PINECREST

Parks and Recreation Department

MEMORANDUM

DATE: January 12, 2026

TO: Yocelyn Galiano, ICMA-CM, Village Manager

FROM: Robert C. Mattes, CPRE, CPSI, Parks and Recreation Director

RE: Coral Pine Park Pine Rockland Restoration Plan

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Over the past eight years, the Parks and Recreation Department has made substantial progress in reducing non-native and invasive plant material within the Coral Pine Park preserve. These efforts have been guided by the 2014 Coral Pine Park Natural Area Management Plan and have yielded measurable improvements in site conditions and overall ecological health.

Building upon this foundation, the Parks and Recreation Department began working in late August 2025 with the Institute for Regional Conservation (IRC) to develop a more comprehensive and phased restoration approach. The resulting plan is designed to:

- Restore the preserve to a functioning pine rockland ecosystem,
- Establish and maintain an appropriate fire break, and
- Encourage healthy hammock growth along the northern portion of the existing fire break.

The Coral Pine Park Pine Rockland Restoration Plan is structured as a six-phase program, with each phase lasting approximately one year and building upon the work completed in prior years. The phased approach allows for adaptive management, ecological monitoring, and budgetary planning over time. Each phase is outlined in the attached restoration plan, which begins on page 37.

The Parks and Recreation Department respectfully recommends adoption of this plan to formalize the Village's commitment to long-term ecological stewardship, wildfire risk management, and the preservation of a rare and valuable pine rockland ecosystem for future generations.

# Basic Ecological Restoration Plan for the Pine Rockland at Coral Pine Park, Village of Pinecrest, Florida

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November 1, 2025

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## 1.0 Introduction

This basic ecological restoration plan for the pine rockland at Coral Pine Park in the Village of Pinecrest (Village), Florida, has been prepared by The Institute for Regional Conservation (IRC) per agreement with the Village. It updates and expands on earlier plans (McHargue 1999, Woodmansee 2014) and aligns with the Society for Ecological Restoration's International Principles and Standards for the Practice of Ecological Restoration (Fig. 1, Table 1; Gann et al. 2019, hereafter SER Standards), and invasive plant best management practices in Florida (e.g., Enloe et al. 2018).

The Coral Pine Park property was acquired by Miami-Dade County in 1973 through resolution 973-73 using the Decade of Progress bond funds. Development as a neighborhood park began in 1974, conforming to Miami-Dade County Resolution 375-74, and the park was dedicated on August 26th, 1978. Following its incorporation in 1996, the property was deeded to the Village of Pinecrest in 1998. The 2.6 acres of pine rockland within Coral Pine Park is protected through the warranty deed and is to be managed as a pine rockland habitat using best practices possible. The pine rockland at Coral Pine Park has also been designated by the U.S. Fish and Wildlife Service as critical habitat for the federally listed crenulate leadplant (*Amorpha herbacea var. crenulata*). The remnant patch at Coral Pine Park is the sole remaining pine rockland remnant publicly owned within the Village of Pinecrest.

This plan provides recommendations for the restoration and ongoing management of pine rocklands at Coral Pine Park, including the treatment of invasive species, the reduction of native hardwoods and palms, the periodic application of prescribed fire, the promotion of natural regeneration, and the appropriate planting of native plants. This plan was jointly developed by IRC and the Village of Pinecrest. It is informed by several IRC site visits in September and October 2025.

The SER Standards recommend the identification of target native reference ecosystems and the development of reference models based on multiple indicators of six key ecosystem attributes (Table 1), which are discussed below. The SER Standards also call for meaningful, informed, reciprocal engagement with key stakeholders, preferably at the initial planning stage of a restoration project and continuing throughout the duration of a project or program. Stakeholder engagement (e.g., public education and outreach about pine rocklands and their restoration and management, citizen science activities, volunteer events), will be key to long-term support.

This plan has been prepared in partnership with IRC's Pine Rockland Initiative (PRI), which aims to restore and manage remnant pine rockland patches on public and private lands throughout their natural range, including providing the thought leadership needed to move beyond "business as usual" and save this unique part of South Florida's natural heritage. This plan also incorporates emerging consensus on target metrics for pine rockland restoration developed through the multi-partner Pine Rockland Business Plan, which has been led by the US Fish and Wildlife Service and The Nature Conservancy. Plant names and data reported here are consistent with the Floristic Inventory of South Florida (FISF) database online (Gann et al. 2025b), which has been maintained by IRC continuously since 2001. As part of the FISF, IRC conducted floristic inventories at the pine rockland at Coral Pine Park in 1997 and 2025; floristic data for the park can be found here. In 2016, IRC also conducted invasive plant removal activities within the pine rockland at Coral Pine Park (IRC 2016).

Figure 1. Eight principles for ecological restoration (reprinted from Gann et al., 2019).

**Table 1.** Description of the key ecosystem attributes used to characterize the reference ecosystem, as well as to evaluate baseline condition, set project goals, and monitor degree of recovery at a restoration site. These attributes are suited to monitoring in Principle 5 and the Five-star System discussed in Principle 6. Descriptions in this table represent a 5-star condition. Reprinted from Gann et al. 2024a.

| Attribute | Description |
|---|---|
| Absence of threats | Direct degradation drivers (e.g., overutilization, active contamination, sources of invasive species, eroding land-surfaces) are minimal or effectively absent. |
| Physical conditions | Environmental conditions (including the physical and chemical conditions of soil, water, and topography) required to sustain the ecosystem are present. |
| Species composition | The native species characteristic of the appropriate ecosystem are present, whereas undesirable species are minimal or effectively absent. |
| Structural diversity | Appropriate diversity of key structural components, including demographic stages, faunal trophic levels, vegetation strata (including nesting and denning habitat), and spatial heterogeneity are present. |
| Ecosystem function | Appropriate levels of growth and productivity, nutrient cycling, decomposition, habitat, species interactions, and types and rates of natural disturbance are present. |
| External exchanges | The ecosystem is appropriately integrated into its larger landscape and watershed context through positive abiotic and biotic flows and exchanges. |

# 2.0 Assessment

## 2.1 Spatial Context and Site History

The 2.6 acres of pine rocklands at Coral Pine Park represents a small remnant of the 160,000-acre pine rockland forest that stretched from north Miami River south to Long Pine Key in what is now Everglades National Park. Due to pressures of agricultural expansion and urban development less than 2% of this forest remains outside of Everglades National Park, mostly in very small patches such as that found at Coral Pine Park. Pine rocklands are ranked as critically

imperiled globally by the Florida Natural Areas Inventory (2025). The location of Coral Pine Park within the urban matrix of the Village of Pinecrest make it highly isolated from other pine rocklands, with extremely low connectivity to beneficial external ecological exchanges and highly vulnerable to external threats such as invasions by nonnative species.

Historically, pine rockland forests were dissected by wetland prairies and marshes, or transverse glades, that connected the interior Everglades to the coast. Coral Pine Park is located along the edge of the historic pine rockland footprint (Fig. 2-3). Review of 1938 aerial photographs show that Coral Pine Park is located at the eastern edge of a broad slough that was drained as part of the C-100 canal system that empties into Biscayne Bay south of Deering Estate at Cutler. Historically, the pine rockland at Coral Pine Park was one of the grassy pinelands that bordered large sloughs that were seasonally flooded (McHargue 1999). The transverse glade had already been converted to agriculture by 1938.

Most of the site represents a fire-suppressed remnant patch of historic pine rocklands. The exception is the area along the northern firebreak where except for a few hardwood trees, the vegetation has largely been removed (Fig. 4). Although the 1999 management plan called for a series of management actions over a 10-year period, only some were implemented. These included the establishment of a fire break along the northern boundary, the placement of signage, invasive species removal from at least 2014 onward (Woodmansee 2014, IRC 2016), and some minor hardwood reduction in 2014 (Woodmansee 2014). A prescribed burn program was

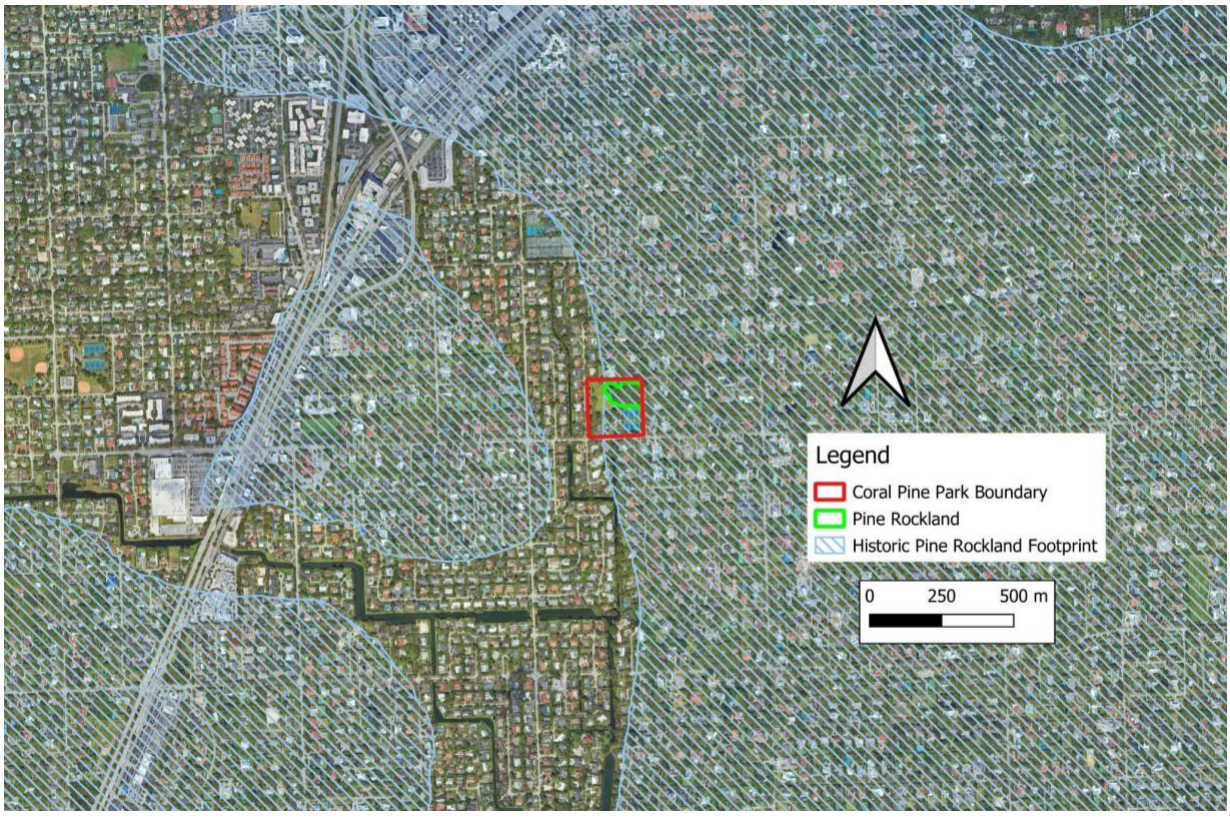


Figure 2. Location of the pine rockland at Coral Pine Park in relation to the Miami Rock Ridge (hatched area) and historical drainageway (non-hatched area).

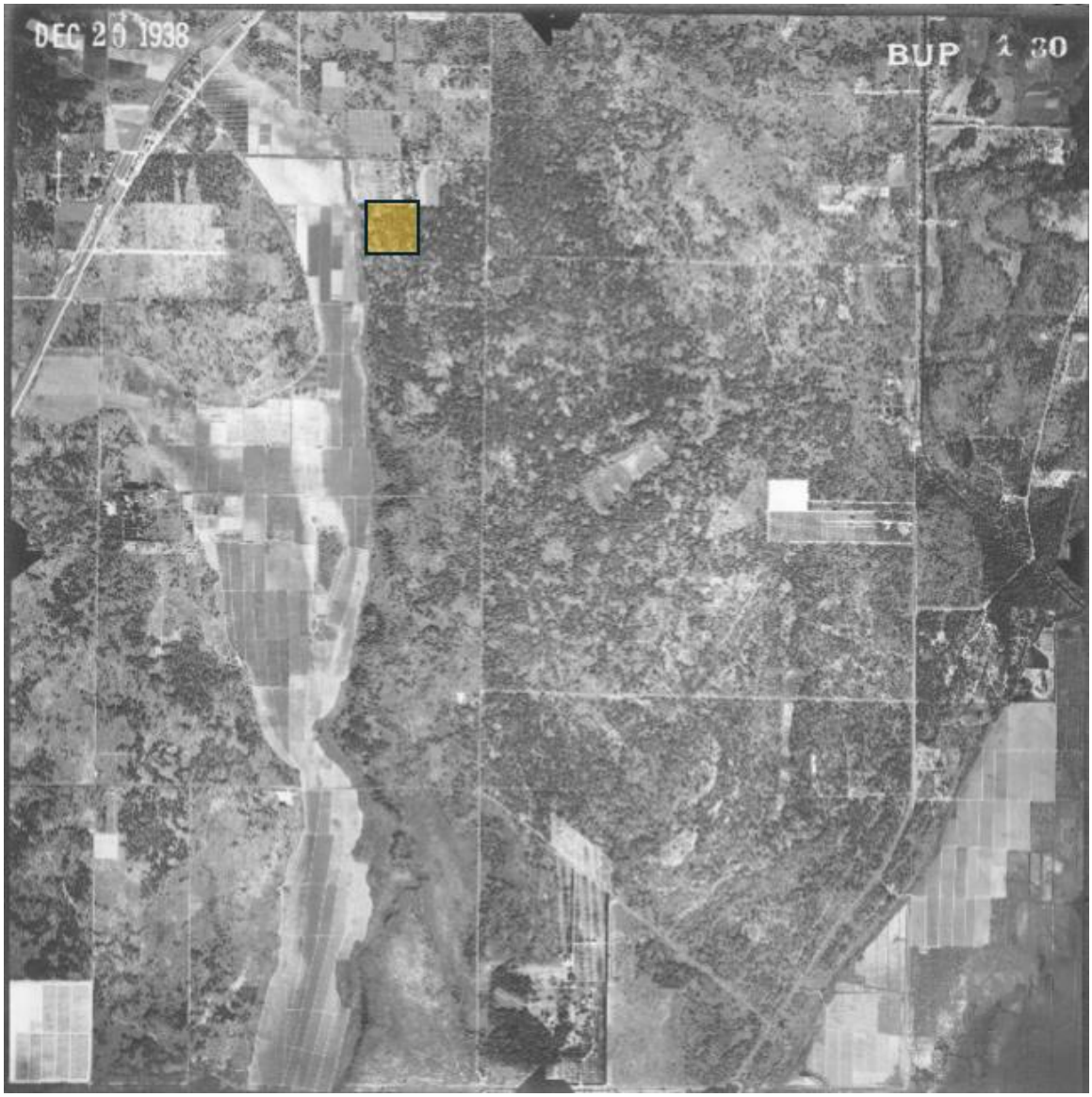


Figure 3. Location of Coral Pine Park in the 1938 regional context. Note agriculture in the transverse glade to the west and the large areas of pine rocklands to the east and south. Extensive logging and conversion of pine rocklands to the north and west had already occurred.

not implemented. The aggressive removal of invasive species in the northern fire break without simultaneous restoration activities has resulted in a very large open area primarily occupied by native and nonnative weeds. As such, the site has been separated into two distinct restoration units (Fig. 5). As in 1999, the remnant pineland is bordered by tennis courts to the south and residential areas to the east and north, while other sections of Coral Pine Park (currently under development) are located to the west. A long, linear rockland hammock has been planted to the east of the tennis courts along 69th Avenue.

Figure 4. Condition of substrate and lack of native vegetation along the northern firebreak.


Figure 5. Landscape context of restoration units at Coral Pine Park including planted rockland hammock to the southeast.

## 2.2 Physical Conditions

The elevation of the pineland at Coral Pine Park is about 10 feet, with minimal topographic relief except for pinnacle rock outcrops and solution holes (McHargue 1999). Although mapped as urban land (fill material over limestone bedrock), McHargue (1999) reported that there was no evidence that the substrate had been altered or filled in the remnant pineland; however, long-term fire exclusion had resulted in the accumulation of several inches of organic material. The substrate is still mostly intact in the pine rockland, but pine needle duff and other organic material has continued to accumulate, reducing the area of open habitat needed for biodiverse pine rockland groundcover and wildlife (Fig. 6). The substrate in the northern firebreak has been heavily degraded by vehicles and heavy machinery, but there has been less accumulation of organic material.

On the surface and underground, the hydrology has been highly modified due to regional drainage and a lowered water table. Some pine rockland species that require wetter conditions or seasonal flooding can no longer survive at Coral Pine Park, or are unable to effectively reproduce (e.g., crenulate lead plant).

Figure 6. The accumulation of pine needles and other organic material reduces habitat for diverse pine rockland groundcover species.

## 2.3 Ecosystem Functions

Fire is an essential natural disturbance process in pine rocklands, with periodic fire every 2-7 years needed to maintain pine rockland structure, composition, and resilience. Lack of fire in pine rocklands is a form of ecosystem degradation, leading to a reduction in sunlight, bare substrate, and generally open conditions needed for most pine rocklands species. It is unknown

when the last fire occurred at Coral Pine Park; however, McHargue (1999) estimated that it had been at least 30 years since the last fire. No fires since 1999 have occurred. Fire exclusion or suppression affects ecosystem structure and composition over time but also increases the chance that catastrophic high intensity fire will eventually occur, leading to mortality of canopy pine trees and sterilization of soil, thus reducing natural regeneration capacity. Many native plants suppressed by fire exclusion persist in the seed bank or as underground rhizomes, tubers, or similar structures, and these propagules may be killed by intense heat. High intensity fire following fire exclusion also increases risk to humans and human infrastructure.

Although not often considered, seasonal flooding was an important natural process in pine rocklands, especially pinelands located on the edges of transverse glades. The loss of seasonal flooding and higher water tables in general limit the richness and abundance of many species of plants and animals that require water. This function has been completely lost at Coral Pine Park and water availability is now limited to rainfall.

## 2.4 Ecosystem Structure

Pine rocklands have a single canopy species, South Florida slash pine (*Pinus elliottii* var. *densa*), which was historically valued as high-quality timber. As depicted in the 1938 aerial imagery (Fig. 3), logging roads dissected the pine rocklands to the east of Coral Pine Park and what is now Old Cutler Road (McHargue 1999) and large swaths of pine rocklands had been logged to the northeast, north, and west. It is unclear when Coral Pine Park was logged but it can be presumed that logging occurred between 1938 and the end of World War 2 in 1945. Whatever pines remained or recruited following logging would have been impacted by Hurricane Andrew in 1992, which resulted in very high mortality of South Florida slash pine (Maguire 1995). However, McHargue (1999) reported "a number of mature, healthy south Florida slash pine on site" together with seedlings and saplings, but in low numbers. A large number of dead snags and downed trees were evidence of either direct impact of Hurricane Andrew or the subsequent outbreak of pine bark beetles (*Ips* spp.). Natural regeneration, however, has allowed for the recovery of a relatively even-aged stand of South Florida slash pine (Fig. 7).

Unfortunately, due to long-term fire suppression the site has been invaded by native hardwoods, which now dominate much of the canopy and subcanopy. These hardwoods include very large wild-tamarind (*Lysiloma latisiliquum*), live oak (*Quercus virginiana*), and strangler fig (*Ficus aurea*) trees (Fig. 8-9). McHargue (1999) reported that live oak was the most common native hardwood, and that the density of native and nonnative hardwoods was high. The native cabbage palm (*Sabal palmetto*) has also become overabundant and dominates much of the subcanopy and understory (Fig. 10). Although McHargue reported that the invasive Brazilian-pepper (*Schinus terebinthifolius*) tree was present throughout the site, due to prior and ongoing invasive species control programs there are currently no major infestations of invasive species in the canopy or subcanopy.

As described in section 4.2 below, the reference condition for the pine rockland groundcover layer (0-3 feet in height) and understory layer (3-6 feet in height) is very open, with hardwood

Figure 7. Relatively even-aged stand of South Florida Slash-pine, which most trees presumably recruited following Hurricane Andrew in 1992.

Figure 8. A very large wild-tamarind tree.

Figure 9. Native hardwoods dominating the canopy.

Figure 10. Overabundant cabbage palms in the subcanopy.

shrubs and native palms taking up less than 50% of the space and groundcover species and bare ground taking up more than 50% of the space, with less than 2% total cover above three feet and less than 1% cover above 6 feet. Groundcover plants should take up 30-50% or more of the total space in the groundcover laver. Following fire exclusion native palms grow higher and more dense and native hardwoods proliferate, shading out groundcover plants and reducing open ground. Pine needle duff and other organic debris cover groundcover plants, reduces bare ground and prevents groundcover plants from reproducing.

The degradation of the groundcover and understory layers at Coral Pine Park is very advanced. As early as 1999, McHargue reported low native diversity due to several decades of fire exclusion, with saw palmetto (*Serenoa repens*) as the most common understory species, noting just a few common herbaceous species: pineland snowberry (*Chiococca pinetorum*), low rattlebox (*Crotalaria pumila*), rabbitbells (*Crotalaria rotundifolia*), coontie (*Zamia integrifolia*), and pine fern (*Anemia adiantifolia*). Pineland snowberry, a species that can tolerate some shade, had disappeared by 2014 (Woodmansee 2014), and rabbitbells were not recorded in 2025. However, there are a few areas, mostly along interior pathways, with noticeably less pine duff and other organic litter at the ground layer and much lower hardwood cover. These areas support pine rockland species such as pineland allamanda (*Angadenia berteroi*) and pineland milkpea (*Galactia pinetorum*). With the exception of native palms, cover of pine rockland groundcover is very low, estimated at less than 5%. There is no remaining bare ground.

## 2.5 Species Composition

### 2.51 Species Composition - Plants

Most of the high integrity pine rockland diversity is in the groundcover layer, with a few species naturally growing in the understory layer three to six feet above the ground or rarely into the subcanopy above six feet. In total, more than 400 species of native vascular plants have been recorded growing in pine rocklands, more than one quarter of the entire South Florida flora (Gann et al. 2025b). These native plants include trees, shrubs, vines, grasses and sedges, wildflowers, vines, epiphytes, and ferns, representing tropical, temperate, and endemic species.

Of the 114 native plant taxa recorded at Coral Pine Park, 16 are found almost exclusively in weedy areas. Of the remainder, 92 species are pine rocklands plants and six are found primarily in hammocks. Of these, 47 species are pine rockland obligates, or grow in wet pinelands and adjacent wetlands (e.g., the federally endangered crenulate leadplant); of these, only nine species were recently recorded, representing an 80% decline in species diversity. Of 35 species commonly found in pinelands and in hammocks or hammock edges, 25 remain or are assumed to be present, representing a much higher resilience in this group. Of the ten remaining species, which are primarily found in hammocks but rarely in pinelands or are found in both pinelands and weedy areas, seven are present and one of the three missing species is associated with wet pinelands. In terms of total native pine rockland diversity (excluding weeds), in 20 years more than half of the recorded native species have been lost or are possibly extirpated from the site. Based on prior experience, some of these species may have been overlooked or would be expected to re-emerge following restoration activities, whereas others may be considered for reintroduction. One native plant species native to Coral Pine Park is federally listed under the Endangered Species Act (crenulate leadplant), and 17 additional species are listed and endangered, threatened, or commercially exploited by the State of Florida or as imperiled or critically imperiled by IRC (Table 2). Of these, 10 are possibly extirpated at the site, and eight are present or assumed to be present.

Of the 202 vascular plants recorded for the park, 88 nonnative species have been recorded representing almost half of the total flora; of these 68 species are classified as invasive (Table 3, Gann et al. 2025) of which 49 species were recorded by Woodmansee in 2014. However, only 44 nonnative species were recorded in 2025, of which 36 are invasive, representing a decline in the total number of invasive species since 2014. Overall cover of invasive species is relatively very low in the canopy and subcanopy layers, reaching perhaps 5% in the understory and groundcover layers. The reduction of overall diversity and cover of nonnative plants species is a positive trend, indicating effective management of this threat since intensive invasive species control began in 2014 (Woodmansee 2014, IRC 2016). Nevertheless, some invasive species persist and are currently spreading including Asian sword fern (*Nephrolepis brownii*), common air-potato (*Dioscorea bulbifera*), governor's-plum (*Flacourtia indica*), oysterplant (*Tradescantia spathacea*), rosary-pea (*Abrus precatorius*). In addition, a serious outbreak of the emerging invasive shineseed (*Rouselia humilis*) is located along the northern firebreak (Fig. 11).

### 2.52 Species Composition - Wildlife

A search of research grade data on iNaturalist yielded preliminary data on wildlife usage at Coral Pine Park (Table 4). Native species included: 15 insects, 2 reptiles, 1 arachnid, and 5 birds. Nonnative species included 3 insects, 2 reptiles, and 1 arachnid. The use of bat boxes along the northern fire break were also noted (Fig. 12). No listed animals were reported by McHargue

(1999) or Woodmansee (2014). Additional data on wildlife at Coral Pine Park are needed, potentially including one or more citizen science bioblitz utilizing iNaturalist as a tool. While acknowledging the paucity of data, it is important to note that remnant patches of native habitat in the Village are critical for the survival of native wildlife, including butterflies, bees, and other pollinators, birds, and small mammals, reptiles, and amphibians.

Table 2. Listed species recorded at Coral Pine Park that are native to pine rocklands in the vicinity of the park: FE (federally endangered), SE (state endangered), ST (state threatened), SCE (state commercially exploited), SF1 (IRC critically imperiled), SF2 (IRC imperiled). Two extralimital native invaders present in the park (*Roystonea regia, Swietenia mahagoni*) are also listed by the State of Florida but are not native here. *Chrysophyllum oliviforme*, listed below, although sometimes found in pine rocklands, is a hammock invader and is not typical of pine rocklands in the Pinecrest area.

| Scientific name | Common name | Status | Occurrence at Coral Pine Park |
|---|---|---|---|
| *Amorpha herbacea var. crenulata* | Crenulate leadplant | FE, SE | Possibly extirpated |
| *Angadenia berteroi* | Pineland-allamanda | ST | Present |
| *Chamaecrista deeringiana* | Deering partridge pea | SF2 | Possibly extirpated |
| *Chiococca pinetorum* | Pineland snowberry | SF2 | Possibly extirpated |
| *Chrysophyllum oliviforme* | Satinleaf | ST | Present |
| *Coccothrinax argentata* | Florida silver palm | ST | Present |
| *Crosspetalum ilicifolium* | Quailberry | ST | Possibly extirpated |
| *Desmodium marilandicum* | Smooth ticktrefoil | SF1 | Possibly extirpated |
| *Euphorbia pergamena* | Rockland sandmat | ST | Possibly extirpated |
| *Galactia pinetorum* | Pineland milkpea | SF1 | Present |
| *Lantana depressa* | Pineland lantana | SE | Possibly extirpated |
| *Melanthera parvifolia* | Pineland blackanthers | ST | Possibly extirpated |
| *Metastelma blodgettii* | Blodgett's swallowwort | ST | Possibly extirpated |
| *Rhynchospora grayi* | Gray's beaksedge | SF2 | Possibly extirpated |
| *Smilax havanensis* | Havana greenbrier | ST | Present |
| *Tillandsia fasciculata var. densipica* | Stiff-leaved wild-pine | SE | Present |
| *Tillandsia utriculata* | Giant wild-pine | SE | Assumed present |
| *Zamia integrifolia* | Coontie | SCE | Present |

Table 3. Invasive plant species recorded at Coral Pine Park that are listed by the Florida Invasive Species Council (2025) or by IRC as Emerging Invasives or Invasive Natives (Gann et al. 2025b). Invasive nonnative plants are ranked as Category I by FISC when they 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 invasives 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 Category I if ecological damage is demonstrated. FISC also has a watch list (W); most of these species are also considered Emerging Invasives by IRC. IRC ranks additional Emerging Invasives (EI) based on field observations in South Florida. IRC also classifies two extralimital natives (native to other parts of Florida) as Invasive Natives (IN) at Coral Pine due to their highly aggressive behavior in native ecosystems there.

| Scientific name | Common name | Invasive category |
|---|---|---|
| *Abrus precatorius* | Rosary-pea, Crab-eyes | FISC I |
| *Acacia auriculiformis* | Earleaf acacia | FISC I |
| *Adenanthera pavonina* | Red sandalwood, Red beardtree | FISC II |
| *Albizia lebbeck* | Woman's tongue, Rattlepod | FISC I |
| *Alysicarpus vaginalis* | White moneywort | IRC EI |
| *Ardisia elliptica* | Shoe-button ardisia | FISC I |
| *Asparagus aethiopicus* | Sprenger's asparagus-fern | FISC I |
| *Bischofia javanica* | Javanese bishopwood | FISC I |
| *Callisia fragrans* | Basketplant | FISC II |
| *Casuarina glauca* | Suckering Australian-pine, Gray sheoak | FISC I |
| *Catharanthus roseus* | Madagascar-periwinkle | FISC W, IRC EI |
| *Chamaedorea seifrizii* | Bamboo palm | FISC II |
| *Clerodendrum speciosissimum* | Javanese glorybower | IRC EI |
| *Clusia rosea* | Pitch-apple | IRC IN |
| *Cocos nucifera* | Coconut palm | FISC II |
| *Combretum indicum* | Rangoon creeper | IRC EI |
| *Crotalaria spectabilis* | Showy rattlebox | FISC W, IRC EI |
| *Cupaniopsis anacardioides* | Carrotwood | FISC I |
| *Cynodon dactylon* | Bermuda grass | IRC EI |
| *Dioscorea alata* | White yam | FISC I |
| *Dioscorea bulbifera* | Common air-potato | FISC I |
| *Dypsis lutescens* | Yellow palm, Areca palm | FISC W, IRC EI |
| *Eriobotrya japanicoa* | Loquat | IRC EI |
| *Eugenia uniflora* | Surinam-cherry | FISC I |
| *Euphorbia graminea* | Grassleaf spurge | IRC EI |
| *Ficus microcarpa* | Laurel fig | FISC I |
| *Flacourtia indica* | Governor's-plum | FISC II |

| Scientific name | Common name | Invasive category |
|---|---|---|
| *Hibiscus tiliaceus* | Seaside mahoe, Sea hibiscus, mahoe | FISC II |
| *Jasminum dichotomum* | Gold Coast jasmine | FISC I |
| *Jasminum fluminense* | Brazilian jasmine, Corky-stemmed jasmine | FISC I |
| *Lantana camara* | Shrubverbena | FISC I |
| *Merremia tuberosa* | Spanish arborvine, Yellow morningglory | FISC I |
| *Millettia pinnata* | Karum tree, Poonga-oil tree | IRC EI |
| *Momordica charantia* | Wild balsam-apple | FISC II |
| *Mucuna pruriens* | Cowitch, Velvetbean | IRC EI |
| *Murraya paniculata* | Orange jessamine | FISC II |
| *Nephrolepis brownii* | Asian sword fern | FISC I |
| *Nephrolepis cordifolia* | Tuberous sword fern | FISC I |
| *Neyraudia reynaudiana* | Burmareed, Silkreed | FISC I |
| *Ochrosia elliptica* | Elliptic yellowwood | FISC W, IRC EI |
| *Pennisetum purpureum* | Napier grass, Elephantgrass | FISC I |
| *Phoenix reclinata* | Senegal date palm | FISC II |
| *Phymatosorus grossus* | Serpent fern, Wart fern | FISC I |
| *Podocarpus macrophyllus* | Podocarpus, Southern-yew, Japanese-yew | IRC EI |
| *Pteris vittata* | China brake | FISC II |
| *Richardia grandiflora* | Largeflower Mexican clover | FISC II |
| *Rouselia humilis* | Shineseed | IRC EI |
| *Roystonea regia* | Royal palm, Florida royal palm | IRC IN |
| *Ruellia blechum* | Green shrimpplant | FISC II |
| *Schefflera actinophylla* | Australian umbrellatree | FISC II |
| *Schinus terebinthifolius* | Brazilian-pepper | FISC I |
| *Solanum diphyllum* | Twoleaf nightshade | FISC II |
| *Spermacoce verticillata* | Shrubby false buttonweed | FISC II |
| *Sphagneticola trilobata* | Creeping wedelia | FISC II |
| *Stachytarpheta cayennensis* | Nettleleaf velvetberry | FSCI II |
| *Stenotaphrum secundatum* | St. Augustine grass | FISC W, IRC EI |
| *Swietenia mahagoni* | West Indian mahogany | IRC IN |
| *Syngonium podophyllum* | Nephthytis, American evergreen | FISC I |
| *Tabebuia heterophylla* | White-cedar | FISC II |
| *Terminalia catappa* | Tropical-almond | FISC II |
| *Tradescantia spathacea* | Oysterplant | FISC I |
| *Triadica sebifera* | Popcorntree, Chinese tallowtree | FISC I |
| *Triumfetta semitriloba* | Burweed, Sacramento burrbark | IRC EI |
| *Turnera ulmifolia* | Yellow alder, Ramgoat dashalong | FISC W, IRC EI |
| *Urena lobata* | Caesarweed | FISC I |

| Scientific name | Common name | Invasive category |
|---|---|---|
| *Youngia japonica* | Rocketweed, Oriental false hawksbeard | IRC EI |
| *Zoysia matrella* | Zoysia grass | IRC EI |

Figure 11. Heavy infestation of emerging invasive shineseed along the northern firebreak.

## 2.6 Ongoing Threats

Threats from invasive plants on site have been reduced from a high point in the mid-2010s (Fig. 13-14). McHargue reported the most common invasive species as Brazilian-pepper, woman's tongue, Australian-pine, earleaf acacia, Australian umbrellatree, and Burmareed, and those species have largely been controlled. However, external threats from invasive plants and animals continue to increase as the diversity and abundance of invasive species in the surrounding urban environment increases. Dumping of landscape debris from neighboring properties was documented by McHargue (1999) and Woodmansee (2014), and was noted by IRC along 69th Avenue in 2025. Long-term continuous use of herbicide along the northern firebreak is a threat to native species and increases habitat and favorable conditions for invasive species and native weeds. Other threats, such as off-target damage to native invertebrates from insect spraying, have likely been present and continue to persist. Birds and other wildlife are almost certainly threatened by domestic and feral cats (Florida Fish and Wildlife Conservation Commission 2021).

The most significant ongoing threat to Coral Pine Park is fire exclusion, which, if not mitigated or reversed, will lead to the complete loss of pine rockland at the park. Fire suppression also creates the threat of catastrophic wildfire, which poses risks to both nature and people. Mitigation of fire suppression must begin with the reduction of native hardwoods and palms, and continued control of invasive species; physical removal of needle duff and other aboveground organic material may also be necessary.

Table 4. Animal taxa recorded at Coral Pine Park, organized by major animal groups and native status. Downloaded from iNaturalist on October 28, 2025 by Liz Dutra.

| Scientific name | Common name | Type | Status |
|---|---|---|---|
| *Anelaphus moestus* | Longhorn beetle | Insect | native |
| *Anomalon sp.* | Wasp | Insect | native |
| *Antaeotricha albulella* | Vestal moth | Insect | native |
| *Callistethus marginatus* | Margined Shining Leaf Chafer | Insect | native |
| *Diaprespes abbreviatus* | Diaprespes root weevil | Insect | native |
| *Dione vanillae* | Gulf Fritillary | Insect | native |
| *Diplozona collaris* | | Insect | native |
| *Garella nilotica* | Black-olive Caterpillar Moth | Insect | nonnative |
| *Harmonia axyridis* | Asian Lady Beetle | Insect | nonnative |
| *Heliconius charithonia* | Zebra Longwing | Insect | native |
| *Ignelater havaniensis* | Glowing click beetle | Insect | native |
| *Orphulella punctata* | Slant-faced grasshopper | Insect | nonnative |
| *Pelidnota punctata* | Grapevine Beetle | Insect | native |
| *Phyllophaga bruneri* | Cuban May Beetle | Insect | native |
| *Samea castellalis* | Stained-glass Moth | Insect | native |
| *Toxomerus floralis* | Florida Calligrapher | Insect | native |
| *Xylophanes tersa* | Tersa Sphinx | Insect | native |
| *Zelus longipes* | Milkweed Assassin bug | Insect | native |
| *Cynortoides quadrispinosa* | Armored harvestmen | Arachnid | nonnative |
| *Gasteracantha cancriformis* | Spinybacked Orbweaver | Arachnid | native |
| *Agama picticauda* | Peter's Rock Agama | Reptile | nonnative |
| *Anolis carolinensis* | Green Anole | Reptile | native |
| *Anolis cristatellus* | Crested Anole | Reptile | nonnative |
| *Anolis sagrei* | Brown Anole | Reptile | native |
| *Cardinalis cardinalis* | Northern cardinal | Bird | native |
| *Cyanocitta cristata* | Bird | Bird | native |
| *Megascops asio* | Eastern screech-owl | Bird | native |
| *Polioptila caerulea* | Blue-gray Gnatcatcher | Bird | native |
| *Setophaga ruticilla* | American Redstart | Bird | native |

Figure 12. Bat boxes can be found in the park as shown here on this gumbo-limbo tree along the northern firebreak. Note the dense hardwood and cabbage palm cover in the pine rockland.

Figure 13. Woodrose (*Merremia tuberosa*) overtaking the northern border in 2016.


Figure 14. Volunteer flyer showing concentration of oysterplant in 2016.

## 3.0 Native Target Reference Ecosystems and Models

Members of the Pine Rockland Business Plan Ecological Restoration Sub-Team prepared a key resource titled *Integrated ecological and social vision, targets, goals, and objectives for the ecological restoration of pine rocklands in Miami-Dade and Monroe counties, Florida* (Gann et al. 2023). This living document develops conceptual restoration targets for contemporary pine rocklands in Miami-Dade and Monroe Counties aligned within the SER Standards. This work expands on guidance published in Maguire (1995), Possley et al. (2014), and Possley et al. (2018). A combination of information including from historical photography (Fig. 15), reference sites, ecological research publications, and practitioner experience have been utilized to build reference models to inform the targets, goals, and objectives of restoration throughout the range of pine rocklands in Florida. Aligned with recommendations by Woodmansee (2014), portions of the northern firebreak should be considered for restoration to a rockland hammock. A reference model for this ecosystem can be developed from information in FNAI 2010, Gann et al. 2023, Gann et al. 2025b, and other resources.


Figure 15. Historical image of pine rocklands in Miami-Dade County in the early 20th Century.

## 4.0 Vision, Targets, Goals, and Objectives

The Society for Ecological Restoration recommends developing a project Vision, Targets, Goals, and Objectives, and the use of monitoring indicators that are specific, quantifiable measures of

attributes, to directly connect longer-term goals and shorter-term objectives (Gann et al. 2019, Principle 5). The following sample vision statement, and recommended targets, goals, and objectives are adapted from Gann et al. (2023).

## 4.1 Sample Vision Statement for Pine Rocklands in the Village of Pinecrest

A broad coalition of stakeholders recover healthy pine rocklands within the Village of Pinecrest wherever they still exist and in areas where they have previously been converted to other uses, including at sites with recognized or previously unrecognized potential for restoration. These pine rocklands are cared for and enjoyed by the residents of Pinecrest, as well as visitors and scientists from around the world. This results in an elevated sense of social cohesion and a significant contribution toward sustainable ecosystem management, including the recovery of local biodiversity, the delivery of ecosystem services, and the mitigation of and adaptation to climate change. This vision operates consistent with the Society for Ecological Restoration's International Principles and Standards for the Practice of Ecological Restoration and is carried out in partnership with the United Nations Decade on Ecosystem Restoration (2021-2030) and aligned global initiatives. The restoration of pine rocklands becomes a flagship restoration program within the Village of Pinecrest and is promoted as an example of best practice restoration assessment, planning, implementation, ongoing management, and monitoring underpinned by sound science and broad community support.

## 4.2 Recommended Ecological Targets for Pine Rocklands at Coral Pine Park

Restored pine rocklands have an open canopy of South Florida slash pine (*Pinus elliottii* var. *densa*), with fewer than 70 mature trees per acre and less than 50% cover, ranging from 1-49%, a relatively open understory layer (1-2 m), and an extremely diverse groundcover layer (<1 m). The understory and groundcover layers comprise a mix of endemic, temperate, and tropical species, the composition of which changes from north to south. Native hardwoods, vines, and palms are important components of pine rocklands, but comprise less than 50% total cover in the understory and groundcover layers; total cover of the understory layer is <2%. Epiphytes are rarely present but may be encountered, especially on the trunks of old cabbage palms (*Sabal palmetto*). The groundcover layer (including bare ground) includes a mix of herbaceous graminoids (grasses, sedges, and similar plants), forbs (non-graminoid herbs, e.g., wildflowers), ferns and allies, creeping vines, and low woody groundcovers that have a combined cover of at least 30-75%; bare ground including exposed limestone has a cover of at least 5-20%, providing key habitat for rare plants and animals. The combined total of native groundcover plants and bare ground is at least 50%. The pine rockland vegetation is expressed as a mosaic, and islands of species or groups of species are frequent. A wide diversity of native plants is present, and invasive or weedy plants and animals are minimized as practicable. Pine rocklands are habitat for an abundance of native wildlife, including pollinators, migratory birds, and small mammals; invasive animals are controlled. Rare, threatened, and listed species are documented, protected, and augmented or reintroduced when and where appropriate. Bare substrate of limestone, sand, and marl (Redland soil) is present within and between vegetation mosaics in heterogenous patterns, providing critical habitat for many plant and animal species. Pine needle and other organic litter and soil organic carbon are present within target ranges of variability. Ecosystem processes and functions, including periodic fire, pollination and dispersal, predation and herbivory, and recruitment, are present and operating. Pine rockland patches are enlarged and connected whenever possible, and substrates, hydrology, and ecosystem processes like periodic fire are restored to the extent practicable; changes in regional hydrology and irreversible soil

modifications are considered when assessing, designing, implementing, managing, and monitoring pine rockland restoration projects. Pine rockland ecotones are connected to other key ecosystems that share species and habitat, including rockland hammocks and freshwater wetlands.

## 4.3 Recommended Social Targets for Pine Rocklands at Coral Pine Park

Pinecrest residents and visitors benefit from restored, well-managed pine rocklands, with ample opportunities to experience pine rocklands through accessible nature trails, informal paths, and vistas, engage in citizen science and the arts, and participate as volunteers in restoration and management activities. Information about pine rocklands, their conservation, restoration, and management, and their contributions to preventing local and global extinctions of plants and animals, mitigating climate change, and providing essential ecosystem services are integrated into robust educational programs for students of all ages. Pine rocklands are considered green infrastructure that provide essential ecosystem services including improved air and water quality, reduction of urban heat effect, reduction in noise pollution, beneficial wildlife and native plant habitat, and improved aesthetics. Pine rocklands provide much needed green spaces that provide numerous contributions to mental health and human wellbeing in the largely urban landscape of South Florida. They are embraced and cared for by a wide constituency of stakeholders. This process is underpinned by the organization of a broad coalition of stakeholders representing local and national government, nonprofits and other community groups, schools, foundation and corporate funders, private owners of conservation lands, and the public. Private and public managers of pine rocklands are provided the technical and financial support essential to their restoration and ongoing management.

## 4.40 Goals and Objectives

The following goals and objectives align with those articulated by McHargue (1999) and Woodmansee (2014), except that they are narrower in scope to specifically address ecological restoration and are updated to consider current conditions. To conform to the warranty deed, the following goals and objectives in McHargue are addressed:

**Goal 1**: Restore and maintain the pine rockland plant community in Coral Pine Park to maximize biological diversity and preserve its natural resource values by appropriate management techniques.
**Objective 1**: Promote establishment of pine rockland herbaceous and graminoid understory vegetation, and improve conditions for pine germination, establishment, and growth.

**Goal 2**: Ensure the long-term viability of federal and state listed rare, threatened, or endangered species, endemic species, and species of special concern.
**Objective 2**: Promote persistence of current populations of species so designated.

**Goal 3**: Ensure that the Coral Pine Park pineland is protected from adverse human impacts.
**Objective 3**: Identify the pineland as a protected natural area on site and through local government ordinance.

Due to the heavy degradation and the presence of large native hardwoods along the northern boundary, Woodmansee (2014) proposed the restoration of rockland hammock in that location, separated from the pine rockland by a five-foot-wide hand cleared firebreak also acting as a trail (Fig. 16). In contrast, McHargue (1999) called for the placement of an eight-foot-wide firebreak

along the northern property boundary. The idea of restoring a portion of the northern firebreak as rockland hammock is sound. However, the spatial extent of the hammock area should be minimized to maximize the spatial extent of the much rarer and more threatened pine rockland ecosystem, and to conform to the extent possible with the warranty deed.

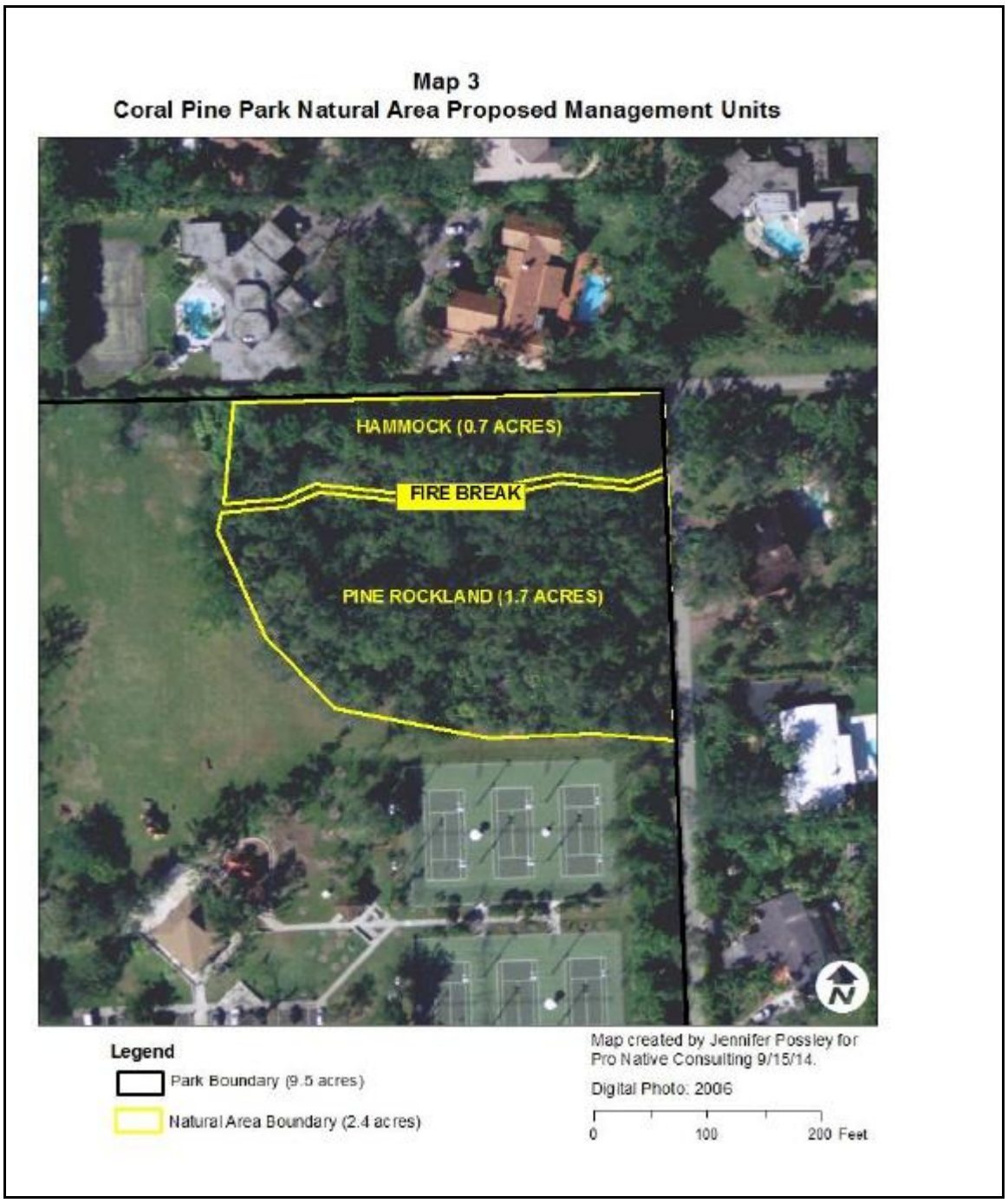


Figure 16. Map from Woodmansee (2014) depicting possible location of rockland hammock restoration along the current northern firebreak.

## 4.41 Recommended Long-term Restoration Goals (Social and Ecological) for the pine rockland at Coral Pine Park. Unless indicated otherwise the time period is 20 years or more.

1. The Village of Pinecrest formalizes the restoration and ongoing management of the site as a protected natural area and provides appropriate budgets and support for these actions.

2. The collective area of protected and managed pine rocklands is maintained or increased as practicable, for example by removing invasives and reducing native hardwoods and palms and restoring pine rocklands in northern firebreak.

3. The connectivity of pine rocklands sites to critical ecotonal habitats (e.g., rockland hammocks, freshwater wetlands) is increased as practicable, for example by restoring rockland hammock along a narrow strip along the northern firebreak.

4. Substrate and hydrological conditions, including topographical variation on former cleared sites, are restored where possible.

5. Appropriate periodic prescribed fire, approximating a fire regime of 2-7 years, is planned and initiated within 5 years.

6. Wildfires are responded to in an appropriate way (e.g., minimizing damage to substrate, rare species, wildlife) and used to restoration advantage when safe and practical within 2 years.

7. Alternative techniques (e.g. hardwood and palm reduction) are applied as fire surrogates, to mitigate fire exclusion, and to facilitate the use of prescribed fire beginning within 1 year.

8. Native palms (*Sabal palmetto*, *Serenoa repens*) are thinned or added (including *Coccothrinax argentata*) where needed to achieve appropriate structure, ranging from 10-25% cover in the groundcover layer and <2% cover in the understory layer within 10 years; native palms may rarely occur above 2 m with a total cover of less than 1%.

9. Native hardwoods and vines are thinned or added where needed to achieve appropriate structure, ranging from 5 to 25% cover in the groundcover layer and <2% cover in the understory layer within 10 years; oaks (*Quercus pumila, Q. virginiana*) and coastalplain staggerbush (*Lyonia fruticosa*) may occur as scattered individuals or small groves with < 1% total cover above 2 m.

10. Slash pines are thinned or planted where needed to achieve and maintain appropriate canopy structure, with 70 mature trees (>4” dbh) or fewer and <50% cover, within 10 years; dead pine snags are left standing as wildlife habitat except where they pose a threat to safety.

11. Pine rockland groundcover species in the groundcover layer are restored to comprise 30-75% cover, and areas of bare ground comprise 5-20% cover within 10 years; the combined total of native groundcover plants, bare ground, and open ground with litter is at least 50%; accumulated pine needles and other organic litter is reduced and never exceeds 1 inch in thickness; native groundcover plants may extend into the understory layer when flowering or fruiting.

12. Previously cleared pine rocklands in the northern firebreak are restored to a 3-star condition.

13. Depleted or extirpated populations of native plants and animals are restored, including all listed species in Table 2, considering insurmountable changes including changes to hydrology, climate change, and fragmentation effect on wildlife populations.

14. Native species richness reaches an average of 95% of the reference model within 10 years, including rare, threatened, and listed species (e.g., US Fish and Wildlife Service, State of Florida, Florida Natural Areas Inventory, The Institute for Regional Conservation).

15. Average cover of native invasive, ruderal, and nonnative plant species is reduced to <2% within 10 years following initiation of restoration.

16. Populations of invasive nonnative and nuisance animals are controlled to the extent practicable or extirpated within 10 years.

17. Pine rocklands are protected from point and non-point sources of pollution and contamination, including insect spraying, overuse of herbicides, and dumping of landscape debris, to the extent practicable within 5 years.

18. Restoration implementation, effectiveness, and impact are monitored throughout a 20-year period or longer.

19. Monitoring data of the restoration of the pine rockland at Coral Pine Park contributes to peer-reviewed papers covering a component of pine rockland ecology, conservation, restoration, or ongoing management within 10 years.

20. Grade-school, adult, and targeted public education and outreach about pine rocklands is doubled within 10 years.

21. A community-based pine rockland restoration corps of practitioners, including volunteers, nonprofits, schools, and Certified Ecological Restoration Practitioners is formalized within 10 years, and formalized training and guidance is in place to support the restoration corps.

22. Community access to pine rocklands through accessible trials, informal paths, and vistas are maintained and improved.

23. Long-term funding adequate to support these goals and objectives is secured within 5 years

24. Village of Pinecrest participates in an organized yet decentralized network that curates and facilitates the sharing of guidance and data on pine rockland restoration, including GIS data layers, site assessments, restoration monitoring reports, and technical guidance.

## 4.42 Recommended Shorter-term Objectives (Social and Ecological) for the pine rockland at Coral Pine Park. Unless indicated otherwise the time period is 10 years.

**OBJECTIVES** (ecological and social) as measured by specific indicators

1. The Village of Pinecrest formalizes the restoration and ongoing management of the site as a protected natural area within 1 year.

2. The collective area of pine rocklands is increased by 5% by removing invasives and restoring pine rockland groundcover by narrowing the northern firebreak and initiating restoration within 3 years; the location of the area to be restored as rockland hammock and the final layout of the northern firebreak is determined within 1 year.

3. The improved connectivity of the pine rockland to critical ecotonal habitats (e.g., rockland hammocks, freshwater wetlands) is initiated within 1 year beginning with the restoration of rockland hammock along the current northern firebreak.

4. Restoration of substrate and hydrological conditions, including topographical variation on former cleared sites, is initiated where possible.

5. The assessment of the use of prescribed fire as a management tool is completed within 1 year.

6. Wildfire response plans are in place within 1 year.

7. Fire surrogate and fire exclusion mitigation techniques and plans are developed and agreed within 1 year.

8. Overly dense stands of palms are thinned within 5 years, and introductions of palms to sites with no or few palms are initiated within 10 years.

9. Overly dense stands of native hardwoods are thinned within 3 years, and introductions of hardwood shrubs to sites with no or few hardwood shrubs are initiated within 10 years.

10. Quantitative assessment of slash pine density and structure is completed within 3 years.

11. Native pine rockland groundcover restoration is initiated within 3 years, and half of potential area of bare ground comprises 5-20% cover within 5 years.

12. Restoration of previously cleared pine rocklands along the northern firebreak is initiated within 2 years.

13. Half of the depleted or extirpated populations of plants and animals are restored as practicable within 10 years.

14. Species richness of native plants is maintained at or reaches an average of 90% of the reference model within 5 years, including rare, threatened, and listed species (e.g.,US Fish and Wildlife Service, State of Florida, The Institute for Regional Conservation);

potential for the restoration of animal populations (e.g., butterflies and other pollinators) is assessed within 10 years.

15. Average cover of native invasive, ruderal, and nonnative plant species is reduced to <2% within 5 years following initiation of restoration.

16. Populations of nonnative, invasive, and nuisance animals are reduced by 50% within 10 years, where practicable.

17. Plans are developed to protect pine rocklands from point and non-point source pollution, including insect spraying, within 3 years; overuse of herbicides along the northern firebreak is stopped within 6 months; dumping of landscape debris is stopped (e.g. through enforcement action) within 1 year.

18. Long-term monitoring methods are developed and initiated within 1 year.

19. Sharing of monitoring data on the restoration of pine rockland at Coral Pine Park within 3 years.

20. Grade-school, adult, and targeted public education and outreach about pine rocklands is increased by 50% within 5 years.

21. The development of a community-based pine rockland restoration corps of practitioners, including volunteers, nonprofits, schools, and Certified Ecological Restoration Practitioners is initiated within 5 years.

22. Community access to pine rocklands through accessible trials, informal paths, and vistas are maintained and improved.

23. Long-term funding adequate to support these goals and objectives has significantly increased.

24. The Village of Pinecrest participates in an organized yet decentralized network that curates and facilitates the sharing of guidance and data on pine rockland restoration.

## 5.0 Best Practices

A checklist of best practices for ecological restoration can be found in the SER Standards, Section 3. For expanded practices for Implementation and Ongoing Management, see the Standards of practice to guide ecosystem restoration – A contribution to the United Nations Decade on Ecosystem Restoration (Un Decade SOPs; Nelson et al. 2024). Practices below are directly relevant to ecological restoration at Coral Pine Park.

### 5.1 Site Planning

Agreement on the restoration targets, goals, objectives, and priority locations for restoration, and where they are located spatially is critical. Some restoration activities will not constrain future decision-making, for example manual control of most invasive species. However, implementation of other activities, especially any planting, mechanical control of invasive species, or the use of prescribed burning, will influence future restoration. At Coral Pine Park,

the decision of whether to restore pine rockland along the northern border, the location of the firebreak, and its width should be reviewed and decided as soon as possible.

## 5.2 Restoration Approaches

The SER Standards call for the identification and justification of specific restoration approaches, descriptions of specific treatments for each restoration area, and prioritization of actions. Whenever possible, the best approach is to remove sources of degradation and to utilize natural recovery potential through the process of natural regeneration. However, in many cases, restoration requires removal of the causes of degradation and interventions to correct damage and trigger recovery. This may include enrichment planting including the reintroduction of species no longer present on or near the site, and follow-up removal of invasive species. This is the assisted regeneration approach. Finally, in cases where damage is high, the reconstruction approach may be utilized. In this case not only do causes of degradation need to be removed or reversed, and biotic and abiotic damage corrected, but also all or a major proportion of its desirable biota may need to be reintroduced. In practice, all of these approaches may be combined at a restoration site. At Coral Pine Park, the natural regeneration and assisted regeneration approaches can be utilized throughout the remnant pine rockland. Given the high levels of degradation from invasive species, fire suppression, and fragmentation effects, biodiversity has been depleted and some enrichment planting will be needed, but it is important to allow for natural regeneration following the reduction in native hardwoods and palms, any thinning of pines, and invasive species control. Along the northern firebreak, the reconstruction approach will be needed, but planting should be limited to only what is needed to stimulate recovery.

## 5.3 Invasive Species

A complete list of the nonnative species recorded at Coral Pine Park can be found on the Floristic Inventory of South Florida (FISF) website, along with images and links to other identification tools. Not all nonnative species are currently invasive, but some may become invasive in the future. Predicting which species may become invasive in the future can be informed by knowledge of the species' behavior in other parts of the world. To date, about 90 species of naturalized nonnative plants have been observed at Coral Pine Park, of which nearly 70 are classified as invasive; this is an exceptionally high diversity of invasive plant species for a site of its size. However, current diversity of nonnative and invasive species is significantly lower, with many invasive species substantially reduced in cover or abundance or possibly extirpated from the site.

Comprehensive resources are available on the control of invasive species including guidance from the State of Florida (Enloe et al. 2018), which includes information on biological, manual, mechanical, cultural (e.g., prescribed burning, flooding), and chemical control methods. Specific control methods for many individual species are also indicated. At Coral Pine Park, most invasive species can be controlled through a combination of manual control (e.g., weeding by hand, digging up), cutting and treating with herbicide, basal bark herbicide applications, and targeted foliar spray. Mechanical clearing of invasive vegetation is neither needed nor recommended.

Regionally, other municipalities are working on finding a non-synthetic replacement for targeted foliar applications of glyphosate (Roundup), but that has not yet been successful. For foliar control, in addition to glyphosate, water-soluble formulations of triclopyr (e.g., Garlon 3A) may

be used to control broadleaf plants, and a variety of graminicides may be used to target grasses. To treat woody vegetation, such as many of the trees and shrubs listed in Table 2, triclopyr has generally been found to be safe and effective. The oil-soluble formulations (e.g., Garlon 4 mixed with plant-based oil, Pathfinder) are effective for basal bark and cut stump applications but cannot be used near water, while the water-soluble formulations (e.g., Garlon 3A) can be used on land as well as near or over water but requires cut stump or hack-and-squirt methods.

To reduce herbicide usage and increase overall efficiency, invasive species control should be conducted as part of an ecological restoration plan and implemented on a schedule. If done properly, repeat use of synthetic herbicides should generally not be necessary after one year, but resprouting of some individuals should be expected, especially within the first few months. Because of the large number of species involved at Coral Pine Park, work should be conducted by a highly trained crew, preferably led by a supervisor holding a Natural Areas Weed Management license from the State of Florida or who is a Certified Ecological Restoration Practitioner (CERP), or CERP In Training (CERPIT) through the Society for Ecological Restoration. Teams of 2-4 should traverse each target area within about 10 feet of each other, carrying supplies needed to deal with most control measures expected. GPS coordinates are recorded for any return work required.

## 5.4 Native Species Management

Native plants may grow in such a way that they need to be managed as part of the restoration process. At Coral Pine Park, the entire remnant pine rockland requires hardwood and palm reduction as a result of fire exclusion. In addition, native vines such as Virginia-creeper (*Parthenocissus quinquefolia*), earleaf greenbrier (*Smilax auriculata*), and muscadine grape (*Vitis rotundifolia*) can become aggressive and problematic following hardwood and palm control and should be controlled. Native weeds can proliferate in areas of soil disturbance and high light, such as along the northern firebread, or following hardwood or palm reduction or invasive species control; these species are indicated as Ruderal species in the FISF under invasive status. Strategies to monitor and treat these weedy areas are an important part of the ecological restoration process. Together, native hardwoods, vines, and weeds, along with invasive species, have overwhelmed the open spaces needed for most of the native pine rockland biodiversity to survive. Management of both native and nonnative species is key to the successful recovery of the pine rockland ecosystem at Coral Pine Park.

## 5.5 Extra-Limital Natives

While adapting to climate change and planning for shifting ranges of native plants and animals is critical to long-term sustainability, ecological restoration standards do not sanction translocating species beyond currently understood ecologically based native ranges. Species native elsewhere in Florida planted beyond their ecologically mediated ranges can be described as extra-limital natives. Three species in this category have been recorded to date at Coral Pine Park: pitch-apple (*Clusia rosea*), royal palm (*Roystonea regia*) and West Indian mahogany (*Swietenia mahagoni*). Any extra-limital natives should be removed from restoration project sites when they are found.

## 5.6 Restoration Planting

Tools for selecting native species for restoration planting can be found on IRC's Natives For Your Neighborhood and Floristic Inventory of South Florida websites. For the reconstruction method, which will be needed along the northern firebreak, guidance for both pine rocklands (Gann et al. 2020) and rockland hammocks (Gann 2006) are available. These documents describe site planning, preparation, species selection, planting, and ongoing management.

## 6.0 Ongoing Management

The SER Standards reserve the term maintenance for activities that take place after restoration is complete; that is when the attributes of the ecosystem resemble the reference model. Aftercare is the term applied to special care given to plants or animals when they have been introduced to a restoration site (e.g., watering newly installed plants). In practice, however, restoration practitioners and others responsible for implementing restoration projects use the term maintenance or ongoing management for many restoration interventions that are applied throughout the restoration process. Regardless of the terminology used, the important thing is that ecological restoration takes time (years, decades, or centuries depending on the ecosystem), and interim interventions will be needed throughout the process (e.g., reducing weed competition, trimming as a surrogate to fire, removing new infestations of invasive species, reintroducing depleted or extirpated species that require mature and high integrity ecosystem conditions).

For areas where reconstruction and most assisted natural regeneration approaches will be used, long-term care primarily involves weeding and perhaps some selective trimming. Fertilizing plants after installation is unnecessary and can be counterproductive.

## 7.0 Monitoring and Adaptive Management

Most restoration projects are trials or experiments, and, because of this, there is a need to monitor and evaluate the extent to which projects are implemented according to plan, achieve project goals and objectives, and to measure overall impact. Therefore, monitoring and evaluation are critical components of the restoration process. However, for monitoring to be effective, it cannot be an afterthought. Monitoring must be planned and budgeted for and included throughout the restoration process. Because each type of monitoring question requires specific types of information collected at specific time-periods, it is important to determine the questions and approach to monitoring during project planning. Timely monitoring and evaluation of results, as well as funding for ongoing restoration, allows for adaptive management, which can and should be the standard approach for any ecological restoration project, irrespective of how well-resourced that project may be. For more information on monitoring and adaptive management, see Principle 5 in the SER Standards, and the relevant section in the UN Decade SOPs. Tools to assist in monitoring and communicating about ecological restoration projects include the SER Five-star System, the Ecological Recovery Wheel (ERW), and the Social Benefits Wheel. The 5-star System and ERW represent a gradient from very low (0-1 stars) to very high (4-5 stars) similarity to the reference model. As a generic framework, users must develop indicators and monitoring metrics specific to the ecosystem and sub-attributes they identify. A baseline ERW for the remnant pine rockland at Coral Pine Park (excluding the northern firebreak) has been prepared to help visualize the baseline condition prior to the initiation of new ecological restoration activities (Fig. 17, Table 5). See also the SER Standards Tools page for more information and support.

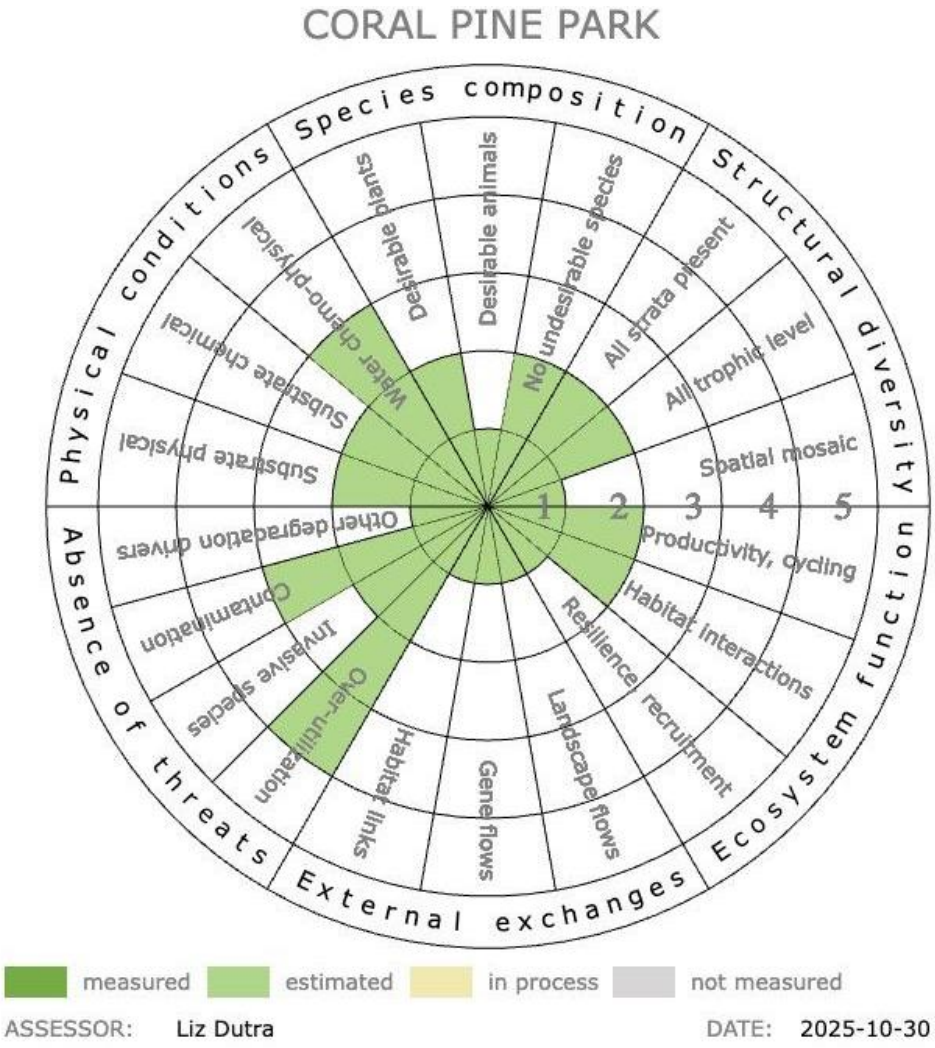


Figure 17. Baseline Ecological Recovery Wheel for the remnant pine rockland at Coral Pine Park, excluding the northern firebreak, October 30, 2025

**Table 5. Baseline condition of 19 ecological sub-attributes of the pine rockland natural area Coral Pine Park, relative to the reference model. Based on the SER Five-star System (Gann et al. 2019).**

| ATTRIBUTE CATEGORY | CONDITION (1-5) | EVIDENCE FOR BASELINE CONDITION |
|---|---|---|
| **ATTRIBUTE 1. Absence of threats** | | |
| Over-utilization | 4 | Minimal current over-utilization |
| Invasive species | 2 | Limited internal threats from invasive species and external threats of invasive plants are partially mitigated. Threats from domestic, feral, and invasive animals are very high and unmitigated. |
| Contamination | 3 | Some threats e.g., from insecticides, need review and mitigation; dumping of landscaping debris observed and needs to be addressed, but other contamination threats are minimal |
| Other degradation drivers | 0 | Fire exclusion is extreme and unmitigated; seasonal flooding along the western margins has been completely lost. |
| **ATTRIBUTE 2. Physical conditions** | | |
| Substrate physical | 2 | Substrate generally intact except on edges, but organic content very high and incapable of supporting most pine rockland plants. |
| Substrate chemical | 2 | Substrate chemistry impacted by high levels of organic content. |
| Water chemo-physical | 3 | Primary water delivery in this ecosystem is via rain, but seasonal flooding from the adjacent wetland has ceased and overall water availability has decreased. |
| **ATTRIBUTE 3. Species composition** | | |
| Desirable plants | 2 | 25-49% richness and compared to reference; evenness is very low in similarity to the reference model. |
| Desirable animals | 1 | 5-24% of richness and evenness compared to reference. |
| No undesirable species | 2 | >25% relative richness of nonnative plants; >50% cover of hardwoods, nonnative, and weedy plants. |
| **ATTRIBUTE 4. Structural diversity** | | |
| All strata present | 2 | Canopy, subcanopy, and understory strata are present, but not similar to reference. Groundcover stratum is effectively absent. |

| | | |
|---|---|---|
| All trophic levels | 2 | Apex predators missing, many consumers missing, but some similarity to reference. |
| Spatial mosaic | 1 | Spatial patterning is largely dissimilar to reference. |
| **ATTRIBUTE 5. Ecosystem function** | | |
| Productivity, cycling etc. | 2 | Intermediate numbers and levels of physical and biological processes and functions |
| Habitat interactions | 2 | Low number and levels of habitat provision relative to reference |
| Resilience, recruitment etc. | 1 | Fire regime effectively absent |
| **ATTRIBUTE 6. External exchanges** | | |
| Landscape flows | 1 | Less than 25% positive exchanges due to urban location. |
| Gene flows | 1 | Less than 25% positive exchanges due to urban location. |
| Habitat links | 1 | Less than 25% positive exchanges due to urban location. |

## 8.0 Volunteers

While some restoration activities require trained professionals, there are many opportunities to involve volunteers in the restoration process. Volunteers can include adults and children, formal groups and individuals, and both the trained and untrained. Volunteers can help remove invasive species, especially smaller plants that are readily removed by hand, such as oysterplant (*Tradescantia spathacea*). They can help haul, dig holes, and install plants, and water both during and following events. Volunteers, when trained, can help with weeding restoration planting areas, and assist with project monitoring such as through repeat photography. Using tools such as iNaturalist, volunteers can help document species occurrences, especially lesser-known groups such as bees, moths, beetles, and invasive animals. To quote from the SER Standards, Principle 1:

> Ecological restoration is undertaken for many reasons including to recover ecosystem integrity and to satisfy personal, cultural, social-economic, and ecological values. This combination of ecological and social benefits can lead to improved social–ecological resilience. Humans benefit from a closer and reciprocal engagement with nature. Participating in restoration projects can be transformative, for example, when children involved in restoration projects develop personal ownership over restoration sites, or when community volunteers seek new career or vocational paths in restoration practice or science. Communities located within or near degraded ecosystems may gain health and

other benefits from restoration that improves the quality of air, land, water, and habitats for native species.

## 9.0 Recommendations

A proposed timetable and scope of work for the first phases of implementation of ecological restoration at the remnant pine rockland at Coral Pine Park, focused on hardwood and palm reduction, concurrent with ongoing invasive plant control, is provided in Appendix A. In addition, a restoration protocol for the northern fire break should be discussed, mapped, and agreed upon. The delineation of any rockland hammock restoration areas is best completed prior to the initiation of pine rockland restoration as outlined in Appendix A.

## 10.0 Acknowledgements

We acknowledge the support of the City, local partners, and community members who will play a vital role in the restoration and long-term management of the pine rockland at Coral Pine Park. We acknowledge assistance and support from Ander Alvarez from the Village of Pinecrest. Jennifer Possely from Fairchild Tropical Botanic Gardens, John Joyner and Joy Klein from Miami-Dade County, and Steve Woodmansee from Pro Native Consulting provided documents and other historical information.

## 11.0 Citations

Enloe SF, Langeland K, Ferrell J, Sellers B, MacDonald G (2018) Integrated management of invasive plants in natural areas of Florida. University of Florida IFAS Extension. http://edis.ifas.ufl.edu/publication/wg209

Florida Fish and Wildlife Conservation Commission (2021) Feral Cats, https://myfwc.com/wildlifehabitats/nonnatives/feral-cats/. Accessed March 10, 2021.

Florida Invasive Species Council (FISC) (2025) 2019 FISC List of Invasive Plant Species. https://www.floridainvasives.org/plant-list/2023-invasive-plant-species/ Accessed October 22, 2025.

Florida Natural Areas Inventory [FNAI] (2010) Guide to the Natural Communities of Florida: 2010 Edition, Rockland Hammock. Tallahassee, Florida. https://www.fnai.org/PDFs/NC/Rockland_Hammock_Final_2010.pdf

Florida Natural Areas Inventory [FNAI] (2025) Natural Community Accounts. Tallahassee, Florida. https://www.fnai.org/species-communities/natcom-accounts Accessed October 31, 2025.

Gann GD, Abbott CJ, Hines KN, and Collaborators. 2025a. Natives For Your Neighborhood [web application]. The Institute for Regional Conservation. Delray Beach, Florida. Available https://www.regionalconservation.org/beta/nfyn/default.asp

Gann GD, McDonald T, Walder B, Aronson J, Nelson CR, Jonson J, Hallett JG, Eisenberg C, Guariguata MR, Liu J, Hua F, Echeverria C, Gonzales E, Shaw N, Decleer K, Dixon KW (2019)

International principles and standards for the practice of ecological restoration. Second edition. Restoration Ecology 27(S1): S1-S46. https://doi.org/10.1111/rec.13035

Gann GD, Mosyaftiani A, Bartholomew D, McDonald T, Walder B, Young R, Dixon KW (2024) Five-star System sub-attribute Table, V1.0, for SER's International principles and standards for the practice of ecological restoration; adapted from Gann et al. 2019, Standards Reference Group SERA 2021, Young et al. 2022, and Bartholomew and Mosyaftiani et al. 2024. Society for Ecological Restoration. Washington, D.C. USA. https://www.ser.org/page/Standards-Tools

Gann GD, Possley J, Woodmansee SW (2020) Guidelines for Planting a Pine Rockland in Miami-Dade County, Florida. The Institute for Regional Conservation, Delray Beach, Florida. https://www.regionalconservation.org/ircs/pdf/Pine%20Rockland%20Planting%20Guide.pdf

Gann GD, Possley J, Bergh C, Klein J, Seasholtz A, Kittredge SM, Kevin K (2023) Integrated ecological and social vision, targets, goals, and objectives for the ecological restoration of pine rocklands in Miami-Dade and Monroe County, Florida. Pine Rockland Business Plan Ecological Restoration Sub-Team. The Institute for Regional Conservation. Delray Beach, Florida. https://www.regionalconservation.org/ircs/pdf/Gann2023PRVGOV1.0.pdf

Gann GD, Trotta LB, and Collaborators (2025b) Floristic Inventory of South Florida Database Online [web application]. The Institute for Regional Conservation. Delray Beach, Florida. Available https://regionalconservation.org/ircs/database/database.asp

IRC (2016) IRC completes invasive plant management project at Coral Pine Park. Monday, November 14, 2016. https://www.regionalconservation.org/ircs/news_archived.asp

Maguire J (1995) Restoration plan for Dade County's pine rocklands following Hurricane Andrew. Dade County Department of Environmental Resources Management.

McHargue, L (1999) Restoration and Management Plan for Coral Pine Park Pineland. Miami-Dade County Park and Recreation Department, Natural Areas Management

Nelson, C.R., Hallett, J.G., Romero Montoya, A.E., Andrade, A., Besacier, C., Boerger, V., Bouazza, K., Chazdon, R., Cohen-Shacham, E., Danano, D., Diederichsen, A., Fernandez, Y., Gann, G.D., Gonzales, E.K., Gruca, M., Guariguata, M.R., Gutierrez, V., Hancock, B., Innecken, P., Katz, S.M., McCormick, R., Moraes, L.F.D., Murcia, C., Nagabhatla, N., Pouaty Nzembialela, D., Rosado-May, F.J., Shaw, K., Swiderska, K., Vasseur, L., Venkataraman, R., Walder, B., Wang, Z., Weidlich, E.W.A. (2024) Standards of practice to guide ecosystem restoration – A contribution to the United Nations Decade on Ecosystem Restoration 2021-2030. Rome, FAO, Washington, DC, SER and Gland, Switzerland, IUCN CEM. https://openknowledge.fao.org/handle/20.500.14283/cc9106en

Possley J, Duncan J, Klein J, Maguire J (2018) Miami-Dade County's management plan for the Richmond pine rocklands, 2nd Edition. Prepared by Fairchild Tropical Botanic Garden for Miami-Dade County, Department of Parks, Recreation and Open Spaces and Zoo Miami.

Possley J, Maschinski J, Maguire J, Guerra C (2014) Vegetation monitoring to guide management decisions in Miami's urban pine rockland preserves. Natural Areas Journal 34:154-165.

Woodmanse, SW (2014) Village of Pinecrest Coral Pine Park Natural Area Management Plan, Pro Native Consulting. Miami, Florida.

# APPENDIX A

## Preliminary Restoration Timetable and Draft Contractor Protocols Remnant Pine Rockland, Coral Pine Park

Prepared for
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By
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**November 1, 2025**

## Background

Six initial phases of work are recommended over a six year period: 1) small hardwood and cabbage palm reduction; 2) medium hardwood reduction and pine needle reduction; 3) large hardwood and saw palmetto reduction; 4) specimen tree treatment and pine thinning; 5) prescribed burn; 6) enrichment planting.

## General Conditions

The Contractor shall be responsible for the removal or treatment of 100% of target vegetation identified in this Scope of Work, within the areas so designated. The Village of Pinecrest (Village) decision regarding the overall compliance is final. All non-compliance must be resolved within one month of notification unless otherwise directed or approved by the Village. If non-compliance is delayed, the Contractor shall be responsible for treatment of new growth. Inspections and non-compliance notifications may occur during or after work activities cease.

The Village will designate a Project Manager. Coordination of work efforts shall be maintained by the Contractor with the Project Manager.

Work activities shall be recorded in a Daily Progress Report each day. The Daily Progress Report shall be used to compile a Weekly Progress Report that shall be submitted to the Project Manager. At the discretion of the Village, the Daily Progress Reports may be requested and must be provided. The Contractor shall also record noteworthy observations in the field, including weather events, nesting birds, rare species locations, additional nonnative plants, nonnative wildlife, hazardous site conditions, and evidence of illegal activities. The Contractor shall report all noteworthy observations to the Project Manager in a timely manner.

The Contractor shall follow all laws and regulations including but not limited to those set forth by the United States Environmental Protection Agency (EPA), Florida Fish and Wildlife Conservation Commission (FWC), Florida Department of Environmental Protection (FDEP),

Florida Department of Agriculture and Consumer Services (FDACS), Miami-Dade County, and the Village. The Contractor shall comply with all applicable permits.

Heavy machinery is prohibited from use inside the project boundary. No tree larger than 18" dbh (i.e., a specimen tree) is to be cut or treated with herbicide without field inspection, photo documentation, and approval in writing by the Project Manager.

## Treatment Protocols

### Phase I (Year 1) - Small Hardwood and Cabbage Palm Reduction

**Task 1: Hardwood and Palm Reduction**

All hardwoods greater than three feet (3') in height with a diameter at breast height (DBH) of ≤4 inches are to be cut down to a level 6" above ground level or below. In addition, any cabbage palm (*Sabal palmetto*) individuals measuring six feet (6') in height or less will be chemically treated using selective herbicide application. Cabbage palms greater than six feet (6') in height, but without a five foot (5') clear trunk and or (i.e., without leaves or leaf bases for at least five feet from ground level), are to be cut down. Cabbage palms with a five-foot clear trunk and or supporting native epiphytic flora are to be left in place. Native pine rockland vegetation including South Florida slash pine, saw palmetto, and silver palm (*Coccothrinax argentata*) shall not be cut down or otherwise damaged. All vegetative debris 1.0 inch in diameter or larger is to be removed from the site and lawfully disposed of offsite, or chipped and used for rockland hammock restoration or another approved use by the Village. Debris material less than 1.0 inch in diameter can be left on site; any remaining debris shall be placed in small piles to act as wildlife habitat, not to exceed 8 feet in length, 6 feet in width, and 4 feet in height. Debris piles must avoid any remnant pine rockland groundcover vegetation.

**Task 2: Invasive Plant Control and Cut-stump Treatment of Hardwoods**

The Contractor shall systematically traverse, locate, and treat 100% of the invasive species listed in Table 1 below, with a minimum of 97% of target plants being killed. In addition, the Contractor shall treat all cut stumps resulting from Task 1 for the following native species only: *Bursera simaruba, Ficus aurea, Lysiloma latisiliquum, Quercus laurifolia, Quercus virginiana, Simarouba glauca, Trema, floridana, Zanthoxylum fagara*. Treatments will follow the *Protocols for Invasive Plant Control and Cut-stump Treatment of Hardwoods* below. Due to the aggressive and resistant nature of some species or a persistent and long-lived seed bank (e.g., rosary-pea), treatment will be conducted quarterly for one year (four treatments total).

### Phase II (Year 2) - Medium Hardwood and Pine Needle Reduction

**Task 1 and 2:** All remaining hardwoods with a diameter at breast height (DBH) of ≤10 inches are to be cut down to a level 6" above ground level or below. All other criteria in Phase I are to be followed, except that aggressive native vines will also be treated as directed by the Village (e.g., *Ipomoea indica, Smilax auriculata, Parthenocissus quinquefolia, Vitis rotundifolia*).

**Task 3: Pine Needle Reduction**

Rake and remove excess accumulations of pine needles so that the maximum depth of pine needles or other organic debris is no deeper than 1". [Protocols to be refined at a later date].

## Phase III (Year 3) - Large Hardwood and Saw Palmetto Reduction

**Task 1 and 2:** All remaining hardwoods with a diameter at breast height (DBH) of ≤17 inches are to be cut down to a level 6" above ground level or below. All other criteria in Phase II are to be followed, except invasive species treatments will be biannual rather than quarterly. In addition, any remaining nonnative or ruderal species (as indicated for the site in the Floristic Inventory of South Florida) will also be treated.

**Task 3: Saw Palmetto Reduction**

If necessary, native saw palmetto (*Serenoa repens*) will be treated to reduce cover so that total palm cover is 20% or less over the site.

## Phase IV (Year 4) - Specimen Tree Treatment and Pine Thinning

**Task 1 and 2:** As directed by the Village, remaining hardwoods with a diameter at breast height (DBH) of >17 inches are to be treated in place or cut down if treating in place creates a safety hazard. All other criteria in Phase III are to be followed.

**Task 3: Pine Thinning**

If necessary, thin South Florida slash pine to reduce total density to 70 or fewer mature pines per acre (>4" DBH) and <50% cover over the site.

## Phase IV (Year 5)

**Task 1 and 2:** Follow all criteria in Phase III.

**Task 3: Conduct Prescribed Burn**

[Protocols to be refined at a later date]

## Phase IV (Year 6)

**Task 1 and 2:** Follow all criteria in Phase III.

**Task 3: Conduct Enrichment Planting**

[Protocols to be refined at a later date]

## Protocols for Invasive Plant Control and Cut-stump Treatment of Hardwoods

GPS tracks are used for monitoring treatment. GPS units shall be used to identify and document treatment area boundaries for each day worked. Each Crew Leader must carry a Garmin GPS, a smart phone with an application capable of recording GPS tracks, or equivalent. The Contactor shall save project tracks and, if requested by the Project Manager, provide tracks to the VPB. These tracks may be provided on-site or via email or other electronic means.

Ground Crew Supervisors must obtain an FDACS license in the category of Natural Areas Management prior to treatment. The Contractor shall provide a list of herbicides and methods to be used for prior approval by the Project Manager.

All herbicides must be EPA/FDACS registered or have the appropriate Florida Special Local Needs (Section 24(c) FIFRA) registration. ALL HERBICIDES SHALL BE USED IN ACCORDANCE WITH THE EPA LABEL. The Contractor is liable for any penalty, fines, or damages resulting from the misuse of herbicides.

All herbicide applications shall be carried out in a manner consistent with EPA and Special Local Need 24(c)(SLN) herbicide labels. Crews will have access to all appropriate labels and Safety Data Sheets while transporting, mixing, or applying herbicides. The Contractor shall comply with all pertinent regulations set forth by FDACS.

The Contractor shall monitor and wind speed and direction when preparing to apply or applying herbicides. The Contractor shall follow the most restrictive wind law or policy when there are conflicting thresholds between laws/policies. Contractors shall follow all laws regarding herbicide wind restrictions including but not limited to the Florida Organo-Auxin Herbicide Rule 5 E-2.033 (http://edis.ifas.ufl.edu/wg051). Herbicide applications shall not occur when wind speeds are greater than 10.0 miles per hour (mph). The Contractor shall take all precautions to minimize and mitigate herbicide drift.

At least 97% of treated plants must be dead at least six months following final treatment. All parts of the plant must be dead, not simply defoliated. If 100% of the area is not treated or 97% kill rate is not achieved for any area after one to six months post final treatment, one additional thorough treatment shall be the responsibility of the Contractor at no cost to the VP. Non-compliance re-treatment tracks must be turned in to the Project Manager. The Contractor is not responsible for the recruitment of any invasive species following the final treatment, unless such recruitment is due to negligence by the Contractor.

**Treatment Methods**

Manual treatment: Includes hand pulling, and using chainsaws, weed whackers, and loppers to cut vegetation. Seedlings may be hand pulled to reduce the impact of herbicides on non-target vegetation. Pulled seedlings should be bagged and removed from the site or piled where roots do not contact the soil to prevent regrowth. Plants known to propagate by vegetative means should be bagged and removed from the site.

Directed foliar: Herbicide is diluted in water and applied to leaves or target species using backpack applicators or spray bottles.

Cut stump treatment: After felling vegetation, herbicide is applied to the cut stump surface.

Basal bark: Herbicide is applied with a backpack or spray bottle directly to the bark around the circumference to each stem/tree. Herbicide must be in an oil-soluble formulation.

Frill, girdle, and hack and squirt: Cuts into the cambium are made completely around the circumference of each stem/tree no higher than one foot off the ground and herbicide is applied completely around the girdle.

All methods above have been found to be effective under specific circumstances; however, many factors can affect the performance of an herbicide application and results can vary. Choice of application method, herbicide, and rate for individual species depends on environmental conditions and professional experience. Marker dyes are required to keep track of what vegetation has been treated.

Additional information on recommended control methods for invasive plants can be found in the University of Florida's Institute of Food and Agricultural Sciences publication Integrated Management of Invasive Plants in Natural Areas in Florida (Enloe et al. 2018).

**Protected Species**

The Contractor shall be responsible for compliance with all Federal and State laws regarding protected species including but not limited to the Endangered Species Act.

The Contractor shall be familiar with threatened and endangered plant and animal species, their identification, and any restrictions or protocols associated with them. When working in an area where these species may be present, the Contractor must follow any established restrictions or protocols including those of U.S. Fish and Wildlife Service (USFWS) and Florida Fish and Wildlife Conservation Commission (FWC).

The contractor shall not harass, injure, kill, or otherwise interfere with native wildlife, including snakes, that may be encountered during the work being conducted under this contract. Any notable encounters with nonnative wildlife shall be immediately reported to the Project Manager.

It shall be the Contractor’s responsibility to exercise care and reasonably protect native vegetation at the project site noting the need for cutting and hauling large plants. The Contractor is responsible for the restoration or replacement of all native vegetation unreasonably damaged during the project to the satisfaction of the VPB, at no cost to the Village.

The Contractor is responsible for protecting non-targeted species including those species with a similar appearance to the targeted species. The Contractor shall be responsible for replacement of non-targeted species damaged by work activities including those damaged due to herbicides.

**Table 1.** Invasive plant species recorded at Coral Pine Park that are listed by the Florida Invasive Species Council (2025) or by IRC as Emerging Invasives or Invasive Natives (Gann et al. 2025b). Invasive nonnative plants are ranked as Category I by FISC when they 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 invasives 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 Category I if ecological damage is demonstrated. FISC also has a watch list (W); most of these species are also considered Emerging Invasives by IRC. IRC ranks additional Emerging Invasives (EI) based on field observations in South Florida. IRC also classifies two extralimital natives (native to other parts of

Florida) as Invasive Natives (IN) at Coral Pine due to their highly aggressive behavior in native ecosystems there.

| Scientific name | Common name | Invasive category |
|---|---|---|
| *Abrus precatorius* | Rosary-pea, Crab-eyes | FISC I |
| *Acacia auriculiformis* | Earleaf acacia | FISC I |
| *Adenanthera pavonina* | Red sandalwood, Red beardtree | FISC II |
| *Albizia lebbeck* | Woman's tongue, Rattlepod | FISC I |
| *Alysicarpus vaginalis* | White moneywort | IRC EI |
| *Ardisia elliptica* | Shoe-button ardisia | FISC I |
| *Asparagus aethiopicus* | Sprenger's asparagus-fern | FISC I |
| *Bischofia javanica* | Javanese bishopwood | FISC I |
| *Callisia fragrans* | Basketplant | FISC II |
| *Casuarina glauca* | Suckering Australian-pine, Gray sheoak | FISC I |
| *Catharanthus roseus* | Madagascar-periwinkle | FISC W, IRC EI |
| *Chamaedorea seifrizii* | Bamboo palm | FISC II |
| *Clerodendrum speciosissimum* | Javanese glorybower | IRC EI |
| *Clusia rosea* | Pitch-apple | IRC IN |
| *Cocos nucifera* | Coconut palm | FISC II |
| *Combretum indicum* | Rangoon creeper | IRC EI |
| *Crotalaria spectabilis* | Showy rattlebox | FISC W, IRC EI |
| *Cupaniopsis anacardioides* | Carrotwood | FISC I |
| *Cynodon dactylon* | Bermuda grass | IRC EI |
| *Dioscorea alata* | White yam | FISC I |
| *Dioscorea bulbifera* | Common air-potato | FISC I |
| *Dypsis lutescens* | Yellow palm, Areca palm | FISC W, IRC EI |
| *Eriobotrya japanicoa* | Loquat | IRC EI |
| *Eugenia uniflora* | Surinam-cherry | FISC I |
| *Euphorbia graminea* | Grassleaf spurge | IRC EI |
| *Ficus microcarpa* | Laurel fig | FISC I |
| *Flacourtia indica* | Governor's-plum | FISC II |
| *Hibiscus tiliaceus* | Seaside mahoe, Sea hibiscus, mahoe | FISC II |
| *Jasminum dichotomum* | Gold Coast jasmine | FISC I |
| *Jasminum fluminense* | Brazilian jasmine, Corky-stemmed jasmine | FISC I |
| *Lantana camara* | Shrubverbena | FISC I |
| *Merremia tuberosa* | Spanish arborvine, Yellow morningglory | FISC I |
| *Millettia pinnata* | Karum tree, Poonga-oil tree | IRC EI |
| *Momordica charantia* | Wild balsam-apple | FISC II |
| *Mucuna pruriens* | Cowitch, Velvetbean | IRC EI |
| *Murraya paniculata* | Orange jessamine | FISC II |

| Scientific name | Common name | Invasive category |
|---|---|---|
| *Nephrolepis brownii* | Asian sword fern | FISC I |
| *Nephrolepis cordifolia* | Tuberous sword fern | FISC I |
| *Neyraudia reynaudiana* | Burmareed, Silkreed | FISC I |
| *Ochrosia elliptica* | Elliptic yellowwood | FISC W, IRC EI |
| *Pennisetum purpureum* | Napier grass, Elephantgrass | FISC I |
| *Phoenix reclinata* | Senegal date palm | FISC II |
| *Phymatosorus grossus* | Serpent fern, Wart fern | FISC I |
| *Podocarpus macrophyllus* | Podocarpus, Southern-yew, Japanese-yew | IRC EI |
| *Pteris vittata* | China brake | FISC II |
| *Richardia grandiflora* | Largeflower Mexican clover | FISC II |
| *Rouselia humilis* | Shineseed | IRC EI |
| *Roystonea regia* | Royal palm, Florida royal palm | IRC IN |
| *Ruellia blechum* | Green shrimpplant | FISC II |
| *Schefflera actinophylla* | Australian umbrellatree | FISC II |
| *Schinus terebinthifolius* | Brazilian-pepper | FISC I |
| *Solanum diphyllum* | Twoleaf nightshade | FISC II |
| *Spermacoce verticillata* | Shrubby false buttonweed | FISC II |
| *Sphagneticola trilobata* | Creeping wedelia | FISC II |
| *Stachytarpheta cayennensis* | Nettleleaf velvetberry | FSCI II |
| *Stenotaphrum secundatum* | St. Augustine grass | FISC W, IRC EI |
| *Swietenia mahagoni* | West Indian mahogany | IRC IN |
| *Syngonium podophyllum* | Nephthytis, American evergreen | FISC I |
| *Tabebuia heterophylla* | White-cedar | FISC II |
| *Terminalia catappa* | Tropical-almond | FISC II |
| *Tradescantia spathacea* | Oysterplant | FISC I |
| *Triadica sebifera* | Popcorntree, Chinese tallowtree | FISC I |
| *Triumfetta semitriloba* | Burweed, Sacramento burrbark | IRC EI |
| *Turnera ulmifolia* | Yellow alder, Ramgoat dashalong | FISC W, IRC EI |
| *Urena lobata* | Caesarweed | FISC I |
| *Youngia japonica* | Rocketweed, Oriental false hawksbeard | IRC EI |
| *Zoysia matrella* | Zoysia grass | IRC EI |