



GUIDELINES FOR PLANTING A PINE ROCKLAND IN MIAMI-DADE COUNTY, FLORIDA

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Why plant a pine rockland? Pine rockland is a critically imperiled ecosystem that has been heavily impacted by urban development and agriculture. Found only in South Florida and the Bahama Archipelago, less than 2% of the original pine rocklands remain in Miami-Dade County outside of Everglades National Park. Pine rocklands of the lower Florida Keys have also been heavily impacted by development, sea level rise, and flooding from hurricanes and tropical storms. Creating a pine rockland is not easy or simple, but it can be extremely rewarding. Pine rocklands provide wonderful habitats for native plants and wildlife, including many species of very rare plants, butterflies, bees and other pollinators, and songbirds. If well-planned and managed they can also be aesthetically pleasing.



Photo courtesy of Haniel Pulido Jr.

Background

Pine rocklands are subtropical savannas with a single species of tree in the canopy – [South Florida slash pine](#) (*Pinus elliottii* var. *densa*). They are found on limestone substrate with little or no organic material on the surface. They have an open (less than 50%) canopy, a subcanopy of palms and shrubs (25-50%), and a diverse groundcover of grasses, wildflowers, vines, ferns, cycads, and other cool plants. Pine rockland plants are of temperate and West Indian origin, along with Florida and local endemics found nowhere else on Earth. Throughout their range, the composition of pine rocklands varies according to type of substrate, hydrological conditions, local climate, and other ecological factors. Pine rocklands are maintained by periodic fires every 2-10 years, which reduce the cover of palms, shrubs, and hardwood trees that would otherwise take over and shade out the diverse understory and groundcover plants.

In South Florida, pine rocklands were historically found in areas of elevated limestone that were maintained by frequent fire: along the Miami Rock Ridge from north of the Miami River south and west to Long Pine Key in Everglades National Park; in the lower Florida Keys in and around Big Pine Key; and in the Lostman's Pines area and some central portions of the Big Cypress Swamp (Fig. 1). A tiny pine rockland was historically present on North Key Largo in the upper Florida Keys, which has already been lost to sea level rise. Pine rocklands have received significant protection in Everglades National Park, Big Cypress National Preserve, and the National Key Deer Refuge; however, this habitat has been severely impacted by development throughout the remainder of the Miami Rock Ridge and in significant areas around the National Key Deer Refuge in the lower Florida Keys. Pine rocklands are also threatened by fire suppression, invasive species, fragmentation, sea level rise, and climate change.

Pine rockland is one of several types of pine ecosystems found in South Florida, including flatwoods and scrub. They most closely resemble mesic flatwoods in structure, which are found throughout much of peninsular Florida. Mesic flatwoods and other pine ecosystems differ from pine rocklands in that they grow on deep sandy soils rather than on limestone, or limestone with a thin layer of sand over the surface. Sandy pine rocklands are more common in the northern Miami Rock Ridge, from about Palmetto Bay and the Richmond area northward. The sandier part of the Miami Rock Ridge has been referred to as the Biscayne region, while the rockier part comprises the Redland region. Most of the pinelands in Everglades National Park are found in Long Pine Key, which lies at a lower elevation; each of these three areas has its own unique flora. Pine rocklands are associated with rockland hammocks and marl prairies on the mainland and with rockland hammocks, coastal berms, and mangrove swamps in the lower Florida Keys.

These guidelines use a reference model based on historical information as well as intact, healthy pine rocklands. They are consistent with the [International Principles and Standards for the Practice of Ecological Restoration](#) (Gann et al. 2019). They provide the basic information needed to restore pine rocklands through planting within their historical range and in their original locations, as well as on fill pads and in areas where marl prairies have been drained and cannot readily be restored. They consider the structure of pine rocklands, ecosystem functions and disturbance regimes like fire, and their floristic and faunistic composition. While we encourage creativity, the recommendations provided are practical ones based on many decades of experience. That said, every site and every project is unique. It is best to approach your pine rockland within a framework of adaptive management, meaning that you should be prepared for surprises, learn from them, and adapt your methods accordingly.

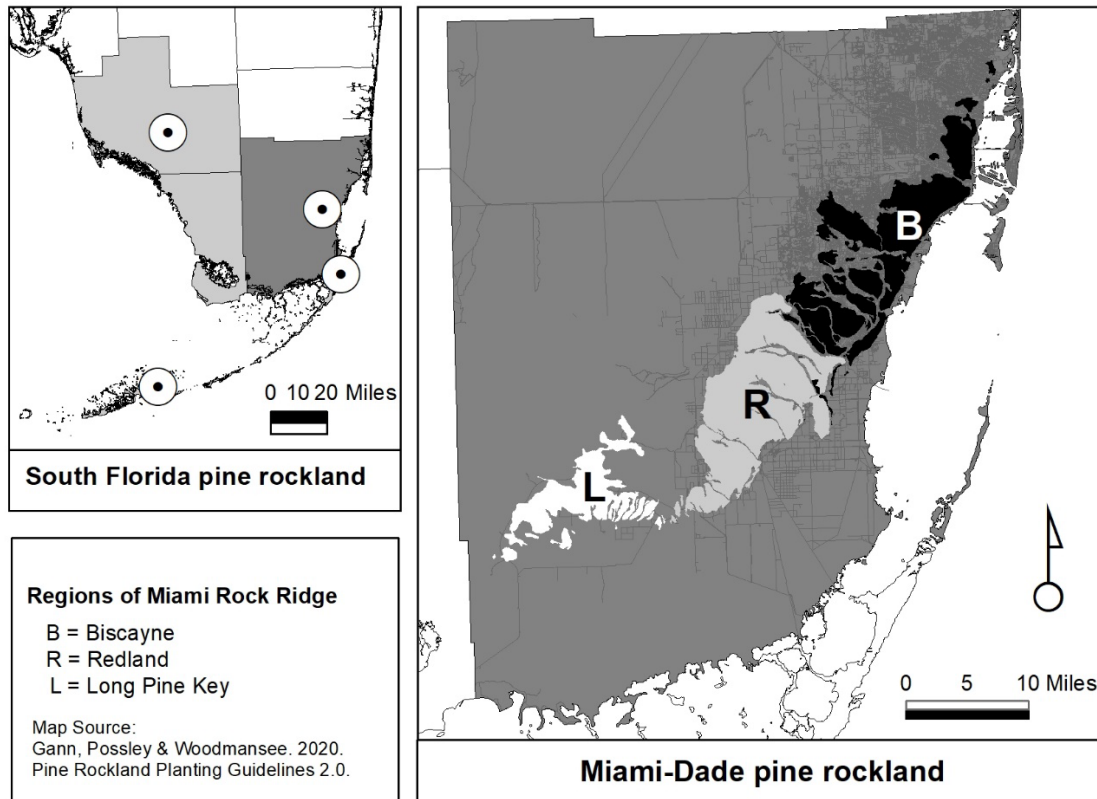


Figure 1. The historical extent of pine rockland in South Florida (inset), with detailed map of Miami-Dade County showing the three regions. The Long Pine Key region is protected in Everglades National Park. Less than 2% of pine rockland in the Redland and Biscayne regions remain. Adapted from map by Fairchild Tropical Botanic Garden.

Site selection

Pine rocklands are optimally planted in the same locations where they were historically found prior to development, especially where soils have not been heavily modified (Fig. 2). They also may be planted on fill pads and in drained marl prairies. Nutrient poor limestone rock, with or without a layer of sand over the surface, is perfect. Good sites for pine rockland planting often have native understory plants persisting from rootstock even decades after the site has been cleared. Other sites may be more challenging but can still be worth the effort. Sites with a lot of organic material or nutrients, whether from imported soil, mulch, or repeated fertilization, will have more weeds and require more maintenance.

Pine rocklands require full sun for maximum success. Be sure to avoid conflicts with overhead or underground power lines or other utilities or structures. Remember that the pine canopy will ultimately be wider than the planting area. Avoid planting large trees such as [live oak](#) (*Quercus virginiana*) near your pine rockland, as they will eventually shade the area and contribute substantial leaf drop, increasing maintenance needs. Also, it is important to consider that pine rocklands are flammable and it is best to keep them a safe distance from structures that may be damaged by fire. Planting a shrubby buffer with fire retardant plants or maintaining an open lawn area between a pine rockland and sensitive structures is a good idea. Due to the high amount of maintenance (especially weeding) associated with creating a pine rockland, starting small is best; even a 10 x 10 foot area can be used. Keep in mind that areas with a lot of edge are more difficult to maintain free of weeds.



Figure 2. Site selection. The area shown here would be optimal for a pine rockland planting. The site is sunny and not immediately adjacent to structures that could be damaged by fire. Natural limestone topography that appears to have been only lightly scraped is visible at the surface. Many of the plants present are native to pine rocklands, including mouse's pineapple (*Morinda royoc*), candyweed (*Polygala violacea*), and Elliott's lovegrass (*Eragrostis elliottii*). Photo by Steve Woodmansee.

Site preparation

Site preparation is critical to the success of pine rockland restoration. As a first step, remove all plants from your future pineland site except for those that you wish to retain; these should be marked and protected or rescued and planted in containers for later use. If native shrubs are present, cut them down as close to the ground as possible. [Saw palmettos](#) (*Serenoa repens*) should be trimmed back hard and all fronds removed from the area.

Remove lawn grasses and dispose of them away from the pineland planting area (Fig. 3). There are several different ways to do this. For small areas, turfgrasses with aboveground stolons like St. Augustine grass can be pulled up by hand and trowel. For deeper-rooted grasses like Bermuda grass or bahia grass, dig out square clods with a sharp shovel, and avoid shaking out the dirt over the planting area as this will disperse weed seeds and unwanted nutrients. Some grasses such as *Zoysia* may be difficult or impossible to dig up. In these cases, you can kill the grass in place by spraying herbicide, by tacking down a covering of clear plastic (heat sterilization through solarization), or by smothering it with cardboard or other material. For these kill-in-place methods, it is important that you follow up by removing as much organic material as possible from the site including dead grass and loose soil, optimally leaving only sand or bare rock.



Figure 3. Site preparation. Clearing the area of turfgrasses and other unwanted plants prior to installation is critical to the success of a pine rockland planting. Photos courtesy of Raul Moas, Devon Powell, and Lisset Perez-Muñoz.

As a final step in site preparation, consider removing any soil that may have been added to the site. This step may not always be realistic, and it is not necessary to grow most pine rockland plants. However, it should be implemented when and where practical. This is because most South Florida yards have amended soil and an excess of nutrients from years of lawn fertilization. Removing this unnatural soil gets rid of weed seeds, restores soils¹ closer to their original composition, and may make it easier to grow some of the more finicky pine rockland endemics. Depending on the yard, this may mean removing several inches of soil. This can be accomplished with shovels for a small area, or even by renting (or borrowing) a skid steer with a bucket (e.g., Bobcat) or mini bulldozer for larger areas.

¹ Technically, pine rocklands grow mostly on infertile substrates of limestone rock, quartz sand, and calcium carbonate claylike marl, with pockets of organic material mostly at the bases of living or dead plants.

Plant selection and placement

Once the site has been selected, calculate the square footage of the planting area, so that you can plan for the recommended number of plants. A rule of thumb is to divide the square footage of the planting area by 4, or about 2 feet between plants on average, to get a minimum number of plants to install. For example, a 10 x 10 foot planting area should have at least 25 plants. More groundcovers are better, and if possible, the total number of plants can be doubled (see Box 1).

Box 1. Planting Density Chart

Dimensions (ft.)	Square feet	Number of plants	Number of pines	Number of palms	Number of shrubs	Number of woody groundcovers, grasses, coontie, ferns
10 x 10	100	25-50	1	1	2	21-46
20 x 20	400	100-200	2	5	8	85-185
50 x 50	2,500	625-1,250	4-12	31	50	540-1,157
100 x 100	10,000	2,500-5,000	16-50	125	200	2,159-4,625

Canopy Pines. Although not mandatory, South Florida slash pine is a quintessential element of pine rocklands. It can be planted relatively densely to start, for example one plant per 200 square feet of planting area (a little less than 15 feet apart on average), but fewer may be better so that the site is not overplanted. Pines grown in seven-gallon to three-gallon containers or smaller are best. Smaller plants may have higher initial mortality but those that survive will probably perform better over time. A healthy root system is a must; inspect the roots of pines prior to purchase and do not select them if you see circling roots. It is also important to obtain plants that have been grown from seed collected in pine rocklands in South Florida, as plants grown from seed collected in other areas may not be suitable. Over time it may be necessary to cull some pines, so be careful not to overplant if cutting down a pine tree will be an issue. Current guidance for pine density in pine rocklands is no more than 70 mature trees per acre, or 25 feet between each tree on average. However, pines should not be evenly spaced, but planted in uneven patterns mimicking intact forests with appropriate fire regimes.

Understory palms. Palms are a key element of pine rocklands, with immense wildlife benefits. Pine rockland palms include saw palmetto, [silver palm](#) (*Coccothrinax argentata*), [cabbage palm](#) (*Sabal palmetto*), and, in the Florida Keys, [Key thatch palm](#) (*Leucothrinax morrissii*). Saw palmettos are the most common in pine rockland, and have trunks that run along the ground. After 20 or more years without fire, a saw palmetto stand may exceed 10 feet in width. Silver palms have a single erect trunk and will occupy a 3-4 foot wide circular space. Cabbage palms also have a single trunk, but are generally double to triple the width of silver palms, and should be used sparingly if at all in pine rockland plantings. Current guidance is that palms should occupy no more than 25% of the pine rockland area, so be careful not to overplant. While silver palms can be interspersed throughout the pineland, it is best to install saw palmettos in clusters, with individuals about 3-4 feet apart. The total number of palms should not exceed one plant per 80 square feet of planting area.

Understory shrubs. A wide variety of shrubs are found in pine rocklands. Current guidance is that shrubs over three feet in height should cover between 5 and 25% of the site. Recommended species include [locustberry](#) (*Byrsonima lucida*), [longstalked stopper](#) (*Mosiera longipes*), [maidenberry](#) (*Crossopetalum rhacoma*), [marlberry](#) (*Ardisia escallonioides*), [pineland strongback](#) (*Bourreria cassinifolia*), [rough velvetseed](#) (*Guettarda scabra*), [West](#)

[Indian-lilac](#) (*Tetrazygia bicolor*), [white indigo](#) (*Randia aculeata*), and [wild-sage](#) (*Lantana involucrata*). Placement of shrubs should be 6-7 feet apart on average, with the total number not exceeding one plant per every 50 square feet of planning area. Many hammock tree species are naturally maintained as shrubs by periodic fire in pine rocklands (e.g., live oak, [willow-bustic](#) [*Sideroxylon salicifolium*]). However, these species are difficult to keep small and are best not planted.

Groundcovers, including woody groundcovers, wildflowers, coontie, and grasses. Woody groundcovers such as [Bahama senna](#) (*Senna mexicana* var. *chapmanii*), [Coker's creeper](#) (*Ernodea cokeri*), [Everglades Keys false buttonweed](#) (*Spermacoce neoterminalis*), [gopher-apple](#) (*Licania michauxii*), [pineland croton](#) (*Croton linearis*), [pineland lantana](#) (*Lantana depressa*), and [quailberry](#) (*Crossopetalum ilicifolium*) may be interspersed throughout the planting area from the start; this is also true of [coontie](#) (*Zamia integrifolia*). In many cases, it is best to wait a few weeks before planting many grasses and other herbaceous plants, to allow time to control the weeds that will sprout following site preparation. Once the weeds are under control, then grasses and sedges, wildflowers, vines, and ferns can be planted at relatively high densities. Take the total number of plants calculated for your site, subtract the number of pines and understory palms and shrubs, and the remainder should be groundcovers. It is important to remember that the pine rockland groundcover is diverse. To mimic this diversity, about half of the groundcovers installed should be grasses including at least three species, and the other half woody groundcovers, coonties and herbaceous plants including at least eight species; a higher diversity can be achieved over time. Place plants in a random pattern. It is best to plant grasses and other herbs in the smallest possible containers (e.g., 1-gallon or smaller). Most will grow relatively quickly, and smaller containers minimize the amount of organic material added to the site. Rhizomatous species of grasses can fill spaces more quickly than clumping ones, although some clumping grasses are vigorous seeders. [Rhizomatous bluestem](#) (*Schizachyrium rhizomatum*) is an excellent choice for outcompeting undesirable weedy species.

Appendices A (p. 11) contains a list of pine rockland grasses, sedges, ferns, wildflowers, and vines with wide historical ranges and broad ecological tolerances. For more detail on these species, to get a list of additional species recommended for your specific project area, and to obtain information on availability, please refer to The Institute for Regional Conservation's (IRC) [Natives For Your Neighborhood](#) (NFYN) website. Appendices B-D (pp. 12-14) display color photographs of a wide variety of pine rockland groundcovers and other cool pine rockland plants.

Obtaining plants

Very few of the species recommended here are available at "big box stores." Look for nurseries specializing in native plants. To obtain some of the rare and unusual species, consider joining the [Dade Chapter](#) of the [Florida Native Plant Society](#), where monthly meetings often include a native plant drawing. Additionally, we encourage you to join Fairchild Tropical Botanic Garden's free, pine rockland-focused citizen science program, the [Connect To Protect Network](#). New members may pick up a "Starter Kit" of 5 plants. Also, keep in mind that it is generally good practice to obtain plants grown from regionally-adapted seeds or other propagules.

Installation

In addition to a shovel and trowel, you may need a pick, pick mattock, or digging bar to excavate holes; larger projects can use mechanized equipment such as an auger or jackhammer. Dig each hole so that the top of the root ball will be level with (pines) or just under the surrounding ground when installed and so that the planting hole is just wider than the container. Do not add special soils or place fertilizer in or around the hole. Shake off any excess potting soil prior to planting (do this outside of the pine rockland). Use the material you excavated from the hole as back fill. Once the plant is placed in the planting hole, water thoroughly to eliminate air pockets under and around the plant. During this process, use a shovel or trowel to lightly (not firmly) pack in the back fill around the plant (Fig. 4). Finally, level out the planting surface so that it grades smoothly into the surrounding terrain. If there is a slope on the surface, consider creating a slight depression around the plant so that added water may flow toward its roots rather than away from the plant.



Figure 4. Proper planting technique.

Pine needles. In cases where aesthetics and cultural norms are critical to project acceptance, a very thin dressing of pine needles (pine straw) may be placed over the planting area. This can add visual appeal and help suppress weeds in the short run, but it is not a long-term solution. It can also have some negative effects. Healthy pine rocklands have no or a very thin layer of pine straw depending on time since the last fire. A thick layer of pine needles handicaps the growth and germination of desired native grasses and herbaceous plants, two types of plants most critical to pine rockland restoration success. In addition, bare soil is an important component for wildlife including many species of native bees (which nest in the soil), ants, beetles, and ground foraging birds such as doves. Do not use mulch or wood chips as these will add nutrients to the soil and invite weeds; pine bark nuggets are also less than ideal. If pine straw is used at the beginning of the project, we recommend that it not be replenished.

Other features to include. Limestone boulders are an excellent way to enhance the look of your pine rockland. They also help retain soil moisture during droughts and provide cover for wildlife seeking refuge. Some pine rockland groundcovers, including ferns and mosses, may even grow upon them.

Watering. Careful watering is essential to the successful establishment of pine rockland plants. Each watering should be equivalent to one inch or more of rainfall. If you use small container plants (3-gallon sized or smaller), water pines, palms, woody groundcovers, and coontie once per day for the first week. During the next three weeks, water every other day, and during the next four weeks, water once per week. Supplemental water may be needed during very hot dry periods. If your site receives one inch or more of rain within 24 hours of when a watering is scheduled, you can skip a watering. Grasses and other herbs generally require far less water than woody plants, but if you would like to be liberal, you can follow the schedule above. Be careful not to wash out newly installed wildflowers if they were formerly in small pots. Larger container material will need additional and longer periods of watering. More water, however, invites more weeds.

Maintenance

The key to the long-term success of a pine rockland planting is continual maintenance. This includes weeding, pruning, and hand removal of excess leaves and other debris. If the site has been properly prepared, weed germination will be minimized, but not eliminated. The key is to weed before the weeds produce seeds. When pulling weeds, be aware that soil disturbance triggers more weeds to germinate, so it is best to pull them when small. Weeding is needed more frequently just after planting, and in the wet season (summer and fall), so make sure to plan for that. Plan on weeding once per month for at least the first year. If possible, bi-weekly or even weekly weeding during the rainy season is ideal.

The area where your pine rockland contacts any remaining lawn can be especially problematic, as lawn grasses and weeds will continuously invade the edges. To combat this problem, some people install wood, rock, concrete, or plastic borders between the lawn area and the pine rockland to prevent the lawn from spreading. You may also consider creating a gravel path around the edge of the pine rockland. Whenever weeding, make sure to not pull up seedlings of preferred natives that might have recruited since the pineland was installed. Many South Florida natives such as [Spanish needles](#) (*Bidens alba* var. *radiata*), [crabgrass](#) (*Digitaria ciliaris*), [wireweed](#) (*Sida acuta*), and many spurges (e.g., [hairy sandmat](#) [*Euphorbia hirta*]) can become aggressive weeds in pine rocklands and are best removed. If a native plant seems too vigorous, control it earlier than later. Be sure to dispose of weeds away from the pineland. Although weeding will always be a component of pine rockland gardening, the need for it should be reduced over time as nutrients are removed and soil disturbance is reduced.

Within a year of installation, hardwood shrubs may grow significantly and begin to shade out other plants. One of the beneficial functions of hardwood shrubs in a pine rockland planting is the uptake of excess nutrients. Cutting shrubs back and removing the pruned material removes nutrients from the pineland, performing some of the functions of natural fire. Trimming is recommended every six months during the first few years and annually thereafter. Most shrubs can be trimmed to within one or two inches of the ground and allowed to re-sprout. If an overabundance of shrubs has been planted, some thinning should be considered. Trimmings should be removed from the pine rockland. Excess hardwood and palm seedlings should also be removed. Current guidance is that shrubs should not be allowed to grow taller than six feet in height.

Larger grasses such as bluestem species (*Schizachyrium* spp.), [muhlygrass](#) (*Muhlenbergia capillaris*), and [Florida gamagrass](#) (*Tripsacum floridanum*) should be clipped annually. This should be done after grass seeds have already had a chance to disperse, generally in the late fall. Other groundcovers may also need to be trimmed from time to time, including coontie, Bahama senna, and pineland croton.

Leaf litter and pine needles will eventually accumulate, changing the soil's structure and chemistry. Normally, natural fire burns off this excess nutrient layer, releasing micronutrients back into the soil. Although fire is not appropriate for most residential pine rocklands, some of its benefits can be mimicked. After 2-3 years, leaves and needles will need to be removed. Removal by hand or with light tools is optimal to minimize soil disturbance. Leaf litter removal should be done annually in most cases.

South Florida slash pines may be difficult to establish, growing well for years and then sometimes becoming sickly and dying. There may be a wide range of afflictions, and there is a lack of consensus as to causes, prevention, and treatment. Rarely do pines that have

become yellowed recover, but dead pine trees do provide essential habitat for wildlife including insects and woodpeckers. If one or more slash pines in your pine rockland die, simply try again if the additional pine density is needed.

Finally, some exotic pests of native plants such as scale insects have become established in South Florida and may affect your pine rockland. However, these usually cause temporary problems resolved by summer rains, native insects, and birds. The more diverse your planting is, the more resistant it will be to pests and disease.

Related habitats

Historical pine rocklands have edges that interface with other native plant habitats, such as rockland hammocks and marl prairies. Rockland hammock plants make excellent landscape features, attract butterflies and birds, and can provide additional color but aren't necessarily suitable next to small pine rocklands. Marl prairies which are dominated by native wetland grasses and herbs are next-level restoration. As an alternative, consider installing a water feature such as a pond next to the pineland, and then fill it with native fish and plants. With water being a necessary component for all life, water features do much to increase biodiversity in your yard. For more information on rockland hammock edges, rockland hammocks, and other habitats that may be appropriate for planting at your project site, please refer to IRC's [Natives For Your Neighborhood](#) website.

Adapting these guidelines for the Florida Keys

If you live on or near Big Pine Key and would like to create a pine rockland, most of the principals in this guide would apply. However, the plant palette will differ. For example, Key thatch palm and [beach creeper](#) (*Ernodea littoralis*) would be present while plants like [pineland clustervine](#) (*Jacquemontia curtissii*) would not. Be sure to visit Natives for Your Neighborhood to obtain an appropriate plant list. Also keep in mind that seed provenance is especially important in the Keys. Whenever possible, use plants grown from seed in the Keys, since local populations may be separated from their mainland counterparts by more than 100 miles and a long evolutionary history.

Just the beginning

These guidelines provide the basics for planting a pine rockland in South Florida. Once mastered, more challenging aspects of pine rockland restoration can be explored. These include the introduction of additional plants that provide food and shelter for wildlife, rare species, and plants that are difficult to grow. Direct seeding of grasses and other groundcovers can also be tried, especially once your pine rockland begins producing its own seeds. Start a wildlife list and document the birds, butterflies, and other creatures that stop by to use the habitat you created. Once begun, the restoration of a pine rockland can turn into a life-long experience that is not only aesthetically rewarding, but also contributes to the restoration of South Florida's native plant heritage.

About the IRC Pine Rockland Initiative

IRC's Pine Rockland Initiative aims to restore and manage pine rockland fragments on public and private lands throughout the range of pine rocklands, including providing the thought leadership needed to move beyond "business as usual" and save this unique part of our natural heritage. One way to do this is through "expanding the footprint" of pine rocklands, including the restoration of fire-excluded pine rockland patches, as well as the restoration of pine rocklands that have been destroyed.

About the FTBG CTPN

Fairchild's Connect to Protect Network enlists South Florida residents to plant native plants in order to connect the few remaining isolated fragments of pine rockland. Installing native plants increases the probability that bees, butterflies and birds can find and transport seeds and pollen across developed areas that separate pine rockland fragments. Connect to Protect is free to anyone located in Miami-Dade or Monroe County. To sign up, email your name, address, and telephone number to ConnectToProtect@fairchildgarden.org.

APPENDIX A

Common grasses, sedges, ferns, wildflowers, and vines recommended for planting a pine rockland in Miami-Dade and Monroe counties.

Grasses and Sedges

Crimson bluestem	<i>Schizachyrium sanguineum</i>
Elliott's love grass	<i>Eragrostis elliottii</i>
Florida gamagrass	<i>Tripsacum floridanum</i>
Florida whitetop	<i>Rhynchospora floridensis</i>
Gulfdune paspalum	<i>Paspalum monostachyum</i>
Lopsided Indiangrass	<i>Sorghastrum secundum</i>
Muhlygrass	<i>Muhlenbergia capillaris</i>
Rhizomatous bluestem	<i>Schizachyrium rhizomatum</i>
Splitbeard bluestem ²	<i>Andropogon ternarius</i>
Wire bluestem	<i>Schizachyrium gracile</i>

Wildflowers

Candyweed ⁺³	<i>Polygala violacea</i>
Clasping aster	<i>Symphyotrichum adnatum</i>
Florida ironweed	<i>Vernonia blodgettii</i>
Havana skullcap	<i>Scutellaria havanensis</i>
Leavenworth's tickseed	<i>Coreopsis leavenworthii</i>
Low rattlebox	<i>Crotalaria pumila</i>
Narrowleaf silkgrass	<i>Pityopsis graminifolia</i>
Pineland clustervine	<i>Jacquemontia curtissii</i>
Pineland heliotrope	<i>Heliotropium polyphyllum</i>
Pitted stripeeed	<i>Piriqueta cistoides</i> subsp. <i>caroliniana</i>
Purple thistle ⁺	<i>Cirsium horridulum</i>
Rockland twinflower	<i>Dyschoriste angusta</i>
Thickleaf wild petunia	<i>Ruellia succulenta</i>
Walter's groundcherry	<i>Physalis walteri</i>
White sunbonnets	<i>Chaptalia albicans</i>
Whitemouth dayflower	<i>Commelina erecta</i>

Vines

Blodgett's swallowwort	<i>Metastelma blodgettii</i>
Corkystem passionflower	<i>Passiflora suberosa</i>
Devil's-potato	<i>Echites umbellatus</i>
Man-in-the-ground	<i>Ipomoea microdactyla</i>
Spurred butterfly-pea ⁴	<i>Centrosema virginianum</i>

Ferns

Bahama ladder brake ⁺	<i>Pteris bahamensis</i>
Pine fern ⁺	<i>Anemia adiantifolia</i>

² This has recently been described as the endemic *A. miamiensis*; use seeds or plants from Miami-Dade County.

³ + indicates species not readily available in the trade, and which may be difficult to grow.

⁴ The narrow-leaf form, *C. virginianum* var. *angustifolium*.

APPENDIX B – Pine Rockland Wildflowers



Candyweed
(*Polygala violacea*) **RH**



Clasping aster
(*Symphyotrichum adnatum*) **RH**



Florida ironweed
(*Vernonia blodgettii*) **JJ**



Havana skullcap
(*Scutellaria havanensis*) **JP**



Leavenworth's tickseed
(*Coreopsis leavenworthii*) **LC**



Low rattlebox
(*Crotalaria pumila*) **JS**



Narrowleaf silkgrass
(*Pityopsis graminifolia*) **JP**



Pineland clustervine
(*Jacquemontia curtissii*) **AS**



Pineland heliotrope
(*Heliotropium polyphyllum*) **LC**



Pitted stripeseed (*Piriqueta cistoides* ssp. *caroliniana*) **LC**



Purple thistle
(*Cirsium horridulum*) **GG**



Rockland twinflower
(*Dyschoriste angusta*) **JP**



Pineland petunia
(*Ruellia succulenta*) **JP**



Walter's ground cherry
(*Physalis walteri*) **LC**



White sunbonnets
(*Chaptalia albicans*) **LC**



Whitemouth dayflower
(*Commelina erecta*) **SW**

Photo credits: George Gann, Lydia Cuni, Roger Hammer, James Johnson, Jennifer Possley, John Shaffer, Steve Woodmansee, Al Sunshine
Source: Gann, G.D., J. Possley and S.W. Woodmansee. 2020. Pine Rockland Planting Guidelines version 2.0.

APPENDIX C – Pine Rockland Grasses and Sedges



Arrowfeather threeawn
(*Aristida purpurascens*) **SW**



Common fingergrass
(*Eustachys petraea*) **JP**



Crimson bluestem
(*Schizachyrium sanguineum*) **JP**



Elliott's lovegrass
(*Eragrostis elliottii*) **VR**



Florida gamagrass
(*Tripsacum floridanum*) **JP**



Florida whitetop
(*Rhynchospora flordensis*) **DS**



Gulfdune paspalum
(*Paspalum monostachyum*) **JP**



Lopsided Indian grass
(*Sorghastrum secundum*) **JP**



Muhlygrass
(*Muhlenbergia capillaris*) **JP**



Rhizomatous bluestem
(*Schizachyrium rhizomatum*) **JP**



Splitbeard bluestem
(*Andropogon ternarius*) **JL**



Wire bluestem
(*Schizachyrium gracile*) **LC**

Photo credits: Dustin Smith, Lydia Cuni, Jennifer Possley, Brian Harding, James Lange, Victor Robles, Steve Woodmansee
Source: Gann, G.D., J. Possley and S.W. Woodmansee. 2020. Pine Rockland Planting Guidelines version 2.0.

APPENDIX D – Other Cool Pine Rockland Plants



Blodgett's swallowwort
(*Metastelma blodgettii*) **LC**



Corkystem passionflower
(*Passiflora suberosa*) **JP**



Devil's potato
(*Echites umbellatus*) **JP**



Man-in-the-ground
(*Ipomoea microdactyla*) **JP**



Spurred butterfly pea
(*Centrosema virginianum*) **KW**



Bahama ladder brake
(*Pteris bahamensis*) **KS**



Pineland fern
(*Anemia adiantifolia*) **JP**



Silver palm
(*Coccothrinax argentata*) **LC**



Coontie
(*Zamia integrifolia*) **MG**

Photo credits: Kristie Wendelberger, Marilyn Griffiths, Lydia Cuni, Jennifer Possley, Ken Setzer.
Source: Gann, G.D., J. Possley and S.W. Woodmansee, 2020. Pine Rockland Planting Guidelines version 2.0.