The Institute for Regional Conservation Pine Rockland Initiative Program

Restoring Globally Imperiled Pine Rockland Habitat in Miami-Dade County

By: Sarah V. Martin



The Institute for Regional Conservation Conservation of rare plants, animals, and ecosystems



Mission Statement:

A private non-profit organization, The Institute for Regional Conservation (IRC) is dedicated to the protection, restoration, and long-term management of biodiversity on a regional basis, and to the prevention of regional extinctions of rare plants, animals and ecosystems.

IRC works on conservation research and action throughout South Florida, the Caribbean and beyond. Our work is premised on an innovative idea of conservation that seeks to protect and restore viable populations of all plant and animal species within a region, rather than simply focusing on charismatic animals or plants with narrow global ranges.

Rare Plants of South Florida:

Their History, Conservation, and Restoration



George D. Gann Keith A. Bradley Steven W. Woodmansee



IRC Floristic Inventory of South Florida





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Gann, G.D., K.A. Bradley and S.W. Woodmansee. 2001-2013. The Floristic Inventory of South Florida Database Online. The Institute for Regional Conservation. Delray Beach, Florida USA.







The Institute for Regional Conservation Conservation of rare plants, animals, and ecosystems



Ipomoea microdactyla Griseb. Man-in-the-ground, 'Bejuco colorado'

<u>Plants of South Florida · Plants by Conservation Area · Plants by County · Plants by Habitat</u> <u>Submit Data · Quick Search · Advanced Search</u>

Family: Convolvulaceae

Group: Dicot

Substrate: Terrestrial

Habit: Vine

Perennation: Perennial

Native Range: Scattered in South Florida (Miami-Dade County) and the West Indies (Cuba, Bahamas, Puerto Rico [Mona Island only]).

Nature Serve Global Status: Imperiled

State of Florida Status: Endangered

FNAI State Status: S1S2

SOUTH FLORIDA Occurrence: Present

SOUTH FLORIDA Native Status: Native

IRC SOUTH FLORIDA Status: Imperiled

SOUTH FLORIDA Cultivated Status: Cultivated

Comments: Visit our <u>Natives For Your Neighborhood</u> website for more information and images.



IRC Natives For Your Neighborhood









To address the problems of neglected forest fragments and connectivity the "Pine Rockland Initiative" was created initially in 2005 to restore pine rockland habitat on private lands in Miami-Dade County.





Pine Rockland Geographical Distribution



South Florida and the Caribbean

Geology

The Miami Rock Ridge: A Pleistocene Deposit of Oolitic Limestone

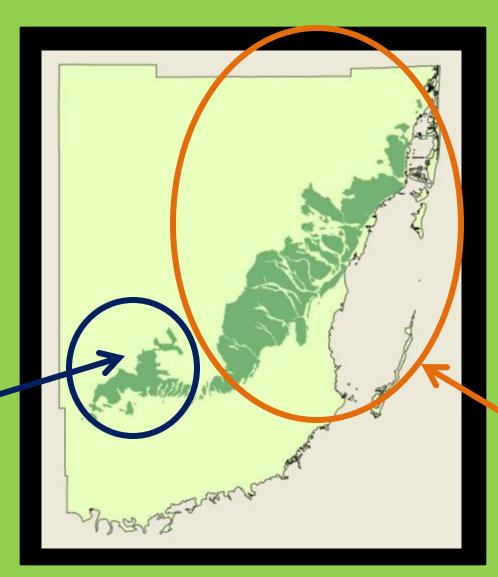


Geology

The Miami Rock Ridge: A Pleistocene Deposit of Oolitic Limestone

The southern quarter of the Miami Rock Ridge is protected in Everglades National Park.

Everglades – National Park Pine Rockland Habitat



The northern three quarters extends 45 miles northward into the vicinity of the City of Miami

City of Miami
 Pine
 Rockland
 Habitat





South Florida slash pine (Pinus elliottii var. densa) is the only canopy species.

We love our pines, but they are only 1 of several hundred species in the ecosystem.

Pine Rockland Ecology – The Subcanopy



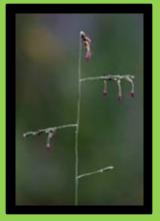
The diverse and constantly changing subcanopy is dominated by palms and tropical hardwoods.

Pine Rockland Ecology – The Groundcover













The forest floor is dominated by a rich diversity of grasses and herbs, where more than 400 plant species occur.

Federally Listed Species Endemic To The Pine Rockland Initiative Project Area

Four of the six federally listed plant taxa documented in the project area are endemic and are not found or protected in Everglades National Park. In addition, there are eight plant species that are candidates for federal listing in the project area (Bradley and Gann 1999) and 74 state-listed plant species.



Crenulated Leadplant *Amorpha herbacea* var. *crenulata* Sand Flax Linum arenicola Goulds Wedge Sandmat Chamaesyce deltoidea subsp. adhaerens Small's Milkwort Polygala smallii

Federal and State Endangered Goulds wedge sandmat *Chamaesyce deltoidea* subsp. *adhaerens*

Family: Euphorbiaceae Group: Dicot Substrate: Terrestrial Habit: Herb **Perennation:** Perennial Native Range: Endemic to South Florida in Miami-Dade County. **NatureServe Global Status:** Critically Imperiled **United States Federal Status: Endangered** State of Florida Status: Endangered **FNAI State Status:** Critically Imperiled SOUTH FLORIDA Occurrence: Present SOUTH FLORIDA Native Status: Native IRC SOUTH FLORIDA Status: Critically Imperiled SOUTH FLORIDA Cultivated Status: Not Cultivated



Federal and State Endangered Wedge sandmat *Chamaesyce deltoidea* subsp. *deltoidea*

Family: Euphorbiaceae Group: Dicot Substrate: Terrestrial Habit: Herb **Perennation:** Perennial Native Range: Endemic to South Florida in Miami-Dade County. NatureServe Global Status: Critically Imperiled United States Federal Status: Endangered State of Florida Status: Endangered FNAI State Status: Critically Imperiled SOUTH FLORIDA Occurrence: Present SOUTH FLORIDA Native Status: Native IRC SOUTH FLORIDA Status: Imperiled SOUTH FLORIDA Cultivated Status: Cultivated



Federal Threatened, State Endangered Garber's sandmat *Chamaesyce garberi*

Family: Euphorbiaceae

Group: Dicot

Substrate: Terrestrial

Habit: Herb

Perennation: Perennial

Native Range: Endemic to South Florida in Miami-Dade and Monroe counties.

NatureServe Global Status: Critically Imperiled

United States Federal Status: Threatened

State of Florida Status: Endangered

FNAI State Status: Critically Imperiled

SOUTH FLORIDA Occurrence: Present

SOUTH FLORIDA Native Status: Native

IRC SOUTH FLORIDA Status: Imperiled



Federal Candidate, State Endangered Blodgett's wild mercury Argythamnia blodgettii

Family: Euphorbiaceae

Group: Dicot

Substrate: Terrestrial

Habit: Herb

Perennation: Perennial

Native Range: Endemic to South Florida in Miami-Dade and Monroe counties.

NatureServe Global Status: Imperiled

United States Federal Status: Candidate

State of Florida Status: Endangered

FNAI State Status: Imperiled

SOUTH FLORIDA Occurrence: Present

SOUTH FLORIDA Native Status: Native

IRC SOUTH FLORIDA Status: Rare



Federal Candidate, State Endangered Mosier's false boneset Brickellia mosieri

Family: Asteraceae

Group: Dicot

Substrate: Terrestrial

Habit: Herb

Perennation: Perennial

Native Range: Endemic to South Florida in Miami-Dade County.

NatureServe Global Status: Critically Imperiled

United States Federal Status: Candidate

State of Florida Status: Endangered

FNAI State Status: Critically Imperiled

SOUTH FLORIDA Occurrence: Present

SOUTH FLORIDA Native Status: Native

IRC SOUTH FLORIDA Status: Imperiled



Federal Candidate, State Endangered Sand flax Linum arenicola

Family: Linaceae Group: Dicot Substrate: Terrestrial Habit: Herb **Perennation:** Perennial Native Range: Endemic to South Florida in Miami-Dade and Monroe counties. NatureServe Global Status: Critically Imperiled United States Federal Status: Candidate State of Florida Status: Endangered **FNAI State Status:** S1S2 **SOUTH FLORIDA Occurrence: Present** SOUTH FLORIDA Native Status: Native IRC SOUTH FLORIDA Status: Imperiled SOUTH FLORIDA Cultivated Status: Cultivated



Federal Candidate, State Endangered Carter's flax Linum carteri var. smallii

Family: Linaceae

Group: Dicot

Substrate: Terrestrial

Habit: Herb

Perennation: Annual

Native Range: Endemic to the South Florida mainland.

NatureServe Global Status: G2T2

State of Florida Status: Endangered

FNAI State Status: Imperiled

SOUTH FLORIDA Occurrence: Present

SOUTH FLORIDA Native Status: Native

IRC SOUTH FLORIDA Status: Imperiled





Federal and State Endangered

Small's Milkpea Galactia Smallii

Family: Fabaceae

Group: Dicot

Substrate: Terrestrial

Habit: Herb

Perennation: Perennial

Native Range: South Florida in Miami-Dade County.

NatureServe Global Status: Critically Imperiled

United States Federal Status: Endangered

State of Florida Status: Endangered

FNAI State Status: Critically Imperiled

SOUTH FLORIDA Occurrence: Present

SOUTH FLORIDA Native Status: Native

IRC SOUTH FLORIDA Status: Imperiled





State Endangered Man-In-The-Ground Ipomoea microdactylla

Family: Convolvulaceae

Group: Dicot

Substrate: Terrestrial

Habit: Vine

Perennation: Perennial

Native Range: Scattered in South Florida (Miami-Dade County) and the West Indies (Cuba, Bahamas, Puerto Rico [Mona Island only]).

NatureServe Global Status: Imperiled

State of Florida Status: Endangered

FNAI State Status: S1S2

SOUTH FLORIDA Occurrence: Present

SOUTH FLORIDA Native Status: Native

IRC SOUTH FLORIDA Status: Imperiled





Family: Celastraceae

Group: Dicot

Substrate: Terrestrial

Habit: Shrub

Perennation: Perennial

Native Range: South Florida and the West Indies (Cuba, Bahamas, Hispaniola).

NatureServe Global Status: Imperiled

State of Florida Status: Threatened

FNAI State Status: Imperiled

SOUTH FLORIDA Occurrence: Present

SOUTH FLORIDA Native Status: Native

IRC SOUTH FLORIDA Status: Rare





State Threatened Pineland Clustervine Jacquemontia curtissii

Family: Convolvulaceae

Group: Dicot

Substrate: Terrestrial

Habit: Herb

Perennation: Perennial

Native Range: Endemic to South Florida.

NatureServe Global Status: Imperiled

State of Florida Status: Threatened

FNAI State Status: Imperiled

SOUTH FLORIDA Occurrence: Present

SOUTH FLORIDA Native Status: Native

IRC SOUTH FLORIDA Status: Rare





Koenophyllon villosum

Family: Asteraceae

Group: Dicot

Substrate: Terrestrial

Habit: Shrub

Perennation: Perennial

Native Range: South Florida and the West Indies. NatureServe Global Status: Apparently Secure State of Florida Status: Endangered FNAI State Status: Imperiled SOUTH FLORIDA Occurrence: Present SOUTH FLORIDA Native Status: Native IRC SOUTH FLORIDA Status: Rare





Pineland Lantana Lantana depressa var. depressa

Family: Verbenaceae

Group: Dicot

Substrate: Terrestrial

Habit: Shrub

Perennation: Perennial

Native Range: Endemic to South Florida in Miami-Dade County.

NatureServe Global Status: Rare

State of Florida Status: Endangered

FNAI State Status: Rare

SOUTH FLORIDA Occurrence: Present SOUTH FLORIDA Native Status: Native IRC SOUTH FLORIDA Status: Rare











Zebra Longwing Butterfly Heliconius charithonia





Gopher Tortoise *Gopherus polyphemus*



Pine Rockland Wildlife



Florida Leafwing Butterfly Anaea troglodyta floridalis





Atala Butterfly Eumaeus atala





Bartram's Hairstreak Butterfly Strymon acis bartrami





Painted Bunting Passerina ciris





Eastern Bluebird Sialia sialis





Pine Warbler Dendroica discolor





Eastern Meadowlark Sturnella magna





Loggerhead Shrike Lanius ludovicianus



Pine Rockland Wildlife

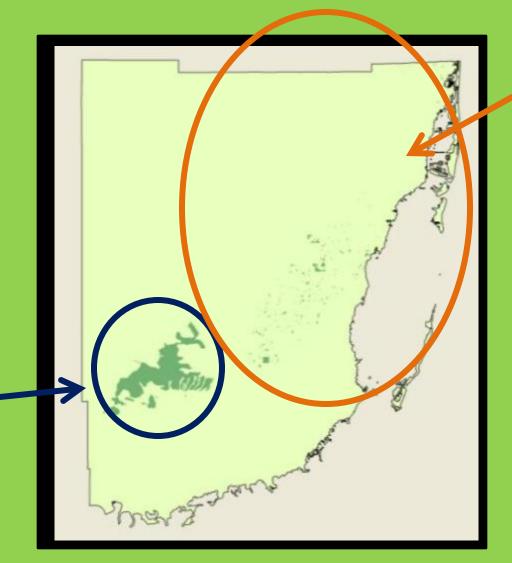


Eastern Screech-Owl Megascops asio



Today, less than 2% of the historical pine rockland habitat remains along the Miami rock ridge outside of Everglades National Park.

Everglades National Park Pine Rockland Habitat



City of Miami Pine Rockland Habitat

Less than 680 acres of pine rockland in private ownership in 114 fragments and an additional 2,267 acres on public lands.



Everglades – National Park Pine Rockland Habitat



City of Miami Pine Rockland Habitat



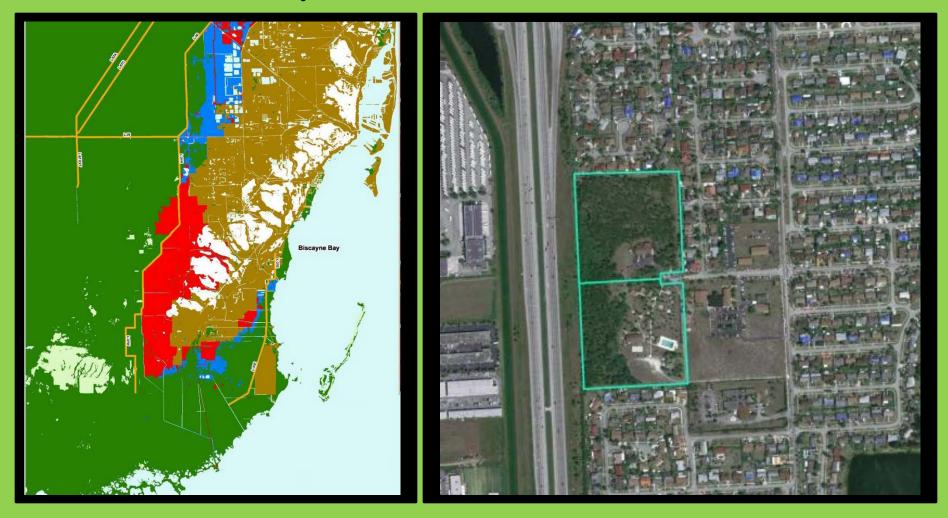
Primary Causes:

-Development, removal and fragmentation
-Invasive species
-Fire suppression
-Illegal dumping
-Sea level rise





The 45 miles of Miami Rock Ridge outside of Everglades National Park has been almost completely developed, with over 2.5 million people living in Miami-Dade County.



Only small isolated fragments of pine rockland remain in isolated patches surrounded by homes, agricultural and industrial lands.



Pine

Rockland

Fragment



Left unmanaged, these fragments may lose entire populations of listed and rare species of plants and animals.







Invasive Species

Florida Exotic Pest Plant Council's 2011 List of Invasive Plant Species

The mission of the Florida Exotic Pest Plant Council is to support the management of invasive exotic plants in Florida's natural areas by providing a forum for the exchange of scientific, educational and technical information.

Purpose of the List:

To focus attention on —

- the adverse effects exotic pest plants have on Florida's biodiversity and native plant communities,
- the habitat losses in natural areas from exotic pest plant infestations,
- the impacts on endangered species via habitat loss and alteration,
- ▶ the need for pest-plant management,
- the socio-economic impacts of these plants (e.g., increased wildfires or flooding in certain areas),
- changes in the severity of different pest plant infestations over time,
- providing information to help managers set priorities for research and control programs.



www.fleppc.org

CATEGORY I

Invasive exotics that are altering native plant communities by displacing native species, changing community structures or ecological functions, or hybridizing with natives. This definition does not rely on the economic severity or geographic range of the problem, but on the documented ecological damage caused.

CATEGORY II

Invasive exotics that have increased in abundance or frequency but have not yet altered Florida plant communities to the extent shown by Category I species.

These species may become ranked Category I, if ecological damage is demonstrated.

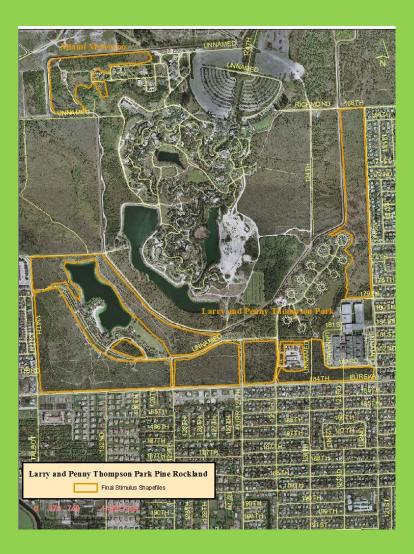
Natural Fire Cycle



Pine rocklands should burn every 3-5 years

Publicly owned and Managed Pine Rockland

There are approximately 2,267 acres of pine rockland fragments existing today on public lands, most of which are being managed by Miami-Dade County, which manages the majority of parcels in County ownership.



This network of managed County lands provides for a mosaic of larger high quality habitats across the County.

Privately Owned and Managed Pine Rockland



Based on data collected in 2004 by IRC there are only 680 acres of pine rockland remaining in private ownership in Miami-Dade County existing in 114 separate fragments.

Pine Rockland Protection Under Miami Dade County's 1984 Enacted NFC Ordinance



Protection under this ordinance is extremely limited and does not provide a mechanism for pine rockland management or sustainability on private lands.



IRC and Pine Rocklands...

-1999 IRC co-authored the pine rockland chapter of the USFWS Multi-Species Recovery Plan.

-2004 IRC mapped all pine rocklands in the project area, and compiled floristic data including locations of listed and candidate plant species.

- 2005 IRC began conducting small scale restoration on pine rocklands in Miami-Dade County on private lands.

- 2007 IRC authored a region-wide Pine Rockland Management Plan for Miami-Dade County Environmentally Endangered Lands Program.

-2009 IRC began conducting restoration of privately and publicly owned pine rocklands in the Florida Keys with a multi-agency partnership involving the USFWS, State of Florida, and The Nature Conservancy.

-2010 IRC's Pine Rockland Initiative Program expanded their scope of possible work by funds received through the American Recovery and Reinvestment Act to restore pine rockland habitat on both public and private lands in MDC.

-IRC initiates efforts to cultivate and reintroduce listed and candidate plant species to restored pine rocklands.

-IRC maintains a database of pine rockland locations, boundaries, landowners, and listed and candidate plant species locations.

-IRC Pine Rockland Initiative continues to restore pine rockland habitat on public and private lands in MDC.

IRC Partnership with the U.S. Fish and Wildlife Service



What is Partners for Fish & Wildlife?

The Partners for Fish & Wildlife program restores, improves, and protects fish and wildlife habitat on private lands through alliances between the U.S. Fish and Wildlife Service, other organizations, and individuals, while leaving the land in private ownership.

"We need to recognize the landowner as the custodian of public game on all private land... compensate him... with either cash, service, or protection, for the use of his land and for his labor... on the condition that he...safeguards the public interest."

Aldo Leopold

Pine Rockland Habitat Restoration Activities and Management

-Eradicate Invasive Species-

Not all plants are beneficial. Non-native invasive species are a real threat to ecosystem health. Plants such as Brazilian-pepper and Burmareed are treated.



-Reintroduce the natural fire cycle– Many ecosystems are fire dependent, meaning they are at their healthiest wher they are burned intermittently. Pinenrockland habitats may be burned to improve ecosystem health and to reduce hazardous fuel loads through controlled burning by the Florida Forest Service.





-Native Planting-Areas of high disturbance are planted to accelerate the restoration process.



-Long term management and planning-For successful habitat restoration results, long term management must be planned and implemented, or habitat <u>will return</u> to pre-treatment levels.





Most pine rockland fragments are invaded by Burmareed (*Neyraudia reynaudiana*), Brazilian-pepper (*Schinus terebinthifolius*) and woman's tongue tree (*Albizia lebbeck*). This is how most pine rocklands appear before IRC begins stewardship activities.



IPM Methods Utilized:

-Seedlings and saplings: handpulled.

-Large Saplings and Trees: treated in place using "basal bark" or "hack and squirt" methods, or cut with chainsaw or machete and treated with 15-30% Garlon 4 Ultra mixed with vegetable oil and dye.

-Grasses and vines: Tall grasses such as Burmareed cut with brushcutters, then treated with 3% Roundup ProMax. Short grasses treated without being cut.







The team also uses chainsaws and machetes to cut out exotic trees such as Queensland umbrellatree (*Schefflera actinophylla*).





IRC habitat restoration team uses brushcutters on Burmareed (Neyraudia reynaudiana)



-Initial Assessment of viable habitat

-Invasive Burmareed (*Neyraudia reynaudiana*) is brush-cut and foliar treated

-Invasive trees such as earleaf acacia (*Acacia auriculiformis*) and Brazilianpepper (*Schinus terebinthifolius*) are treated in-place

-Evaluation of viable pine rockland habitat assessed









Initial Assessment: No pines visible, entry without a machete is almost impossible. Habitat edges are made up of dense Burmareed and invasive trees. No pine rockland species are notable from the outside.

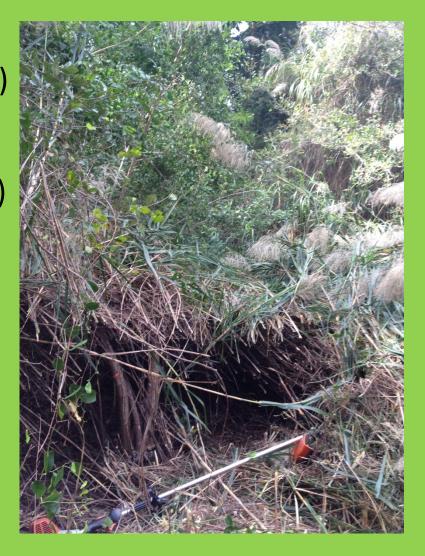




Typical Species Treated:

Burmareed (Neyraudia reynaudiana)
Brazilian-pepper (Schinus terebinthifolius)
earleaf acacia (Acacia auriculiformis)
lead tree (Leucaena leucocephala)
woman's tongue (Albizia lebbeck)
Queensland umbrella (Schefflera actinophylla)
Jasmine (Jasminum dichotomum)

- -Java plum (Syzgium cumini)
- rosary pea (Abrus precatorius)













IRC Pine Rockland Initiative Outreach and Education



IRC leads volunteer work days, neighborhood workshops and educational events in an effort to reach out to the community about pine rockland conservation.



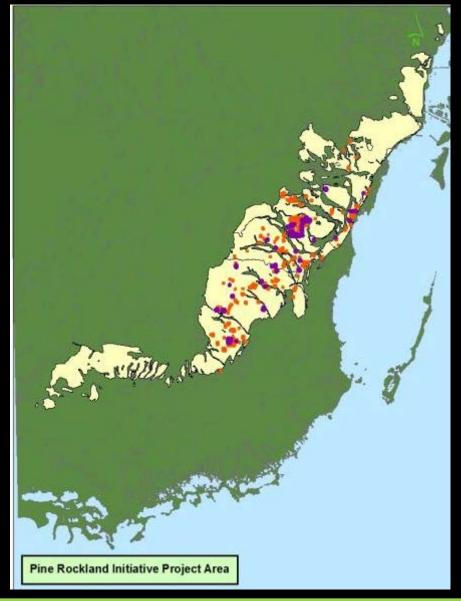
And all the effort is worth it!

IRC Pine Rockland Initiative Accomplishments

To date, IRC has worked to restore more than 580 acres of pine rockland fragments in Miami-Dade County. This accounts for 20% of the remaining pine rockland outside Everglades National Park in mainland Florida.

Red represents remaining pine rockland fragments occurring in Miami-Dade County along the historic range of the Miami rock ridge (Tan) outside of Everglades National Park.

Purple represents the public and private lands enrolled in the IRC Pine Rockland Initiative Program for habitat restoration.



Why Pine Rockland Habitat Restoration?

-Increase habitat potential-

Encourage a rich diversity of many different species of native birds, butterflies and other desirable wildlife.



-Improved neighborhood aesthetics-Native wildflowers, trees, shrubs and grasses put on a year round show for residents to enjoy.



-Lower maintenance costs – Over time, habitat restoration now will decrease maintenance costs later.



Global Environmental Health-Local conservation projects help make the world a better place! You Can Help: How To Donate To The Project Tax deductible donations can be made specifically to this project on The Institute For Regional Conservation's (IRC) website www.regionalconservation.org.

IRC is a **501c**(3) **non-profit** organization.

Donations can also be sent to the Main IRC office located at: 100 East Linton Boulevard, Suite 302 B Delray Beach, Florida 33483



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Thanks So Much!