

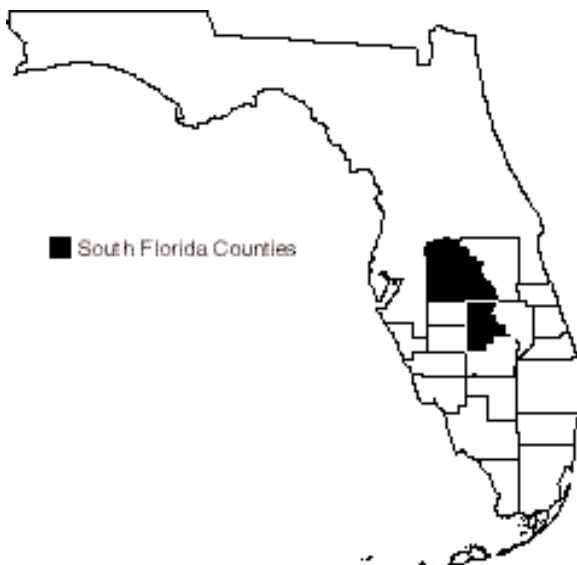
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# Highlands Scrub Hypericum

*Hypericum cumulicola* (Small) P. Adams

|                       |                               |
|-----------------------|-------------------------------|
| Federal Status:       | Endangered (January 21, 1987) |
| Critical Habitat:     | None Designated               |
| Florida Status:       | Endangered                    |
| Recovery Plan Status: | Revision (May 18, 1999)       |
| Geographic Coverage:  | Rangewide                     |

Figure 1. County distribution of Highlands scrub



*Hypericum cumulicola* is a rare species that is endemic to the Lakes Wales Ridge in central Florida. It is only known from Polk and Highlands counties. Within those counties, it may occur in relatively large populations of hundreds or thousands of individuals. The scrub hypericum is threatened by habitat loss, isolation of populations, and fire suppression threats, factors which led to its listing as an endangered species on January 21, 1987. Measures being used to conserve this species include land acquisition and management.

This account represents a revision of the existing recovery plan for the Highlands scrub hypericum (FWS 1996).

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## Description

*Hypericum cumulicola* is a small, short-lived perennial herb reaching 20 to 70 cm in height. It is branched from the base and has a woody, fibrous root system. The stems are shorter and more numerous in winter and spring before reproductive stalks are differentiated. Usually there are three stems, but there can be as many as 17 stems on a healthy plant (Quintana-Ascencio and Morales-Hernández *in press*). During the reproductive season, all stems of mature individuals bear flowers and fruits. The leaves of *H. cumulicola* are opposite, simple, entire, and needle-like. Flowers are small, bisexual, and arranged in cymes. The calyx consists of five distinct sepals, while the corolla consists of five bright yellow petals shaped like the blades of a propeller. There are approximately 27 anthers. The gynoecium has three, sometimes four locules, and the ovary is superior with approximately 22 ovules aligned around the walls of the ovary (parietally). The style has three, sometimes four, white lobes. Fruits are small capsules, red when immature and dark purple at the time of dehiscence. Mature seeds are small and dark brown. This species, as other *Hypericum*, may contain hypericin, a promising compound with protective effect in the control of viral diseases in animals (Duke 1989).

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## Taxonomy

*Hypericum* is a predominantly temperate genus, and a member of the family Hypericaceae. This family is closely related to the Clusiaceae (Guttiferae), and some authorities include both groups together (Cronquist 1988). In central Florida, *H. cumulicola* is morphologically distinct from other species in its genus (Ward and Godfrey 1978). In 1924, Small first named the plant *Sanidophyllum cumulicola*. Later, Adams (1962) reassigned the species to the genus *Hypericum*, renaming it *Hypericum cumulicola*. *Hypericum cumulicola*'s closest relative in Florida is *H. gentianoides*, which is very similar morphologically, but branches repeatedly above the base versus only at the base for *H. cumulicola* (Archbold Biological Station, personal communication 1998).

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## Distribution

With the exception of one site on the Winter Haven Ridge at Lizzie Lake (Archbold Biological Station, personal communication 1998), *Hypericum cumulicola* is restricted to scrub on the Lake Wales Ridge in Polk and Highlands counties, from just north of Sunray, Polk County (FWS 1996) to the south end of the Lake Wales Ridge near Archbold Biological Station in Highlands County (Judd 1980) (Figure 1).

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## Habitat

*Hypericum cumulicola* is limited to upland areas with well-drained, sterile, white sands (Judd 1980). It is almost exclusively found in the sunny openings in rosemary balds. Rosemary balds are unique vegetative communities that occur as patches within the more expansive scrub ecosystem. These habitat patches provide suitable habitat for a number of rare scrub endemics (Christman and Judd 1990). Rosemary balds have a low fire frequency from 10 to 100 years (Johnson 1992, Myers 1990), while the surrounding scrubs are burned more frequently. *Hypericum cumulicola* occurs occasionally in openings in well-drained scrubby flatwoods or among turkey/oak scrubs in yellow sands (P. Ascencio-Quintana, Archbold Biological Station, personal communication 1995). Where found, it is locally common and can occur even in large groups of several thousand individuals (Judd 1980). Population increases of this species are associated with the occurrence of fires that may release local populations from competitive exclusion (Abrahamson 1984, Johnson and Abrahamson 1990, Quintana-Ascencio and Morales-Hernández *in press*, Quintana-Ascencio and Menges undated).

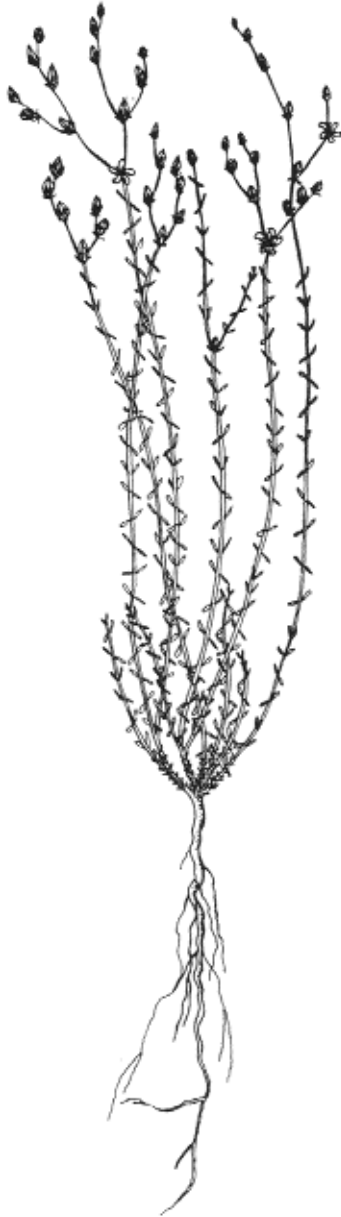
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## Reproduction

The stems of *Hypericum cumulicola* are branched, many-flowered, and indeterminate. There can be as many as 1,600 reproductive structures (fruits, flowers, or buds) per plant in large individuals by the end of the reproductive season (P. Quintana-Ascencio and M. Hernández *in press*). Flowers develop acropetally and are exposed one at a time or in small numbers (up to eight per branch) each day. The new flowers open early in the morning and the petals

**Highlands scrub hypericum.**

Original drawings by Lisa C. Magahee; original flower photograph by Steve Shirah.



curl up by noon depending on the weather. Native solitary bees (*Dialictus* spp. and *Augochloropsis* spp.) appear to be the primary pollinators (M. Evans, Archbold Biological Station, personal communication 1995). Other visitors include *Geron* sp., *Copestilius nigrum*, and *Bombus* spp. Pollinator visitation occurs at similar rates regardless of flower or plant density (O. Boyle, Archbold Biological Station, personal communication 1996). The initial position of the styles and stamens in many individuals suggests the prevention of self-pollination, since they make an approximately 90° angle that separate each from the other at the time of pollen release. *Hypericum cumulicola* is self-compatible. The lower fruit set of flowers under an autogamous (isolated to avoid their contact to potential pollinators) experimental treatment, compared with flowers under manual self and outcross, and control treatments, suggests the important role of pollinators for pollen transfer in this species (M. Evans, Archbold Biological Station, personal communication 1995). There is an interval of approximately 25 days between fertilization and fruit dehiscence (O. Boyle, Archbold Biological Station, personal communication 1996). The mature purple capsules remain attached to the stem after releasing the seeds. Seeds do not show any obvious primary dispersal mechanism and probably are dispersed passively by gravity. This herb does not survive burning and population recovery requires the presence of buried seeds in the soil or their dispersal from nearby populations (Quintana-Ascencio, Dolan, and Menges, undated).

Reproduction in this species takes place between April and October, but most flowering and fruiting occurs between June and September, coinciding with the rainy season and daily thunderstorms typical of the region. Stems dry at the end of the reproductive season and new ones sprout from the base in late winter and early spring. Germination occurs from November through June, but most seedlings germinate between December and February. Plants reach maturity in as little as a year.

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## Relationship to Other Species

Gap size requirements of this herb appear to be intermediate (P. Quintana-Ascencio, Archbold Biological Station, personal communication 1995) in comparison with two other co-occurring rosemary scrub plants: *Eryngium cuneifolium*, restricted to large openings (Menges and Kimmich 1996), and *Polygonella basiramia*, found in large and small gaps between shrubs (Hawkes and Menges 1995).

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## Status and Trends

*Hypericum cumulicola* was listed as endangered under the ESA on January 21, 1987 (52 FR 2234). This species is threatened with habitat loss, fire suppression, and isolation of populations. Originally part of a more extensive xeric vegetation, remaining patches of Florida scrub have been increasingly isolated because of habitat destruction and degradation due to conversion for residential developments, ranches, and orange groves. In the last three decades approximately 90 percent of its habitat has been lost (Peroni and Abrahamson 1985, Richardson 1989).

Suppression of the natural burn regime has intensified the threats to this species. Where it still occurs, long unburned patches of habitat have experienced increases in shrub and lichen cover. Increased competition results in higher mortality and lower recruitment, and eventually the extirpation of *H. cumulicola* (P. Quintana-Ascencio, Archbold Biological Station, personal communication 1995). Suitable habitat for this species is often naturally patchy and occurs in a mosaic of other vegetation types. Extended periods without fire can result in the loss of some patches of suitable, occupied habitat. Increasing isolation may have an important detrimental effect on habitat colonization and the persistence of this species (Quintana-Ascencio and Menges undated).

Protected sites where *H. cumulicola* occurs include: Archbold Biological Station, Gould Road Preserve, Holmes Avenue Preserve, Lake Apthorpe Preserve, Lake Arbuckle State Preserve, Lake Arbuckle WMA, Lake June, Lake Wales Ridge SF, Placid Lakes, Saddle Blanket Lakes Preserve, Sun-N-Lakes Preserve, and Sun Ray.

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## Management

*Hypericum cumulicola* has evolved in xeric vegetative communities that are fire maintained. It inhabits a specific vegetative community that has a relatively long burn return interval compared to most other upland xeric communities. When fire does occur within rosemary balds, *H. cumulicola* responds favorably to the reduction in competing vegetation and is usually found in large numbers immediately following fire. These responses to fire and our knowledge of xeric community fire regimes should guide management efforts for this species.

It is clear that management of xeric uplands containing *H. cumulicola* should utilize fire to create vegetative mosaics within and adjacent to rosemary balds. Because of the inability to ignite rosemary balds during more frequent

prescribed burns of adjacent scrub, some land managers have suggested that no specific efforts be made to manage rosemary balds. Instead, they recommend management efforts be directed toward other xeric uplands that require more frequent fires, suggesting that adjacent rosemary balds will burn as part of the landscape when they are capable of carrying fire.

Where fire has been used, improvements in *H. cumulicola* habitat quality have been noted. In instances where use of fire may not be appropriate, use of mechanical disturbances that decrease shrub and lichen cover may be a suitable management alternative. Mechanically altered sites should be monitored to assess the recovery of *H. cumulicola* and possible effects to other scrub species.

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# Recovery for the Highlands Scrub Hypericum

*Hypericum cumulicola* (Small) P. Adams

**Recovery Objective:** STABILIZE, then reclassify to threatened.

## Recovery Criteria

*Hypericum cumulicola* may be considered stabilized when existing populations, within its historic range are adequately protected from further habitat loss, degradation, exotic plant invasion, and fire suppression. These sites must also be managed to maintain the rosemary phase of sandpine scrub to support *H. cumulicola*.

Once the existing populations are stabilized, *H. cumulicola* may be considered for reclassification to threatened. Reclassification will be considered when: enough demographic data are available to determine the appropriate numbers of self-sustaining populations and sites needed to ensure 20 to 90 percent probability of persistence for 100 years; when these populations, within the historic range of *H. cumulicola* are adequately protected from further habitat loss, degradation, fragmentation, and fire suppression; when these sites are managed to maintain the rosemary phase of sandpine scrub to support *H. cumulicola*; when monitoring programs demonstrate that populations of *H. cumulicola* on these sites support sufficient population sizes; when those populations are stable and distributed throughout the historic range; and when *H. cumulicola* are sexually or vegetatively reproducing at sufficient rates to maintain the population.

This recovery objective is an interim goal because of the limited data on the biology, ecology, and management needs of this species. The recovery objective will be reassessed annually based on new research, management, and monitoring information. Reclassification criteria may be refined if new information identifies ways of re-establishing populations of this species to expand its current distribution within its historic range.

## Species-level Recovery Actions

- S1. Determine current distribution of *H. cumulicola*.** This species has been relatively well-surveyed and a distribution has been ascertained. Additional surveys will confirm the species' distribution and locate new sites.
- S1.1. Conduct surveys of *H. cumulicola*.**
- S1.1.1. Continue surveys in Polk and Highlands counties.** The Lake Wales Ridge has probably been adequately surveyed, though new sites for *H. cumulicola* may still be found.
- S1.1.2. Continue surveys on protected lands.** New sites for listed species are still being found on protected lands. This survey work should be continued to catalog all existing protected sites and new sites as they are acquired.

- 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, population sizes, and status. This information should also be used for project review, in land acquisition activities, and to coordinate updates with the Florida Natural Areas Inventory database. Currently, the Lake Wales Ridge Ecosystem Working Group and Archbold Biological Station are proposing to map the entire central ridge. This information would show potential habitat for scrub endemics based on their habitat needs.
- 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, isolated. For this reason, existing populations are in need of protection from a variety of threats.
- S2.1. Protect habitat through acquisition, conservation easements, or agreements with landowners.**
- S2.2. Protect populations on public lands.** Develop management guidelines that allow for a fire regime that includes a mosaic of successional stages. *Hypericum cumulicola* would require a burn regime that had an average burn cycle of around 20 years.
- 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 of *H. cumulicola*.
- S2.4. Conserve germ plasm.** The seed for this species is not presently in long-term storage. Germplasm conservation preserves genetic diversity and provides valuable information regarding the reproductive biology of rare species. *Hypericum cumulicola* has a very high genetic diversity among populations. This unusual characteristic would require that any effort for seed storage be made of samples from a large number of populations. The local abundance of this species makes an *ex situ* garden collection a low priority for this species.
- S2.5. 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 *H. cumulicola* lives.
- S2.5.1. Initiate section 7 consultation when applicable.** Initiate section 7 consultations when Federal activities may affect this species.
- S2.5.2. Enforce take and trade prohibitions.** This species is protected by take provisions of the Endangered Species Act (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, 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. Conduct research on life history characteristics of *H. cumulicola*.** Continue the study of basic biology and ecology of this species. To effectively recover this species more specific biological information is needed.
- S3.1. Continue research to determine demographic information, such as numbers of populations, numbers of individuals in a population, recruitment, growth, survival, and mortality.** The current research indicates that the seedbank may be the key for this species' survival.
- S3.2. Once demographic data are known, conduct population viability and risk assessment analysis to determine the numbers of plants, sites, subpopulations/populations, and spatial distribution needed to ensure persistence of the species.**
- S3.3. Conduct research to assess management requirements of *H. cumulicola*.** Determine which natural populations can be stabilized or increased by habitat management. Surveys, research, and monitoring information on the localities of *H. cumulicola* sites will provide factors contributing to any declines at each site. Monitoring of populations should be in reference to various habitat management practices. Site-specific management guidelines should be provided to land managers. Close coordination among land managers is essential in the development of adaptive management techniques.
- S4. Monitor existing populations of *H. cumulicola*.**
- S4.1. Develop monitoring protocol to assess population trends for *H. cumulicola*.**
- S4.1.1. Monitor to detect changes in demographic characteristics, such as reproduction, seed dormancy, germination, recruitment, growth, dispersal, survival, and mortality.** Also monitor for pollinators, herbivory, disease, and injury.
- S4.1.2. Monitor the effects of various land management actions on *H. cumulicola*.** Assess any changes in demographic characteristics of *H. cumulicola* in response to land management activities, such as prescribed fire, exotic plant control, *etc.* The number of individuals in a population is highly variable through the burn cycle.
- S4.2. Develop a quantitative description of the population structure of *H. cumulicola*.** This description will provide a baseline for monitoring population dynamics in response to natural environmental changes and management treatments. Data recorded should include morphology, survivorship, mortality, and reproduction for individual plants. Data about each plant's microsite (vegetation cover, litter depth, substrate, and closest neighbors) should also be included.
- S5. Provide public information about *H. cumulicola*.** It is important for the recovery of this species that governmental agencies, conservation organizations such as the Florida Native Plant Society, and private land owners be appropriately informed about this species. Care is needed, though, to avoid revealing specific locality information about where *H. cumulicola* is found.
- S6. Develop delisting criteria.** Once reclassification is achieved, research and monitoring results may provide data necessary to develop delisting criteria.

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## Habitat-level Recovery Actions

- H1. Prevent degradation of existing habitat.** Extensive habitat loss, degradation, and fragmentation have already occurred throughout the range of this species. *H. cumulicola* is particularly sensitive to habitat fragmentation from a genetic standpoint, as well as a metapopulation perspective. Both development and fire suppression have decreased the available habitat. To date, there are 13 protected sites for *H. cumulicola* in Polk and Highlands counties.
- 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.** Prevent habitat damage from off-road vehicle use and provide proper management of habitat including prescribed fire.
- H1.2.1. Conduct prescribed burns.** Fire is a necessary and integral characteristic of the scrub community. A variable interval in fire return and in season is important to mimic the natural fire regime. In addition, spatial variation in fire intensity and unburned patches is necessary to construct a natural fire landscape. The scrub is naturally made up of islands of suitable and unsuitable habitat. To repeat this landscape pattern, sites should be burned as a mosaic when possible to allow for variation. *Hypericum cumulicola* is a species that needs a fire return interval of less than 20 years to safeguard against a failure in the seedbank.
- H1.2.2. Control and eliminate exotic and invasive plants and animals.** Exotic plant and animal species are not yet a major threat in Florida scrub as compared to other communities in South Florida. However, in isolated areas, exotic species are becoming established. Without control, exotic/invasive plants may become a threat to the survival and recovery of *H. cumulicola*.
- H1.2.3. Control access to areas where listed plants are growing.** 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. On these sites a seed bank may exist that could include rare endemic species.
- 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. Continue habitat-level research projects.** Study the response of *H. cumulicola* 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 *H. cumulicola* occurs.
- H5. Provide public information about scrub 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 Division of Forestry, the South Florida Water Management District, 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 Division of Forestry has been especially successful in disseminating knowledge about these unique communities.

