

# GUIDELINES FOR PLANTING A PINE ROCKLAND IN SOUTH FLORIDA

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**Why plant a pine rockland?** Pine rockland is a globally imperiled plant community that has been heavily impacted by urban development and agriculture. Less than 2% of the original pine rocklands remain in Miami-Dade County outside Everglades National Park. Pine rocklands of the lower Florida Keys have also been heavily impacted by development. Creating a pine rockland is not easy or simple, but it is very rewarding. Pine rocklands provide wonderful habitats for native plants and wildlife, including many species of very rare native plants. They are also aesthetically pleasing and provide year-round color for the yard.

**Background.** Pine rocklands are coniferous forests 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 are open forests with the understory dominated by a diverse mix of grasses and other herbs, palms and shrubs, primarily of West Indian origin. Pine rocklands are similar throughout their range, although the flora and vegetation varies according to type of limestone, hydrological conditions, local climate, and other ecological factors. In their natural form, pine rocklands are maintained by regular fire, which kills back shrubs and hardwood trees that would otherwise take over and shade out the understory.

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 the mouth 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 Lostmans Pines area of the Big Cypress Swamp. A tiny pine rockland was historically present on North Key Largo in the upper Florida Keys. 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 in and around the National Key Deer Refuge in the lower Florida Keys.

Pine rockland is one of several types of pine forests found in South Florida, including wet flatwoods, mesic flatwoods, scrubby flatwoods, and scrub. All of these other pine forests differ from pine rocklands by being found on sandy soils rather than on limestone. Pine rocklands are closely 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 are intended to provide the basic information needed to restore pine rocklands within their historical range and in their original locations, as well as the creation of rockland hammocks within their historical range on fill pads and in areas where marl prairies have been drained and cannot be restored. Guidelines for planting pine rocklands in the Lostmans Pines area of Big Cypress National Preserve are not given, as this system is still intact.

**Site selection.** Pine rocklands are best planted in the same locations where they were historically found prior to development, especially where soils have not been heavily modified. They also may be attempted 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.

Pine rocklands require full sun for maximum success. An open site is easiest to work with. Be sure to avoid conflicts with overhead (or underground!) power lines or other utilities or structures. Remember that the pineland canopy will ultimately be larger than the planting area. Also, it is important to take into account 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 hammock buffer or maintaining an open lawn area between a pine rockland and sensitive structures is almost always a good idea. Due to the high amount of maintenance associated with creating a pine rockland, starting small is best; even a small site 10 feet x 10 feet in area can be used. However, keep in mind that areas with a lot of edge are often more difficult to maintain free of weeds.

**Site preparation.** Remove all plants from the pineland site except for those that may be part of the pineland community. Lawn grass is best dug up and disposed of away from the pineland planting area. In some cases, such as with *Zoysia* grass, it may be difficult or impossible to dig up the grass. In this case it can be killed with an herbicide such as Roundup or killed with black plastic. Regardless of the method, try to remove as much material as possible from the site including dead grass and loose soil, leaving only sand or bare rock if possible.

**Plant selection and placement.** Although not mandatory, South Florida slash pine is a quintessential element of a pine rockland. It can be planted relatively densely to start, at densities of one plant per 50 square feet of planting area to one plant per 100 square feet of planting area. Plants grown in seven gallon to three gallon containers or smaller are best. Smaller plants may have higher initial mortality, but will probably perform better over time. A healthy root system is a must. 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.

A few keystone species may be planted along with the slash pine and at a similar density. These are saw palmetto (*Serenoa repens*), silver palm (*Coccothrinax argentata*) and coontie (*Zamia integrifolia*). Larger specimens of these species are preferred if they can be obtained. With a few exceptions, hardwood shrubs are best kept to the margins of the pineland to start, although a few can be added at very low densities once the pine rockland begins to mature. Woody groundcovers such as quailberry (*Crossopetalum ilicifolium*), pineland croton (*Croton linearis*), and gopher-apple (*Licania michauxii*) may be interspersed throughout the planting area.

In most cases, it is best to wait a few months before planting grasses and other herbs, to give time to control the weeds that will sprout following site preparation. Once the weeds are under control, then grasses and sedges, wildflowers, and ferns can be planted at densities from one plant per square foot of planting area to one plant per four square feet of planting area. It is important to remember that the pine rockland understory is typically diverse. To mimic this diversity, install at least three species of grasses and five species of other herbs; a higher diversity can be achieved over time. Place plants in a random pattern. Unlike the keystone

species mentioned above, it is often best to plant grasses and other herbs in the smallest possible containers. Most species will grow relatively quickly and smaller containers minimize the amount of organic material added to the site as well as damage to pine roots.

Attached is a list of 21 pine rockland species with wide historical ranges and broad ecological tolerances; many of these are not readily available even at native plant nurseries. 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 Natives For Your Neighborhood (NFYN) website, which is available on the IRC website at [www.regionalconservation.org](http://www.regionalconservation.org). While it is generally good conservation practice to obtain plants grown from locally-collected seed, this is especially true in the lower Florida Keys, where some species are separated from their mainland counterparts by more than 100 miles.

**Installation.** Dig the hole so that the plant will be level with the surrounding ground surface when installed. While some prefer a planting hole just wider than the container, others recommend digging a hole twice as wide as the container; I prefer the former. Regardless of the method used, do not add special soils or place fertilizer in or around the hole. Use the soil 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. Finally, level out the planting surface so that it grades smoothly into the surrounding terrain.

**Pine straw.** After all plants are installed, apply a 2-3 inch top dressing of pine straw to the planting area. 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. Pine straw can be purchased from The Bushel Stop ([www.thebushelstop.com](http://www.thebushelstop.com)), which has several locations in southeastern Florida.

**Watering.** Careful watering is essential to successful pine rockland establishment. Each watering should be equivalent to one inch or more of rainfall. During the first two weeks after installation, water pines, palms and coontie once per day; during the next two weeks, water every other day; during the next four weeks, water twice per week; and during the next four weeks, water once per week. If your site receives one inch or more of rainfall within 24 hours of when a watering is scheduled, you can skip a watering. Additional watering may be necessary during the hot, dry periods of the spring and summer, and in areas of drier, hotter climates such as the Florida Keys. Grasses and other herbs generally require far less water, but if you would like to be liberal, you can follow the schedule above. More water, however, invites more weeds.

**Maintenance.** Short-term maintenance of a pine rockland primarily involves weeding. If the site has been properly prepared and pine straw has been applied, then weeds will be suppressed, but not eliminated. Plan on weeding once per month for at least the first year. Especially problematic will be where the planting area interfaces with any remaining lawn areas, as lawn grasses and weeds will continuously invade the edges of the pineland. To combat this problem, some people install wood, rock, or plastic borders between the lawn area and the pine rockland to prevent the lawn from spreading. Whenever weeding, make sure to not pull up seedlings of preferred natives that might have recruited since the pineland was installed. However, many South Florida natives can be quite weedy in pine rocklands and are best removed. These include Spanish-needles (*Bidens alba* var. *radiata*), wireweed (*Sida acuta*), finger grass (*Eustachys petraea*) and several spurges in the genus *Chamaesyce*. If it seems too aggressive, control might be wise earlier than later. Try to weed before the plant has had a chance to set seed and place into a compost bin or somewhere where the seeds cannot find

their way back to the pineland. Some people chose not to put down pine straw in order to increase recruitment of native species. This is fine, so long as things don't get out of control.

Within a year of installation, hardwood shrubs may grow significantly and begin to shade out other plants. Select trimming may be necessary every six months or so to keep the understory open. Most shrubs are 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 may be needed.

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, and they probably are best removed. Some exotic pests of native plants, such as lobate lac scale, have become established in South Florida. Lobate lac scale may occasionally attack pine rockland shrubs. For recommendations on the identification and treatment of lobate lac scale, see the October, 2003, *Tillandsia*, the newsletter of the Miami-Dade County chapter of the Florida Native Plant Society.

**Ecotones and related habitats.** All natural pine rocklands have edges that interface with other native plant habitats, such as rockland hammocks and marl prairies. Rockland hammock edges make excellent landscape features, attract butterflies and birds, and provide an abundance of color. 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.

**Just the beginning.** These guidelines provide the basics for planting a pine rockland in South Florida. Once mastered, other, more challenging aspects of pine rockland restoration can be explored. These include the introduction of vines, plants that provide food for wildlife, rare species, and plants that are difficult to grow. Experimentation with direct seeding can be tried, and when appropriate, prescribed fire can be implemented. In addition, much can be done to enhance and maximize wildlife habitats within the pineland. 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.

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

**Grasses and Sedges**

Crimson bluestem	<i>Schizachyrium sanguineum</i>
Florida gama grass	<i>Tripsacum floridanum</i>
Florida whitetop	<i>Rhynchospora floridensis</i>
Lopsided Indian grass	<i>Sorghastrum secundum</i>
Rhizomatous bluestem	<i>Schizachyrium rhizomatum</i>
Splitbeard bluestem	<i>Andropogon ternarius</i>
Wire bluestem	<i>Schizachyrium gracile</i>

**Ferns**

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

**Wildflowers**

Candyweed	<i>Polygala grandiflora</i>
Elliott's fanpetals	<i>Sida elliotii</i>
Florida ironweed	<i>Vernonia blodgettii</i>
Leavenworth's tickseed	<i>Coreopsis leavenworthii</i>
Narrowleaf silkgrass	<i>Pityopsis graminifolia</i>
Narrow-leaved goldenrod	<i>Solidago stricta</i>
Pineland heliotrope	<i>Heliotropium polyphyllum</i>
Pitted stripeseed	<i>Piriqueta 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>

\*additional species appropriate for you area can be found on IRC's NFYN website.

