



Best Survey Period



Status: State threatened

Global and state rank: G4G5/S2S3

Family: Rosaceae (Rose family)

Other common names: prairie avens, purple avens

Total range: *Geum triflorum* ranges from western New York north to Ontario, through the Great Lake states, occurring west through the Great Plains, the Rockies, and to British Columbia and California. It is considered rare in New York and Michigan.

State distribution: *Geum triflorum* occurs primarily in the Lower Peninsula, where it is restricted to dry prairies, barrens, and oak-pine savannas of Montcalm, Oceana, Muskegon, and Newaygo counties. There are a few historical collections from Kent and Allegan counties where it has not been observed in several years. In the eastern Upper Peninsula, a well-known disjunct population occurs in the alvar grasslands on Drummond Island in Chippewa County.

Recognition: The hairy basal leaves of *Geum triflorum* are **pinnately-compound** (leaf divided into leaflets that are positioned in two rows along a central axis) with the lateral leaflets increasing in size toward the leaf tip. The short (8-12mm) floral shoots bear a few reduced leaves and **terminate in a loose cluster of several flowers on arching or drooping stalks**. **Dark purple, triangular sepals** obscure the short (8-12mm),

maroon petals that open only slightly. When in fruit, the **silky styles** elongate to produce a cluster of pale, **rosy plumes** that give this species its “prairie-smoke” appearance when viewed from a distance.

Prairie smoke is somewhat similar to other species of *Geum*, such as *G. rivale* (water avens), but is unlikely to be confused when in flower or fruit owing to its long, plumose styles. Prairie-smoke is also somewhat superficially similar to the common *Potentilla anserina* (silverweed), however the latter can be distinguished by leaves that are glabrous (not hairy) above and yellow flowers.

Best survey time/phenology: Surveys are best conducted during the flowering and fruiting periods from mid-May to mid-June.

Habitat: Throughout its range, *Geum triflorum* is usually found in prairies and dry, open woodlands. Most of the populations found in Michigan occur in dry sand prairie and other types of prairie remnants, frequently occurring in Sparta loamy sand. It is often concentrated on lower slopes, probably favoring areas of increased moisture. *Geum triflorum* is typically found growing with such dominants as *Carex pensylvanica* (Pennsylvania sedge) and *Danthonia spicata* (poverty grass). Other associates include *Rubus allegheniensis* (blackberry), *Artemisia caudata* (wormwood), *Blephilia ciliata* (horsemint), *Coreopsis lanceolata* (lance-leaved coreopsis), *Heuchera richardsonii* (prairie alum-root), *Opuntia compressa*



(prickly pear), *Phlox pilosa* (downy phlox), and *Penstemon hirsuta* (hairy beard-tongue). On Drummond Island, *Geum triflorum* grows on seasonally wet organic soils that overlie limestone pavement, occurring in a natural grassland community known as alvar. It is commonly associated with such typical species as *Arenaria stricta* (stiff sandwort), *Antennaria plantaginifolia* (pussy toes), *Castilleja coccinea* (Indian paintbrush), *Eleocharis compressa* (flat stemmed spikerush), *Carex scirpoidea* (bulrush sedge), *Juniperus communis* (ground juniper), *Saxifraga virginensis* (Virginia saxifrage), and *Senecio pauperculus* (ragwort).

Biology: *Geum triflorum* is a rhizomatous (possessing an elongate, underground stem) perennial. It flowers in mid-May and bears fruit from late-May to mid-June. Plants may flower as early as their second year of growth, but young plants are often vulnerable to desiccation. Bumblebees effect pollination by forcing their way through the nearly closed petals in search of nectar. The amplified, plumose styles aid the dispersal of fruits by wind and/or animals. Seeds are ready to germinate immediately upon maturation and can be stored for up to two years with high germination rates. In the fall, the leaves turn burgundy red.

Conservation/management: This species is threatened by severe or persistent disturbances, especially ORVs that destroy turf and destabilize the easily erodable sandy soils found in dry sand prairies. In addition, *Geum triflorum* is threatened by competition in disturbed areas from aggressive weeds such as *Centaurea maculosa* (spotted knapweed) and *Hypericum perforatum* (St. John's-wort). The best strategy for conservation of *Geum triflorum* is habitat preservation and the minimization of severe unnatural disturbances such as that caused by ORVs. Where invasive species are significant, appropriate application of prescribed fire may favor *Geum triflorum*'s establishment and proliferation by reducing competition. Since succession is extremely slow in dry sand prairies, prescribed burning should be infrequent, and spring fires should be avoided (Rock 1981). In the alvar communities of Drummond Island, conservation of prairie smoke will be favored by minimizing mechanical and hydrological disturbances.

Geum triflorum is known from at least three protected land sites, a Nature Conservancy preserve, a Michigan Nature Association Sanctuary, and a National Forest Ecological Study Area. Several other colonies are on state or federal lands, some of which are proposed for Natural Area designation.

Research needs: Detailed research to determine optimal fire management regimes is of high priority for this species, as well as monitoring of populations in restoration areas.

Related abstracts: Oak-pine savanna, Hill's thistle, red-legged spittlebug

Selected references:

- Burrell, C.C. 1992. Prairie Smoke, *Horticulture* May ad. p. 96.
 Rock, H.W. 1981. Prairie propagation handbook; 6th ed. Wehr Nature Center, Milwaukee. 74pp.
 Voss, E.G. 1985. Michigan Flora: Part II, Dicots (Saururaceae-Cornaceae). Cranbrook Inst. of Sci. Bull. 59 and U. of Mich. Herbarium, Ann Arbor, MI.

Abstract citation:

- Choberka, E.G., P.J. Higman, and M.R. Penskar. 2000. Special plant abstract for *Geum triflorum* (prairie smoke). Michigan Natural Features Inventory, Lansing, MI. 2 pp.

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