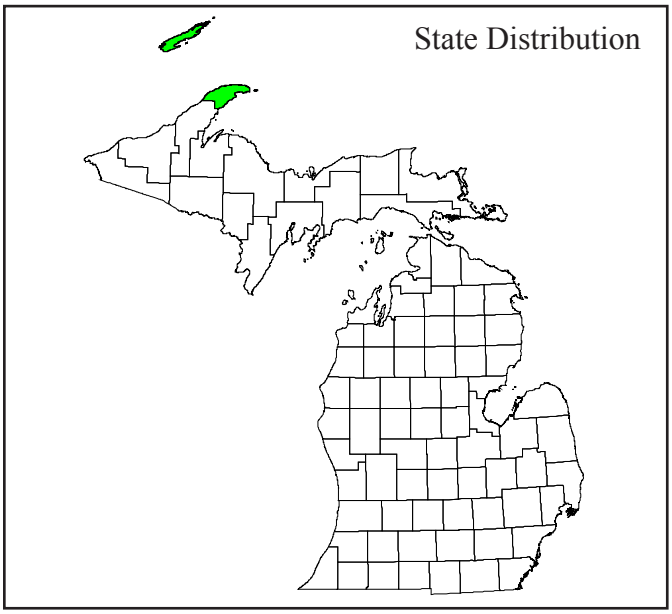
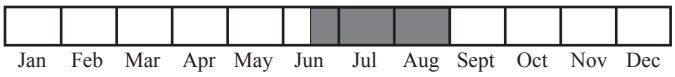
Castilleja septentrionalis Lindley — pale Indian paintbrush

Photo by Susan R. Crispin



Best Survey Period



Status: State threatened

Global and state rank: G5/S2S3

Other common names: northern paintbrush, northern Indian paintbrush, northern painted-cup, Labrador Indian paintbrush.

Family: Scrophulariaceae (snapdragon family)

Synonyms: *Castilleja pallida* (L.) Spreng. ssp. *septentrionalis* (Lindl.) Scoggan, *Castilleja pallida* (L.) Spreng. var. *septentrionalis* (Lindl.) A. Gray, C. acuminata (Pursh) Spreng.

Taxonomy: This taxon has sometimes been treated as a variety or subspecies of *Castilleja pallida* (Scoggan 1978).

Range: Pale Indian paintbrush is distributed in North America from the Northwest Territories and Manitoba eastward to Labrador, ranging south to the Lake Superior region of the Upper Midwest and montane areas of New England. It is considered rare in Maine, Manitoba, Minnesota, New Brunswick, New Hampshire, and Vermont (NatureServe 2007).

State distribution: Restricted in Michigan to Keweenaw and Houghton counties (Voss 1996), where there is a total of approximately 30 occurrences, this species is relatively common near Lake Superior in Isle Royale National Park. On the mainland, it is found at several localities scattered along the Keweenaw Peninsula's northern shore, also occurring on Manitou Island just east of the tip of the Peninsula.

Recognition: The typically unbranched (but often clumped) shoots of pale Indian paintbrush are **hairy only in the upper portions**, and bear narrow, alternate leaves that become broader toward the **crowded flower clusters**. **Cream-colored to sometimes purple tinged, leaf-like bracts**, each with **three shallow lobes**, nearly obscure the **tubular greenish-white flowers**. Our only other species of Indian paintbrush, the much more widespread *Castilleja coccinea*, has brilliant red-orange floral bracts and deeply lobed leaves. The latter species, which is distributed throughout much of the state, occurs primarily in fens and along shores of the eastern Upper Peninsula and Lower Peninsula. *C. coccinea* occasionally produces a form (f. *lutescens* Farw) in which the calyx and bracts are a bright yellow, and a white form has also been described (Voss 1996), but these variants can be distinguished by their mid-cauline leaves, which are deeply lobed and hairy, in contrast to the unlobed, smooth mid-cauline leaves of *C. septentrionalis*.

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Best survey time/phenology: Best sought when in flower, this species can also be reliably identified when in fruit. The vast majority of Michigan's occurrences have been observed from June through August, and the best survey period is conservatively indicated as being from mid-June through August.

FQI Coefficient and Wetland Category: 10, FACW+

Habitat: On the Keweenaw Peninsula, pale Indian paintbrush grows almost exclusively along the Lake Superior shore or in close proximity to it. Occurring primarily in association with Copper Harbor conglomerate bedrock or basaltic substrates, this species grows on the upper rock shores but also occurs in relatively shrubby zones, generally back from the lichen-dominated bedrock shore, where there is a moist humus substrate. It also occurs inland scattered through forest openings and at the edge of moderate overstory vegetation. Common associates include *Physocarpus opulifolis* (ninebark), *Alnus crispus* (western alder), *Shepherdia canadensis* (buffaloberry), *Carex* spp. (sedges), *Primula mistassinica* (bird's-eye primrose), *Campanula rotundifolia* (harebell), *Deschampsia cespitosa* (hair grass), *Fragaria virginiana* (strawberry), and occasionally *Pinguicula vulgaris* (butterwort). In Isle Royale National Park, paintbrush occurs primarily near rock shores and occasionally in boreal forest openings. Mainland specimens labeled from "Brockway Mountain" most likely came from shoreline areas near Brockway. Elsewhere throughout its rather broad range, this species inhabits rocky, gravelly, and peaty soils from low to fairly high elevations (Scoggan 1978).

Biology: Northern paintbrush is a perennial. In Michigan it blooms from early June through mid-July, producing many seeded capsules in August. Pennell (1935) suggests that the pale bract and flower color may be indicative of self-pollination. Plants of this genus are well known to be hemiparasitic (i.e. partially parasitic), gaining a portion of their nutrients through attachments to the roots of other plants. Heckard (1968) studied chromosome numbers and the occurrence of polyploids (i.e. plants with multiple sets of chromosomes as opposed to having the basic diploid number) in the genus *Castilleja*, and concluded that the widespread occurrence of polyploidy is prinicipally responsible for the high degree of morphological variation observed in the genus.

Conservation/management: Michigan's greatest concentration of northern paintbrush lies within Isle Royale National Park where this species is under little threat. On the mainland, this species is protected in a significant Nature Conservancy preserve and at least two Michigan Nature Association sanctuaries. Several mainland occurrences, however, remain highly vulnerable to residential and commercial shoreline development, especially in the Keweenaw Peninsula, where development pressures are steadily increasing along the highly scenic shores of Lake Superior.

Comments: In New England, Kimball and Weihrauch (2000) delineated and mapped alpine vegetation communities along the alpine-treeline ecotone boundary, where *C. septentrionalis* occurs in herbaceous snowbank meadows, to identify sensitive biomonitoring areas to study plant community responses to climate change.

Research needs: Research on virtually any aspect of the natural history of this species would assist in management and conservation efforts.

Related abstracts: Volcanic lakeshore cliff, volcanic bedrock lakeshore, volcanic bedrock glade, bald crested vertigo, mystery vertigo, eagle, merlin, northern blue, peregrine falcon, alpine bistort, alpine bluegrass, black crowberry, butterwort, calypso, downy oatgrass, dwarf bilberry, heart-leaved arnica, pearlwort, rock whitlow-grass, ram's head orchid, squashberry.

Selected references:

Heckard, L.R. 1968. Chromosome numbers and polyploidy in *Castilleja* (Scrophulariaceae). Brittonia 20: 212-226.

Kimball, K.D. and D.M. Weihrauch. 2000. Alpine vegetation communities and the alpine-treeline ecotone boundary in New England as biomonitors for climate change. USDA Forest Service Proceedings RMRS-P-15-Vol. 3

NatureServe. 2007. NatureServe Explorer: an online encyclopedia of life [web application]. Version 6.1. NatureServe, Arlington, Virginia. Available http://www.natureserve.org/explorer. (Accessed: September 11, 2007).

Pennell, F. W. 1935. The Scrophulariaceae of eastern temperate North America. Monogr. I, Acad. Nat. Sci. Phila.

Scoggan, H. J. 1978. The Flora of Canada. Nat. Mus. Nat. Sci. Publ. Botany. 4 vol., 1711 pp.

Voss, E.G. 1996. Michigan Flora. Part III. Dicots (Pyrolaceae-Compositae). Bull. Cranbrook Inst. Sci. 61 & Univ. of Michigan Herbarium. xix + 622 pp.

Abstract citation:

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