
DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

Endangered and Threatened Wildlife and Plants; Determination of Endangered or Threatened Status for Seven Florida Scrub Plants

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Final rule.

SUMMARY: The Service determines endangered status pursuant to the Endangered Species Act of 1973 (Act), as amended, for the following six plants: *Chionanthus pygmaeus* (pygmy fringe tree), *Eryngium cuneifolium* (snakeroot), *Hypericum cumulicola* (Highlands scrub hypericum), *Polygonella basiramia* (wireweed), *Prunus geniculata* (scrub plum), and *Warea carteri* (Carter's mustard). Threatened status is determined for *Paronychia chartacea* (papery whitlow-wort). These seven species are restricted to sand pine-evergreen oak scrub vegetation in south-central peninsular Florida. All known populations of these plants are on private or State owned land. These species are endangered or threatened primarily by development of their habitat for agricultural and residential purposes. This rule will implement the Federal protection and recovery provisions afforded by the Act for these plants.

EFFECTIVE DATE: February 20, 1987.

ADDRESSES: The complete file for this rule is available for inspection, by appointment, during normal business hours at the Endangered Species Field Station, U.S. Fish and Wildlife Service, 2747 Art Museum Drive, Jacksonville, Florida 32207.

FOR FURTHER INFORMATION CONTACT: David J. Wesley, Endangered Species Field Supervisor, at the above address (904/791-2580 or FTS 946-2580).

SUPPLEMENTARY INFORMATION:

Background

Sand pine scrub vegetation (locally called "scrub") consisting of sand pine (*Pinus clausa*) with shrubby evergreen oaks is restricted to Florida, where it is widespread, and the Gulf coast of Alabama. Southeastern Georgia has

evergreen oak scrub without sand pine (Wharton 1978). The major evergreen scrub oaks are myrtle oak (*Quercus myrtifolia*), Chapman oak (*Quercus chapmanii*) and sand live oak (*Quercus geminata*). Scrub, one of the most distinctive natural communities of Florida, is found along the coasts and on sand ridges in the interior of the Florida peninsula. Scrub often occupies ancient sand dunes (White 1958), but it also occurs on dry sand soils where scrub mingles with sandhills vegetation consisting of longleaf pine (*Pinus palustris*), turkey oak (*Quercus laevis*), and wiregrass (*Aristida stricta*) (Meyers 1985).

A number of plants and animals are endemic to (restricted to) these scrub communities. Animals of the scrub include Florida scrub jay (*Aphelocoma coerulescens coerulescens*), which is a Federal threatened species; blue-tailed mole skink (*Eumeces egregius lividus*); sand skink (*Neoseps reynoldsi*); and Florida scrub lizard (*Scleroporos woodi*). The two skinks are being proposed for listing elsewhere in today's Federal Register, and the lizard is a candidate for Federal listing. The following endemic plants of Florida scrub vegetation are already listed or proposed for listing under provisions of the Act: *Chrysopsis floridana*, *Dicerandra cornutissima*, *Dicerandra frutescens*, *Dicerandra immaculata*, *Lupinus aridorum*, *Bonamia grandiflora* and *Asimina tetramera*. Other scrub plants are candidates for listing, including *Polygonella macrophylla* in the Florida panhandle, and *Liatris ohllingeriae* in central Florida.

The southernmost interior scrubs are on the Lake Wales Ridge in Polk and Highlands Counties, an area that includes the cities of Lake Wales, Avon Park, Sebring, and Lake Placid, and extends as far south as the small town of Venus. The scrub vegetation of these counties is distinctive for having relatively little sand pine (Abrahamson *et al.* 1984), and for its rich endemic flora (Ward 1979b), including four endemic shrubs: the very abundant shrubby evergreen inopina oak (*Quercus inopina*), *Chionanthus pygmaeus*, *Prunus geniculata*, and the apparently extinct *Ziziphus celata* (Judd and Hall 1984). The other endemic scrub plants are perennial or annual herbs. Highlands County has more scrub endemics than Polk, but in both counties, the scrub vegetation is varied, and some sites have more endemic species present than others. In Highlands County, some scrub sites have four or five of the endemic plants

listed in this rule, while others have none (Stout 1982).

Sand pine scrub burns infrequently, roughly every 30–80 years, but the fires are intense. Most of the shrubs renew themselves from root sprouts, like shrubs in Southeastern pocosins (evergreen shrub bogs) or California chaparral. Sand pine and rosemary (*Ceratiola ericoides*) reoccupy burned scrub only by seed. Rosemary seedlings typically appear 3 years after a fire (Abrahamson *et al.* 1984); mature rosemary approaches senescence at an age of 30–35 years (Johnson 1982). Rosemary is characteristic of early vegetation development in scrub. It and some other shrubs release toxic chemicals into the soil that inhibit or prevent the growth of most other plants, resulting in areas of relatively bare, open sand between the shrubs. A few annual and perennial herbs tolerate the toxic chemicals and inhabit the otherwise bare sand, including five species from the present rule: *Eryngium cuneifolium*, *Hypericum cumulicola*, *Paronychia chartacea*, *Polygonella basiramia*, and *Warea carteri*. *Liatris ohllingeriae* and *Calamintha ashei*, candidates for Federal listing, are also typical of this habitat. The bare sand areas are transitory habitats; unless renewed by fire or brush removal, they disappear after 20–30 years (Richardson 1985). The herbs that inhabit the open sand form large populations, but these populations die out unless the habitat is renewed; thus these herbaceous species, like rosemary, are characteristic of early vegetation development in scrub, and are often absent from later stages.

Six biological preserves and one Federal installation in Polk and Highlands Counties contain sand pine scrub vegetation. Avon Park Air Force Range (U.S. Air Force) in Polk County has small tracts of scrub, but lacks the plant species listed in the present rule (Wunderlin *et al.* 1982). The Lake Arbuckle Wildlife Management Area (Florida Game and Fresh Water Fish Commission) and Lake Arbuckle State Park, contiguous to each other and to the Avon Park Air Force Range, contain large tracts of scrub that have not been fully inventoried for candidate scrub plants. The Nature Conservancy acquired 31 hectares (77 acres) in the Saddle Blanket Lake area in December 1985; and the State of Florida has begun the process of acquiring an additional 283 hectares (700 acres) through its Conservation and Recreation Lands Program. In Highlands County are Highlands Hammock State Park and the privately owned Archbold Biological Station. Archbold, the richest of the

preserves in terms of endemic plant species, has been thoroughly studied. The vegetation patterns found there are not necessarily typical of the entire Lake Wales Ridge. Abrahamson *et al.* (1984) distinguish two kinds of sand pine scrub at Archbold. The first, with an understory of myrtle oak and scrub hickory (*Carya floridana*), is primarily located on the slopes of a hill, occupying 143 hectares (353 acres). The scrub mint *Dicerandra frutescens* (Federally listed as endangered) is found here. The second, with an understory of rosemary, is located on several patches of dry sand, each no larger than 1 hectare (2.5 acres) and totaling 36 hectares (89 acres), surrounded by scrubby flatwood (a vegetation of inopina oak with occasional sand pine or slash pine trees), flatwoods, and flatwood ponds. Rosemary scrub is the home of *Eryngium cuneifolium*, *Hypericum cumulicola*, *Paronychia chartacea*, *Polygonella basiramia*, and *Warea carteri* (which also occupies scrubby flatwoods and flatwoods).

Biological data pertaining to the seven species listed herein follow:

Chionanthus pygmaeus (pygmy fringe tree) was first collected by G.V. Nash in 1894 near Eustis, Lake County, Florida. It was later collected and described by John K. Small (1924) from "ancient sand-dunes between Avon Park and Sebring" in Highlands County. The plant may represent a subspecies of *Chionanthus virginicus*, the fringe tree (R. Currie, U.S. Fish and Wildlife Service, pers. comm. 1985). It is a shrub of the olive family (Oleaceae), typically less than 1 meter tall (3 feet), with the stems rising from branches buried by blowing sand, but sometimes reaching 2–4 meters (6–13 feet). The leaves are deciduous, opposite, and entire-margined. The flowers are borne in showy panicles in late March. The corolla lobes (fused petals) are four in number, linear, white, and roughly 1 centimeter (0.4 inch) long, as opposed to 2–3 centimeters (0.8–1.2 inch) long in *Chionanthus virginicus*. The fruits are purple drupes, 2.0–2.5 centimeters (0.8–1.0 inch) long versus 1.0–1.5 centimeters (0.4–0.6 inch) long in *Chionanthus virginicus* (Kral 1983, Ward and Godfrey 1978, Wunderlin 1982, Wunderlin *et al.* 1980a). *Chionanthus pygmaeus* is restricted to sand pine scrub vegetation. It is known from west of Lake Apopka, Lake County; northwestern Osceola County; and the Lake Wales Ridge in Polk and Highlands Counties, including the Saddle Blanket Lakes scrub (R. Mulholland, Florida Dept. of Natural Resources, pers. comm., 1986) and Highlands Hammock State Park according to the Florida Natural

Areas Inventory (Florida Department of Natural Resources). A reported population of *Chionanthus pygmaeus* in Hillsborough County was probably *Chionanthus virginicus*, but has been extirpated (R. Currie, pers. comm., 1985). *Chionanthus pygmaeus* may be present at Fort Cooper State Park south of Inverness, Citrus County (Florida Natural Areas Inventory), but the report has not been verified.

Eryngium cuneifolium (snakeroot), a member of the parsley family (Apiaceae or Umbelliferae), was first collected in 1927 near Sebring, Highlands County, by John K. Small, who subsequently described the plant as a new species (Small 1933). Bell (1963) maintained the plant as a distinct species. It is an erect perennial herb with a long, woody taproot and usually several erect, branching stems, 0.2–0.5 meter (0.6–1.5 feet), rarely to 0.9 meter (3 feet) tall. The leaves are clustered at the base of the plant. The basal leaves are long-stalked and shaped like narrow wedges, with 3–5 bristle-tipped teeth at the apex. Stem leaves are smaller and lack leaf stalks. The flowers are small, greenish-white when first opening, turning powder blue. The flowers and bristly bracts form small heads 4–8 millimeters (0.15–0.3 inches) in diameter. The fruit is top-shaped, scaly, and 1.5–2.0 millimeters (0.06–0.08 inch) long. The plants flower from August to October. *Eryngium cuneifolium* is most similar to *Eryngium aromaticum* (Wunderlin *et al.* 1981b). The known populations of *Eryngium cuneifolium* are in an area about 16 kilometers (10 miles) long, from the west side of Lake Placid south to near Venus. Johnson (1981) reports outlying populations in Collier and Putnam Counties.

Hypericum cumulicola (Highlands scrub hypericum), a member of the St. John's wort family (Hypericaceae), was described from specimens collected on the Lake Wales Ridge between Avon Park and Sebring by John K. Small (1924), who created a new genus for this plant, *Sanidophyllum*. Subsequently, Adams (1962) transferred *Sanidophyllum* to *Hypericum*, a genus with many species in the Southeastern Coastal Plain. *Hypericum cumulicola* is a wiry herbaceous to slightly woody perennial about 0.6 meter (2 feet) tall. Several erect stems, branched near their tops, grow from a taproot. New shoots form in September and overwinter. The stems bear widely-spaced pairs of small, needlelike leaves 0.5 centimeter (0.2 inch) long. The small, numerous flowers are arranged in the upper forks and toward the tips of the stems. Each flower has five separate, obovate, bright yellow petals. The petals are asymmetrical, like the blades of a

window fan. The stamens are numerous. A red to brown capsule produces many minute seeds. Flowering and fruiting occur from June through early November (Judd 1980). *Hypericum cumulicola* shares patches of sunny, relatively barren sand within the scrub with *Cladonia* lichens (reindeer moss) and with other endemic herbs, especially *Eryngium cuneifolium*. *Hypericum cumulicola* benefits from fire in its environment (Johnson 1981). The plant is endemic to the sand pine-evergreen oak scrub and rosemary scrub vegetation in the southern Lake Wales Ridge in Highlands and Polk Counties, Florida, from Frostproof and Lake Arbuckle south to Venus, where it occurs at the Archbold Biological Station (Judd 1980). Also, it occurs at Saddle Blanket Lakes.

Paronychia chartacea (papery whitlow-wort), a member of the pink family (Caryophyllaceae), was first collected by John K. Small, in the scrub between Avon Park and Sebring. Small (1925) created a new genus to accommodate the plant, which he named *Nyachia pulvinata*. Subsequent workers transferred this species into the large genus *Paronychia*; the name *Paronychia pulvinata*, however, was preoccupied, so Fernald (1936) renamed the plant *Paronychia chartacea*. Ward (1977) recognized *P. chartacea* as one of seven species of *Paronychia* in Florida. It is an annual, 3–10 centimeters (1–4 inches) tall forming bright green low round mats of many branches radiating from a taproot. The stems fork repeatedly. Leaves are opposite, scalelike, rarely longer than 3 millimeters (0.12 inch). The small, white, numerous flowers are solitary or in clusters of 3. They have 5 sepals, each less than 1 millimeter (0.04 inch) long, and no petals (Kral 1983, Wunderlin *et al.* 1981a). Flowering is in summer (Wunderlin 1982). *Paronychia chartacea* is a small plant, but it is easily distinguished from other members of its genus by its mat-forming habit, scalelike leaves, and tiny flowers. It is endemic to the interior scrub in Lake County (where it is known from only one specimen and where its current status is unknown), in Orange County (at least two sites), and in Polk and Highlands Counties, where it is present at Archbold Biological Station (Wunderlin *et al.* 1981a), at the Arbuckle Lake Wildlife Management Area (Florida Natural Areas Inventory), and at Saddle Blanket Lakes (R. Mulholland, pers. comm.). It is found only on bare sand in scrub vegetation, nearly always with inopina oak and rosemary (Stout 1982). *Paronychia chartacea* benefits from limited disturbance that creates bare sand, and it can form large local populations. However, the plant does not persist in

areas that are converted to citrus groves or homes.

Polygonella basiramia (wireweed), a member of the buckwheat family (Polygonaceae), was first collected east of Lake Josephine in Highlands County by John K. Small in 1920. Small (1924) named the plant *Delopyrum basiramia*. Horton (1963) included *Delopyrum* in the genus *Polygonella* and made *Delopyrum basiramia* a variety of *Polygonella ciliata*, a species from the Tampa Bay area and the Florida east coast from Brevard County southward. Horton examined only four mature plants of *Polygonella ciliata* var. *basiramia*. Nesom and Bates (1984), working with more specimens, concluded that var. *basiramia* deserved recognition as a full species, and published the name *Polygonella basiramia*. The plant is a taprooted annual with its stems branched at or slightly below ground level, forming a cluster of 7 to more than 30 erect, slender branches of nearly equal height (Nesom and Bates 1984). The stems are up to 0.8 meter (2.5 feet) tall; the hairlike leaves are no more than 2 centimeters (0.8 inch) long. Branches of the main stems are tipped by short clusters of small white flowers. The plant blooms in fall and fruits in late fall and winter (Wunderlin *et al.* 1980b), and is conspicuous only when in bloom. *Polygonella basiramia* is endemic to sand pine scrub on the southern Lake Wales Ridge in Polk and Highlands Counties, Florida. Its geographic range extends from the northwest side of Crooked Lake (5 miles south of Lake Wales) and from the west side of Lake Weohyakapka south to the southern end of the Ridge near Archbold Biological Station. *Polygonella basiramia* grows on areas of bare sand within sand pine and rosemary scrub (Johnson 1981, Stout 1982).

Prunus geniculata (scrub plum) was named by Roland Harper in 1911 from plants he found in the high sandy hills of Lake County, Florida, just west of Lake Apopka. It is a member of the rose family (Rosaceae). *Prunus geniculata* is a scraggly, heavily branched shrub up to 2 meters (6 feet) tall. The twigs are strongly zigzag, with spiny lateral branches. The deciduous leaves have stipules and fine teeth. The white flowers are five-petaled, about 1.0–1.3 centimeter (0.4–0.6 inch) in diameter. The fruit is a bitter, dull reddish plum, 1.2–2.5 centimeter (0.4–1.0 inch) long (Kral 1983). Flowering is in winter (Wunderlin 1982). Scrub plum is native to two areas in central Florida:

- (1) Lake County between Lake Apopka and Clermont, in longleaf pine-turkey oak vegetation; and
- (2) Polk and Highlands Counties from Lake Wales south to Highway 27 near

Venus in scrub on the Lake Wales Ridge (Johnson 1981, Stout 1982). It is known from the Pine Ridge Nature Reserve of Bok Tower Gardens near Lake Wales (J. Shaw, President, Bok Tower Gardens, pers. comm. 1986), from Saddle Blanket Lakes in Polk County (R. Mulholland, pers. comm. 1986) and from the Nature Conservancy's Tiger Creek Preserve in Polk County, where Gary Schultz saw one plant in 1983 (D. Hardin, Florida Natural Areas Inventory, pers. comm., 1986). The plum is often found on roadcuts and fire lanes, which indicates that it benefits from moderate disturbance that removes other shrubs.

Warea carteri (Carter's mustard) was named by John K. Small in 1909 from a specimen collected near Miami in 1903. The plant is an unbranched annual 0.2–1.0 meters (0.6–3.0 feet) tall with simple, alternate leaves up to 1 centimeter (0.4 inch) long, gradually diminishing in size upward on the stem, becoming small bracts toward the top of the stem. The stem is topped by a raceme of white, four-petaled flowers. The fruits are seed pods 4–6 centimeters (1.6–2.4 inches) long, mounted on slender stalks up to 1.5 centimeter (0.6 inch) long (Kral 1983). *Warea* is a member of the mustard family (Cruciferae or Brassicaceae), but is of taxonomic interest because it resembles *Cleome* and *Polanisia* of the caper family (Capparidaceae). Over a dozen herbarium collections of *Warea carteri* were made in Dade County from 1878 to 1934, mostly from rock pinelands, but also from scrub. Careful searches have failed to relocate this plant in the remaining fragments of Dade County pineland and it appears to have been extirpated. From 1922 to 1967, *Warea carteri* was collected from scrub in Polk and Highlands Counties (Nauman 1980). The plant was also reported from Liberty County, Florida (a possible misidentification), and from Brevard County (Kral 1983). Gary Schultz, in a 1983 floristic inventory of scrub for the Florida Natural Areas Inventory in Highlands and Polk Counties, found *Warea carteri* near Lake Josephine in Highlands County. The site is now being developed (D. Hardin, pers. comm., 1986). Currently, despite recent floristic inventories by Schultz, Johnson (1981), and Stout (1982), *Warea carteri* is known only from two privately owned sites in northeastern Polk County, one site northeast of Sebring in Highlands County (N. Bissett, pers. comm. 1986), and a small area at the Archbold Biological Station, in scrub, scrubby flatwoods, and flatwoods, where it is associated with *Ceratiola ericoides*, *Calamintha ashei*,

Eryngium cuneifolium, *Hypericum cumulicola*, and *Paronychia chartacea*.

Federal Government actions on these plants began as a result of Section 12 of the Endangered Species Act of 1973, which directed the Secretary of the Smithsonian Institution to prepare a report on plants considered to be endangered, threatened, or extinct. This report, designated as House Document No. 94–51, was presented to Congress on January 9, 1975. In the report, *Hypericum cumulicola*, *Paronychia chartacea*, *Polygonella ciliata* var. *basiramia*, *Prunus geniculata*, and *Warea carteri* were listed as endangered; *Chionanthus pygmaeus* and *Eryngium cuneifolium* were listed as threatened. On July 1, 1975 (40 FR 27823), the Service published a notice in the **Federal Register** that accepted the report of the Smithsonian Institution as a petition within the context of section 4(c)(2) [now section 4(b)(3)] of the Act, and of its intention thereby to review the status of the plant taxa named within. The above seven taxa were included in the notice. On June 16, 1976, the Service published a proposed rule in the **Federal Register** (41 FR 24523) to determine approximately 1,700 vascular plant species to be endangered species pursuant to section 4 of the Act. The list of 1,700 plant taxa was assembled on the basis of comments and data received by the Smithsonian Institution and the Service in response to House Document No. 94–51 and the July 1, 1975, **Federal Register** publication. *Hypericum cumulicola*, *Paronychia chartacea*, *Polygonella ciliata* var. *basiramia*, and *Prunus geniculata* were included in the proposed rule. General comments received in relation to the 1976 proposal were summarized in an April 26, 1978, **Federal Register** publication, which also determined 13 plant species to be endangered or threatened (43 FR 17909). On December 10, 1979, the Service published a notice of withdrawal of that portion of the June 16, 1976, proposal that had expired, along with four other proposals that had expired due to a procedural requirement of the 1978 Amendments. On December 15, 1980, the Service published a revised notice of review for native plants in the **Federal Register** (45 FR 82480); *Chionanthus pygmaeus*, *Eryngium cuneifolium*, *Hypericum cumulicola*, *Paronychia chartacea*, *Polygonella ciliata* var. *basiramia*, *Prunus geniculata*, and *Warea carteri* were included as Category 1 species (species for which data in the Service's possession indicate listing is warranted). On November 28, 1983, the Service published in the **Federal Register** (48 FR 53640) a

supplement to the 1980 notice of review. This supplement treated *Paronychia chartacea* as a Category 2 species (species for which data in the Service's possession indicate listing is probably appropriate, but for which additional biological information is needed to support a proposed rule). Subsequent field work by Gary Schultz for the Florida Natural Areas Inventory supported the proposal of *Paronychia chartacea* as a threatened species. The proposal to list the six other species as endangered was based on the extensive field work that has been carried out since the Smithsonian Institution report of 1975 by Schultz and others (Johnson 1981, Judd 1980, Nauman 1980, Stout 1982, Wunderlin *et al.* 1980a, 1980b, 1981b). All seven species were included in Category 1 in the September 27, 1985, revised notice of review for plants (50 FR 39526).

Section 4(b)(3)(B) of the Act, as amended in 1982, requires the Secretary to make findings on certain pending petitions within 12 months of their receipt. Section 2(b)(1) of the 1982 amendments further requires that all petitions pending on October 13, 1982, be treated as having been newly submitted on that date. This was the case for all seven of the interior scrub plants because the 1975 Smithsonian report had been accepted as a petition. On October 13, 1983, October 12, 1984, and October 13, 1985, the Service found that the petitioned listing of these seven species was warranted, and that, although pending proposals had precluded their proposal, expeditious progress was being made to list other species. The proposed rule to list the seven Florida scrub plants as endangered and threatened species was published in the **Federal Register** (51 FR 12444) on April 10, 1986. That proposal constituted the next 1-year finding required on or before October 13, 1986.

Summary of Comments and Recommendations

In the April 10, 1986, proposed rule (51 FR 12444) and associated notifications, all interested parties were requested to submit factual reports or information that might contribute to the development of a final rule. Appropriate State agencies, county governments, Federal agencies, scientific organizations, and other interested parties were contacted and requested to comment. Newspaper notices that invited general public comment were published in the *Leesburg Commercial* (May 8), *Naples Daily News* (May 5), the *News Chief*, Winter Haven (May 3), *Kissimmee News-Gazette* (May 8), *Palatka Daily*

News (May 2), *The Orlando Sentinel* (May 4), and *The Sebring News-Sun* (May 4). Five written comments were received on the proposal and are discussed below.

The Florida Game and Fresh Water Fish Commission and the President of Bok Tower Gardens/The American Foundation, Inc. supported the listing proposal as published. The district biologist for the Florida Department of Natural Resources, Division of Recreation and Parks provided an additional locality for *Chionanthus pygmaeus*, *Hypericum cumulicola*, *Paronychia chartacea*, and *Prunus geniculata*. This locality has been included in the present rule. The botanist for the Florida Natural Areas Inventory commented that data in the Inventory's data base "fully support" the listing proposal; additional localities for *Warea carteri* and *Prunus geniculata* were provided, which have been incorporated into the present rule. A commercial native plant grower from Winter Haven supported the listing proposal, provided three new localities for *Warea carteri* (which have been incorporated herein), and noted that at least one private landowner was bulldozing scrub vegetation for fear that endangered plants on his land might prevent development. The Act does not affect land development, except through section 7 which applies only to Federal activities, nor does the Act prohibit removal of plants from private lands; the Service makes every effort to work cooperatively with private owners to insure protection of candidate and listed plants. In Florida, the Service is working with State government agencies, Regional planning councils, and County governments to address protection of plants on private lands. Unfortunately, in the case of the *Warea* the site was reported totally destroyed.

Summary of Factors Affecting the Species

After a thorough review and consideration of all information available, the Service has determined that the seven Florida scrub plants should be classified as endangered or threatened species. Procedures found at section 4(a)(1) of the Endangered Species Act (16 U.S.C. 1531 *et seq.*) and regulations (50 CFR Part 424) promulgated to implement the listing provisions of the Act were followed. A species may be determined to be an endangered or threatened species due to one or more of the five factors described in section 4(a)(1). These factors and their application to *Chionanthus pygmaeus* Small (pygmy fringe tree); *Eryngium cuneifolium* Small

(snakeroot); *Hypericum cumulicola* (Small) P. Adams (= *Sanidophyllum cumulicola* Small) (Highlands scrub hypericum); *Paronychia chartacea* Fernald (= *Nyachia pulvinata* Small) (papery whitlow-wort); *Polygonella basiramia* (Small) Nesom & Bates (= *Delopyrum basiramia* Small, = *Polygonella ciliata* Meisn. var. *basiramia* (Small) Horton) (wireweed); *Prunus geniculata* Harper (scrub plum); and *Warea carteri* Small (Carter's mustard) are as follows:

A. The Present or Threatened Destruction, Modification, or Curtailment of Their Habitat or Range

Five of the seven species are restricted to sand pine scrub vegetation. *Prunus geniculata* and *Chionanthus pygmaeus* also occur in longleaf pine-turkey oak vegetation in a limited area west of Lake Apopka in Lake County. Destruction of habitat is the principal threat to all seven species herein listed as endangered or threatened.

A large portion of the interior scrub plants' habitat has been converted from sand pine scrub to citrus groves. Lake and Polk Counties are the leading citrus producers in Florida, and Highlands County is an important producer (Fernald 1981). In Lake County, essentially all of the original habitat of *Chionanthus pygmaeus* and *Prunus geniculata* has been converted to citrus groves. In Polk and Highlands Counties, housing development is concentrated on the Lake Wales Ridge along U.S. Highway 27. Many subdivisions laid out from 1952 to 1972 are evident on photorevised topographic maps published by the U.S. Geological Survey. The Ridge features well-drained soils, attractive hills, and numerous lakes. In Highlands County, 64.2 percent of the xeric vegetation (scrub, scrubby flatwoods, and southern ridge sandhills) present before settlement was destroyed by 1981. An additional 10.3 percent of the xeric vegetation was moderately disturbed, primarily by building roads to create housing subdivisions (Peroni and Abrahamson 1985). Remaining tracts of scrub in Highlands County are rapidly being developed for citrus groves and housing developments (Fred Lohrer, Archbold Biological Station, pers. comm. 1985). The situation is similar in Polk County. Many of the remaining stands of scrub are vacant lots, patches of land isolated by railroad tracks, or other fragments of the original vegetation that have escaped development. Few large tracts are left. Since not all scrub vegetation, even in Highlands County, contains the endemic plants, the remaining stands of scrub with the endemics are very limited in extent.

Chionanthus pygmaeus is known from roughly 20 sites, most apparently consisting of only a few plants (because multiple above-ground shoots grow from buried stems, the number of genetically distinct individuals is unknown). Six sites are on the Lake Wales Ridge in Polk County, nine sites in Highlands County, and the remaining sites in Lake and Osceola Counties. Only the plants at Highlands Hammock State Park and The Nature Conservancy's Saddle Blanket Lake tract are protected. *Chionanthus pygmaeus* tends to occur with *Prunus geniculata*, but not with the endemic scrub herbs.

Eryngium cuneifolium has a very narrow geographic distribution in an area 16 kilometers (10 miles) long in Highlands County. It occurs at 11 localities in the Placid Lakes subdivision, Archbold Biological Station, an area east of Archbold, and two outlying localities, one at Interlachen in Putnam County, and the other north of Naples in Collier County (Johnson 1981). The small number of localities, combined with this species' requirement for nearly barren sand, renders the plant very vulnerable to further habitat loss. Only the sites at Archbold are protected.

Hypericum cumulicola is known historically from 36 sites, 11 of them confirmed in 1983 by the Florida Natural Areas Inventory. This plant occurs at the same sites, and in the same habitat as *Eryngium cuneifolium* in southern Highlands County. All but four sites (at Archbold Biological Station, Saddle Blanket Lake, and Lake Arbuckle) are vulnerable to development; many are on vacant lots or in small remnant patches of scrub vegetation.

Polygonella basiramia shares the same habitat of bare sand as the herbs discussed above. The total known number of sites is only 21. Protected sites exist at Highlands Hammock State Park and Archbold Biological Station.

Prunus geniculata is native to two areas in central Florida. One area, in central Lake County, has now been converted almost entirely to citrus groves. The other area, in Polk and Highlands Counties, has largely been developed (see "Background" section). Roughly 36 localities have been reported, four of them in Lake County (Johnson 1981, Stout 1982). The plant is protected only at the Pine Ridge Nature Reserve of Bok Tower Gardens and at the Nature Conservancy's Tiger Creek and Saddle Blanket Lakes Preserves.

Warea carteri is presently known from four sites in Highlands and Polk counties. Only one, at Archbold Biological Station, is protected. Nearly

all of its former habitat in Dade County has been destroyed.

Paronychia chartacea has a larger geographical range than the other species, and is known from 46 sites according to the Florida Natural Areas Inventory. This plant is restricted to scrub with bare sand and is threatened by the rapid destruction of this habitat.

B. Overutilization for Commercial, Recreational, Scientific, or Educational Purposes

Chionanthus pygmaeus and *Prunus geniculata* are vulnerable to taking due to their horticultural potential as ornamentals; *Chionanthus pygmaeus* is already in cultivation (F. Lohrer, Archbold Biological Station, pers. comm. 1985) and is offered for sale by at least two nurseries. The closely related *Chionanthus virginicus* and *Prunus angustifolia* (chickasaw plum) are used as ornamentals. Collecting or vandalism could threaten the other five species as well if publicity increases.

C. Disease or Predation

Not applicable.

D. The Inadequacy of Existing Regulatory Mechanisms

Chionanthus pygmaeus, *Hypericum cumulicola*, and *Warea carteri* are listed as endangered under the Preservation of the Native Flora of Florida Law, section 581.185 of the Florida Statutes. The other species in this proposal are not protected by the State law at the present time. The Florida law regulates taking, transport, and the sale of plants, but it does not provide habitat protection. *Chionanthus pygmaeus*, *Hypericum cumulicola*, and *Prunus geniculata* were listed as endangered by the Florida Committee on Rare and Endangered Plants and Animals (Ward 1979a), but this listing confers no protection under the law.

Several of these species are protected where they grow in the privately-owned Archbold Biological Station, in Highlands Hammock State Park, in the Tiger Creek and Saddle Blanket Lakes Preserves owned by The Nature Conservancy, in the new State Park and Wildlife Management Area at Lake Arbuckle, and in a nature reserve at Bok Tower Gardens. These existing preserves, however, may not have sufficient populations of the species to assure their survival. Listing of these species under the Endangered Species Act adds Federal protection to these species.

E. Other Natural or Manmade Factors Affecting Their Continued Existence

The five herbs (*Eryngium cuneifolium*, *Hypericum cumulicola*, *Paronychia chartacea*, *Polygonella basiramia*, and *Warea carteri*) are all vulnerable to destruction by off-road vehicles that pass through the open spaces between shrubs. Trampling of the herbs by pedestrians is potentially a problem in areas set aside for scientific or educational use (Judd 1980). Restriction to specialized habitats and small geographic ranges tends to intensify any adverse effects upon the populations of any rare plant. This is certainly true for these seven species of the Florida interior scrub.

The herbs also depend on occasional fires (see "Background" section) or equivalent mechanical land disturbance to maintain their bare sand habitats. Conservation of the scrub ecosystem and its endemic plants requires adequately large areas of natural vegetation and long-term vegetation management, including prescribed fire or brush removal. Archbold Biological Station conducts prescribed burning, and similar vegetation management is expected for the Tiger Creek Preserve and the Arbuckle Lake Wildlife Management Area and State Park. The listing of these scrub plants may encourage the development and implementation of prescribed burning plans or other vegetation management.

The Service has carefully assessed the best scientific and commercial information available regarding the past, present, and future threats faced by these species in deciding to proceed with this rule final. Based on this evaluation, the preferred action is to list *Chionanthus pygmaeus*, *Eryngium cuneifolium*, *Hypericum cumulicola*, *Polygonella basiramia*, *Prunus geniculata*, and *Warea carteri* as endangered species, and to list *Paronychia chartacea* as a threatened species.

Chionanthus pygmaeus and *Prunus geniculata* have been extirpated from most of their historic ranges and presently exist in small numbers at few sites; they could become extinct in the near future as removal of scrub vegetation continues. *Eryngium cuneifolium*, *Hypericum cumulicola*, *Polygonella basiramia*, and *Warea carteri* have already lost most of their original habitat, and further habitat destruction is continuing rapidly. All of the four herbs are also endangered by vegetation change within their shared habitat. These six plants are in danger of extinction throughout all or significant portions of their ranges, and

therefore fit the Act's definition of endangered.

Paronychia chartacea has been extirpated from most of its former range and is threatened by lack of fire or other disturbances that are needed to renew the bare sand it occupies in remaining areas of scrub vegetation. However, this plant has a wider geographic range and is present at more sites than the six scrub plants listed as endangered. It is therefore likely to become an endangered species within the foreseeable future rather than being in danger of extinction. Because of this, it fits the definition of a threatened species contained in the Act.

Based on current knowledge, all other alternatives to the proposed listing of these species as endangered or threatened do not adequately reflect the biological facts and therefore have been rejected. Critical habitat is not determined for the reasons described in the next section.

Critical Habitat

Section 4(a)(3) of the Act, as amended, requires that to the maximum extent prudent and determinable, the Secretary designate critical habitat at the time a species is determined to be endangered or threatened. The Service finds that designation of critical habitat is not prudent for these species at this time. Publication of critical habitat maps in the **Federal Register** would increase the degree of threat from taking or other human activity. Designation of critical habitat for plants affects only Federal agencies. The known sites for these species are primarily on private or State land with no known Federally funded or Federally authorized activities. The major exception is State-owned highway rights-of-way. All the species herein listed, except *Warea carteri*, exist along U.S. Highway 27 and/or other roads. These occurrences are all at the edges of tracts of scrub vegetation in private ownership. The proper agencies have been notified of the plants' locations and management needs. *Chionanthus pygmaeus* and *Polygonella basiramia* occur at Highlands Hammock State Park and *Chionanthus pygmaeus* may occur at Fort Cooper State Park. Several species may be present at Arbuckle Lake State Park and the adjoining State Wildlife Management Area. The State of Florida is aware of their locations. No Federal involvement is known at these parks. Designation of critical habitat would provide no further notification benefit. *Chionanthus pygmaeus* and *Prunus geniculata* are desirable as ornamentals, and all seven species are vulnerable to vandalism and

unintentional trampling. While collecting is prohibited in the State parks and on Federal lands, these prohibitions are difficult to enforce. The Service believes that Federal involvement in the areas where these plants occur can be identified without the designation of critical habitat. Therefore, it would not be prudent to designate critical habitat for these plants at this time, since such designation can be expected to increase the degree of threat from taking or other human activity.

Available Conservation Measures

Conservation measures provided to species listed as endangered or threatened under the Endangered Species Act include recognition, recovery actions, requirements for Federal protection, and prohibitions against certain practices. Recognition through listing encourages and results in conservation actions by Federal, State, and private agencies, groups, and individuals. The Endangered Species Act provides for possible land acquisition and cooperation with the States and requires that recovery actions be carried out for all listed species. Such actions are initiated by the Service following listing. The protection required of Federal agencies and the prohibitions against taking are discussed, in part, below.

Section 7(a) of the Act, as amended, requires Federal agencies to evaluate their actions with respect to any species that is proposed or listed as endangered or threatened or with respect to its critical habitat if any is being designated. Regulations implementing this interagency cooperation provision of the Act are codified at 50 CFR Part 402 and have recently been revised (see 51 FR 19926, June 3, 1986). Section 7(a)(2) requires Federal agencies to ensure that activities they authorize, fund, or carry out are not likely to jeopardize the continued existence of a listed species or to destroy or adversely modify its critical habitat. If a Federal action may affect a listed species or its critical habitat, the responsible Federal agency must enter into formal consultation with the Service. All presently known sites for the Florida interior scrub endemic plants are on private or State-owned land with no known Federal involvement, with the following exceptions. Sites extending onto State-owned highway rights-of-way may be subject to Federal involvement if the U.S. Department of Transportation (Federal Highway Administration) should provide funds for maintenance or construction. Federal mortgage

programs may be subject to section 7 review, including those of U.S. Department of Agriculture (Farmers Home Administration), Veterans Administration, and the U.S. Department of Housing and Urban Development (Federal Housing Administration loans). The supply of electricity to new housing developments may be subject to Federal involvement through the Rural Electrification Administration. There are currently no known Federal projects that will be affected by the listing of these species.

The Act and its implementing regulations found at 50 CFR 17.61, 17.62, and 17.63 for endangered species and 17.71 and 17.72 for threatened species set forth a series of general trade prohibitions and exceptions that apply to all endangered and threatened plant species. These prohibitions, in part, make it illegal for any person subject to the jurisdiction of the United States to import or export any endangered or threatened plant, transport it in interstate or foreign commerce in the course of a commercial activity, sell or offer it for sale in interstate or foreign commerce, or remove it from areas under Federal jurisdiction and reduce it to possession. Seeds from cultivated specimens of threatened plant species are exempt from these prohibitions provided that a statement of "cultivated origin" appears on their containers. Certain exceptions can apply to agents of the Service and State conservation agencies. The Act and 50 CFR 17.62, 17.63, and 17.72 also provide for the issuance of permits to carry out otherwise prohibited activities involving endangered and threatened species under certain circumstances. It is anticipated that few trade permits would be sought or issued, except for *Chionanthus pygmaeus*, which is already cultivated as an ornamental. Requests for copies of the regulations on plants and inquiries regarding them may be addressed to the Federal Wildlife Permit Office, U.S. Fish and Wildlife Service, Washington, DC 20240 (703/235-1903 or FTS 235-1903).

National Environmental Policy Act

The Fish and Wildlife Service has determined that an Environmental Assessment, as defined under the authority of the National Environmental Policy Act of 1969, need not be prepared in connection with regulations adopted pursuant to section 4(a) of the Endangered Species Act of 1973, as amended. A notice outlining the Service's reasons for this determination

was published in the **Federal Register** on October 25, 1983 (48 FR 49244).

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Author

The primary author of this final rule is David L. Martin, Endangered Species Field Station, 2747 Art Museum Drive, Jacksonville, Florida 32207 (904/791-2580 or FTS 946-2580).

List of Subjects in 50 CFR Part 17

Endangered and threatened species, Plants (agriculture).

Regulation Promulgation

PART 17—[AMENDED]

Accordingly, Part 17, Subchapter B of Chapter I, Title 50 of the Code of Federal Regulations, is amended as set forth below:

1. The authority citation for Part 17 continues to read as follows:

Authority: Pub. L. 93-205, 87 Stat. 884; Pub. L. 94-359, 90 Stat. 911; Pub. L. 95-632, 92 Stat. 3751; Pub. L. 96-159, 93 Stat. 1225; Pub. L. 97-304, 96 Stat. 1411 (18 U.S.C. 1531 *et seq.*).

2. Amend § 17.12(h) by adding the following, in alphabetical order, to the List of Endangered and Threatened Plants:

Note.—The "When listed" number for this rule is correct as 256. The rule for the red wolf experimental population published November 19, 1986, (51 FR 41796) was not numbered but should be number 248. The seven intervening rules will also be renumbered accordingly at the next compilation of this section.

§ 17.12 Endangered and threatened plants.

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(h) * * *

Species		Historic range	Status	When listed	Critical habitat	Special rules
Scientific name	Common name					
Apaceae—Parsley family:						
<i>Eryngium cuneifolium</i>	Snakeroot	U.S.A. (FL)	E	256	NA	NA
Brassicaceae—Mustard family:						
<i>Warea carteri</i>	Carter's mustard	U.S.A. (FL)	E	256	NA	NA
Caryophyllaceae—Pink family:						
<i>Paronychia chartacea</i> (= <i>Nyschia putvinate</i>)	Papery whitlow-wort	U.S.A. (FL)	T	256	NA	NA
Hypericaceae—St. Johns-Wort family:						
<i>Hypericum cumukicola</i>	Highlands scrub hypericum	U.S.A. (FL)	E	256	NA	NA
Oleaceae—Olive family:						
<i>Chionanthus pygmaeus</i>	Pygmy fringe tree	U.S.A. (FL)	E	256	NA	NA
Polygonaceae—Buckwheat family:						
<i>Polygonella basiramia</i> (= <i>Polygonella ciliata</i> var. <i>basiramea</i>)	Wireweed	U.S.A. (FL)	E	256	NA	NA
Rosaceae—Rose family:						
<i>Prunus geniculata</i>	Scrub plum	U.S.A. (FL)	E	256	NA	NA

Dated: December 31, 1986.

P. Daniel Smith,

Acting Assistant Secretary for Fish and Wildlife and Parks.

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