

The Quarterly Journal of the Florida Native Plant Society

Palmetto



FLORIDA'S ENDANGERED AND THREATENED
PLANT CONSERVATION GRANTS PROGRAM

Saving Florida's

Rarest

As Florida's human population continues to grow, so does the threat to some of our most unique and vulnerable residents. Hundreds of Florida's native plants are imperiled by residential and commercial development, habitat degradation, and the impact of exotic species. The state's Endangered and Threatened Plant Conservation Grants Program was designed to address the recovery needs of Florida's unique flora and the habitats that sustain it. In the last seven years, over 20% of the state's imperiled plant species have benefited from this exemplary funding program.

Florida's Regulated Plant Index contains 542 plant species, including 421 endangered (E), 113 threatened (T), and eight commercially exploited species. Because only 55 of these plants are also protected by the federal Endangered Species Act (ESA; 1973), almost 90% of Florida's rarest and most imperiled plants are offered no federal protection. State-listed species not covered by the ESA range from the Keys to the Panhandle and include rare tropical trees, pine rockland herbs, Appalachian Ice Age refugees, and many species narrowly endemic to Florida. Examples include species reduced to single wild populations in the state, such as young palm orchid (*Tropidia polystachya*), shrub verbena (*Lantana canescens*), and coral hoary pea (*Tephrosia angustissima* var. *corallicola*), and species that fail to recruit seedlings in the wild, such as Florida ziziphus (*Ziziphus celata*) and Florida torreya (*Torreya taxifolia*).

The DPI Grants Program

The Endangered and Threatened Plant Conservation Grants Program is the only funding program in Florida focused on the conservation of state-listed plants. The program is administered by the Florida Department of Agriculture and Consumer Services' Division of Plant Industry (DPI), which also maintains the Regulated Plant Index. The Endangered Plants Advisory Council (EPAC), made up of seven representatives of academia, industry and environmental groups (including the Florida Native Plant Society), provides expert advice on endangered and threatened native plants, reviews grant applications, and makes recommendations to DPI on Program awards. Funding for the DPI Grants Program began in 2000.

Funding under the DPI Program is restricted to non-profit institutions with a proven record of research, propagation, conservation, and educational activities designed to protect or recover Florida's imperiled native plants. To date, over 150 of the rarest and most imperiled species have been helped by the program. Funded activities include curation of ex situ populations and seed banks, development of propagation techniques, demographic monitoring, research on reproductive biology, genetics and ecology, rescues



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Editor's note: authors names after the first author are listed alphabetically.

Plants



Photos: (left to right).

First row – *Liatris provincialis*; *Chionanthus pygmaeus*; *Conradina grandiflora*; *Euphorbia telephioides*; (photos by Cindy Campbell).

Second row – *Lupinus aridorum*; *Nolina brittoniana*; *Bonamia grandiflora*; *Cuphea aspera*; (photos by Cindy Campbell).

Third row – *Polygala lewtonii* (Carl Weekley); *Scutellaria floridana* (Cindy Campbell); *Asimina tetramera* (Anne Cox);
Crotalaria avonensis (Eric Menges).

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of rare plants from sites slated for development, and the introduction of species to protected sites. In addition, outreach programs funded by DPI reach a broad spectrum of Florida's residents, including over 30,000 schoolchildren.

Another stringent requirement of the program is the 1-to-1 matching funds clause, whereby recipients must spend a dollar for every DPI dollar received. For tax-paying citizens, however, this is a 2-for-1 bargain, since they get two dollars-worth of plant conservation for every tax dollar spent.

Ex situ populations and propagation

Because many endangered and threatened species are restricted to few populations, often on unprotected sites, plant conservationists have relied on the creation and maintenance of ex situ (off-site) populations in botanical gardens and long-term seed storage to conserve germplasm. The two major ex situ collections in Florida are maintained by Fairchild Tropical Botanic Garden and Historic Bok Sanctuary, both supported in part by the DPI Grants Program. Altogether, the two gardens maintain off-site populations of 146 state-listed species. Examples include semaphore cactus (*Consolea corallicola*), crenulate leadplant (*Amorpha herbacea* var. *crenulata*), Florida ziziphus, and several rare woody mints (*Conradina* and *Dicerandra* spp.).

Another important ex situ activity supported by DPI funding is the development of propagation techniques for imperiled species, including vegetative propagation from cuttings, seed germination, and tissue culture. Grant recipients, often in collaboration with experts from other institutions, have developed propagation methods for over 60 species (e.g., Roncal et al. 2006a, 2006b). Ex situ propagation has been critical in providing plants for the introduction of listed species to protected sites (see below).

Monitoring listed plants

The DPI Grants Program supports the monitoring of over 50 listed species from one end of the state to the other. Supported projects include both population-level and demographic monitoring. Population-level monitoring is based on counts or estimates of population sizes that provide data on whether populations are increasing or decreasing over time. Demographic monitoring involves periodic censusing of individually marked plants to collect data on their survival, growth, and reproduction.

Monitored populations are usually mapped with a global positioning system (GPS) and visited at least annually. Population-level monitoring is also useful for tracking the impact of management activities like prescribed fire on the population dynamics of a species. On the Lake Wales Ridge, for example, DPI-funded research has shown that species such as Lewton's polygala (*Polygala lewtonii*), scrub blazing-star (*Liatris ohlingerae*), and scrub mint (*Dicerandra frutescens*) respond differently to fire, although all occupy similar pyrogenic communities.

Data produced by demographic monitoring is particularly fruitful in understanding the biology of rare species because it can be used to develop population viability (PVA) models. PVA

models generate testable hypotheses about the habitat and management requirements of listed species, but their usefulness depends on large, long-term data sets. Two of the five models developed for scrub plants by Archbold Biological Station in recent years were supported in part by a DPI Grant (Menges and Quintana-Ascencio 2004, Menges et al. 2006). PVA models can also be used to infer the types of land management most beneficial to rare species. For example, the Archbold PVA model of *Dicerandra frutescens* led to new recommendations for more frequent prescribed fire in oak-hickory scrub, its primary habitat (Menges et al. 2006). In addition, PVA models are useful for determining whether conservation efforts are reducing extinction risks of our rarest plants. For example, Fairchild researchers determined through PVA modeling that re-introduced Sargent's cherry palms (*Pseudophoenix sargentii*) lowered the extinction risk of the species in Florida because they are growing more rapidly than wild germinated individuals (Maschinski and Duquesnel 2006).

Research on reproductive biology, genetics, and ecology

In addition to understanding the demography of listed species, plant conservationists need to understand their reproductive biology, genetic variability, and ecological requirements. The DPI Grants Program has funded research in all these areas. For example, Archbold researchers have shown that Lewton's polygala has an unusual breeding system characterized by the presence of both above- and belowground flowers (Weekley and Brothers 2006). With funding from DPI, research conducted at Bok and Fairchild has been critical in evaluating genetic diversity in such critically endangered species as beach jacquemontia (*Jacquemontia reclinata*; Maschinski and Wright 2006), coral hoary pea, and four-petaled pawpaw (*Asimina tetramera*; Center for Plant Conservation 2007).

The DPI Program has also funded research on the germination ecology of over 60 species including Highlands golden aster (*Chrysopsis highlandsensis*), scrub blazing-star (Weekley et al. submitted), crenulate lead plant, beach peanut (*Okenia hypogaea*), and Florida ziziphus. Germination experiments have been carried out in the greenhouse, in controlled environment growth chambers, and in the field.

(Re)-introductions of listed species and rare plant rescues

Sometimes it is necessary to re-introduce a listed species to a site where it is known to have occurred or to introduce it to a new site containing appropriate habitat. In both cases, the goal is to establish viable populations on protected sites within the historic range of the species. Often introductions are a species' only hope of avoiding extinction or of being reduced to a handful of captive individuals in a greenhouse or garden.

The DPI Program has contributed to over 50 (re)-introductions involving about 15 species (e.g., Maschinski and Duquesnel 2006, Maschinski and Wright 2006, Possley et al. 2007, Possley et al. in press, Wendelberger et al. in press). For example, Bok

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Top: Planting Florida ziziphus seeds – photo courtesy of Archbold Biological Station. **Below:** Sam Wright and Jennifer Possley install a seed study – photo courtesy of Fairchild Tropical Botanic Garden.

Sanctuary has provided hundreds of potted plants for the introduction of Florida ziziphus to protected sites on the Lake Wales Ridge. Bok has also carried out introductions of both varieties of *Dicerandra immaculata* (Lakela's mint, var. *immaculata* and Savannahs mint, var. *savannarum*). Similarly, Fairchild conservationists have led or participated in (re)-introductions of such critically imperiled species as the semaphore cactus, shrub verbena, and Biscayne prickly ash (*Zanthoxylum coriaceum*). Using tissue-cultured plantlets, Archbold recently carried out the first-ever introduction of Avon Park harebells (*Crotalaria avonensis*), one of the most narrowly endemic plants in Florida.

DPI grants have also funded several plant rescues, whereby species occupying sites slated for development are transplanted to protected sites or to ex situ collections. In some cases, (e.g., Florida ziziphus), clonal propagation substitutes for direct transplantation. Plant rescues are important because they help to maintain the genetic diversity of rare species.

Scientific publications and public education

The DPI Grants Program has funded peer-reviewed scientific publications and science-based Conservation Action Plans to advise land managers on how to protect and promote populations of listed species. Annual meetings of the Rare Plant Task Force, which bring together plant conservationists, land managers, and academic botanists from across the state and beyond, are funded in part by DPI grants. As a result of these meetings, Task Force organizers have compiled the best scientific and technical information available on the recovery needs of over 200 state- and federally listed plants.

In addition, funds support ongoing public outreach programs and educational programs specifically targeted to schoolchildren.

The DPI Grants Program: Leading the way

Kathryn Kennedy, Executive Director of the Center for Plant Conservation, a national organization dedicated to the conservation of America's native plants, characterizes the DPI Grants Program as a "model for the nation", and has praised the state for its foresight in funding conservation activities for Florida's unique flora.

However, in response to the state's 2007 budget shortfall, the DPI Program was briefly considered for elimination. Fortunately, the Program survived and funding has continued. As Kennedy's remarks indicate, by funding a program specifically focused on conservation of the state's unique native flora, Florida has proven itself a leader in the national effort to protect biodiversity and save our irreplaceable natural heritage. The DPI Grants Program is one of the most effective funding programs in the US for the protection of native plants and should be the pride of every citizen, as it is the envy of plant conservationists in states with less foresight. The continued support of this Program by the Division of Plant Industry indicates their commitment to conservation of Florida's rarest plant species. They deserve our thanks for the legacy they are leaving for future generations. 🌿

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The authors are plant conservationists centrally involved in the effort to preserve Florida's unique native flora and its habitats. They represent a broad array of institutions that have benefited directly or indirectly from the Division of Plant Industry's Endangered and Threatened Plant Conservation Grants Program over the past seven years.

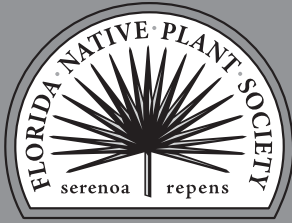


Photos: (Left to right).

First Row – *Jacquemontia pentanthos*; *Adiantum melanoleucum*; *Tectaria fimbriata*; *Pilosocereus robinii* (photos by Jennifer Possley);

Second Row – *Consolea corallicola* (photo by Meghan Fellows); *Passiflora sexflora*; *Matelea alabamensis* (photos by Jennifer Possley);

Dicerandra frutescens (photo by Tom Eisner).



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The purpose of the Florida Native Plant Society

is to conserve, preserve, and restore the native plants and native plant communities of Florida.

Official definition of native plant:

For most purposes, the phrase Florida native plant refers to those species occurring within the state boundaries prior to European contact, according to the best available scientific and historical documentation. More specifically, it includes those species understood as indigenous, occurring in natural associations in habitats that existed prior to significant human impacts and alterations of the landscape.



The Palmetto

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Editorial Content

We welcome articles on native plant species and related conservation topics, as well as high-quality botanical illustrations and photographs. Contact the editor for guidelines, deadlines and other information.

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