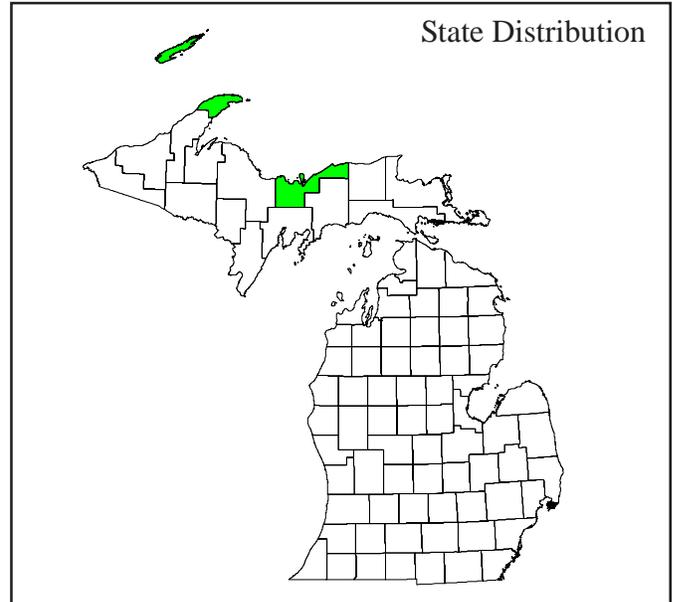
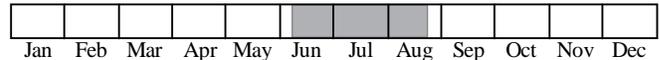


Photo by Susan R. Crispin



Best Survey Period



Status: State threatened

Global and state rank: G5/S1

Other common names: small-flower or smallflower wood rush

Family: Juncaceae (rush family)

Synonym: *Juncus parviflorus* (Ehrhart) Desvaux, *Luzula parviflora* var. *melanocarpa* (Michx.) Buchenau

Taxonomy: *Luzula parviflora* is referred to *Luzula* sect. *Anthelaea* Grisebach, one of three sections delineated within the genus (Flora of North America 2000).

Range: A circumboreal species, *L. parviflora* occurs in southern Greenland and across North America through all the Canadian provinces and territories to Alaska, ranging southward in the Northeast to the mountains of New England, Lake Superior in the Midwest, and through much of the American West and Southwest though western mountain chains. It is considered rare in Labrador, Newfoundland, Nova Scotia, and Vermont (NatureServe 2007).

State distribution: Prior to 1994, *Luzula parviflora* was known in Michigan only from Isle Royale, where it

has now been documented from eight locations—seven on the main island and one occurrence on Passage Island at the northeastern tip of the archipelago (Crispin et al. 1985). All observed colonies have been relatively small and rather localized, although on Passage Island, several patches of up to 50 plants were observed in a large meadow opening. In 1994 this species was discovered on the Michigan mainland at a locality in the Hiawatha National Forest in Alger County. In addition, two additional “near-mainland” occurrences were documented as a result of botanical inventories in 1996 and 2005, respectively, when *Luzula parviflora* was discovered – with a number of similar disjunct boreal rarities – on Manitou Island in Lake Superior, ca. 3.5 mi east of the tip of the Keweenaw Peninsula.

Recognition: This wood-rush, which can range from ca. 30 cm to nearly one meter in height, arises from rhizomes and may also produce short stolons up to 5 cm long, and has both basal and stem (cauline) leaves. **The leaves are relatively broad, ca. 5-10 mm wide, with long, soft hairs at the upper portion (mouth or throat) of the sheath, and end in an acute to extended sharp tip.** The stem leaves are relatively few, numbering from 3-4 up to 6 leaves, and are well spaced. Plants are terminated by an inflorescence with **arched to spreading primary branches and drooping forked, secondary branches, each bearing 1-2 small, pale flowers at their tip.** As in all other plants in the



Juncaceae, the flower or perianth consists of six similar floral parts known as tepals, which in this species are light to dark brown and acute at the apex. The tiny, oval, brown fruits, which are capsules, **are less than 2.5 mm long**, exceed the perianth at maturity, and usually contain three tiny seeds per capsule that are **elliptical and lack tails or appendages**. In Michigan the genus *Luzula* can be distinguished from *Juncus* on the basis of leaf width (5-10 mm or more versus less than 5 mm in *Juncus*), pubescence (hairy foliage or sheath throat versus a complete lack of pubescence in *Juncus*), and the fruits (three-seeded capsules versus many-seeded capsules in *Juncus*). Small-flowered wood rush is most likely to be confused with the smaller, much more common and widespread *Luzula acuminata* (hairy wood rush). *L. acuminata* can be distinguished by its **inflorescence, which forms a more distinct umbel with closer, non-forking primary branches, a larger perianth (2.5-4 mm versus smaller than 2.5 mm in *L. parviflora*), and seeds with tail-like appendages (in this species a persistent tuft of hairs) that may be as long as the main portion of the seed.**

Best survey time/phenology: This perennial wood-rush has been collected in fertile condition on Isle Royale primarily from about mid-June to mid-August, though some earlier records have been recorded. Based on collection records, the optimal survey period is estimated to be from the second week of June through the third week of August.

FQI Coefficient and Wetland Category: 10, FAC

Habitat: Isle Royale collections of *L. parviflora* are from moist to swampy woods – including one of spruce-fir-birch and another of white cedar-birch – and also along the gravelly upper shore of Lake Superior. Throughout the main island, it typically occurs in rich, deep soil in boreal forest, especially in shaded areas in pockets among rocks or in the lee of cliffs, and it also was observed as having a tendency to occur along trails and near abandoned dwelling. The colonies on Passage Island were found in forest openings and along footpath edges. At the mainland site in Alger County, small-flowered wood rush was found in a mesic northern hardwood forest, occurring in disturbed sandy soil where deposited by a creek; in this site it was associated with *Carex intumescens* (sedge), *Viola* sp. (violet), *Cirsium palustre* (European thistle), *Prunus serotina* (black cherry), *Epilobium* sp. (willow-herb), and the non-native

Bromus inermis (smooth brome). At the Manitou Island site discovered in 1996, this species was found sparsely at the edge of the limited zone of Copper Harbor conglomerate bedrock along the shore, where it occurred at the forest edge under *Abies balsamea* (balsam fir), *Picea glauca* (white spruce), and *Betula papyrifera* (paper birch). Notable herbaceous associates included the state special concern *Carex media* (sedge) and the state threatened *Polygonum viviparum* (alpine bistort). Elsewhere in its range, this species inhabits boreal forests, montane forests, thickets, meadows, and subalpine slopes (Flora of North America 2000, Clemants 1990).

Biology: *L. parviflora* is a perennial forb. The habitats described for this species indicate that disturbance is an important aspect in its natural history, and that natural disturbance such as windthrow, alluvial deposition, and similar events may be necessary to create colonization sites. Kershaw and Kershaw (1987) studied primary succession over a wide geographic area of tundra in northwestern Canada (Yukon Territory and Northwest Territories) via borrow pits created through large-scale road construction, and found *L. parviflora* to be an early and vigorous colonizer. Mueggler (1965) similarly found *L. parviflora* to respond well to a series of controlled disturbances involving patterns of logging and burning in a study of the ecology of seral shrub communities in northern Idaho. Among the numerous and ongoing studies of plant succession and recovery on Mount St. Helens in Washington state, *L. parviflora* has been shown to be an important component of refugia sites and a colonizer in pumice areas (Fuller and del Moral 2003, del Moral 1999, del Moral et al. 1995). Formation of a soil seed bank also plays an important role in the life history of this species, which is linked to the requirement for disturbance. Halpern et al. (1999) identified the seed banks in closed-canopy forests of the Olympic Peninsula in Washington State, finding *L. parviflora* to be an important component, whereas McGraw et al. (1991) extracted buried seeds from Alaskan tundra and found *L. parviflora* to comprise one of the two, oldest, seed bank species identified, remaining viable for at least 200 years or more.

Conservation/management: This plant is relatively rare on Isle Royale, although it is probably more frequent than indicated by collection records because it often occurs in small, localized colonies, and is fertile and most conspicuous in early summer. It is thus likely



to be overlooked. Because of its tendency to colonize edges and small openings, it is probably not threatened by the low level and type of human use existing in Isle Royale National Park where the majority of its populations exist. Recent discoveries on or very near the mainland of the Upper Peninsula indicate that this easily overlooked boreal species should be sought elsewhere in northern Michigan, particularly in close proximity to Lake Superior shoreline areas.

Research needs: Research on the basic life history of this species would be useful, especially studies on population structure, genetic diversity, and requirements for seed germination and establishment.

Related abstracts: Volcanic bedrock lakeshore, alpine bluegrass, alpine bistort, squashberry

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