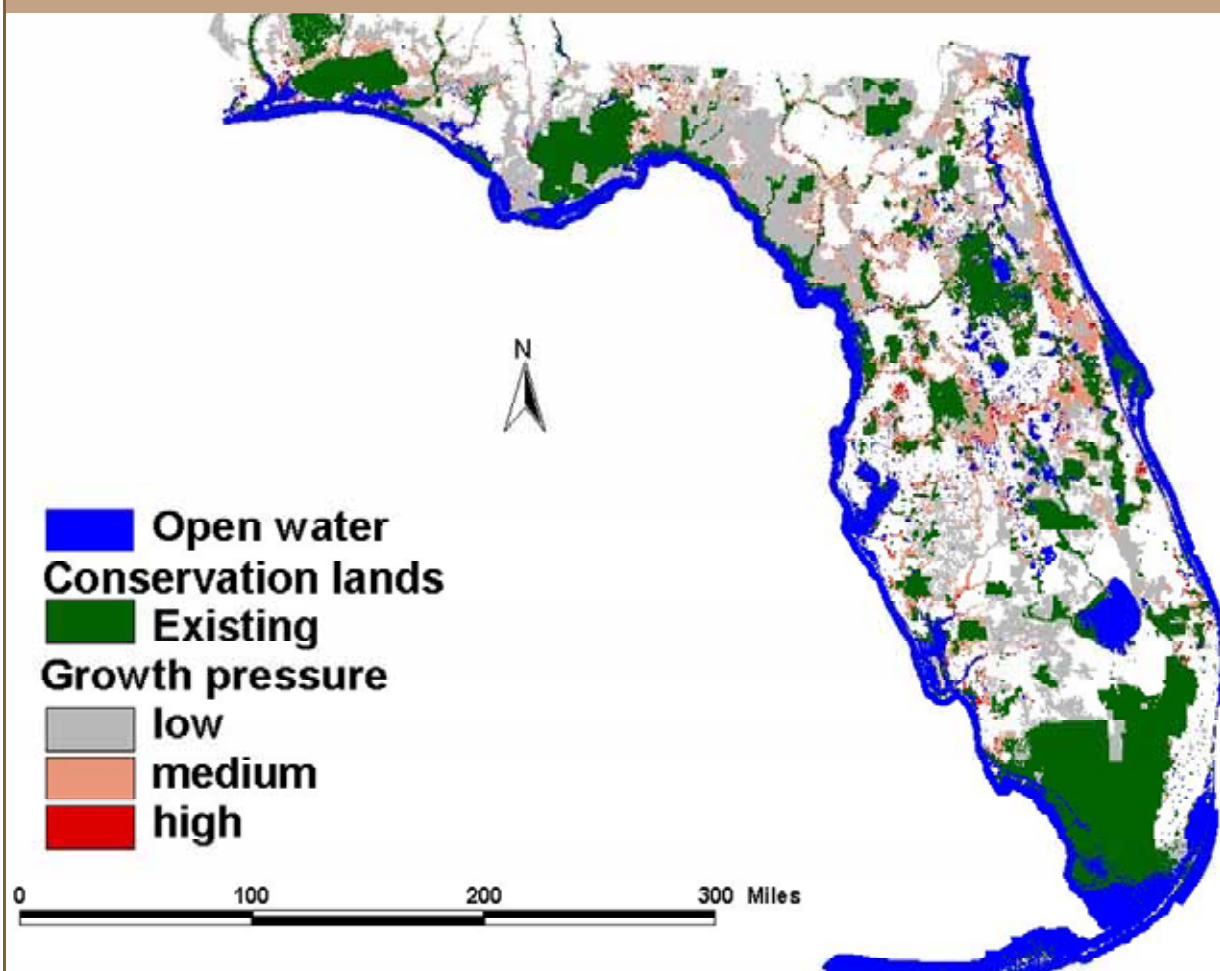
Credit: University of Florida, and Office of Greenways & Trails, FDEP. n.d., p. 4

separately through GIS models, then together (Figure 6) through application of a matrix; and

- compilation of a candidate list (24 linkages), which was winnowed to ten through the application of standard questions about:
 - ⇒ the degree to which an area was critical to completion of the statewide network and nearby linkages;
 - ⇒ the likelihood of conversion of an area to an incompatible use in the near future; and
 - ⇒ the analysis of land ownership patterns to assess the feasibility of purchase.

The FGTC-adopted critical linkages (Figure 7) encompass about 2.7 million acres, of which about 17% and 30% is existing and proposed conservation land, respectively; more than 50% is private land. Purchase options are being pursued for many of these properties through Florida Forever and other land conservation programs.

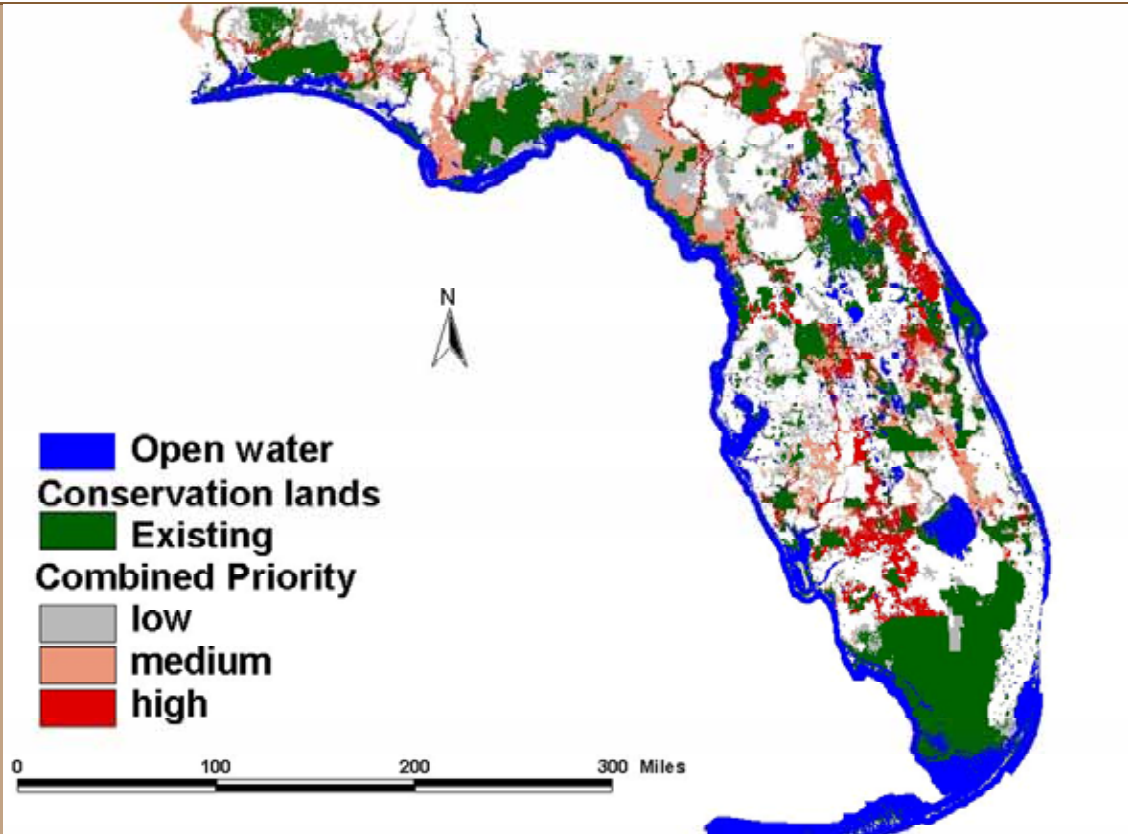
Figure 5: Growth pressure model within the Ecological Greenways Network



Credit: University of Florida, and Office of Greenways & Trails, FDEP. n.d., p. 7

Figure 6:

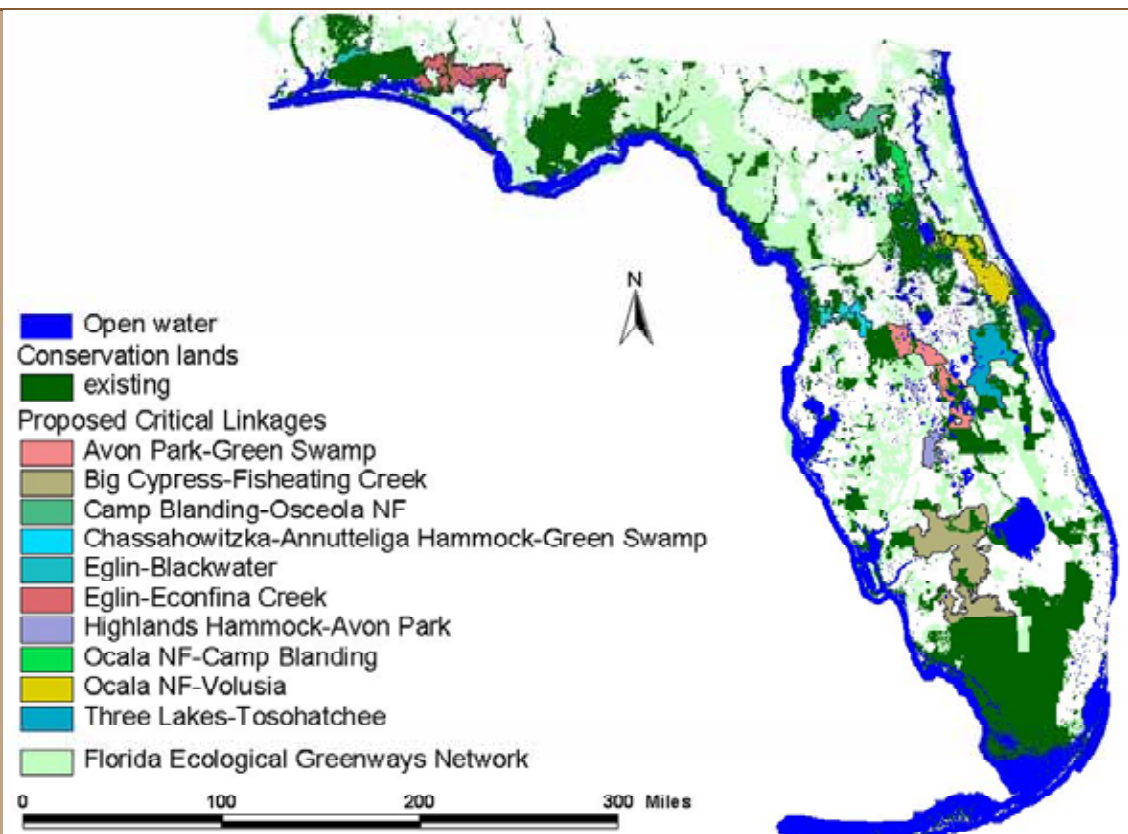
Combined ecological greenways priorities



*Credit:
University of
Florida, and
Office of
Greenways &
Trails, FDEP.
n.d., p. 9*

Figure 7:

Critical linkages approved by the Florida Greenways and Trails Council



*Credit:
University of
Florida, and
Office of
Greenways &
Trails, FDEP.
n.d., p. 12*

Designation as Part of the Florida Greenways and Trails System

Also as recommended in the FGCC's 1998 report, a process was developed for designating lands and waterways as part of the Florida Greenways and Trails System. As of late 2004, the OGT had designated more than 700,000 acres of land and nearly 1,500 miles of land and water trails in the system. Among the designated lands is the first private designation, which was completed in 2003 and provides access for a key segment of the congressionally designated Florida National Scenic Trail on private land. Designation ensures that components of the system further the purposes, goals, and objectives of the system; ensures an inclusive and interconnected system of greenways; encourages voluntary partnerships in conservation, development, and management of system components; recognizes individual components and the partners involved; and raises public awareness of the system and its benefits.

For designation of an individual component of the system, a project sponsor, who can be any interested person or group, submits a designation application, which includes written expression of willingness to proceed from all landowners and managers. DEP then evaluates the application and negotiates an agreement. The application is then reviewed by the FGTC, and public comment is invited. FGTC recommends approval or disapproval to the Secretary of DEP, who makes the final decision. Periodic reports are required to ensure that the natural and other resources of the area are being maintained.

Designation brings public recognition to Florida's greenways efforts. DEP will sometimes work out a management, patrol, and protection agreement with the landowner, although public access to designated sites is not required. The owner of a designated greenway is protected from liability for third-party use of the land. DEP may also identify opportunities for management and restoration funds for designated lands.

Another phase of designing the Ecological Network involved public review of the results of the GIS model and incorporation of public comments into the plan.

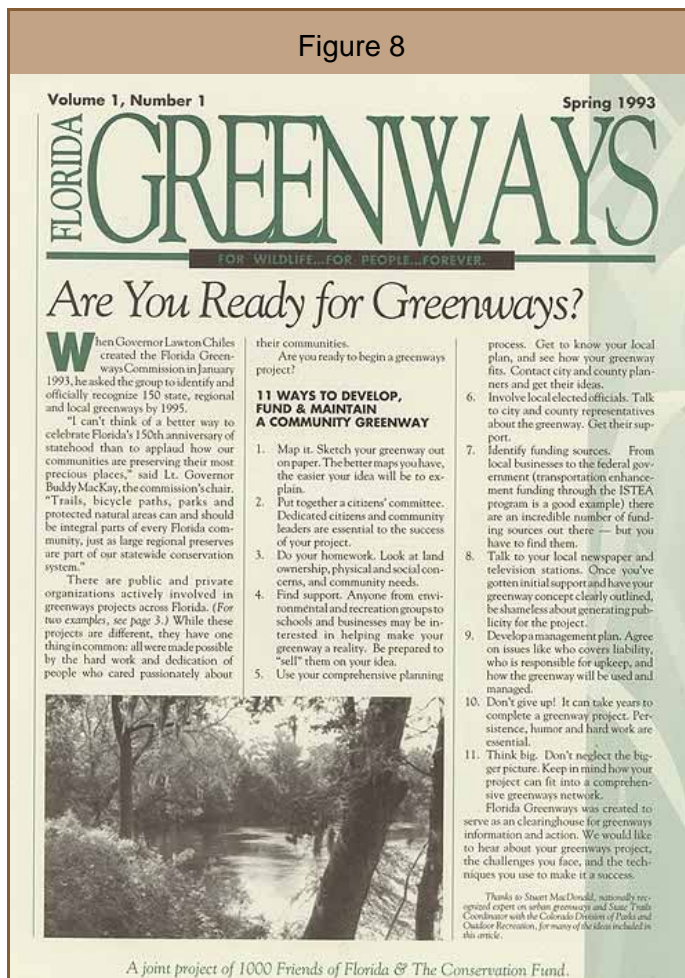
Public Process/Outreach

1991–1995

Between 1991 and 1995, members and staff of the Florida Greenways Program and the Florida Greenways Commission did considerable work to get the word out about greenways. They designed and distributed a quarterly newsletter (Figure 8) and a series of fact sheets about greenways issues and projects. They sponsored several workshops and roundtables related to greenways planning and sought and received funding for four prototype greenways projects around the state.

Under the auspices of the Commission, press releases were issued on project milestones to keep the public up to date. Commission members and Florida Greenways Program staff partnered with Walt Disney World, Inc. to produce a video and slide show about the proposed statewide greenways system.

Figure 8



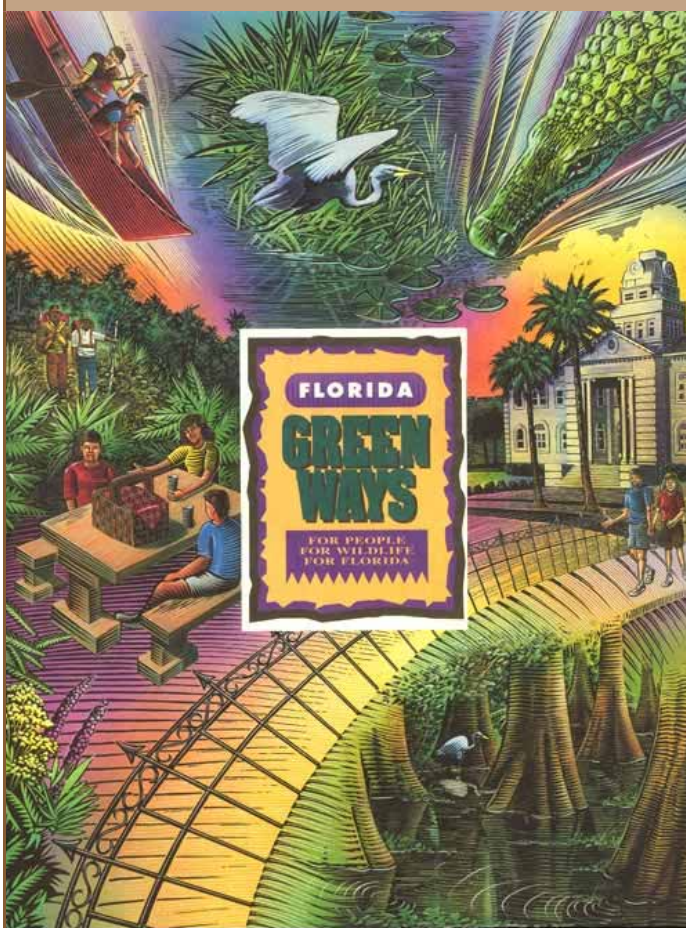
They also partnered with the National Park Service's Rivers, Trails, and Conservation Assistance Program (RTCA) to design and distribute a Florida Greenways poster (Figure 9). RTCA staff took the lead with Commission members and Florida Greenways Program and DEP staff to design and facilitate five public forums around the state in late 1994 to inform the public about greenways and the concept of a statewide greenways system, to supply information on existing and proposed greenway initiatives in surrounding areas, to provide an overview of the Commission's mission and work to date, and to seek input on the Commission's draft findings and recommendations.

A critical public awareness campaign involved a celebration of "150 Greenways Across Florida" to coincide with Florida's sesquicentennial in 1995. The goal was to create public excitement and support for

the state's greenways system. Citizens, governments, and groups were encouraged to nominate greenways for inclusion in the celebration. Then, over a six-month period, the governor officially recognized 150 examples (Figure 10) of the different kinds of greenways that would make up the Florida greenways system. Organizations representing recognized greenways received a framed proclamation from the governor. Each greenway was included in a commemorative map/brochure, and permission was given to use the official Florida sesquicentennial celebration logo and special signage in publicizing the selected greenways. A key part of the celebration included local events held at recognized greenways around the state.

In 1995 the Commission also funded 32 small grants for projects that stimulated or supported community greenway initiatives. These grants of up to \$1,000 were made possible through support from the American Express Foundation and the John D. and Catherine T. McArthur Foundation.

Figure 9



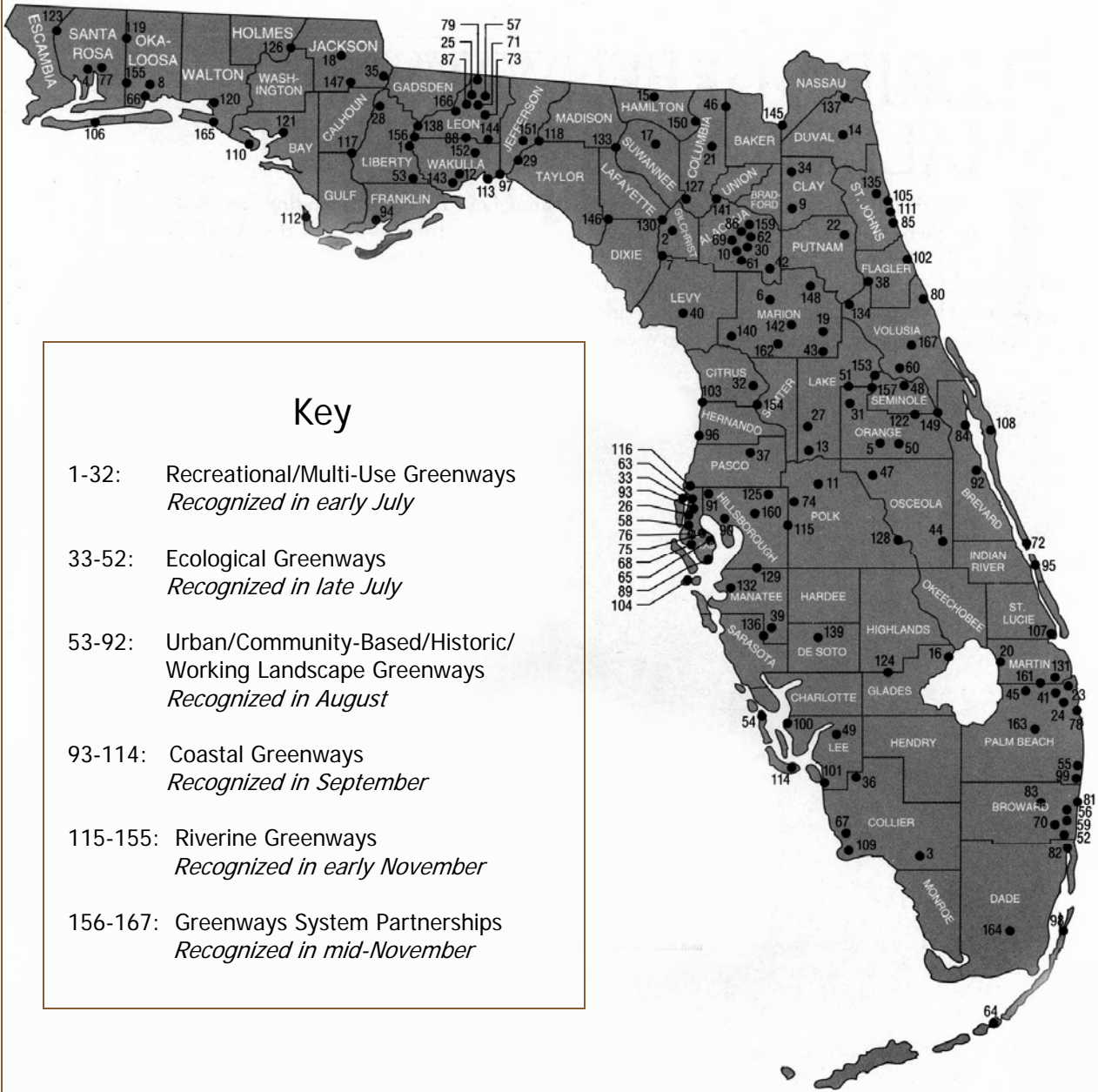
Credit: Florida Greenways Commission

1995–1997

Phase I (1995–1996) of public outreach under the FGCC involved review of the design goals, objectives, assumptions, and data for the Ecological Network. Phase II (1996–1997) involved public review of the preliminary network design results. Four series of public participation forums were held:

- ten sessions of the Florida Greenways Workshop Series in 1996, planned by FGCC in partnership with RTCA, featuring an overview of the Florida Greenways Program, a briefing on design procedures and processes for the system, and a mapping exercise;
- six public hearings sponsored by the Regional Greenways Task Forces, one hearing in each region, in 1997;
- two public hearings sponsored by the FGCC in 1997 for review of the preliminary network design and the recommendations of the regional task forces; and
- review and input from private landowners (1997). Any landowner whose property was included in the network was given the option of removing the property from consideration.

Figure 10: Greenways recognized in 1995 as part of Florida's sesquicentennial celebration



Credit: Florida Greenways Commission

“... linking natural areas and recreational corridors, conservationists and recreationists with urban dwellers, and neighborhoods and towns with cities and people of all colors and stations—not just in the use of greenways but in the making of them.”

— Florida Greenways Commission 1994,
in Florida Department of Environmental Protection and Florida Greenways Coordinating Council 1998, p. A-2

Results and Products

It may be most clear to think of results and products according to the leadership body that produced each.

Florida Greenways Program of 1000 Friends of Florida and the Conservation Fund

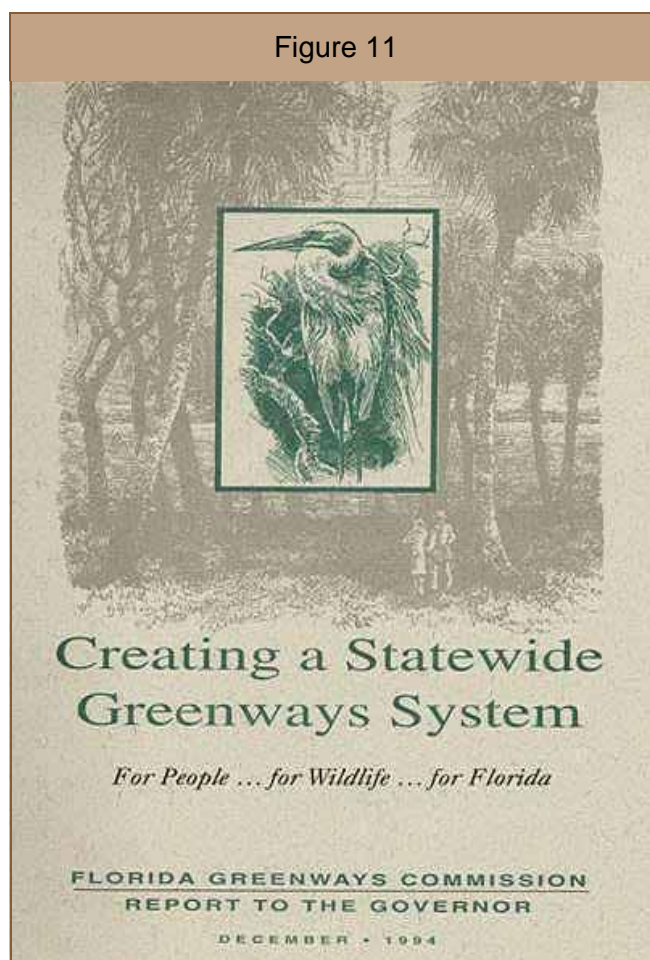
- Developed the concept and framework for a statewide greenways system and succeeded in selling the concept to the governor, who created the Florida Greenways Commission to flesh out specific goals and an implementation plan for the system.

Florida Greenways Commission

- Prepared the 1994 report entitled “Creating a Statewide Greenways System: for People...for Wildlife...for Florida,” (Figure 11) which recommended that the greenways system should be composed of two networks: the Ecological Network, consisting of ecological hubs, linkages, and sites along rivers and coastlines and across watersheds, and the Recreational/Cultural Network, consisting of trail corridors connecting parks, urban areas, working landscapes, and cultural/historic sites. Other recommendations in this report, which was prepared for the state legislature and the governor, were critical for the continuation of the program:
 - ⇒ create an institutional framework that supports state and community greenway initiatives and coordinates government and private sector greenway efforts;
 - ⇒ stimulate public and private sector awareness, involvement, and action in creating and managing greenways;
 - ⇒ design and manage a statewide system of greenways that provides essential ecological linkages to conserve critical elements of Florida’s green infrastructure of native ecosystems and landscapes and facilitates the ability of these ecosystems and landscapes to function as dynamic systems and maintain the evolutionary potential that will allow them to adapt to future environmental changes;

- ⇒ incorporate urban open space, working landscapes, historical sites, and cultural resources in Florida’s system of greenways;
 - ⇒ design, develop, and maintain trails throughout Florida that provide public access to and promote appreciation, support, and conservation of the natural, cultural, and historical features of the system; and
 - ⇒ educate and inform diverse audiences about the concept of greenways and the statewide system.
- Based on the recommendations in the Report, the Florida legislature in 1995 created the FGCC. The legislation identified the Florida Department of Environmental Protection as the lead state agency and charged both FGCC and DEP with developing an implementation plan for the statewide greenways program by 1999.

Figure 11



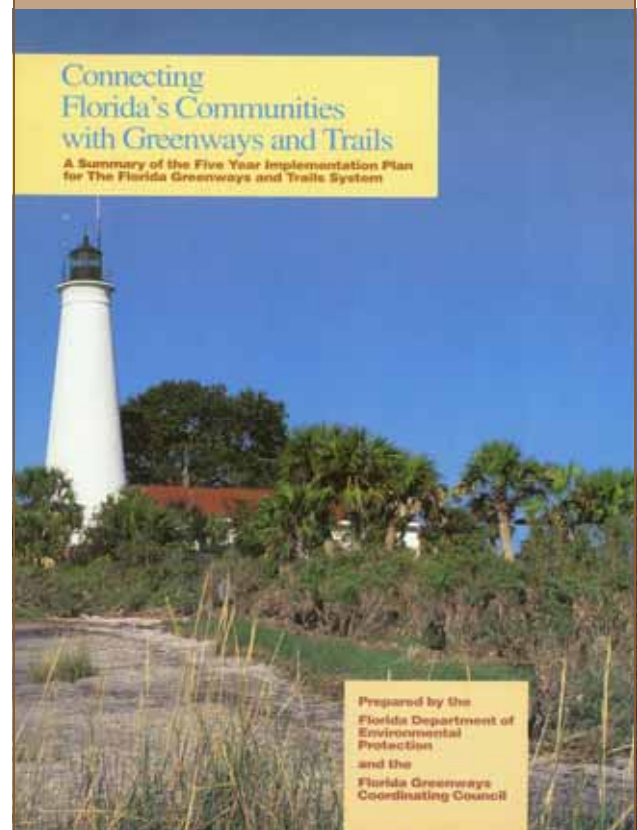
Florida Greenways Coordinating Council

- Prepared a five-year implementation plan for the Florida Greenways and Trails System, entitled “Connecting Florida’s Communities with Greenways and Trails” (1998) (Figure 12). The plan called for revisions to the mapping effort and implementation strategies over time as circumstances changed and opportunities arose. Revisions were slated to occur on the basis of the prioritization of lands for acquisition or protection; the annual identification of the most critical linkages in the state; the addition of newly designated components of the Florida Greenways and Trails System; and ongoing maintenance of the data and results of the GIS-based network design model. The report’s recommendations set the tone for inception of Florida’s greenways system:
 - ⇒ Focus resources toward the most significant components of the Florida Greenways and Trails System.
 - ⇒ Adopt a process to designate lands and waterways as part of the Florida Greenways and Trails System.
 - ⇒ Stimulate awareness, involvement, and action in public and private groups that can help create and manage local greenways and trails and components of the regional and statewide system.
 - ⇒ Provide additional resources to local, regional, state, and federal agencies and private landowners to acquire, protect, develop, manage, and maintain lands for greenways and trails.
 - ⇒ Develop mechanisms to coordinate management within the Florida Greenways and Trails System.
 - ⇒ Educate and inform Florida’s residents and visitors about the value of the state’s greenways and trails system.

Florida Greenways and Trails Council

- Approved the prioritization of areas within the Ecological Network as a precursor to identifying critical linkages.
- Identified as the highest priorities for state protection ten critical linkages between important protected areas in regions with heavy growth pressure.

Figure 12



- Updated the original Recreational/Cultural Network to reflect the significant progress made in trails master planning since the original network was delineated. Prioritized all segments.

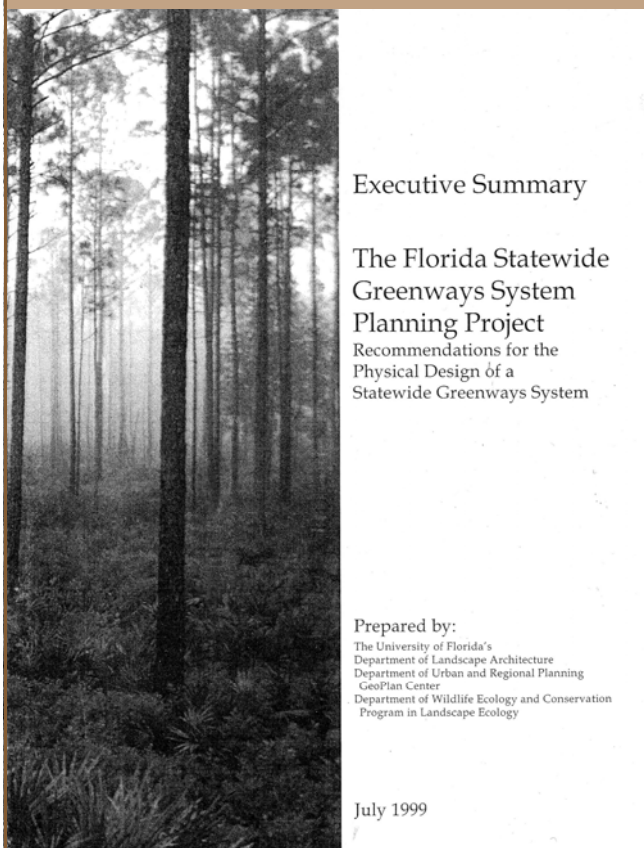
Florida Department of Environmental Protection, Office of Greenways & Trails

- Responsible for implementation of the Statewide Plan for Greenways and Trails.
- Established an official greenways designation process under which more than 700,000 acres and nearly 1,500 miles of land and water trails have been designated.
- Tied the Florida Greenways and Trails Acquisition Program to the Opportunity Maps for the Recreational/Cultural Network, so that only trails within opportunity corridors are eligible for funding.
- Pursuing acquisition of the ten critical linkages through conservation land buying programs such as Florida Forever.

University of Florida

- Catalogued and mapped all conservation lands and trails in Florida.
- Developed a GIS-based model and used it to design Florida's statewide greenways system.
- Prepared the report "Florida Statewide Greenways System Planning Project: Recommendations for the Physical Design of a Statewide Greenways System" (1999) (Figure 13).
- Developed GIS-based process for prioritizing and identifying critical linkages statewide.
- Assisted with the development of the report "Identification of Critical Linkages within the Florida Ecological Greenways Network," which included recognition of 10 priority landscape linkages around the state.
- Developed and applied procedures for updating the ecological and trails networks.

Figure 13



Land Management/ Stewardship

The three commissions/councils were not directly involved in land acquisition, so management and stewardship of the lands in the network did not fall under their purview.

A whole host of tools is currently used to protect land in Florida—everything from fee simple acquisition, conservation easements, storm water management, and mitigation banking to floodplain regulations, conservation development, parks and open space programs, historic/archeological site protection, and implementation of best management practices for working lands.

Financing, Costs, and Benefits

Financing

Between 1991 and 1995, private funding to support development of Florida's vision for a statewide greenway system came from the Surdna Foundation, the John D. and Catherine T. MacArthur Foundation, the Elizabeth Ordway Dunn Foundation, the National Fish and Wildlife Foundation, and the American Express Foundation. In 1994, 1000 Friends of Florida received \$150,000 from the Florida Department of Transportation's (FDOT) Intermodal Surface Transportation Efficiency Act (ISTEA) Enhancements Program. These funds were used to support the work of the Commission in 1994 and 1995, including the initial Florida greenways system data collection undertaken by the University of Florida. In 1995, Florida DEP received approval for \$2 million from FDOT's ISTEA Enhancements Program. This funding was used to support the statewide greenways system planning work of FGCC and DEP as well as the GIS-modeling and system design work undertaken by the University of Florida. The greenways system was eligible for this federal money because the department was charged with mitigating the environmental impacts of roads and other transportation infrastructure projects and with increasing public involvement in planning for transportation options, and because greenways allow for alternative means of transportation.

Preservation 2000

Much of the land acquisition for greenways and trails was coordinated under the Preservation 2000 (P-2000) program, which provided \$3 billion for public acquisition and protection of more than 1.7 million acres of land over 10 years. Of that, funds for the Conservation and Recreation Lands (CARL) program and the Save Our Rivers (SOR) program best represent spending to protect the Ecological Network, although not all of the acquisitions through these programs were lands in the network. CARL and SOR together protected nearly 1.5 million acres for a cost of \$2.3 billion. The Florida legislature authorized use of P-2000 funds for greenways and trails acquisitions starting in 1996.

Florida Forever

The major land acquisition program in the state is now Florida Forever, which is scheduled for funding at about \$105 million per year through 2010. In addition to land acquisition through fee simple and conservation easement transactions, the goals of this program include restoration of damaged ecosystems, water resource development and supply, increased public access, and public lands management and maintenance. Inclusion in the Ecological Network is one of the criteria by which lands proposed for purchase under Florida Forever are selected. In addition, components of the ten critical linkages are being pursued for acquisition under Florida Forever.

Costs and Savings

A few hundred thousand dollars of funding from private foundations allowed program leaders to garner several million dollars of state funding and in-kind support to continue and expand the program. Preservation of natural lands reduced the need for and taxpayer costs of new roads, utilities, schools, public safety, and other gray infrastructure.

Benefits

The plan used to design the GIS-based model that identified the hubs and links has served as the prototype for several other statewide and regional greenways programs. The Ecological Network protects Florida's native biodiversity, provides landscape linkages for wildlife and healthy fisheries, protects drinking water supplies, guards against flooding and erosion, purifies the air, protects natural viewsheds, increases tourism—a \$3 billion per year income generator for the state—and overall business incomes by improving the quality of life, and increases property values and tax bases. Support for the network has increased developers' interest in sustainable growth models, strengthened citizens' connections to the land, and fostered support for natural resource conservation.



Photo by Gary M. Stolz / USFWS

Application of Green Infrastructure Principles

Principle 1: Protect green infrastructure before development.

The Ecological Network was designed so that land acquisition decisions could be made proactively, by prioritizing lands based on their ecological value for wildlife habitat and provision of services such as water quality protection, rather than reactively, under imminent threat of development.

Principle 2: Engage a diverse group of stakeholders.

The composition of the Commission and the councils was purposely formulated to represent all the interests in the program, from the tourism and agricultural industries to private landowners, conservationists, and recreationists. Public involvement in the design of the network and education about the benefits of greenways were key goals of the program.

Principle 3: Linkage is key.

The network connects ecologically important hubs and sites using ecologically valuable links such as rivers and wetlands. The program also fosters connections among groups with disparate interests that might not ordinarily work together.

Principle 4: Work at different scales and across boundaries.

The Ecological Network includes hubs, which are large, regionally important protected areas or entry points, and sites, which are smaller or more locally important areas. The network cuts across county, local, and watershed divisions, necessitating a cooperative planning and implementation effort. This helps people to see that natural ecosystems rarely align with jurisdictional boundaries and therefore require joint management. Network design also involved people with many interests: water managers, environmental educators, historic and cultural resource managers, recreationists and recreation-based business owners, downtown redevelopment concerns, and all levels of government, to name only a few.

Principle 5: Use sound science.

The GIS-based network design model developed by the University of Florida allowed unbiased analysis of the ecological value of various pieces of land. The model accounted for vegetation, land use, water management potential, connectivity to other natural areas, and human population patterns, among many other landscape features. Land acquisition could be prioritized on the basis of this analysis.

Principle 6: Fund up-front as a public investment.

With the startup money provided by private foundations, \$2 million was secured from the Florida Department of Transportation. DEP was named the supporting state agency, and its long history of support for public land acquisition continued.

Principle 7: Green infrastructure benefits all.

Through the public education campaign, citizens were made aware of the benefits of greenways to all people and nature. Benefits from the Ecological Network include protection of native flora and fauna, provision of wildlife corridors, protection of drinking water supplies, safeguard against flooding and erosion, purification of the air, support for tourism and other businesses, improvement in the quality of life, protection of natural viewsheds, increase in property values, greater interest in sustainable growth models, strengthened connections of citizens to the land, and improved support for natural resource conservation.

Principle 8: Make green infrastructure the framework for conservation and development.

There are two components to the Florida greenways and trails system: the protection of ecologically important sites (Ecological Network) and the provision of recreation and alternative transportation options (Recreational/Cultural Network). The greenways system was founded on the basis of the former component, but the latter component is a big selling point for the public and government officials. The program obtained state transportation funds because of the need to mitigate the impacts of transportation infrastructure projects and to encourage more public involvement in transportation planning.

Evaluation

The framework of the Florida greenways program was used in part to develop The Conservation Fund's principles, elements, and strategies of green infrastructure planning. These points serve as a guide for founders of new green infrastructure programs around the country.

Unique, innovative, or outstanding elements

- Advanced concept of statewide integrated habitat conservation system.
- Overseen by diverse leadership bodies that reflected the various interests in the program. Successfully transitioned from a nonprofit-led program to a continuing state government-led program.
- Developed groundbreaking procedures for constructing GIS database and models on which decisions about the design of the network were made. Procedures later adapted for similar analysis by at least five other jurisdictions on the East coast and in the Midwest.
- Featured public involvement and education as key goals. Heightened public awareness of the greenways system and of the benefits of the system.
- Funded in the early stages by both public funds from the Florida Department of Transportation and private funds from philanthropic foundations.

Key problems, challenges, or missing pieces

- Selling the concept of a statewide greenways system and making it relevant in economically hard times.
- Keeping all the diverse stakeholders and interests working toward a common goal of protecting ecosystems.
- Managing land protection through the various state funding sources, with their different rules and requirements.
- Rapid rate of growth and change in Florida's population and land use and the resulting

challenges posed in keeping the design model and land prioritizations current.

- Keeping the statewide vision of the greenways system relevant at the local and regional levels.

Lessons learned or experience gained

- Expanded and advanced concept of statewide integrated habitat conservation system.
- Developed innovative and adaptable procedures for gathering data for and designing a GIS-based ecological network model for greenways evaluation.
- Laid framework for development of nationally applicable principles, elements, and strategies for green infrastructure network planning, design, and implementation.



Photo by Herb Stein / USFWS

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Additional information about green infrastructure concepts and approaches can be found at www.greeninfrastructure.net.



Photo courtesy of Florida Department of Environmental Protection



Photo courtesy of Florida Department of Environmental Protection

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Photo courtesy of Florida Department of Environmental Protection

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About Green Infrastructure

Green infrastructure is a strategic approach to land and water conservation that links lands for the benefit of nature and people, helps identify conservation priorities, and provides a planning framework for conservation and development. Green infrastructure is different from conventional approaches to conservation because it looks at conservation values and actions in concert with land development and growth management. Green infrastructure projects bring public and private partners together to work collaboratively toward a common land conservation goal. They help move beyond jurisdictional and political boundaries by providing a process for identifying, protecting, and restoring interconnected green space networks that conserve natural ecosystem functions and provide associated benefits to human populations. The green infrastructure approach appeals to people concerned about biodiversity, habitat, and land conservation as well as people interested in open space and land use planning at the community, region, or statewide scale. It also appeals to smart growth advocates because of its potential to lessen impacts and reduce the costs of built infrastructure.

Green Infrastructure Case Study Series

This series of case studies highlights successful and innovative green infrastructure projects from around the country. The series was undertaken so that readers can learn from and improve upon approaches tried by others. We hope that thorough, well-documented examples will allow readers to see the many possibilities and to adapt successful practices to their unique situations and challenges. Each case study addresses the same basic pieces of the story: overview, highlights, background and context, process, public education and participation, results and products, management and stewardship, financing, application of green infrastructure principles, and evaluation. Eight principles of green infrastructure, which are elements of most successful efforts, form the core of the case studies. The series illustrates concrete, real-life examples of how to assess and protect green infrastructure, including details about how each step was implemented.

About The Conservation Fund

The Conservation Fund is a national, nonprofit land conservation organization that forges partnerships to protect America's legacy of land and water resources. Through land acquisition, community planning, and leadership training, the Fund and its partners demonstrate sustainable conservation solutions emphasizing the integration of economic and environmental goals. Since 1985, the Fund has protected more than 4 million acres of open space, wildlife habitat, and historic sites across America.

The Conservation Fund's Green Infrastructure Program was created in 1999 to build the capacity of land conservation professionals and their partners to undertake strategic conservation activities that are proactive, systematic, well integrated, and applied at multiple scales. The program is a cooperative effort of the Fund and multiple public and private partners. Program products include a national course, workshops and conference sessions, publications, case studies, demonstration projects, a website, and related educational materials.

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