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# Beach Jacquemontia

## *Jacquemontia reclinata* House

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<b>Federal Status:</b>	<b>Endangered (Nov. 24, 1993)</b>
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<b>Critical Habitat:</b>	<b>None Designated</b>
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<b>Florida Status:</b>	<b>Endangered</b>
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<b>Recovery Plan Status:</b>	<b>Revision (May 18, 1999)</b>
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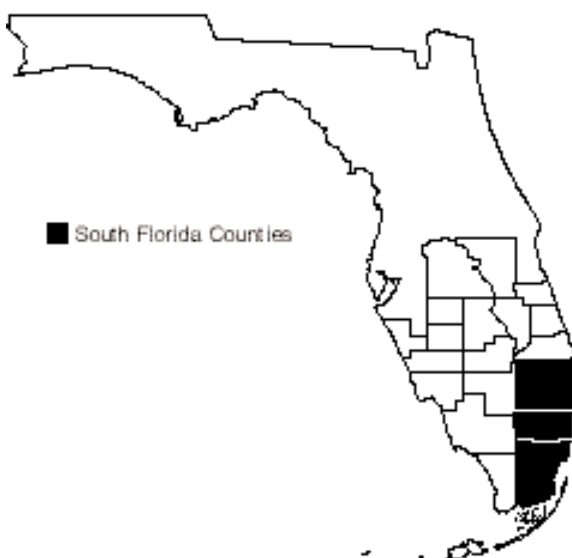
<b>Geographic Coverage:</b>	<b>Rangewide</b>
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*Jacquemontia reclinata* is a member of the morning glory family (Convolvulaceae) that is restricted to the southeastern coast of Florida. Much of the primary habitat of this species, beach coastal strand and maritime hammock, has been destroyed or altered for residential and commercial construction. Fewer than 1,000 individual plants exist. They are found in small, widely separated populations in Dade, Broward, and Palm Beach counties, where habitat loss and modification place this species at a high risk of extinction. Habitat conservation and management and reintroduction efforts are needed to ensure the survival of this species.

This account represents a revision of the existing recovery plan for the beach jacquemontia (FWS 1995).

Figure 1. County distribution of beach jacquemontia.



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### Description

*Jacquemontia reclinata* is a perennial vine which has a main stem with numerous laterals spreading out from a stout rootstock (Robertson 1971). These reclining, partly twining or ascending, slender stems are woody at the base and may twine over other plants (Robertson 1971, Austin 1979). The older leaves and stems of this species can be glabrous, but the pubescence makes younger leaves and stems appear whitish (Austin 1979). The leaves are entire, alternate, estipulate, spirally arranged, and almost always petiolate, reaching 1 to 3 cm in length and 0.5 to 2.5 cm in breadth (Small 1905, Robertson 1971, Austin 1979).

The flowers of this species are white to light pink and the sepals are persistent. The inflorescences can be axillary cymose or solitary with branches 8-40 mm long, usually not exceeding the leaves (Robertson 1971, Austin 1979). The fruit is a light brown capsule about 4-5 mm long (Small 1905, Robertson 1971). Additional physical descriptions of *J. reclinata* can be found in Small (1905) and Robertson (1971).

Though *J. havanensis* is closely related, *J. reclinata*'s main distinction is its ciliolate (marginal fringe of hairs) sepals

and rather succulent leaves (Robertson 1971). This ciliolate on the outer sepals and fleshy leaves also distinguishes this species from *Jacquemontia curtissii*, which has hairless sepals and narrow leaves that are not fleshy (Austin 1979).

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### Taxonomy

There are approximately 100 species of the genus *Jacquemontia*, most of which are found in tropical and subtropical America (Robertson 1971). *Jacquemontia reclinata* is the only species found along the beaches of southeastern Florida (Austin 1979). *Jacquemontia reclinata* was first described from specimens collected in 1903 at northern Miami Beach (Small 1905). The original treatment of this taxon as a distinct species was upheld by Robertson (1971) during a review of the genus *Jacquemontia*.

Three other species are found in Florida: *J. curtissii* inhabits pinelands on the mainland, while *J. jamaicensis* and *J. pentantha* occur in the Florida Keys (Small 1933). Although Small (1933) considered *J. reclinata*'s range to extend into the West Indies, Austin (1979) considered it endemic to the east coast of Florida.

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### Distribution

*Jacquemontia reclinata* is native to coastal barrier islands in southeast Florida from Biscayne Bay in Dade County northward to Palm Beach County (Austin 1979) (Figure 1). It was once found at several sites on Jupiter Island in Martin and Palm Beach counties, but due to habitat destruction associated with residential construction, it is no longer found north of Jupiter Inlet. One specimen, identified as *J. reclinata*, collected on BLM's Jupiter Inlet tract in 1993 may, in fact, actually be *Stylisma villosa*; Palm Beach County's Department of Environmental Resources Management is currently reexamining the population for a definite identification.

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### Habitat

*Jacquemontia reclinata* requires open areas that are typically found on the crest and lee sides of stable dunes (Austin 1979). *Jacquemontia reclinata* may also invade and restabilize maritime hammock or coastal strand communities that have been disturbed by tropical storms, hurricanes, and possibly fire. Common vegetative associates found with *J. reclinata* include sea grape (*Coccoloba uvifera*), cabbage palm (*Sabal palmetto*), poisonwood (*Metopium toxiferum*), Madagascar periwinkle (*Catharanthus roseus*), *Croton involucratus*, gopher apple (*Licania michauxii*), prickly pear cactus (*Opuntia* sp.), sandspurs (*Cenchrus* spp.), sea oats (*Uniola paniculata*) and other shrubs and dwarfed trees (Johnson *et al.* 1993, Lippincott 1990).

At Crandon Park, Dade County, *J. reclinata* exists on dune faces at the edge of shrubby hammocks. These plants apparently spread from rootstock centered under adjacent shrubs (C. Kernan, Fairchild Tropical Gardens, personal communication 1995). At Hugh Taylor Birch SRA, Broward County, *J. reclinata* is located in coastal scrub with little canopy cover and exposed sandy substrate. There, it receives protection from direct ocean winds and sea spray (Lippincott 1990).

**Beach jacquemontia.**

Original drawing by Jean C. Putnam; original photograph by Steve Shirah.

**Reproduction**

*Jacquemontia reclinata* flowers from November to May, but may vegetatively propagate at any time. The incidence or importance of vegetative propagation is not known at this time. At some sites, *J. reclinata* sets fruit and disperses seed prolifically (Robertson 1971); however, few seedlings or young plants are ever found near adult plants. Microhabitat conditions and locations relative to adult plants probably play a major role in providing suitable germination sites (D. Austin, Florida Atlantic University, personal communication 1997, C. Kernan, Fairchild Tropical Gardens, personal communication 1997). For example, at Crandon Park, naturally sown seeds had extremely low germination rates (unmeasurable) compared to seeds taken from this site and germinated under greenhouse conditions (70 percent). Findings from these investigations indicated that germination rates were highest in more organic soils in the shade, but that the seed viability was short-lived once sowed.

Seedling and young *J. reclinata* grow best when shaded. Under natural conditions, young plants are typically found growing in the shade of adjacent shrubs and trees. When mature, *J. reclinata* spread laterals from the rootstock into adjacent exposed sites (C. Kernan, Fairchild Tropical Gardens, personal communication 1997).

**Relationship to Other Species**

*Jacquemontia reclinata* typically grows on disturbed sites with exposed sand, and is found with plants such as Madagascar periwinkle, sand spurs, and sea grape. *Jacquemontia reclinata* occasionally occurs in the beach dune community with sea oats (Austin 1979, Johnson *et al.* 1993). Though we know little of the reproductive biology of this species, several observations of possible pollinator visitors from the Halictidae family have been made (D.

Austin, Florida Atlantic University, personal communication 1997, C. Kernan, Fairchild Tropical Gardens, personal communication 1997). It is not clear, however, whether these relationships are essential for the successful reproduction of *J. reclinata*. The loss of seeds to granivores has not been reported, but granivorous arthropods and small mammals are ubiquitous and are probably present on sites with *J. reclinata*.

In some locations, *J. reclinata* is adversely affected by competition with native and non-native plants. At Crandon Park *J. reclinata* did not regenerate because many areas that had previously provided suitable germination sites had been invaded by Bermuda grass (*Cynodon dactylon*) (C. Kernan, Fairchild Tropical Gardens, personal communication 1997). In other locations, shading from Brazilian pepper (*Schinus terebinthifolius*), Australian pine (*Casuarina equisetifolia*), carrotwood (*Colubrina asiatica*) and seagrape have restricted growth and reproductive success of *J. reclinata*.

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### Status and Trends

Loss of habitat to urbanization and beach erosion led to the listing of *J. reclinata* as endangered on November 24, 1993 (58 FR 62050). The vast majority of beach coastal strand and maritime hammock vegetation, the primary habitat of this species, has been destroyed by residential and commercial construction. Habitat within public lands has also been destroyed or degraded due to construction of parking lots, pedestrian routes, picnic areas, and other modifications for recreational uses. Additional habitat has been lost to beach erosion at some sites (Johnson *et al.* 1993, P. Davis, Palm Beach County DERM, personal communication 1997). The limited geographic distribution, fragmentation of remaining habitat, small sizes of *J. reclinata* populations, and possibility of stochastic natural events make it doubtful that many of the existing populations will persist for 100 years.

The barrier islands within the range of *J. reclinata* are entirely urbanized except for a few small parks and private estates. Johnson *et al.* (1993) inventoried all tracts of native coastal vegetation in southeast Florida that were four or more hectares in size. They found only 24 tracts of that description in the known range of *J. reclinata*, five of them entirely or mostly in private ownership. These tracts comprised approximately 87 ha of beach strand vegetation in public ownership, 10.5 ha in private ownership, and 26.7 ha of maritime hammock in public ownership.

In 1991, less than 1,000 individual plants of *J. reclinata* were known to occur on 12 sites (Austin 1991). Eleven of these sites were in public parks or recreation areas operated by State, county, or local governments in Palm Beach (8 sites), Broward (1 site), and Dade (2 sites) counties. The only known privately owned site, in Broward County, had just one plant (Johnson *et al.* 1993, Austin 1991).

A 1995 survey for *J. reclinata* located 450 to 600 plants at 10 sites in Dade and Palm Beach counties (C. Kernan, Fairchild Tropical Gardens, personal communication 1995). More than half of these plants were located at two sites: Red Reef Park in Palm Beach County and Crandon Park in Dade County. The remaining plants were scattered in populations of fewer than 50 individuals in Broward, Dade, and Palm Beach counties.

As of 1996, *J. reclinata* was known from only nine sites in Dade and Palm Beach counties (D. Garview, Fairchild Tropical Gardens, personal communication 1997, P. Davis, Palm Beach County Department of Environmental Resources Management, personal communication 1997). Eight of these sites contained natural populations, while one site was established from restoration efforts. Several previously known sites have been lost over the past several years, including re-established populations at Coral Cove Park and Gemini Gardens (private), and Juno Beach Park, Nasa (private). There may be an additional historic site in Palm Beach County added if future surveys confirm the presence of *J. reclinata*.

Since 1996, surveys have revealed that more *J. reclinata* colonies in Palm Beach County have been lost. Colonies are now known to exist at Carlin Park, Loggerhead Park, Red Reef Park, Red Reef Golf Course, South Beach Park, and South Inlet Park. Gemini Gardens, Atlantic Dunes Park and Spanish River Park were not included in those surveys (P. Davis, Palm Beach County Department of Environmental Resources Management, personal communication 1998).

Information from specific localities of *J. reclinata* suggest that the species is relatively secure at some sites but susceptible at others. For example, it was collected at South Coral Cove Park, Jupiter Island, Palm Beach County, in 1962, but was not found there in 1990 (Johnson *et al.* 1993). The disappearance from this site is due to severe beach erosion and shading from Australian pines (Johnson *et al.* 1993). Several specimens identified as *J. reclinata* from the Jupiter Lighthouse on the mainland opposite the southern tip of Jupiter Island have been subsequently identified as *J. curtissi* (P. Davis, Palm Beach County Environmental Resources Management, personal communication 1998). Land clearing for residential development has eliminated *J. reclinata* from other sites in this area (Austin 1979). Although apparently suitable habitat exists at Blowing Rocks Preserve and Hobe Sound NWR on Jupiter Island, *J. reclinata* has not been found there (Johnson *et al.* 1993).

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## Management

To ensure the survival of this plant, the remaining populations of *J. reclinata* on public lands will require careful, active management and a program of propagation, germplasm conservation, and augmentation. Basic demographic, pollination, seed dispersal, seed germination and seed establishment information is needed to effectively recover this endangered species.

Successful management of this species will require new surveys for sites that contain *J. reclinata*, complete knowledge of where it existed historically, and surveys for sites within its historic range that would be suitable for re-establishment. In addition, threats to existing and proposed sites posed by commercial and residential development and invasion of exotic species need to be addressed.

Because additional protection of beachfront property through fee title acquisition or easement is unlikely due to high real estate values, *J. reclinata* will be best protected and recovered through re-establishment efforts.

Greenhouse propagated plants were successfully reestablished to three sites in Crandon Park in 1989; however, two plants used in the Coral Cove Beach Dune Restoration Project in 1994 did not survive (P. Davis, Palm Beach County Department of Environmental Resources Management, personal communication 1994). Although this attempt was unsuccessful, we believe the recovery of this species can be partially accomplished through reestablishment as part of dune restoration projects. Dade County is planning to re-establish about 60 *J. reclinata* plants at Bill Baggs Cape Florida SRA, Key Biscayne, Dade County (L. Carter, Bill Baggs Cape Florida SRA, personal communication 1997). It is important to remember that *J. reclinata* should only be re-established in areas within its historic range. Restoration efforts should also consider using other plants that occur naturally with *J. reclinata*, so that more of a representative vegetative complex is recreated.

Some of the existing *J. reclinata* sites and many other potentially suitable recipient sites for *J. reclinata* translocation will require removal and control of exotic vegetation as part of the restoration process. It seems that this species does best in sparsely vegetated habitats, and that one of the factors responsible for its decline is the lack of sparsely vegetated areas that are typical of overwashed dunes (P. Davis, Palm Beach County Department of Environmental Resources Management, personal communication 1998). At Crandon Park, herbicides are being used on a few plots where *J. reclinata* is suppressed by St. Augustine grass, and the plants do not seem to be adversely affected. Fire may also play an important role in habitat maintenance for *J. reclinata* as demonstrated by the short-term response to a recent burn on Bear Cut Preserve on Key Biscayne, Dade County (C. Kernan, Fairchild Tropical Gardens, personal communication 1996). The long-term effects of burning will need to be analyzed over the next several years. Mowing or bush-hogging could also be used where fire cannot be safely utilized, or in areas where the plants currently exist as a result of mowing.

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# Recovery for the Beach Jacquemontia

## *Jacquemontia reclinata* House

**Recovery Objective:** RECLASSIFY to threatened.

### Recovery Criteria

*Jacquemontia reclinata* may be considered for reclassification from endangered to threatened when: enough demographic data are available to determine the appropriate numbers of self-sustaining populations and sites needed to ensure 20 to 90 percent probability of persistence for 100 years; when these sites, within the historic range of *J. reclinata*, are adequately protected from further habitat loss, degradation, and fragmentation; when these sites are managed to maintain the coastal strand to support *J. reclinata*; and when monitoring programs demonstrate that populations of *J. reclinata* on these sites support the appropriate numbers of self-sustaining populations, and those populations are stable throughout the historic range of the species.

*Jacquemontia reclinata* may be considered for delisting when there is an adequate number of geographically distinct, self-sustaining populations throughout its historic range to ensure 95 percent probability of persistence for 100 years. The recovery identifies management recommendations, such as translocations, that are necessary to accomplish this objective. Additional criteria for delisting will need to ensure persistence of the species for 100 or more years, and will be defined once this species is reclassified.

### Species-level Recovery Actions

- S1. Determine the distribution of beach jacquemontia.**
  - S1.1. Conduct surveys in areas where beach jacquemontia is known to exist to determine the status of known populations.**
  - S1.2. Survey for additional natural populations in Palm Beach, Broward, and Dade counties.** Locate search sites by using historical aerial photos to determine the original extent and location of potential *Jacquemontia reclinata* habitat in combination with overlays of maps showing existing land use.
  - S1.3. Maintain distribution data in GIS database.** Maintaining distribution data for *J. reclinata* in a GIS database will provide information on the status and trends of the species over time.
- S2. Protect and enhance existing populations.**
  - S2.1. Protect any existing populations on private land through acquisition, conservation easements, or agreements with landowners.** All but one of the currently known populations are located on public land in public parks or recreation areas operated by State, county, or local governments. Additional

populations located by surveys on private land should be protected through acquisition, conservation easements or agreements.

- S2.2. Inform State, county, and city agencies of natural populations of *Jacquemontia reclinata* on public lands and provide information on conservation methods and management practices for these populations.** Some of the larger populations may be stabilized by appropriate habitat conservation measures. Smaller isolated populations may need to be augmented with greenhouse-raised seedlings.
- S2.3. (Re)establish *Jacquemontia reclinata* where appropriate.**
- S2.3.1. Establish protocols for restoration of *Jacquemontia reclinata*,** including maintaining records for source plants, developing techniques for establishing new populations, and establishing methodology for monitoring newly established plants.
- S2.3.2. Locate potential (re)introduction sites within the historic range** on protected lands, including public land and conservation easements on private land.
- S2.3.3. (Re)introduce plants to protected sites** using plants under cultivation. Before reintroductions begin, site-specific ecological data must be gathered to determine within-site reasons for *Jacquemontia reclinata*'s decline so that effective site-specific management can be implemented.
- S2.3.4. Re-establish plants as part of dune restoration efforts.** *Jacquemontia reclinata* should be used along with other native vegetation as part of dune restoration projects in areas of suitable habitat within its historic range.
- S2.4. Continue *ex situ* conservation** as a means of preserving genetic diversity, preventing loss of the species, and determining ecological characteristics and habitat management needs. The ultimate goal is to restore *Jacquemontia reclinata* to self-sustaining populations in a functioning ecosystem.
- S2.4.1. Send seeds to the seed bank at the U.S. Department of Agriculture Forest Service Northern Plains Area National Seed Storage Laboratory in Fort Collins, Colorado.** These should be a genetically representative sample of the remaining natural populations of *Jacquemontia reclinata*. This is best achieved by including samples from all remaining populations.
- S2.4.2. Continue propagation and development of successful horticultural methods** that have been initiated by Fairchild Tropical Garden in Miami, Florida. Fairchild has germinated wild-gathered seed and maintained plants of *Jacquemontia reclinata* for more than 5 years. The plants have flowered and borne fruit. Greenhouse-raised seedlings have been transplanted successfully to the field. Successful propagation of this species from stem cuttings has also been achieved at Fairchild.
- S2.4.3. Establish and maintain an *ex situ* collection to prevent loss of natural populations and diversity due to natural disasters, habitat destruction, unfavorable management practices, or failure of long-term viability of stored seeds.** Collection of seeds and cuttings from each wild population of *Jacquemontia reclinata* should adhere to the guidelines

established by the Science Advisory Council of the Center for Plant Conservation (CPC). The collection should be managed to represent and maintain the genetic integrity of each natural population. This collection will provide a source for restocking natural populations and establishing new populations in appropriate habitat within the historical range of *J. reclinata*. The FWS has provided some initial funding to Fairchild Tropical Garden for this purpose. Additional funding should be made available for development and maintenance of this *ex situ* collection.

- S2.5. Enforce available protective measures.** Employ local, State, and Federal regulations to protect *Jacquemontia reclinata* from overcollection, and to protect maritime hammock and coastal strand vegetation where *J. reclinata* is found.
- S2.5.1. Initiate section 7 consultation when applicable.** Section 7 of the ESA applies to Federal activities which might affect listed species. Few consultations are anticipated. Consultations concerning beach renourishment projects may occur; however, strategies to avoid and minimize impacts to *Jacquemontia reclinata* populations would most likely be possible.
- S2.5.2. Enforce take and trade prohibitions.** *Jacquemontia reclinata* is protected by take provisions of the ESA (including its prohibition against removing and reducing to possession any endangered plant from land owned by the Federal government; maliciously damaging or destroying any such species on any such area; or removing, cutting, or digging up any such species), by the Preservation of Native Flora of Florida Act, and by Florida rules regulating removal of plants from State lands. Violation of these State prohibitions (including Florida criminal trespass law) is also a violation of the ESA.
- S3. Conduct research on life history characteristics and requirements for reproduction.**
- S3.1. Continue research to determine demographic information,** such as numbers of sites and populations, numbers of individuals in a population, recruitment, dispersal, growth, survival, and mortality.
- S3.2. Once demographic data are known, conduct population viability and risk assessment analysis** to determine the numbers of plants, sites, subpopulations/populations, and spatial distribution needed to ensure persistence of the species.
- S3.3. Conduct research to assess management requirements of *Jacquemontia reclinata*.** Determine which natural populations can be stabilized or increased by habitat management. Surveys, research, and monitoring will provide information on the localities of *Jacquemontia reclinata* sites, and on the factors contributing to any declines at each site. Site-specific management guidelines should be provided to land managers.
- S3.4. Determine response to habitat changes and management manipulations based on site-specific research and monitoring.** Recent work by Fairchild Tropical Garden at Crandon Park suggests that *Jacquemontia reclinata* seed germination is being suppressed. Field experiments should demonstrate whether adult plants

released from St. Augustine grass competition will begin to reproduce and whether seeds planted in moist microsites free of St. Augustine grass and exotic species competition will germinate at high rates. Rebuilding depleted populations from greenhouse-raised seedlings also should be field tested.

- S3.5. Develop a quantitative description of the population structure of *Jacquemontia reclinata*.** This description will provide a baseline for monitoring population dynamics in response to natural environmental change and management treatments. The position of each individual plant in each surviving population should be located by triangulation from permanent stakes and each plant identified with coded metal tags. Data recorded should include stage class (seed, pre-establishment seedling, established seedling, juvenile, adult, reproducing adult), size, morphology, survivorship, mortality, and reproduction for individual plants. Data about each plant's microsite (vegetation cover, litter depth, substrate, soil organic content, soil sample analysis, distance from strand line, and position on dune profile) should also be collected.
- S3.6. Conduct population viability and risk assessment analyses** to determine the numbers of *Jacquemontia reclinata* plants, sites, and populations needed to ensure persistence of the species for 100 years into the future.
- S4. Monitor populations of *Jacquemontia reclinata*.**
- S4.1. Map and monitor natural populations to maintain an inventory of naturally reproducing populations** and help determine habitat characteristics and natural environmental changes affecting *Jacquemontia reclinata* survival.
- S4.1.1. Develop a monitoring protocol to assess population trends.**
- S4.1.2. Monitor to detect changes in demographic characteristics, such as reproduction, recruitment, growth, dispersal, survival, and mortality.** Also monitor for pollinators, herbivory, disease, and injury.
- S4.1.3. Monitor the effects of land management activities. Assess any changes in demographic characteristics** as in 4.1.2. in response to land management activities such as exotic plant control.
- S4.1.4. Monitor introduced plants for survival, productivity, and growth to compare with data from natural populations.**
- S4.2. Assess management requirements.** Determine which natural populations can be stabilized and increased by habitat management and which populations need to be augmented, either from other natural populations or from the *ex situ* collection. Monitoring and research should yield detailed habitat maps of all *Jacquemontia reclinata* sites, maps of tagged individuals, and analyses of within-site factors involved in *J. reclinata* decline at each site to be made available to site managers. Site-specific management guidelines based on research should be provided to site managers.
- S5. Provide public awareness about additional threats to *Jacquemontia reclinata*.** The public needs to be made aware that Federal and State regulation of endangered plants does not address the horticultural use of *Jacquemontia reclinata*, and that ornamental use of endangered plants can threaten the genetic integrity of natural populations. This concern has led to suggestions that endangered species should not be commercially available, or that records should be kept of sources and out-planting locations for horticultural projects, just as for conservation projects, so

that introductions and resulting population dynamics can be reconstructed. The goal of the recovery process is to restore listed species to a point where they are secure, self-sustaining components of their ecosystem and can be delisted. Commercial production and horticultural use of an endangered species on private land would contribute little to that goal.

- S6. Refine delisting criteria once reclassification is achieved, and adequate research and monitoring data are available to develop these criteria.**

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## Habitat-level Recovery Actions

**H1. Prevent degradation of existing habitat.**

**H1.1. Prevent direct destruction of habitat.**

**H1.1.1. Construction of roads, parking lots, buildings, and other structures should be set back behind primary dunes and outside of *Jacquemontia reclinata* habitat.**

**H1.1.2. Prevent or eliminate human access to dunes.** Provide dune crossovers (boardwalks) and signage at essential beach access points to avoid dune erosion and blowouts.

**H1.1.3. Enforce regulations prohibiting use of motor or man-powered vehicles on beaches and dune habitat.**

**H1.2. Continue extirpation or control of exotic plant species, such as Australian pine, carrotwood, and Brazilian pepper, that have invaded and altered the remnants of South Florida's strand vegetation.** Eliminating invasive vegetation would open up areas to *Jacquemontia reclinata*, which prefers disturbed and sunny areas. Dormant seeds in the soil may be one explanation of the apparent movement of this species from one disturbed area to another. Removal of exotics from known or potential *J. reclinata* habitats may stimulate the revival of nonproductive or apparently extirpated populations of *J. reclinata*.

**H2. Restore beach dune habitat through dune building and stabilization projects.** Include *Jacquemontia reclinata* with other native vegetation for dune restoration projects that are proposed within its historic range.

**H3. Conduct habitat-level research projects.** Study the response of *Jacquemontia reclinata* to various land management practices, such as prescribed fire regimes, vegetative thinning, and exotic vegetation control.

**H4. Monitor habitat/ecological processes.** Monitor the effects of land management actions (prescribed fire, exotic plant control) to assess the long-term response of *Jacquemontia reclinata*.

**H5. Provide public information about coastal ecosystems.** Public education is essential to develop a general understanding and support for protection and restoration efforts in threatened dunes, coastal strand, and maritime hammock ecosystems. Removal of exotic plant species and maintenance of open spaces are necessary management practices to facilitate the recovery of *Jacquemontia reclinata* and protect coastal ecosystems. Control and removal of vegetation on public lands is often misunderstood by the general public. Specific information on *J. reclinata* biology and management requirements can also be provided once these are defined. This information can be disseminated through signs, brochures, and displays in visitors centers on public lands and nature centers.

