

CONVENTION ON INTERNATIONAL TRADE IN ENDANGERED SPECIES
OF WILD FAUNA AND FLORA



Fourteenth meeting of the Conference of the Parties
The Hague (Netherlands), 3-15 June 2007

CONSIDERATION OF PROPOSALS FOR AMENDMENT OF APPENDICES I AND II

A. Proposal

Deletion of *Shortia galacifolia* from Appendix II.

B. Proponent

United States of America

C. Supporting statement

1. Taxonomy

1.1 Class: Dicotyledonae

1.2 Order: Diapensiales

1.3 Family: Diapensiaceae

1.4 Genus, species or subspecies, including author and year: *Shortia galacifolia* Torrey & Gray 1842.

1.5 Scientific synonyms: *Sherwoodia galacifolia* (Torrey & Gray) House 1907

1.6 Common names: English: Oconee bells, hyams sparkling Shortia, one-flowered coltsfoot shortia
French: shortie
Spanish: campanas de Oconee

1.7 Code numbers: ---

2. Overview

Shortia galacifolia has been included in Appendix II since 1983. The species is a low-growing perennial plant with shiny leathery leaves. It is considered a narrow endemic of North America with limited distribution in the Appalachian Mountains of the southeastern United States of America. International trade is not a factor affecting the status of the species.

3. Species characteristics

3.1 Distribution

The genus *Shortia* has a disjunct distribution, with one species native to eastern North America and five species native to eastern Asia (Scott and Day 1983; Nesom in prep.).

Shortia galacifolia is endemic to the escarpment gorges of the Appalachian Mountains in the southeastern United States of America. It occurs near the tri-state borders of northern Georgia, southwestern North Carolina, and northwestern South Carolina (Vivian 1967; Weakley 2006). There are two varieties of the species that are separated by approximately 100 km of mountainous terrain (Weakley 2006; Nesom in prep.). *Shortia galacifolia* var. *brevistyla* (northern *Shortia*) occurs at 200–600 m elevation in one county in North Carolina; and *S. galacifolia* var. *galacifolia* (southern *Shortia*) occurs at 200–700 m elevation in a single county within each of the States of Georgia, North Carolina, and South Carolina (Nesom in prep.). The species has also been introduced, most likely from horticultural sources, in Tennessee and Virginia (Weakley 2006).

The type locality of the taxon was destroyed by hydroelectric construction in Oconee County, South Carolina, during the late 1960s (Weakley 2006).

3.2 Habitat

Shortia galacifolia occurs almost exclusively on moist sloping land in shady forests of northerly aspect terrain with rich, humus soils; on ravine slopes where cool, humid conditions prevail; along stream banks; and also on alluvial flats in moist, acid loam soils (Vivian 1967; Hatley 1977). Associated shrub species include: *Acer rubrum*, *Kalmia latifolia*, *Rhododendron maximum*, and *R. minus*. Associated tree species include: *Liriodendron tulipifera*, *Pinus strobus*, and *Tsuga canadensis* (Vivian 1967; Hatley 1977; Nesom in prep.).

3.3 Biological characteristics

Shortia galacifolia is probably a relict of an arcto-tertiary forest of circumboreal distribution (Cain 1944), which has survived in the Appalachian Mountains for thousands of years in relatively small isolated populations (Hatley 1977).

The species is a low-growing evergreen herbaceous perennial that can form patches of dense ground cover. Plants have solitary bell-like flowers on stalks that rise above the leaves. Flowers typically bloom from March to mid-April, with seed capsules maturing from May to June (Dunn and Jones undated). New leaves appear after capsules have matured. Seedlings appear in July and develop slowly during the first growing season (Dunn and Jones undated). The species has poor seed dispersal and specific conditions for seed germination limit regeneration success in the wild (Hatley 1977). According to Vivian (1967), optimal germination and seedling development occurs in disturbed sites with exposed mineral soil and increased light intensity. Large colonies of plants are produced asexually through the expansion of rhizomes. The species forms both ecto- and endotrophic mycorrhiza associations (Rönblom and Anderberg 2002).

3.4 Morphological characteristics

Perennial acaulescent, glabrous herb or subshrub with lignescent rhizomes; 10–12 rootlets develop at each rhizome node (Vivian 1967). Leaves: basal, rosulate from rhizome buds, petiole 4–9 (–15) cm long; blade orbiculate to elliptic-orbiculate, 3–8 cm long, pinnately veined, base rounded to cordate, margins coarsely serrate, with apex truncate or slightly emarginate. Scapes: 10–18 cm long; bracts 3–5, usually closely subtending calyx. Inflorescences: 1-flowered, spreading to slightly nodding. Flowers have 5 sepals and 5 petals: calyx 8–12 mm, lobes barely united at base, pinkish; corolla white to pinkish, 15–25 mm, lobes connate in proximal one-fourth, margins coarsely and irregularly toothed (Nesom in prep.). Style simple, 3-lobed; 5 fertile stamens and 5 sterile stamens hidden within the flower at the base of the petals (Patrick et al. 1995). Capsules: 3-valved, 5–7 mm (Patrick et al. 1995; Nesom in prep.).

Morphological differences between the two varieties are relatively few, quantitative, and overlapping; recognition of the infraspecific taxa is based on the geographic disjunction (Nesom in prep.).

3.5 Role of the species in its ecosystem

Further study is needed to determine the role of the species in its ecosystem.

4. Status and trends

4.1 Habitat trends

In the late 1960s, approximately 60% of the habitat for *S. galacifolia* var. *galacifolia* was destroyed in South Carolina due to hydroelectric construction (Dunn and Jones 1979). Current trends indicate that the habitat for the species is stable because many of the populations occur on protected lands and/or are located in remote rugged terrain.

4.2 Population size

Population sizes are not known; however, the vast majority of the species' populations are of *S. galacifolia* var. *galacifolia* (NatureServe 2003). *Shortia galacifolia* var. *brevistyla* is known from seven extant populations in one county in North Carolina (Misty Franklin, botanist, North Carolina Natural Heritage Program, pers. com. to USFWS 2006).

Given the species' ability to reproduce asexually, populations can range in size from a few hundred clumps to thousands of clumps; however, populations may only consist of a few genotypes (Dunn and Jones 1979). Since the species has no effective means of seed dispersal, and rather specific conditions for seed germination, it is limited in its ability to colonize new areas. Despite its very limited distribution, it is reported that the species is abundant at most of its few remaining sites (NatureServe 2003).

4.3 Population structure

Plants spread by horizontal rhizomes, and are able to form relatively large clumps ranging up to 1–2 m in diameter.

4.4 Population trends

The range-wide conservation ranking for *S. galacifolia* and *S. galacifolia* var. *galacifolia* is imperiled, and is critically imperiled for *S. galacifolia* var. *brevistyla* (NatureServe 2003).

The primary factor contributing to the decline of *S. galacifolia* var. *galacifolia* was loss of habitat and populations due to hydroelectric construction in the late 1960s in South Carolina. Distribution of the species is limited due to poor seed reproduction and dispersal (Ross 1936; Primack and Wyatt 1975; Scott and Day 1983). Where populations persist, asexual reproduction has enabled many impacted populations to recover. Although the population trend is unknown, populations are believed to be in a stable condition (NatureServe 2003). However, given the species' limited distribution and gene pool (Dunn and Jones 1979), there is concern that populations could be adversely affected by stochastic events.

4.5 Geographic trends

Shortia galacifolia was never a widespread species. Hydroelectric construction in South Carolina destroyed approximately 60% of the historic range of *S. galacifolia* var. *galacifolia* (Dunn and Jones 1979). The species exhibits poor seed dispersal; therefore, its geographic range is limited.

5. Threats

Potential threats to the species are forest management activities (e.g., timber harvest, road construction), erosion of soil substrate, invasive species, clearing of lands for rural homes, and feral pigs rooting in habitat occupied by the species (Mark Hall, biologist, South Carolina Department of Natural Resources, pers. com. to USFWS 2006).

6. Utilization and trade

6.1 National utilization

Prior to the hydroelectric construction and inundation of the habitat for *S. galacifolia* var. *galacifolia* in South Carolina, numerous plants were salvaged from the area, and are believed to be the original founder stock for much of the horticultural trade. According to one source, as much as 5% of existing plants were removed from the construction area (Edward Fletcher, Strategic Sourcing, Inc., pers. com. to USFWS 2006). Plants continue to be in demand by plant enthusiasts (Tom Patrick, botanist, Georgia Natural Heritage Program, pers. com. to USFWS 2006; Weakley 2006). However, there is no evidence of collection of wild plants.

6.2 Legal trade

Cultivated nursery-grown plants are legally sold in the United States of America.

6.3 Parts and derivatives in trade

Seeds from cultivated sources may be in trade, but undocumented.

6.4 Illegal trade

There is no evidence of illegal trade, at the national or international level.

6.5 Actual or potential trade impacts

International trade does not appear to be a threat to this species. According to CITES trade data, since 1994 there has been no international trade in this species (UNEP-WCMC Database).

7. Legal instruments

7.1 National

Shortia galacifolia var. *brevistyla* is listed as endangered in the State of North Carolina. No collection is allowed on state lands. However, collection of wild specimens is allowed on private lands with written permission from the landowner; a state-issued permit to transport and/or sell such specimens is required. The species is also listed on the state's Special Concern Species List, which allows qualified propagators to artificially propagate the species; transport and/or selling of such specimens is allowed with a state-issued permit (North Carolina Department of Agriculture 1998).

Shortia galacifolia var. *galacifolia* is listed as endangered in the States of Georgia and North Carolina, and listed as rare in South Carolina (Weakley 2006). In Georgia, collection of wild specimens is allowed on private property; however, a state-issued permit is required to transport such specimens. In North Carolina, the same regulations apply to this taxon as for *S. galacifolia* var. *brevistyla*.

The species is listed on the Regional Forester Sensitive Species List in Region 8 of the U.S. Forest Service (U.S. 2001). The U.S. Forest Service's Sensitive Species List includes species of conservation concern, for which collection may only be permitted for scientific or educational purposes, or for conservation or propagation of the species. Collection must be authorized through issuance of a permit by the Forest Service.

The U.S. Lacey Act of 1981 also provides protection for this species. Under this law, for any species listed under CITES or protected by U.S. federal, state or Indian tribal law it is prohibited to import, export, transport, acquire, sell, or purchase plants taken, possessed, transported or sold: 1) in violation of U.S. or Indian law, or 2) in interstate or foreign commerce involving any plants taken possessed or sold in violation of State or foreign law (Lacey Act Amendments of 1981).

7.2 International

The species has been included in CITES Appendix II since 1983.

8. Species management

8.1 Management measures

Because the species is protected in Georgia and North Carolina, populations are periodically monitored by state natural resource agencies. The U.S. Forest Service is responsible for surveying for the species prior to any land management activity that would affect the species and its habitat on Forest Service lands.

8.2 Population monitoring

Populations are periodically monitored in Georgia, North Carolina, and on U.S. Forest Service lands.

8.3 Control measures

8.3.1 International

The species has been subject to the trade controls of CITES Appendix II since 1983. Therefore, all exports have required the issuance of an export permit by the country of origin, and re-exports have required the issuance of re-export certificates by the country of re-export.

8.3.2 Domestic

Collection of wild specimens of the species is prohibited on state land in North Carolina. However, the collection of wild specimens is allowed on private lands with written permission from the landowner, and a state-issued permit to transport and/or sell such specimens. Additionally, propagators with a state-issued permit are allowed to artificially propagate specimens of the species, and to transport and/or sell such specimens (North Carolina Department of Agriculture 1998).

In the State of Georgia, the collection of wild specimens is allowed on private property; however, a state-issued permit is required to transport such specimens.

On U.S. Forest Service lands, the collection of wild specimens is only allowed for scientific or educational purposes, or for conservation or propagation of the species; collection must be authorized through issuance of a permit by the Forest Service.

The U.S. Lacey Act of 1981 also provides protection for this species (Section 7.1).

8.4 Artificial propagation

Although the species may not be commercially produced to the extent it once was in the United States of America (Roh and Lawson 1996), it is known to be commercially propagated from cultivated stock both nationally and internationally, particularly in the United Kingdom (Bailey 1951; Griffiths 1994; Isaacson 2000). It also continues to be recommended for landscape use (Eck 2006). The species can be easily propagated from seeds, and stem and root cuttings.

8.5 Habitat conservation

The majority of known locations are relatively inaccessible on protected state and federal lands, and also on lands owned by the Duke Energy Corporation in South Carolina.

8.6 Safeguards

In addition to being protected on state and federal lands, and on lands owned by the Duke Energy Corporation in South Carolina, the mountainous terrain where populations are located also provides protection to the species.

9. Information on similar species

Shortia galacifolia does not resemble any other species in the Appendices. However, its congeners are similar in appearance and grow in analogous plant communities in eastern Asia: *S. xappendiculata* is native to montane Taiwan; *S. rotundifolia*, *S. soldanelloides* (with 5 recognized varieties), and *S. uniflora* (with 3 varieties) are native to montane Japan; and *S. sinensis* is native to the People's Republic of China (Nesom in prep.).

10. Consultations

The Scientific Authority of the United States of America solicited public comments via a public notice (U.S. *Federal Register* Vol. 71, No. 215, 2006). Consultation letters were sent to appropriate state and federal resource agencies in Georgia, North Carolina, and South Carolina.

11. Additional remarks

Shortia galacifolia was proposed for removal from Appendix II by Switzerland as the Depository Government for CITES at CoP11 in 2000. At that time, the proposal was withdrawn as a result of discussions with the U.S. delegation, which requested additional time to review the status of the species. Based on recent consultations with state and federal resource agencies, we have no information to indicate that the specimens of the species are collected for international trade. Furthermore, the species is adequately protected and managed within the United States of America.

12. References

- Bailey, L. H. 1951. Manual of cultivated plants: most commonly grown in the continental United States and Canada. Macmillan Publishing Co., Inc. New York, New York, USA.
- Cain, S. A. 1944. Foundations of plant geography. Macmillan Publishing Co., Inc. New York, New York, USA.
- Dunn, A. B. and S. M. Jones. Undated. The phytogeographical characteristics of *Shortia galacifolia* in Oconee and Pickens counties, South Carolina. Department of Forestry and Recreation Resources, Clemson University, South Carolina, USA.
- Dunn, A. B. and S. M. Jones. 1979. Geographical distribution of *Shortia galacifolia* in Oconee and Pickens counties, South Carolina. The Journal of the Elisha Mitchell Scientific Society 95:1.
- Eck, Joe. 2006. Plant profiles: native groundcovers. *Horticulture Magazine* 103(2): 46-51. Available at: <http://www.hortmag.com/>.
- Griffiths, M. 1994. Index of garden plants. The Royal Horticultural Society. Timber Press, Portland, Oregon, USA.
- Hatley, J. R. 1977. An analysis of variation in *Shortia galacifolia*. Unpublished M.S. thesis. North Carolina State University at Raleigh, USA.
- Isaacson, R. ed. 2000. Source List of Plants and Seeds, 5th edition. Andersen Horticultural Library, University of Minnesota, Minnesota, USA.
- Lacey Act Amendments of 1981. Digest of Federal Resource Laws of Interest to the U.S. Fish and Wildlife Service. Available at: http://www.fws.gov/laws/laws_digest/LACEY.HTML. Accessed December 21, 2006.
- NatureServe. 2003. NatureServe Explorer: An online encyclopedia of life [web application]. Version 6.0. NatureServe, Arlington, Virginia. Available at <http://www.natureserve.org/explorer>. Accessed: October 25, 2006.

- Nesom, G. In prep. Diapensiaceae. For: Flora of North America Editorial Committee, eds. 1993+ .
Flora of North America North of Mexico. 12+ vols. New York and Oxford. Vol. 6.
- North Carolina Department of Agriculture. 1998. North Carolina Regulations for Plant Species of
Special Concern. Chapter 48:48F Plant Conservation. Available at:
<http://www.ncagr.com/plantind/plant/conserv/07080448f03c.htm>. Accessed: November 20,
2006.
- Patrick, T. S., Allison, J. R., and G. A. Krakow. 1995. Protected plants of Georgia: an information
manual on plants designated by the State of Georgia as endangered, threatened, rare, or
unusual. Georgia Department of Natural Resources, Georgia Natural Heritage Program.
Available at <http://georgiawildlife.dnr.state.ga.us>. Accessed: October 24, 2006.
- Primack, R. B. and R. Wyatt. 1975. Variation and taxonomy of Pyxidanthera (Diapensiaceae).
Brittonia 27:2. Available at:<http://www.jstor.org/view/0007/96x/dm994111/99p0997/0>.
Accessed: October 24, 2006.
- Roh, M.S. and R.H. Lawson. 1996. New floral crops in the United States. In: J. Janick (ed.),
Progress in new crops. ASHS Press, Arlington, Virginia, USA. Available at:
<http://www.hort.purdue.edu/newcrop/proceedings1996/v3-526.html>. Accessed: October 24,
2006.
- Rönblom, K. and A. A. Anderberg. 2002. Phylogeny of Diapensiaceae Based on Molecular Data and
Morphology. Systematic Botany Vol 27:2. Available at
[http://www.bioone.org/perlserv/?request=get-abstract&doi=10.1600/2F0363-
6445\(2002\)027%5B0383%3APODBOM%5D2.0.CO%3B2](http://www.bioone.org/perlserv/?request=get-abstract&doi=10.1600/2F0363-6445(2002)027%5B0383%3APODBOM%5D2.0.CO%3B2). Accessed: October 25, 2006.
- Ross, M. N. 1936. Seed reproduction of *Shortia galacifolia*. New York Botanical Garden. Journal 37.
- Scott, P. J. and R. T. Day. 1983. Diapensiaceae: A review of the taxonomy. Taxon Vol. 32:3.
- U.S. (United States Department of Agriculture) Forest Service Region 8. 2001. Regional Forester
Sensitive Species List. Unpublished. Atlanta, Georgia, USA.
- Vivian, V. E. 1967. *Shortia galacifolia*: its life history and microclimate requirements. Bulletin of the
Torrey Botanical Club Vol. 94:5.
- Weakley, A. S. 2003. Flora of the Carolinas, Virginia, Georgia, and surrounding areas. Working draft
version August 9, 2006. Available at: <http://herbarium.unc.edu/Weakleysflora.pdf>. Accessed:
October 25, 2006.