Conservation Assessment
for
Trailing arbutus *(Epigaea repens* L.*)*

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This Conservation Assessment was prepared to compile the published and unpublished information on the subject taxon or community; or this document was prepared by another organization and provides information to serve as a Conservation Assessment for the Eastern Region of the Forest Service. It does not represent a management decision by the U.S. Forest Service. Though the best scientific information available was used and subject experts were consulted in preparation of this document, it is expected that new information will arise. In the spirit of continuous learning and adaptive management, if you have information that will assist in conserving the subject taxon, please contact the Eastern Region of the Forest Service - Threatened and Endangered Species Program at 626 East Wisconsin Avenue, Milwaukee, Wisconsin 53203.

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EXECUTIVE SUMMARY

Trailing arbutus, *Epigaea repens* L., is a prostrate, trailing evergreen shrub. It is found in sandy or rocky, usually xeric, woodlands with acid soil throughout the eastern United States and Canada. It is considered common and secure through most of its range.

Trailing arbutus is known from twenty-nine states. It is only tracked in Florida, at the southern edge of its distribution, where 16 occurrences are reported. It is a Watch List species in Indiana, one that was officially listed as Threatened or Endangered at one time but is now considered more common. The plant occurs on eight National Forests and is a Regional Forester Sensitive Species on one, the Hoosier National Forest in Indiana, where it is known from at least four sites.

Trailing arbutus is subject to collection (its evergreen leaves are used for wreaths) and may be slow to recover following disturbance. Canopy closure and competition with overstory plants represent additional threats. Populations on the Hoosier National Forest are probably stable.

ACKNOWLEDGEMENTS

I would like to thank Science Librarian Barb Howes at Butler University for tireless assistance with references, Marcia Moore, Herbarium Assistant for help in all things and Butler student Kathy Fidler for research and clerical assistance. I am grateful to Kirk Larson, Botanist on the Hoosier National Forest, and to all agency personnel who provided information.

NOMENCLATURE AND TAXONOMY

Epigaea repens L.

Published in: *Species Plantarum* 1: 395. 1753.

Common names: Trailing arbutus, Mayflower, gravel plant

Synonym: *Epigaea repens* var. *glabrifolia* Fern.

DESCRIPTION OF SPECIES

From Gleason and Cronquist (1991), Radford et al. (1968) and others:

Stems: branched, 2-4 dm, hirsute.

Leaves: evergreen, leathery, alternate, ovate or oblong, 2-10 cm. entire, rounded or cordate at base, +/- pilose, especially when young.

Petioles: pubescent, half as long as the blade.

Flowers: borne on terminal, congested, racemes or spikes 2-5 cm, pedicels 1-4mm long, each flower closely subtended by 2 ovate, ciliate bracts; calyx 5-lobed, corolla-tube salverform, densely pubescent within, 8-15 mm, pink or white, the lobes 6-8 mm, very fragrant, stamens 10, anthers not awned, opening by longitudinal slits. Flowers are either pistillate with vestigial stamens, or apparently perfect, but with unexpanded stigmas and functionally staminate.

Fruit: a 5-locular fleshy capsule, depressed globose, subtended by persistent calyx and bracts, pulpy white within.

Seeds: many, light reddish orange or brown, 0.4-0.6 mm long, oblong or subrotund.

The species is easily distinguished based on its prostrate stems and alternate, evergreen leaves.

LIFE HISTORY

Prostrate evergreen shrub, trailing up to 15 ft (Henn 1998).

Reproduction

Trailing arbutus blooms February through May. Plants are functionally dioecious (Clay and Ellstrand 1981, Yatskievytch 2000). Male flowers are larger than female flowers (W-1). No pretreatment is required for germination. Plants spread asexually via rhizomes.

Ecology

Studies in Nova Scotia have shown first flowering dates to be significantly later than they were a century ago (Vasseur et al. 2002), perhaps as a response to a warming trend.

Trailing arbutus has been grown horticulturally in the United States for over 200 years (Rogers 1994). It tends to "fade" following transplanting from the wild (Rogers 1994). It can be propagated by cuttings of short stem pieces (Wampler and Wampler 1998). Trailing arbutus is reportedly very slow-growing (W-11).

Dispersal/Migration

Estimates of the number of seeds per fruit range from several dozen (Rogers 1994) to an average of 241 (W-25) and are explosively dehisced. Seeds are also dispersed by ants (Clay 1983). Chipmunks and small game may eat the fruits (W-1). Propagation by seed, including stratification techniques to increase germination percentage and soil mixture recommendations, is detailed at www.wpsm.net.

Obligate Associations

Spicy-scented flowers of *Epigaea repens* are pollinated by bumblebees (W-1). Both germination and successful propagation from cuttings requires soil mycorrhizal fungi, best provided from soil collected near the source material (W-25 and reference there-in).

HABITAT

Range-wide

Tailing arbutus is found in sandy or rocky, usually xeric, woodlands with acid soil (Gleason and Cronquist 1991, Radford et al. 1968). It does not grow well under leaf cover. It is reported from Canada in sandy or peaty woods and clearings (Scoggan 1979) and conifer woods (Scoggan 1950).

National Forests

On the Hoosier National Forest in Indiana, the plant grows on shaded, acidic, dry slopes adjacent to sandstone (siltstone) outcrops (Olson et al. 1991). Populations

are “at the break of the upper slope” (Olson, pers.com.). The plant is usually associated with Black (*Quercus velutina*) , White (*Q. alba*) and Chestnut oak (*Quercus prinus*) in Indiana (Deam 1940, Olson, pers. com.). Understory associates include *Vaccinium vacillans, Smilax rotunidifolia,* and *Danthonia spicata.*

Site Specific

The plant grows on shaded, acidic, dry slopes adjacent to sandstone (siltstone) outcrops in the Pleasant Run Unit of the Brownstown District of the Hoosier National Forest (Olson et al. 1991).

DISTRIBUTION AND ABUNDANCE

Range-wide Distribution

Epigaea repens is found in the eastern and north central United States and Canada. Gleason and Cronquist (1991) cite Newfoundland and Quebec to Saskatchewan, south to Florida, Mississippi, and Iowa. It is very common throughout most of its range, becoming somewhat rarer at the edges of its range, especially in the south.

Over collection nearly lead to its extirpation in Massachusetts (Carlock 1991). It is locally common and found throughout the state in New York (Troy Weldy, pers. com.). It is fairly frequent both in the mountains and on the coastal plain in Maryland (Chris Frye, pers. com.). *Epigaea repens* is common on well-drained, acidic soil of the Coastal Plain physiographic province (95% of state) in Delaware, and is uncommon on the same soil type in the Piedmont province (5% of state) of the state, but is not considered to be of conservation concern in the state (ranked S4) (William A. McAvoy, pers. com.). It is fairly common in acidic dry forests particularly at higher elevations but almost state-wide in West Virginia (Brian McDonald, pers. com.).

National Forest Distribution

It is reported from the Hoosier, Green Mountain, Huron Manistee, Hiawatha, Ottawa, Chequamegon/Nicolet, Superior, and Chippewa National Forests. It is designated a Regional Forester Sensitive species on the Hoosier. On all the other Forests, the species is present within proclamation boundaries but is not designated as Regional Forester Sensitive because it has not been determined to be at risk (W-16).

Trailing arbutus is known from 4 sites on the Hoosier National Forest in Monroe County, on the Pleasant Run Unit (Olson et al. 1991). The species has a few populations in the Brown County Hills (Kirk Larson pers. com.). Deam (1940) reported it as "very local and limited in quantity at each station where I have seen it" in Indiana.

RANGE WIDE STATUS

Epigaea repens has a Global Natural Heritage Rank of G5, indicating it is very common and demonstrably secure (W-14). It is ranked N? in Canada, suggesting some uncertainty about its status. Its National Natural Heritage Rank is N5, again indicating it is thought to be secure in the United States. It is a Regional Forester Species at Risk on the Hoosier National Forest in Indiana because of the few known sites on the Forest, and their location at sites well suited for potentials (Steve Olson, pers. com.).

Trailing arbutus is found in 29 states (see Appendix for a complete list). It is ranked SR (reported from the state, but without persuasive documentation that would provide a basis for either accepting or rejecting the species) in 16 and as S? in 6 (not enough information available to assess at this time, more field studies and/or specimen identification is needed).

It is an S2 species in Florida (very rare; typically between 6 and 20 known occurrences; may be susceptible to becoming extirpated), S3 in Indiana and Mississippi (rare to uncommon; typically 21 to 50 known occurrences; S3 ranked species are not yet susceptible to becoming extirpated in the state but may be if additional populations are destroyed), S4 in Delaware, New Jersey, and New York (common; apparently secure under present conditions; typically 51 or more known occurrences, but may be fewer with many large populations; usually not susceptible to immediate threats) , and S5 in Kentucky and North Carolina (very common; demonstrably secure under present conditions).

Trailing arbutus is the state flower of Massachusetts. There are fines imposed for collecting it, based on very old legislation (Paul Somers, pers. com.). It is currently listed as Exploitably Vulnerable in New York (likely to become threatened in the near future throughout all or a significant portion of its range if causal factors continue), but it is not rare. The Exploitably Vulnerable list currently includes a number of showy plants that are common but people think should be protected (Troy Weldy, pers. com.).

In Florida, Trailing arbutus is listed as Endangered. There are 16 occurrences in the Florida Natural Diversity Database (2004). These records are thought to accurately reflect the actual abundance of this species in Florida, except that several populations were recently discovered in ravines in a new addition to Torreya State Park. If these are all in the same ravine system, which is likely, they will be treated as one new occurrence in the database (Linda Chafin, pers. com.).

Trailing arbutus is on the Watch List in Indiana. Watch List plants are those that used to be listed as Threatened or Endangered, but for various reasons (usually because there are more than 20 documented extant occurrences) have been down-graded and are no longer species of high concern (Homoya, pers. com.).

This plant is relatively common in West Virginia (S4) and is know from 34 of 55 counties through herbarium records. It is not tracked (Brain McDonald, pers. com.)

Trailing arbutus is ranked S5 in North Carolina and Kentucky, demonstrably secure and is not tracked. It is common throughout the state in acidic mesophytic forests in Kentucky (Deborah White, pers. com). Likewise, it is considered to be a common species and is not tracked by the Natural Heritage Program in New Jersey (ranked S4) (Elena Williams, pers. com.).

POPULATION BIOLOGY AND VIABILITY

POTENTIAL THREATS

Present or Threatened Risks to Habitat

According to the Virginia Native Plant Society (W-22), the species is very intolerant of habitat disturbance in any form, including fire, logging, grazing, and housing development, and serious deer overpopulation is wiping out many old colonies. Many report Trailing arbutus does not return following disturbance. "Sites are easily destroyed when disturbed by man or livestock and seldom recover" (Reed 2002).

The greatest threat in New York is habitat conversion through development and natural succession (Troy Weldy, pers. com.). Closure of canopy and understory may pose a risk on the Hoosier National Forest if there is no management to address these threats at known sites, but these populations are currently stable (Olson, pers. com.).

Over utilization

Collection for wreaths and winter decoration is a concern in some areas (Minnesota DNR 2002). Over collection nearly lead to its extirpation in Massachusetts (Carlock 1991). Collection does not seem to be a major concern in New York (Troy Weldy, pers. com.), despite the plant's listing as Exploitably Vulnerable in the state. The plant is known as gravel plant in the medicinal drug trade (W-3), and was used by the Shakers to treat kidney stones (=gravel) (W-24).

The leaves are gathered at flowering time and have been used as an astringent and diuretic (W-26).

Disease or Predation

No information found.

Inadequacy of Existing Regulatory Mechanisms

No information found.

Other Natural or Human Factors

No information found.

SUMMARY OF LAND OWNERSHIP & EXISTING HABITAT PROTECTION

Florida is the only state that tracks trailing arbutus. Florida Heritage Database records list 16 occurrences for the plant. All have been revisited since 1976 (most in the 1990's) and were confirmed extant. Population sizes were small when reported, less than 30 plants. Eight sites are on Eglin Air Force Base. All others are in managed areas such as Torreya State Park or the Lower Escambia River Water Management Area (Florida Natural Heritage Database 2004).

On the Hoosier National Forest, where Trailing arbutus is a Regional Forester Sensitive species, 4 occurrences are known. The plant is reported from six other National Forests in the Region.

SUMMARY OF EXISTING MANAGEMENT ACTIVITIES

None were identified.

PAST AND CURRENT CONSERVATION ACTIVITIES

No information found.

RESEARCH AND MONITORING

Existing Surveys, Monitoring, and Research

No information found.

Survey Protocol

N/A.

Research Priorities

This plant is secure globally and is state listed only in Florida, at the extreme southern limit of its distribution. There may be no research required. There is some indication populations are threatened by natural wood succession. Research to document the effects of prescribed fire or mechanical clearing might provide management recommendations that would be helpful at some sites.

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W-4. Illinois Natural History Survey Herbarium Collection Database Search Results. http://ellipse.inhs.uiuc.edu:591/INHSCollections/FMPro.

W-5. Institute for Systematic Botany, Atlas of Florida Vascular Plants. http://www.plantatlas.usf.edu/images.asp?plantID=3480#.

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W-16. Regional forester sensitive plants. USDA Forest Service, Region 9. http://www.fs.fed.us/r9/wildlife/tes/docs/rfss_plants_083002.pdf.

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W-21. USDA and NRCS PLANTS Database. http://plants.usda.gov.

W-22. Virginia Native Plant Society. http://www.vnps.org/epig.htm.

W-23. Wildflowers of Indiana, by F. Wampler and M. R. Wampler. http://www.ulib.iupui.edu/wildflowers/plate02.html.

W-24. Wildflowers of the southeastern United States. http://2bnthewild.com/plants/H43.htm.

W-25. Woody Plant Seed Manual, F. T. Bonner and R. G. Nisley, eds. http://wpsm.net/Epigaea.pdf.

W-26. A modern herbal by Mrs. M. Grieve. http://www.botanical.com.

APPENDIX

Heritage Status Ranks by State (from W-14).

Alabama	SR	Mississippi	S3
Connecticut	SR	New Hampshire	SR
Delaware	S4	New Jersey	S4
District of Columbia	S?	New York	S4
Florida	S2	North Carolina	S5
Georgia	SR	Ohio	SR
Illinois	S?	Pennsylvania	S?
Indiana	S3	Rhode Island	SR
Iowa	SR	South Carolina	SR
Kentucky	S5	Tennessee	SR
Maine	SR	Vermont	SR
Maryland	SR	Virginia	SR
Massachusetts	SR	West Virginia	S?
Michigan	S?	Wisconsin	SR
Minnesota	SR		

Labrador (Newfoundland)	S?	Ontario	S5
Manitoba	S3?	Prince Edward Island	S5
New Brunswick	SR	Quebec	SR
Newfoundland Island	S3S5	Saskatchewan	SU
Nova Scotia	S5		

S1: Extremely rare; typically 5 or fewer known occurrences in the state, or only a few remaining individuals may be especially vulnerable to extirpation.

S2: Very rare; typically between 6 and 20 known occurrences; may be susceptible to becoming extirpated.

S3: Rare to uncommon; typically 21 to 50 known occurrences; S3 ranked species are not yet susceptible to becoming extirpated in the state but may be if additional populations are destroyed.

S4: Common; apparently secure under present conditions; typically 51 or more known occurrences, but may be fewer with many large populations; usually not susceptible to immediate threats.

S5: Very common; demonstrably secure under present conditions.

SX: Species has been determined or presumed to be extirpated. All historical occurrences have been searched, or all known sites have been destroyed and a thorough search of potential habitat has been completed.

SR: Reported from the state, but without persuasive documentation that would provide a basis for either accepting or rejecting the species.

S?: Not enough information available to assess at this time, more field studies and/or specimen identification is needed.

SH: Possibly extirpated (historical); occurred historically and there is some expectation that it may be rediscovered. Its presence may not have been verified in the past 20 years.

SU: Currently unrankable due to lack of information or due to substantially conflicting information about status or trends.

HYB: Unranked because it represents an interspecific hybrid, not a species.

LIST OF CONTACTS

Information Requests

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Review Requests