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Conservation Strategies for a Globally Imperiled and Hyper-Fragmented Ecosystem: Acquisition, Regulations, Incentives and Outreach in Miami Dade County

Pine rocklands are a globally critically imperiled ecosystem with limited geographic range, characterized by a high biodiversity of endemic herbaceous plants and frequent fire intervals (2-5 years). In Miami-Dade County, approximately 2% of the forest outside Everglades National Park (ENP) remains. The County adopted a forest property tax program in 1979, passed a forest preservation ordinance in 1984, and created a land acquisition program in 1991. Outreach and filling in the gaps between preservation areas are critical for the survival of a number of species.

Keywords

urban land preservation, urban conservation, urban biodiversity

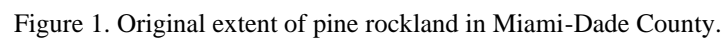
INTRODUCTION

Pine rocklands are a globally critically imperiled ecosystem with limited geographic range, characterized by a high biodiversity of endemic herbaceous plants and frequent fire intervals (2-5 years). In Miami-Dade County, approximately 2% of the forest outside Everglades National Park (ENP) remains. The County adopted a forest property tax program in 1979, passed a forest preservation ordinance in 1984, and created a land acquisition program in 1991. Outreach and filling in the gaps between preservation areas are critical for the survival of a number of species.

CONTEXT

In south Florida, pine rocklands evolved on a limestone formation called the North Atlantic Ridge. This ridge rises above the wetlands that dominated most of pre-drained south Florida and was coveted by early pioneers for homesteading, as it was one of the few places that didn't seasonally flood. Prior to regional drainage of the adjacent wetlands, pine rocklands were converted for agricultural and, eventually, other more intensive uses.

In 1975, a County forest inventory documented the almost complete disappearance of pine rocklands within Southeast Florida (Shaw 1975). A growing public awakening of environmental issues spurred the state of Florida and the County to enact policies and legislation to protect the remaining forests. Additionally, new approaches have been developed in recent years. The goal of these conservation interventions is to preserve biodiversity where the ecosystem no longer functions or when a particular species is at heightened risk of extinction. One successful program is Fairchild Tropical Botanic Garden's (Fairchild) Connect to Protect Network.



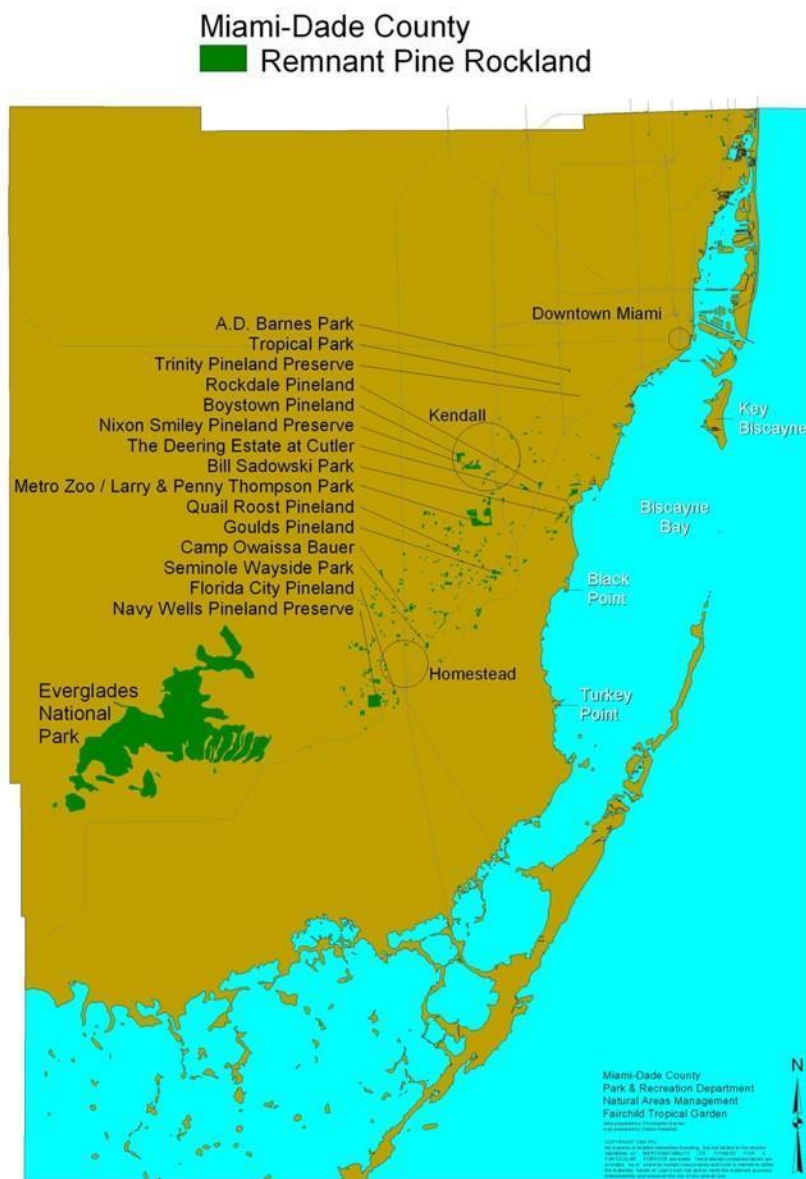


Figure 2. A representation of the remnant fragments of pine rockland habitat in Miami-Dade County

GOAL

The overall goal for the County's pine rockland conservation strategies is to preserve unique listed and endemic species and their associated habitats. The strategies are to conserve significant areas and connect them in the urban landscape using existing regulatory, incentive, acquisition, and outreach programs. The County leverages existing regulations to maximize conservation of species and habitat on public and private lands. An emphasis on existing regulations is important due to new regulatory preemptions.

A supporting objective is to manage fire-dependent plant and animal populations in a landscape that has been hyper-fragmented and traditional prescribed burning has become near impossible. This includes identifying fire surrogates and looking for opportunities in the urban landscape.

APPROACH

Much of the County's approach to conservation of pine rocklands is codified by local ordinance. Unfortunately, Florida is not friendly to restrictive regulations, however development of many regulatory tools preceded state prohibitions. A timeline of three portions of county code and description of the programs created by them follows:

- In 1979, a resolution passed by the Board of County Commissioners created an incentive program based on the recreational lands state property tax code. The program proffers a property tax reduction in exchange for a voluntary, ten-year covenant. This covenant transfers development rights and creates a management agreement for qualifying, privately held natural areas.
- In 1984, the County adopted a regulatory ordinance establishing the protection of Natural Forest Communities (NFCs). Forests identified on maps were deemed NFCs by resolution. Development of NFCs is restricted and all work requires a permit. If a property owner can demonstrate that the preservation of an NFC prevents a reasonable use of property, then a permit can be issued to destroy a portion of the NFC, generally limited to 20% of the forest. All remaining NFC shall be preserved and managed (restrictive covenant required).
- In 1990, the citizens of the county adopted a referendum that imposed two years of an extraordinary millage on property taxes for the Environmentally Endangered Lands (EEL) Acquisition Program.

The EEL program is a crucial part of public acquisition and management of pine rocklands. The legislative intent of the EEL program is to acquire, preserve, enhance, restore, conserve, and maintain environmentally endangered lands for this and future generations. Once a land is under EEL it is preserved in perpetuity. While the regulatory program and tax incentive programs affect private owners of forests, non-governmental programs have been looking to developed areas for conservation opportunities.

In 2007, Fairchild launched the Connect to Protect Network. This free program enlists homeowners and schools to include pine rockland plants into urban landscaping. Plants are provided and citizen science is emphasized.

RESOURCES

A history of efforts culminated in the programs that preserve pine rocklands, including local ordinances, regulations, a referendum, and policies adopted in the County's Comprehensive Development Master Plan. The public demand to support pine rocklands extended beyond

governance. Fairchild capitalized upon the unmet desire for rare pine rockland species by creating the Connect to Protect Network.

In 2012, the qualifying forest factors for the tax incentive and NFC program were incorporated into an updated quantitative evaluation form adopted by the Board of County Commissioners. Factors are presence of listed or endemic species, biodiversity, forest structure, forest size, habitat values, geology, and cover of exotic species. Additionally, the County code contains evaluation criteria used to nominate land to the EEL acquisition list. The criteria for evaluating the resource consists of biological value; vulnerability to degradation or destruction; the requirements (costs) for managing natural attributes; and the feasibility of meeting management requirements.



Image 1. The federally and Miami-Dade county endangered Goulds sandmat (*Euphorbia deltoidea ssp. adhaerans*)

KEY RESULTS

Local actions have been too little, too late in some cases. In the past century, the county has lost a number of species. Plant species include three global and fifty-one regional (USA) extinctions. A number of animal species native to Miami-Dade have been declared extinct, including two

butterflies declared extinct in 2012. Many under-studied taxa, such as invertebrates, are thought to have gone extinct prior to formal scientific study.

However, there are some encouraging signs. The Miami tiger beetle has been rediscovered after being considered extinct for over 50 years. The Florida bonneted bat, once considered the rarest mammal in North America, is now understood to be more abundant, and its largest population is in urban Miami-Dade County. Additionally, a number of invertebrates thought to be endemic to Miami pine rocklands are in the process of being formally described as new to science. Enough plant conservation efforts have occurred that extinction in the wild likely does not mean complete extinction. Fairchild has banked numerous pine rockland seeds. The programs listed below have made major strides in preserving what is left:

- Tax break covenants currently incentivize management on 418 acres of natural areas on private properties. These covenants only prohibit development during the minimum ten years the covenant is in effect. The covenants are entered into at the discretion of the property owner and run with the land.
- Regulatory covenants or easements permanently mandate preservation and management on 681 acres of privately and publicly held NFCs to date. Mostly, these covenants result from developing a portion of the forest.
- The EEL program has acquired 1,585 acres of pine rockland, with more acquisition in the works.
- Over 10,000 rare, native plants have been distributed to approximately 800 gardens (including 100 schools) through the Connect to Protect Network to date. Membership is approaching 1,000.

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