

RECOVERY PLAN

Etonia Rosemary

(Conradina etonia)



U.S. Fish and Wildlife Service
Southeast Region
Atlanta, Georgia

RECOVERY PLAN
FOR
ETONIA ROSEMARY
(*Conradina etonia*)

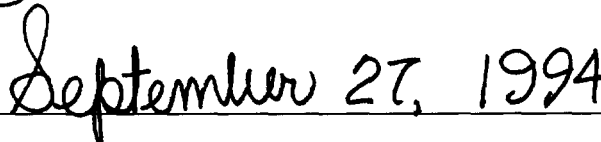
prepared by

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Atlanta, Georgia

Approved:


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Date:



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Literature citations should read as follows:

U.S. Fish and Wildlife Service. 1994. Recovery Plan for Etonia rosemary (*Conradina etonia*). U.S. Fish and Wildlife Service, Atlanta, GA. 11 pp.

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Fish and Wildlife Reference Service
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Acknowledgement:

The cover illustration was done by Noah Lowenthal.

EXECUTIVE SUMMARY

Current Species Status: The Etonia rosemary (*Conradina etonia*) is listed as an endangered species due to habitat loss from residential development.

Habitat Requirements and Limiting Factors: Because of the very recent discovery of *Conradina etonia* in 1990 and its only known locations being on private lands, little is known about specific habitat requirements and limiting factors. *Conradina etonia* is apparently restricted to very limited areas of deep white-sand scrub with shrubby oaks and sand pines on dry soils.

Recovery Objective: Downlisting to threatened when recovery criteria for *Conradina etonia* are achieved.

Recovery Criteria: Reclassification to threatened can be considered when five wild populations are under protection and management. Criteria for delisting may be developed once this species is reclassified. Based on the limited knowledge of its biology and its limited range, a recovery goal of self-sustaining populations without management is unlikely to be achieved.

Major Actions Needed:

1. Protect and monitor natural populations.
2. Survey for additional populations along Etonia Creek, in Putnam County, and potential areas of scrub habitat.
3. Continue propagation at several locations to prevent extinction of the species due to disease or other disaster at any one propagation site.
4. Determine habitat requirements, life history characteristics, and requirements for reproduction.
5. Locate potential (re)introduction sites on protected lands, including public land, highway rights-of-way, and conservation easements on private land.
6. (Re)introduce plants to protected sites using plants under cultivation and/or plants from natural sites.

Estimated cost (\$000) of recovery:

Year	Need 1	Need 2	Need 3	Need 4	Need 5	Need 6	Total
FY1	10	2	2	9	5	5	33
FY2	8	2	2	9	5	5	31
FY3	8	2	2	9		5	26
FY4	8	2	2			5	17
FY5	8	2	2			5	17
Total	42	10	10	27	10	25	124

Date of Recovery: The possibility of recovery will depend on locating and protecting additional natural populations and on the success of relocating propagated plants to protected land. We are unable to determine the date of recovery at this time.

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PART I. INTRODUCTION

A. INTRODUCTORY INFORMATION

Conradina is a genus of minty-aromatic shrubs in the mint family (Lamiaceae). These shrubs resemble the herb rosemary (*Rosmarinus officinalis*). Five of six allopatric species of *Conradina* occur in Florida. The sixth species, *Conradina verticillata* (Cumberland rosemary), listed as threatened in 1991 (U.S. Fish and Wildlife Service 1991), is restricted to sand bars along rivers in the Cumberland Plateau of Tennessee and Kentucky. The other five species have more restricted geographic distributions and are considerably less variable (Gray 1965). The most widespread species, *Conradina canescens*, occurs in the Florida panhandle, southern Alabama, and southern Mississippi. This species, which occurs on dry sand soils on coastal dunes, in sand scrub vegetation, and in dry longleaf pinelands, is widespread and reasonably secure. *Conradina grandiflora* (large-flowered rosemary) is native to scrub vegetation near Florida's Atlantic coast from Daytona Beach south to Miami, inland near Orlando, and in Okeechobee County.

Three Florida endemic species of *Conradina*, including *Conradina etonia* (Etonia rosemary), the subject of this recovery plan, were listed as endangered on July 12, 1993 (USFWS 1993). *Conradina glabra* (Apalachicola rosemary) is restricted to Liberty County, Florida, west of Tallahassee near the Apalachicola River in the Florida panhandle (Gray 1965, Schultz 1987). It lives on the edges of ravines and has spread into planted pine forests and to roadsides. Its original habitat was apparently between the hardwood forests of the ravines and the dry longleaf pine-wiregrass of the uplands. *Conradina brevifolia* (shortleafed rosemary) is restricted to the biologically rich scrub vegetation of the Lake Wales Ridge in Highlands and Polk Counties of central Florida.

Conradina etonia was discovered in 1990. It is known from only two sites near Etonia Creek, northeast of Florahome, Putnam County, where it is restricted to very limited areas of scrub vegetation with scrubby evergreen oaks (*Quercus* spp.) and sand pines (*Pinus clausa*) (Fig. 1). These two sites are privately owned and were already subdivided for residential development or had been approved for development when it was discovered. A site visit to the type locality by U.S. Fish and Wildlife Service (Service) biologists in May 1994 confirmed the continued presence of the natural population at that site. No new development had occurred on adjacent residential lots.

Kral and McCartney (1991) described the habitat along Etonia Creek as a northern extension of the deep scrub habitat of south Florida. Several plant species characteristic of Florida scrub reach their northeastern range limit here, including *Persea humilis* (silk bay), *Ilex cumulicola* (sand holly), and *Garberia fruticosa*. However, *Sabal etonia* (scrub palmetto), which is named for this locality, was not observed in the immediate vicinity of *Conradina etonia*. The Florida scrub jay, a threatened species, was noted at this site.

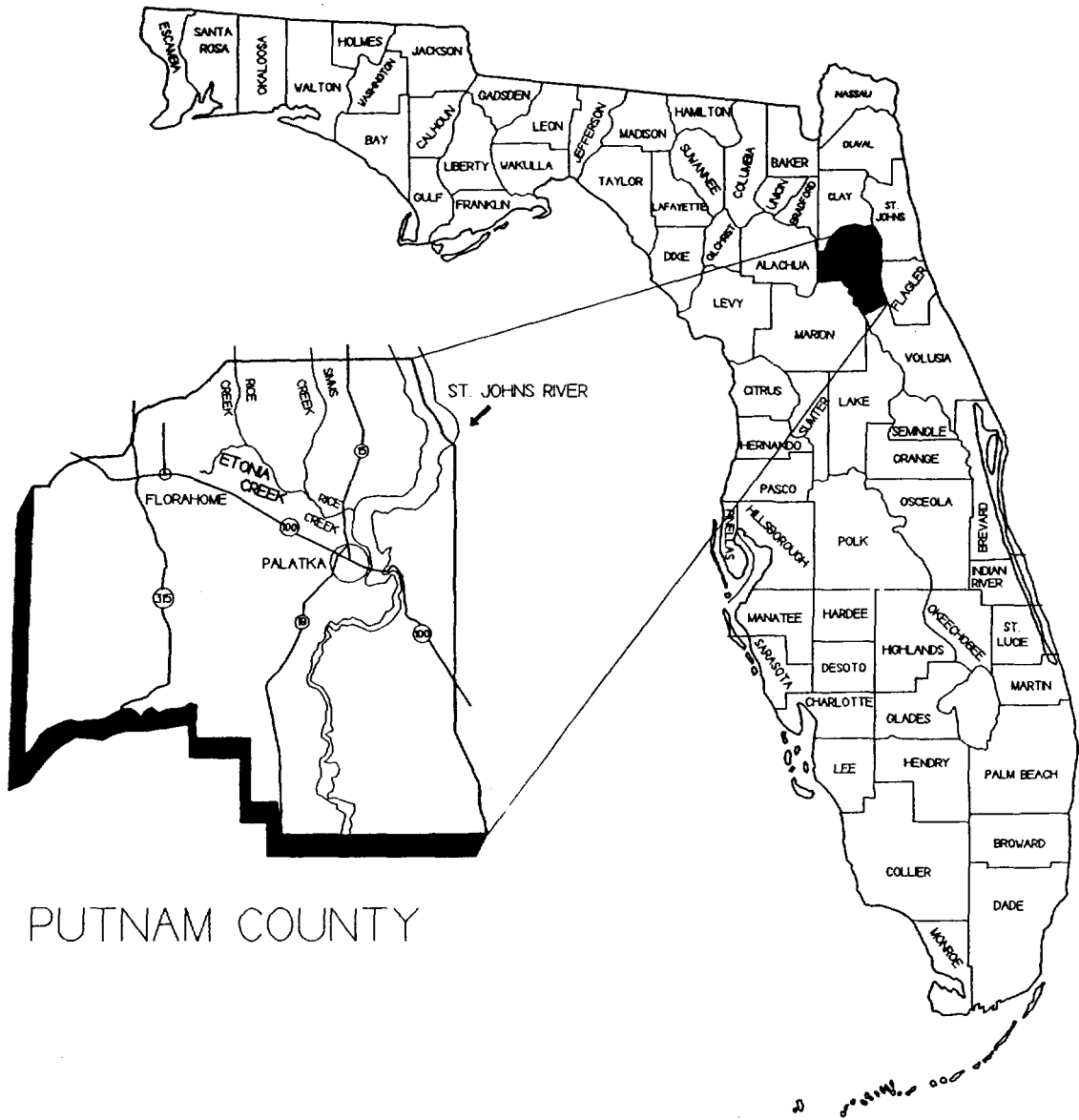


Figure 1. General location of known populations of *Conradina etonia* on the Etonia Creek drainage in Putnam County, Florida.

Description and Taxonomy

Kral and McCartney (1991) described *Conradina etonia* and compared the species to *Conradina grandiflora* (large-flowered rosemary). The flowers of both species are very similar in their dimensions, shapes, and pollination guide markings. The leaves of *C. etonia* are distinctly broader and have lateral veins clearly visible on the ventral surface. The *C. grandiflora* leaves are dark green and lustrous in contrast to the dull green of *C. etonia*. The two plants differ in the pubescence on the leaves, young shoots, inflorescence branches, sepals, and anthers. One specimen of *C. grandiflora* from south of Daytona Beach had new shoots with downiness similar to that of *C. etonia*, but the closest known population of *C. grandiflora* to the Etonia Creek site is approximately 70 air miles to the southeast in Volusia County, Florida.

Conradina etonia is a long, straight, slender shrub that grows up to 1.5 meters and has numerous, frequently arching primary branches (Fig. 2). The reddish-brown new shoots, about 1 millimeter (mm) thick, have square stems covered with very short, fine, downy hairs and scattered glands. Older growth thickens and has circular stems. The outer bark peels off in long, narrow gray strips, exposing red-brown or orange-brown smooth inner bark.

The leaves are 15 to 30 mm long and 3 to 9 mm wide. The tips are rounded to broadly acute and the margins are tightly rolled to the underside (Fig. 2a). The blade tapers to a short (less than 1 mm) petiole. Short, leafy shoots develop at each node with axillary buds giving the foliage a clustered, whorled appearance (Fig. 2b). The dull green dorsal side of the leaf is covered with short, downy hairs and numerous minute glands. The ventral side is slightly paler and concave with tiny hairs that are very dense even on the midrib. The midrib, seen at the base of a strong median groove on the dorsal surface, is strongly raised on the ventral surface and has two to four strong branch nerves on each side, a characteristic unique to this species of *Conradina*.

Clusters (cymes) of three to seven flowers are produced from all or most nodes from the midstem up. The flower's corolla tube is sharply bent above the middle, a characteristic of this genus (Fig. 2c). The sepals form two lips. The upper lip is three-toothed and upswept, and the lower lip with two teeth is split almost to the base (Fig. 2d). The corolla is 20 to 25 mm long to the tip of the lower lip. It is also strongly two-lipped with a lavender-blue to lavender-rose corolla tube and throat. The upper lip is uniformly lavender and the lower lip and throat have a broad longitudinal zone of white or cream mottled with spots and streaks of deep purple. The four stamens consist of a shorter pair extending almost to the tip of the upper lip and a longer pair, extending slightly beyond, arching outward and downward (Fig. 2e). The pollen sacs on the anthers are dark purple with white

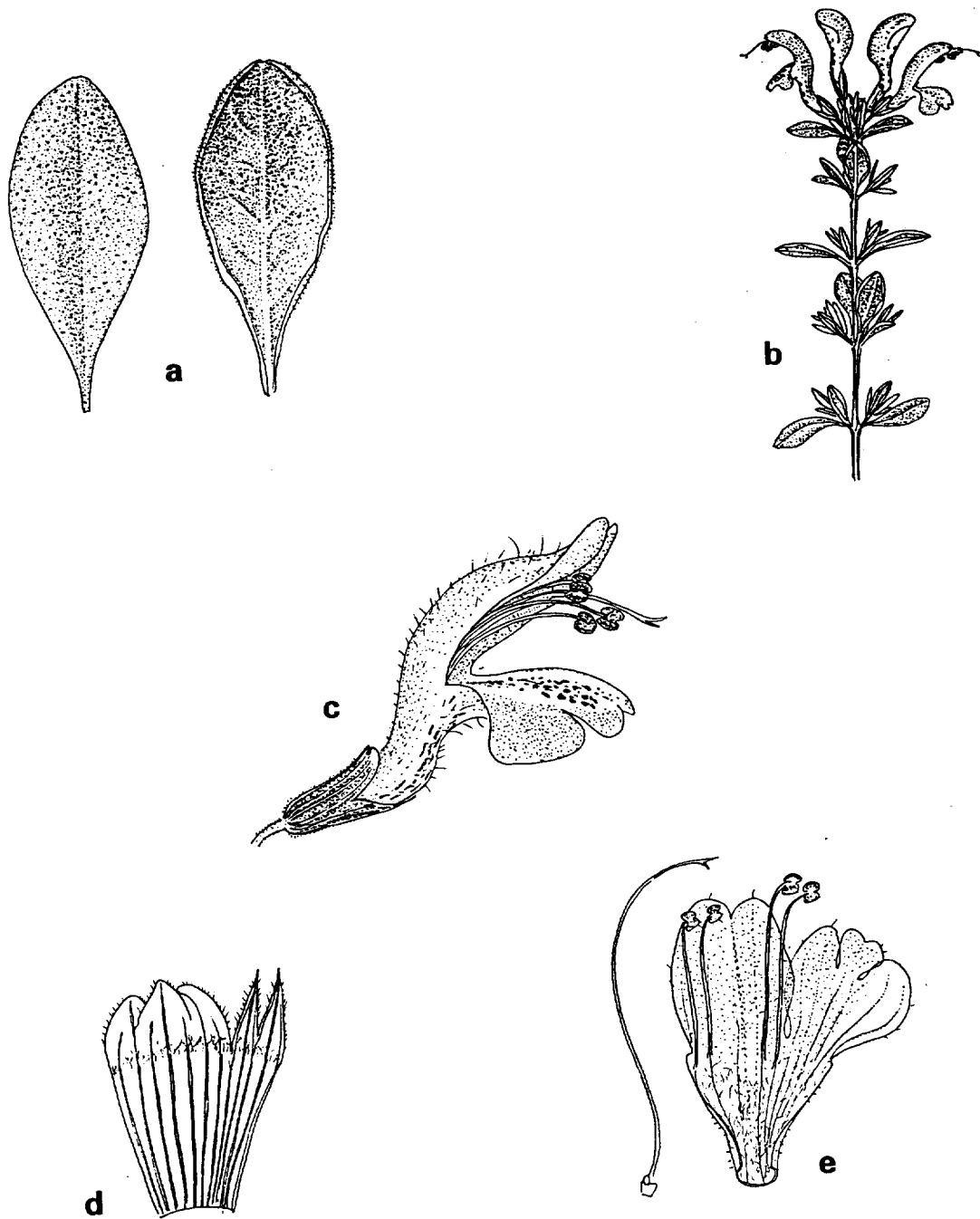


Figure 2. *Conradina etonia*. a. Dorsal (left) and ventral (right) views of leaf. b. Flowering branchlet. c. Side view of flower. d. Opened calyx. e. S-shaped style and opened corolla showing arrangement of stamens. Drawings adapted from Kral and McCartney (1991) with permission from R. Kral.

hairs. The S-shaped style extends beyond the anthers (Fig. 2e). Generally, four brown, egg-shaped nutlets are produced. Flowering occurs from early spring to late fall (R. McCartney, pers. comm., T. Race, pers. comm.).

Kral and McCartney (1991) describe the habitat as deep white-sand scrub dominated by sand pine and shrubby oaks including Chapman oak (*Quercus chapmani*), scrub live oak (*Q. geminata*), myrtle oak (*Q. myrtifolia*), and some turkey oak (*Q. laevis*). A mixed understory includes saw-palmetto (*Serenoa repens*), greenbrier (*Smilax*), silk bay (*Persea humilis*), pawpaw (*Asimina*), rosemary (*Ceratiola*), buckthorn (*Sageretia minutiflora*), sand holly (*Ilex cumulicola*), gopher apple (*Licania*), sand blackberry (*Rubus cuneifolius*), and *Garberia*. Herbaceous species include dog fennel (*Eupatorium compositifolium*), blazing star (*Liatris chapmani*), yellow buttons (*Balduina angustifolia*), carphophorus (*Carphephorus corymbosus*), golden aster (*Chrysopsis scabrella*), *Palafoxia integrifolia*, elephant's-foot (*Elephantopus*), and jointweed (*Polygonella*).

Species of *Conradina* generally are most abundant in natural openings or artificial clearings rather than in the scrub. These mints respond positively to disturbance, which, historically, was probably fire.

B. THREATS

Loss of habitat to development is the primary threat to this species. It is only known from two localities in Putnam County, Florida. Both sites are privately owned. One site was subdivided for residential development and one site was permitted for development at the time the plants were discovered. Service biologists confirmed the continued existence of *Conradina etonia* along the roadsides at the type locality in May 1994. No new development had occurred on adjacent platted lots, however new stakes and flagging indicated some intent toward development.

C. EXISTING CONSERVATION MEASURES

At the time of its discovery, some material was collected for propagation, and living plants from cuttings are part of a collection of southeastern woody Lamiaceae in cultivation at Woodlanders, Inc., in Aiken, South Carolina (Kral and McCartney 1991). *Conradina etonia* is also under cultivation at Bok Tower Gardens (T. Race, pers. comm.). Specimens for cultivation in the Bok Tower's Endangered Plant Program were collected in November 1993 from the type locality.

The area where *Conradina etonia* was initially discovered is included in Phase I of a Conservation and Recreation Lands (CARL) project area, No. 25 Etoniah [*sic*] Creek (FDEP 1994). This project is part of an acquisition plan to secure a wildlife habitat

corridor connecting the Ocala National Forest and Camp Blanding. Upon acquisition, the Etoniah Creek project will be managed by the Division of Forestry as a State Forest. Thus, the original site will be protected, assuming any *C. etonia* remain when the land is purchased, and more public land would be made available for establishing new populations in appropriate habitat.

PART II. RECOVERY

A. RECOVERY OBJECTIVE AND CRITERIA

The immediate goal of this recovery plan is to locate remaining populations on natural sites and protect naturally reproducing populations from extinction. The ultimate goal is to have adequate numbers of plants and populations naturally reproducing on protected natural sites, such that *Conradina etonia* can be downlisted to threatened and eventually delisted.

Etonia rosemary (*Conradina etonia*) may be considered for reclassification from endangered to threatened when five geographically distinct, self-sustaining populations are protected and appropriately managed. Criteria for delisting may be developed once this species is reclassified. Based on the limited range of *C. etonia* and the limited knowledge of its biology, recovery goals cannot be established at this time.

Recovery of *Conradina etonia* will require the establishment of new populations, since both known sites for this species are designated for development. If no new populations are located and the natural populations are lost to development, reintroduction from cultivated specimens will be necessary. With adequate funding, available and appropriate reintroduction sites, and immediate success of reintroduced populations, recovery will take a minimum of 10 years.

These recovery objectives are only interim goals as there are insufficient data on the biology, habitat characteristics, and management strategies required for this species. The estimated number of self-sustaining populations required for survival and objectives for downlisting and recovery will be reevaluated as new information is acquired.

B. NARRATIVE OUTLINE FOR RECOVERY ACTIONS

1. Locate and protect existing populations.

1.1 **Protect any existing populations** on private land, through conservation easements or agreements with landowners.

1.2 Purchase and manage land having natural populations. The largest group of plants at the type locality probably only occur on a few subdivision lots (R. McCartney, pers. comm.). Purchase of these lots could protect this species for the short term. However, long-term oversight and management within the subdivision, once development is completed, will be difficult. Management for *C. etonia* will require opening up the canopy and restoring the scrub habitat to an earlier successional stage by prescribed burning.

1.3 Protect existing roadside plants through the development of roadside management plans with Putnam County and the Florida Department of Transportation.

1.4 Map and monitor natural populations to maintain an inventory of naturally reproducing populations and help determine habitat characteristics and climatic factors affecting *C. etonia* survival .

1.5 Inform State and County agencies and St. Johns River Water Management District of the existence and locations of *C. etonia* populations and encourage the use of beneficial management practices to allow the survival of roadside plants.

2. Survey for additional natural populations in the vicinity of Etonia Creek. Scrub habitat in other areas, particularly public land, should also be searched.

3. Continue propagation of *Conradina etonia* plants already in cultivation, which may be the only survivors of development of their natural habitat. Propagation should be continued at several locations to prevent extinction of the species due to disease or other disaster at any one propagation site.

4. Determine life history characteristics and requirements for reproduction. *Conradina etonia* plants in the two known cultivated populations are thriving (R. McCartney, pers. comm., T. Race, pers. comm.). However, little is known about requirements for this species under natural conditions. Research should include studies of plants in natural settings, if possible, to determine life history (reproductive biology, seed viability, seedling establishment), habitat characteristics (soil types, drainage, soil microbe associations, light and shade, degree of tolerance of disturbance), and climatic influences.

5. Locate potential (re)introduction sites on protected lands, including public land and conservation easements on private land. Since the plant prefers open and somewhat disturbed areas and grows well on the roadside where it was initially found (T. Race, pers. comm.), highway rights-of-way should be considered for (re)introduction sites.

6. (Re)introduce plants to protected sites using plants under cultivation and/or plants from any existing natural populations.

C. REFERENCES

- Florida Department of Environmental Protection, Division of State Lands. 1994. Conservation and recreation lands annual report. 418 pp.
- Gray, T. C. 1965. A monograph of the genus *Conradina* A. Gray (Labiatae). Unpublished Ph.D. thesis, Vanderbilt University. 189 pp.
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- U.S. Fish and Wildlife Service. 1991. Endangered and threatened wildlife and plants; *Conradina verticillata* (Cumberland rosemary) determined to be threatened. Fed. Reg. 56:60937-60941.
- U.S. Fish and Wildlife Service. 1993. Endangered and threatened wildlife and plants; endangered or threatened status for five Florida plants. Fed. Reg. 58:37432-37443.

PART III. IMPLEMENTATION SCHEDULE

The Implementation Schedule outlines actions and estimated costs for the recovery program. It is a guide for meeting the objectives discussed in Part II of this Plan. This Schedule indicates task priorities, task numbers, task descriptions, duration of tasks, the responsible agencies, and lastly, estimated costs. These actions, when accomplished, should bring about the recovery of *Conradina etonia* and protect its habitat. It should be noted that not all monetary needs for all parties involved in recovery are identified and, therefore, Part III reflects only the estimated financial requirements for the recovery of this species.

While the U.S. Fish and Wildlife Service has no power to require other Federal and State Agencies to carry out specific actions for endangered species recovery, we believe the designated agencies have the necessary authority to carry out the identified tasks. The Implementation Schedule serves to alert those agencies to the need for these actions and to justify seeking funds to carry out the actions.

Priorities in Column 1 of the following Implementation Schedule are assigned as follows:

- Priority 1 - An action that must be taken to prevent extinction or to prevent the species from declining irreversibly in the foreseeable future.
- Priority 2 - An action that must be taken to prevent a significant decline in species population/habitat quality or some other significant negative impact short of extinction.
- Priority 3 - All other actions necessary to provide for full recovery of the species.

NOTE: Each task in the Implementation Schedule is assigned a priority number. While the number reflects the importance of the activity, it does not mean that the highest-priority tasks will necessarily be accomplished first.

Abbreviations in the Implementation Schedule:

Bok	Bok Tower Gardens Endangered Plant Program
CARL	Conservation and Recreation Lands Program (State of Florida)
FDACS	Florida Department of Agriculture and Consumer Services, Division of Forestry
FDOT	Florida Department of Transportation
FNAI	Florida Natural Areas Inventory
FS	U.S. Forest Service, National Forests in Florida
FWS	U.S. Fish and Wildlife Service
PC	Putnam County
TNC	The Nature Conservancy
Univ	Universities
WI	Woodlanders, Inc., Aiken, SC

IMPLEMENTATION SCHEDULE

Priority	Task Number	Task Description	Task Duration	Responsible Agency	Cost estimates (\$000)					Comments
					FY 1	FY 2	FY 3	FY 4	FY 5	
1	1.1	Protect existing populations on private land through conservation easements and landowner agreements.	ongoing	FWS, TNC	2	2	2	2	2	Actual costs of acquiring land by purchase or protecting it through conservation easements is <u>not</u> included here.
1	1.2	Purchase and manage land having natural populations or potential for reintroduction.	2 years	CARL						
1	1.3	Protect existing roadside plants.	ongoing	FDOT, PC	3	3	3	3	3	
1	1.4	Map and monitor natural populations.	ongoing	FWS, Univ.	5	3	3	3	3	
1	1.5	Inform State and County agencies.	ongoing	FWS						
2	2	Survey for additional natural populations.	3 years	FNAI, FWS	2	2	2	2	2	
2	3	Continue propagation.	ongoing	Bok, WI	2	2	2	2	2	
2	4	Determine habitat requirements, life history, and requirements for reproduction.	3 years	FWS, TNC, Bok, WI, Univ.	9	9	9			
3	5	Locate potential (re)introduction sites.	2 years	FS, FWS, FNAI, TNC, FDACS	5	5				
3	6	(Re)introduce plants to protected sites.	3-5 years	FS, FWS, FDACS	5	5	5	5	5	

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