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# Scrub Buckwheat

*Eriogonum longifolium* Nutt. var. *gnaphalifolium* Gandog.

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Federal Status:	Threatened (April 27,1993)
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Critical Habitat:	None Designated
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Florida Status:	Endangered
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Recovery Plan Status: Contributiion:	May 1999
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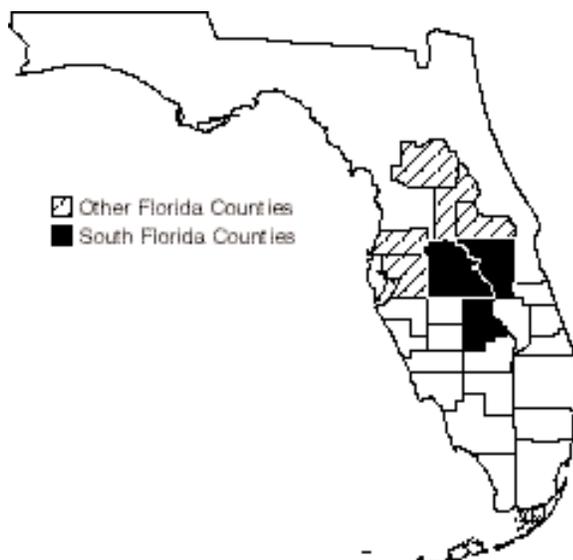
Geographic Coverage:	South Florida
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*Eriogonum longifolium* var. *gnaphalifolium* was federally listed in 1993 due to rapid loss of suitable habitat. Only about 15 percent of the original upland habitat remains; the remainder has been converted to citrus groves, pasture, and residential areas.

This account represents South Florida's contribution to the existing recovery plan for the scrub buckwheat (FWS 1996).

Figure 1. County distribution of scrub buckwheat.



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## Description

*Eriogonum longifolium* var. *gnaphalifolium* is a perennial herb. It has a taproot and one to three above-ground stems up to 1 m tall, but upwards of 10 stems have been observed in vigorous specimens, especially post-fire. It has a basal rosette of leaves that are 15 to 20 cm long, narrow, and white-woolly on the underside. The stem leaves are smaller than the rosette leaves. The stem terminates in a corymb, with each branch of the corymb ending in a cup-shaped involucre that holds a cluster of 15 to 20 small flowers, with each flower hanging on its stalk down below the involucre. The involucre is silvery, silky-pubescent, and the flowers are green with pink anthers (Rickett 1967).

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## Taxonomy

The genus *Eriogonum* includes about 150 species, most of them in western North America. Florida has only two species, both native to high pineland. *Eriogonum tomentosum* is common throughout the northern part of the state, as far south as Highlands County. The second species, scrub buckwheat, was named *Eriogonum floridanum* by J.K. Small (1903). Subsequent publications on Florida's flora consistently adopted Small's treatment of *E. floridanum* as a full species (Small 1933, Kral 1983, Ward 1979, Wunderlin 1982), but James Reveal (1968), an expert on the genus, treats the Florida plants as a variety of *Eriogonum longifolium*, a widespread species of the Great Plains that is represented east

of the Mississippi by var. *harperi* in northern Alabama, Tennessee, and Kentucky (Kral 1983), and by var. *gnaphalifolium* in Florida.

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## Distribution

*Eriogonum longifolium* occurs in Marion, Pasco, Hillsborough, Lake, and Orange counties in central Florida, and in Osceola, Highlands, and Polk counties in South Florida (Figure 1). Suitable habitat exists in Sumter County, but it is not known whether this plant occurs there. In Polk and Highlands counties, it is found on the Lake Wales Ridge as far south as Archbold Biological Station, south of Lake Placid. Most of the recent records for the species are from Polk and Highlands counties, partly because intensive biological surveys of scrub vegetation have been conducted in those counties (Christman 1988c). *Eriogonum longifolium* var. *gnaphalifolium* historically occurred in the Tampa area, assuming that a specimen cited by Gandoger (1906) as the type of “*E. longifolium* var. *floridana*” belongs to this variety.

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## Habitat

*Eriogonum longifolium* var. *gnaphalifolium* occurs in high pine and in turkey oak barrens habitats from Marion County to Highlands County (Christman 1988). The northern range limits for *E. longifolium* var. *gnaphalifolium* are in Ocala National Forest and in areas of mixed scrub and high pine south of Ocala in Marion County. Suitable habitat and possibly the plant extend south into northern Sumter County. *Eriogonum longifolium* var. *gnaphalifolium* historically occurred near Eustis in Lake County (where it was collected around the turn of the century), and it still occurs near Clermont in remnants of high pine with *Polygala lewtonii* and several other endangered plant species.

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## Reproduction

Although little information on the reproduction of this species is available, plants in the Ocala NF have been observed with immature flower stalks between April and mid-July and bloom from May to mid-October. Seedlings have been observed in a variety of substrates within a few feet of the parent plant (J. Clutts, USFS, personal communication 1998). Seedlings germinate in summer in open sand (R. Yahr, Archbold Biological Station, personal communication 1998).

Three species of Hymenoptera (wasps) have been observed visiting the flowers of this plant although additional information on pollination is not available (J. Clutts, USFS, personal communication 1998).

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## Relationship to Other Species

Relationships between plant species and their constituents may take many forms. Scrub buckwheat is foraged upon by herbivorous vertebrate species. In addition to this relationship is the relationship of this plant to the community surrounding it.

Several other endangered or threatened scrub plants occur in turkey oak scrub, notably *Chionanthus pygmaeus*, *Clitoria fragrans*, *Warea carteri*, and *Polygala lewtonii* (Christman 1992).

**Scrub buckwheat flower.**

Original photograph by Steve Shirah.



The low-intensity fires typical of high pineland are relatively easy to prescribe and conduct. The high pineland “islands” in Ocala NF show that appropriate fire management is feasible. The Ocala “islands,” apart from being important for *Eriogonum longifolium* var. *gnaphalifolium* and *Polygala lewtonii*, are occupied by endangered red-cockaded woodpeckers (*Picoides borealis*). The USFS Service plans to manage the longleaf pines so that there are enough trees old enough for woodpecker nest cavities. Woodpecker-oriented management will almost certainly benefit the entire high pineland flora, but it is important to obtain site-specific analyses of the effects of logging and other management activities, at least to determine if such management affects the ground flora.

In Ocala NF, *E. longifolium* var. *gnaphalifolium* occupies 71 areas extending through the westerly part of the forest from Fore Lake south along county Road 314 to the area between Big Bass and Nicotoon Lakes along State Road 42 at the forest’s southern boundary, an area of about 37 km from north to south and 10 km east to west (FWS 1996).

A USFS survey (Brandt 1992) and subsequent surveys in 1994 and 1995 located 976 *E. longifolium* var. *gnaphalifolium* plants in longleaf pine with wiregrass and turkey oak, 20 plants in areas where slash pine had been planted in high pineland, and 400 plants in sand pine scrub. The *E. longifolium* var. *gnaphalifolium* plants were well within stands, flowering in filtered light situations, not just along roadsides. Forest Service biologists conclude that the plant persists without regard to site preparation practices. The longleaf pine sites had some combination of mowing, single chopping, herbicide application, releasing by chain saw, prescription burning, and machine planting. Sand pine scrub was either not site-prepared or site-prepared by either single-chopping or burning, and seeded by either broadcast seeding, or row seeding. The apparent tolerance of *E. longifolium* var. *gnaphalifolium* for these various practices may be due to its woody taproot.

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## Status and Trends

The principal cause of decline of central Florida's upland plants is conversion of high pineland and scrub for agricultural purposes (principally citrus groves), and for commercial, residential, and recreational purposes. Peroni and Abrahamson (1985) used aerial photography to determine that in Highlands County, 64.2 percent of the xeric vegetation (scrub, scrubby flatwoods, and southern ridge sandhills [high pineland]) 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. This left about 9,700 ha. The situation appeared similar in Polk County. Christman (1988) prepared an estimate of habitat loss by examining a 10 percent random sample of all land sections containing scrub on the Lake Wales, Lake Henry, and Winter Haven ridges. Present-day scrub was mapped using aerial photography taken November 1984 to January 1987, supplemented by more recent site visit data, where available. His results showed that the original area of scrub was 31,000 ha and the present area of scrub is 11,100 ha. In addition to habitat loss, this species is threatened by invasive species such as cogon grass and centipede grass. Preventive measures against invasive species, such as cogon grass, are needed on preserves such as Avon Park, Carter Creek, and Avon Park Lakes. Recreational motorized off-road vehicles (all-terrain vehicles and motorcycles) in publicly owned high pinelands also have the potential to severely impact *E. longifolium* var. *gnaphalifolium* (FWS 1996).

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## Management

On the Lake Wales Ridge in South Florida, *E. longifolium* var. *gnaphalifolium* is protected at Lake Arbuckle State Preserve, the Arbuckle and Lake Walk-in-the-Water tracts of Lake Wales Ridge SF, Catfish Creek State Preserve, the Lake Apthorpe preserve, The Nature Conservancy preserve at Tiger Creek, and Archbold Biological Station. A population is also protected on the Pine Ridge nature preserve at Bok Tower Gardens. More sites will be protected as State or Federal land acquisition proceeds.

The CARL program includes the Lake Wales Ridge Ecosystem Project, which in turn includes a subset of parcels commonly known as the Warea Archipelago sites. These sites target remnant high pine habitats in the northern Lake Wales Ridge. *Eriogonum longifolium* var. *gnaphalifolium* occurs on all six sites: Sugarloaf Mountain, Ferndale Ridge, Castle Hill, Flat Lake, Schofield Sandhill, and Lake Davenport. The 49 ha Flat Lake property in Lake County is now under contract for acquisition by The Nature Conservancy. The Nature Conservancy is still attempting to negotiate a sale for the Lake Davenport property in Osceola County (R. Hilsenbeck, The Nature Conservancy, Tallahassee, personal communication 1997). Purchase of all six properties should be a high priority for recovery of the species.

Post-fire response of *E. longifolium* results in many plants in bloom the year post-fire; this species steadily declines as open space declines (E. Menges, Archbold Biological Station, personal communication 1998). The only study of *E. longifolium* var. *gnaphalifolium*'s recovery from a site-preparation burn is

from a recently-clearcut site in the Ocala NF (Carrington 1993). The resprouting plants flowered within a month of the July fire, and seedlings were observed three months later. However, a few individuals have died following hot prescribed burns (J. Clutts, USFS, personal communication 1998). There was a different response among *E. longifolium* var. *gnaphalifolium* plants in a relict longleaf pine site encroached by sand pine, after the 50-year old sand pine was logged on March 9, 1995, followed by a prescribed burn in May. The fire was fast-moving and unexpectedly intense, even jumping a plowline. Thirty *E. longifolium* var. *gnaphalifolium* plants were selected before the logging and prescribed burn. Twenty plants with live basal rosettes were relocated afterward; ten had apparently died. Of the 20 live plants, 15 flowered. There may be a correlation between pre-fire flowering and post-fire mortality or flowering. Some of the plants that died had produced four flower stalks before the fire, while plants that had produced only one flower stalk before the fire sent up an average of six stalks afterward. Possibly, plants that recently flowered heavily lacked reserves to recover from the disturbance. Partial excavation around the roots of several dead plants showed that most of them had tap roots as large as those of plants that survived the fire. Another possibility is that the abrupt change from partial shade to direct sun stressed the plants. Rainfall, or more accurately, soil moisture, may have been a factor. Rainfall in May was close to the 10-year average, but local conditions were dry, as shown by the intensity of the fire (in northern Florida, plants often suffer water stress in spring as their rapidly increasing evapotranspiration outpaces the seasonal increase in rainfall). Rainfall in the wet months of June, July, and August was higher than the 10-year average. The USFS will continue monitoring *E. longifolium* var. *gnaphalifolium* (FWS 1996).

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# Recovery for the Scrub Buckwheat

*Eriogonum longifolium* (Nutt. var. *gnaphalifolium* Gandog.)

**Recovery Objective:** DELIST the species once recovery criteria are met.

**South Florida Contribution:** STABILIZE and increase the population.

## Recovery Criteria

The South Florida recovery objective can be achieved when sites within the historic range of *E. longifolium* var. *gnaphalifolium* are adequately protected from further habitat loss, degradation, and fragmentation; when these sites are managed to maintain the scrub and sandhill communities to support *E. longifolium* var. *gnaphalifolium*; and when monitoring programs demonstrate that populations of *E. longifolium* var. *gnaphalifolium* on these sites support the appropriate numbers of self-sustaining populations, and those populations are stable throughout the historic range of the species. The recovery narrative identifies management recommendations, such as translocations, that are necessary to accomplish this objective.

## Species-level Recovery Actions

- S1. **Determine current distribution of *E. longifolium* var. *gnaphalifolium*.** A survey has not been made of the Lake Wales Ridge for this species, making defining a complete distribution in South Florida difficult.
  - S1.1. **Conduct surveys of *E. longifolium* var. *gnaphalifolium*.**
    - S1.1.1. **Conduct additional surveys in Polk, Highlands, and Osceola counties.** New locations for this species may be found.
    - S1.1.2. **Continue surveys on protected lands.** New sites for listed species may be found on protected lands.
  - S1.2. **Maintain distribution of known populations and suitable habitat in GIS database.** Use GIS to map existing populations and to assess the species' status and trends over time. The database should contain information on locations, number of individuals, population sizes, and status. This information should also be used for project review and land acquisition activities.
- S2. **Protect and enhance existing populations.** Much of the native xeric uplands on the Lake Wales Ridge and surrounding counties has been converted to agriculture or urban development. The remaining habitat is fragmented into small parcels and in many cases is isolated.

- S2.1. Protect habitat through acquisition, conservation easements, or agreements with landowners.** The Warea Archipelago is a series of small properties that are being purchased through CARL that are designed to protect *E. longifolium* var. *gnaphalifolium* and the unique community in which it lives.
- S2.2. Protect populations on public lands.**
- S2.3. Use local or regional planning to protect habitat.** Utilize available regional and county planning processes to encourage protection of suitable unoccupied and occupied habitat, both of *E. longifolium* var. *gnaphalifolium*.
- S2.4. Continue *ex situ* conservation.** *Ex situ* collections are important for preserving genetic diversity, preventing extirpation, and determining ecological characteristics and habitat management needs of species. These collections will be instrumental in the recovery of *E. longifolium* var. *gnaphalifolium*.
- S2.4.1. Conserve germ plasm.** The seed for this species is not presently in long-term storage.
- S2.4.2. Maintain *ex situ* collection.** Research ways to propagate *E. longifolium* var. *gnaphalifolium*.
- S2.5. Augment natural populations of *E. longifolium* var. *gnaphalifolium*.**
- S2.5.1. Establish a protocol for reintroduction.** Records for source plants, techniques for establishing new populations, and protocols for monitoring are needed.
- S2.5.2. Locate potential (re)introduction sites.** Survey habitat within the historic range of *E. longifolium* var. *gnaphalifolium* and identify protected lands, both public and private, that will be suitable habitat.
- S2.5.3. (Re)introduce plants to protected sites.** Use plants under cultivation to (re)establish plants in suitable habitat.
- S2.6. Enforce available protective measures.** Use local, State and Federal regulations to protect this species from overcollecting and damage from off-road vehicle use. Regulations should also be used to protect xeric vegetative communities where *E. longifolium* var. *gnaphalifolium* lives.
- S2.6.1. Initiate section 7 consultation when applicable.** Initiate section 7 consultations when Federal activities may affect this species.
- S2.6.2. Enforce take and trade prohibitions.** This species is protected by take provisions of the ESA (including its prohibition against removing and reducing to possession any endangered plant from areas under Federal jurisdiction; 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 the Florida rules regarding removal of plants from State lands.
- S3. Continue research on life history characteristics of *E. longifolium* var. *gnaphalifolium*.** Much of the basic biology and ecology of this species remains poorly understood. To effectively recover this species more specific biological information is needed.

- S3.1. Continue research to determine biology and demographic information, such as numbers of sites and populations, numbers of individuals in a population, morphology, reproduction, recruitment, dispersal, growth, survival, and mortality.**
- S3.2. Continue research to assess management requirements of *E. longifolium* var. *gnaphalifolium*.** Continue to assess site-specific management requirements of *E. longifolium* var. *gnaphalifolium*. At this time, the survival and recovery of this species is dependent upon the implementation of site-specific management techniques that favor *E. longifolium* var. *gnaphalifolium*. Site-specific management guidelines should be provided to land managers.
- S4. Continue monitoring the existing populations of *E. longifolium* var. *gnaphalifolium*.**
- S4.1. Evaluate the effectiveness of the monitoring protocol used to assess population trends for *E. longifolium* var. *gnaphalifolium*.** As more information is gained about *E. longifolium* var. *gnaphalifolium*, monitoring protocols may need to be altered to make use of new information.
- S4.2. Monitor and detect changes in demographic characteristics, such as growth, survival, mortality.** Herbivory, pollinators, disease, and injury should also be monitored. Characteristics such as reproduction, recruitment, and dispersal cannot truly be monitored in the wild at this time, but should be included as introductions make reproduction possible.
- S4.3. Monitor the effects of various land management actions on *E. longifolium* var. *gnaphalifolium*.** Assess any changes in demographic characteristics of *E. longifolium* var. *gnaphalifolium* in response to land management activities, such as prescribed fire, exotic plant control, *etc.*
- S4.4. Continue to work with private landowners.** The successful recovery of this species will be influenced by the participation of private landowners. To date a varying amount of support has been gained among the individual landowners.
- S4.5. Monitor introduced plants. Monitoring of reintroduced plants will be essential for assessing the status of new plants and their contribution to the population as a whole.** Compare adult survival, seedling production, germination rates, seed survival, seedling survival, and growth rates between transplanted and natural plants. Where monitoring indicates that introduction has been unsuccessful, reevaluate protocol and methodology developed.
- S5. Provide public information about *E. longifolium* var. *gnaphalifolium*.** It is important for the recovery of this species that governmental agencies, conservation organizations such as the Florida Native Plant Society, and private landowners be appropriately informed. Public outreach efforts must also continue to address the increasing concern that horticultural demand for rare species may not benefit conservation of threatened and endangered species. Public education should identify that commercial production and horticultural uses of endangered species provide little benefit to species, since the recovery of *E. longifolium* var. *gnaphalifolium* and other rare species requires a self-sustaining, secure, number of natural populations.

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## Habitat-level Recovery Actions

- H1. Prevent degradation of existing habitat.** Extensive habitat loss has already occurred throughout the range of this species. Both development and fire suppression have decreased the available habitat.
- H1.1. Secure habitat through acquisition, landowner agreements, and conservation easements.** With so little xeric scrub habitat left, any method of securing protected populations should be sought.
  - H1.2. Manage and enhance habitat.** Manage habitat to maintain *E. longifolium* var. *gnaphalifolium* populations by preventing damage from off-road vehicle use and collection, and by providing proper management of habitat including prescribed fire.
    - H1.2.1. Conduct prescribed burns.** Fire is a necessary and integral characteristic of the high pine community. A variable interval in fire return and in season is important to mimic the natural fire regime.
    - H1.2.2. Control and eliminate exotic and invasive plants and animals.** Exotic plant and animal species are not yet a major threat as compared to other communities in South Florida.
    - H1.2.3. Control access to areas where listed plants are growing.** Collection, trampling, and off-road vehicles can severely threaten individual populations.
- H2. Restore areas to suitable habitat.** Native habitats that have been disturbed or that have experienced a long history of fire suppression may be good candidates for future reserves.
- H2.1. Restore natural fire regime.** Long periods without fire can change the species composition and the ability of the site to carry fire. Rehabilitation of a site may be a lengthy process, but with fewer and fewer sites remaining, these sites may become more valuable for future recovery.
  - H2.2. Enhance sites with native plant species.** Because of logging or long periods without fire, certain native plant species that were present historically may now be absent from the natural composition of the community. These species can be reintroduced if natural colonization is not possible.
- H3. Conduct habitat-level research projects.** Study the response of *E. longifolium* var. *gnaphalifolium* to various land management practices, such as prescribed fire regimes, vegetative thinning, and control of exotic/invasive vegetation.
- H4. Monitor habitat/ecological processes.** Monitor the effects of land management actions, such as prescribed fire, exotic plant control, *etc.*, on the habitats where *E. longifolium* var. *gnaphalifolium* occurs.
- H5. Provide public information about high pine and its unique biota.** Educational efforts, especially those conducted by Archbold Biological Station, have been successful. Without these successful efforts, the Lake Wales Ridge NWR would not have been created. Florida's system of biological preserves depends on a broad base of public understanding and support

for its funding and future success. In addition to past and ongoing educational efforts by The Nature Conservancy, Bok Tower Gardens, and Archbold Biological Station, future efforts by these organizations, and the Florida Park Service, the Florida Department of Forestry, the Florida Native Plant Society, and local garden clubs are crucial in increasing public appreciation of scrub and high pine communities, and their associated plant species. The Arbuckle Appreciation Day sponsored by the Florida Department of Forestry has been especially successful in disseminating knowledge about these unique communities.

