

Isoetes minima A.A. Eaton
midget quillwort
Isoetaceae (Quillwort Family)

Status: State Review Group 1
Rank: G2S1

General Description: Adapted from the FNA eds. treatment of *Isoetes howellii* (1993) and Taylor et al. (2001): *Isoetes minima* is a terrestrial quillwort that is usually found in seasonally saturated areas. The rootstock is 3 lobed and nearly globose. The leaves are linear, spirally arranged, less than 4 in. (10 cm) long, deciduous, bright green, pale to brown or lustrous black toward the base, pliant, and gradually taper toward the tip. The sporangia are borne at the base of the leaves. The sporangium lacks a velum (a membranous flap of tissue partially covering the sporangium). The sporangium wall is brown-streaked to completely brown. The megaspores inside the sporangium are spiny, white, and less than 420 µm in diameter.

Identification Tips: *Isoetes minima* is very similar in appearance to *I. howellii* and *I. nuttallii*, and can be distinguished by the following. *I. minima* has small, spiny megaspores, and sporangia that completely lack a velum, whereas the megaspores of *I. howellii* have low ridges and its sporangia have a partial velum. The megaspores of *I. nuttallii* are smooth or have tuber-like projections, and its sporangia are completely covered by a velum. The spiny megaspores of *I. minima* are unique among all other seasonal terrestrial *Isoetes* species in North America. The megaspores can be seen with the naked eye, but a dissecting microscope is required to see whether or not they are spiny (Ceska 2005).

Phenology: In Washington, the species was identified in late June.

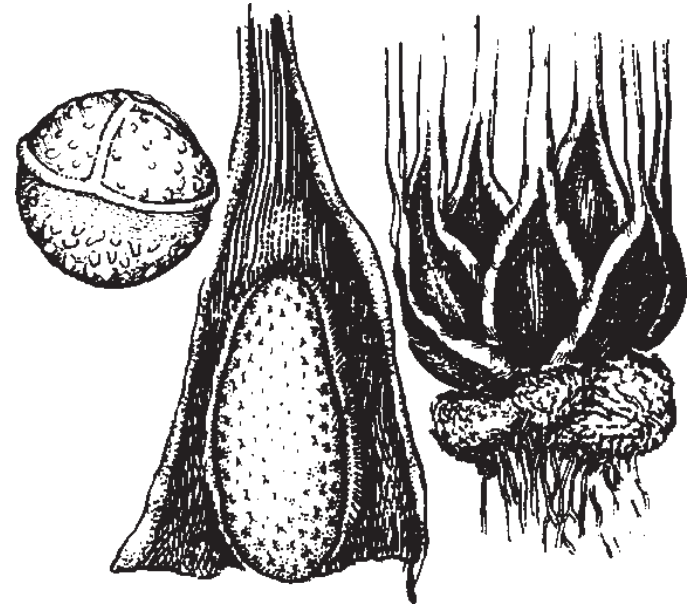
Range: *Isoetes minima* is known from British Columbia and in Kittitas and Spokane County, Washington.

Habitat: This species has been found in seasonally wet swales in big sagebrush (*Artemisia tridentata*) shrub steppe, at an elevation of 5300 ft. Associated species include camas (*Camassia quamash*), Douglas' onion (*Allium douglasii*), dwarf hesperochiron (*Hesperochiron pumilus*), false mermaidweed (*Floerkea proserpinacoides*), Sierra springbeauty (*Claytonia nevadensis*) and narrowleaf miners-lettuce (*Montia linearis*). There is also a historic record for this species from the Spangle area, which once supported large vernal pool complexes.

Ecology: In eastern Washington *Isoetes minima* grows in depressions that are seasonally wet, drying by mid-summer (Ceska & Ceska 2001).

State Status Comments: Because this species was recently added to the Washington rare plant list, and because of its minute size, not

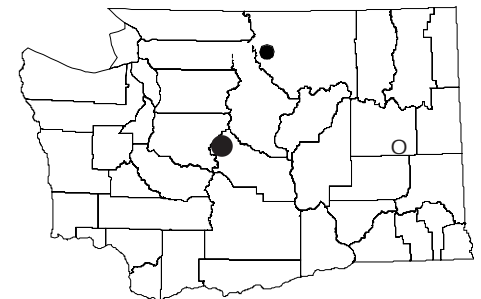
Isoetes minima
midget quillwort



This is an illustration of *Isoetes howellii* (Engelm.) which closely resembles *Isoetes minima*. However, the megaspores of *I. minima* are spiny, and its sporangia completely lack a velum. Whereas, the megaspores of *I. howellii* have low ridges and its sporangia have a partial velum shown here.

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Known distribution
of *Isoetes minima*
in Washington



● Current (1980+)
○ Historic (older than 1980)

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much is known about the degree of its rarity in the state at this time. There is one known site and one historic collection site from eastern Washington.

Inventory Needs: Seasonally wet habitat in eastern Washington should be investigated.

Threats and Management Concerns: Threats and management concerns have not been identified for this species. However, vernal pools and seasonally wet areas in eastern Washington are vulnerable to damage by grazing cattle.

Comments: Hitchcock et al. (1969) do not list *Isoetes minima*. In 1922 N.E. Pfeiffer reduced A.A. Eaton's 1889 treatment of *I. minima* into a variety of *I. howellii*, (*I. howellii* var. *minima* (A.A. Eaton) N. Pfeiff), which is the taxonomy that the FNA eds. (1993) currently follow. However, recent genetic work found *I. minima* to be only distantly related to *I. howellii*, and distinct enough to be recognized as a species (Taylor et al. 2001).

References:

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Taylor, C.W., N. T. Luebke, and A. R. Lekschas. 2001. Taxonomic status and evolutionary relationship of *Isoetes minima* A.A. Eaton (Isoetaceae) based on nuclear ribosomal DNA internal transcribed spacer sequences. Botanical Electronic News (BEN): issue #304