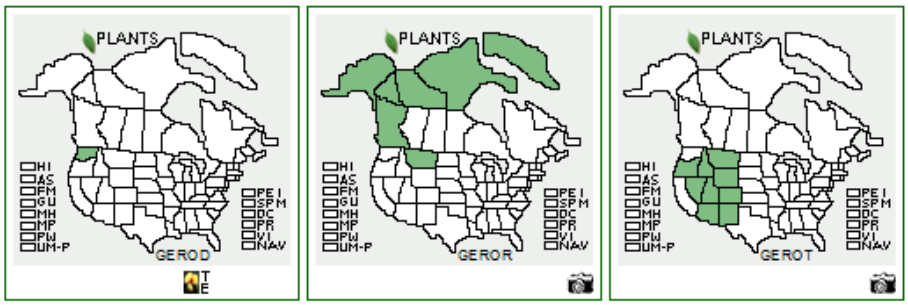
Plant Propagation Protocol for *[Insert Species]*

ESRM 412 – Native Plant Production

Protocol URL: https://courses.washington.edu/esrm412/protocols/*[*GERO2*.pdf]*

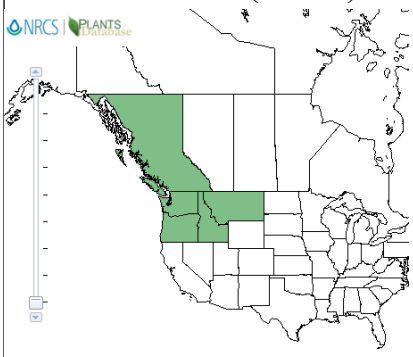
TAXONOMY	
Plant Family	Rosaceae
Scientific Name	*Geum rossii* (R. Br.) Ser. (USDA NRCS).
Common Name	Ross' avens (USDA NRCS).
Species Scientific Name	*Geum rossii* (R. Br.) Ser. (USDA NRCS).
Scientific Name	*Geum rossii* (R. Br.) Ser. (USDA NRCS).
Varieties	*Geum rossii* (R. Br.) Ser. var. *turbinatum* (Rydb.) C.L. Hitchc, *Geum rossii* (R. Br.) Ser. var. *depressum* (Greene) C.L. Hitchc, *Geum rossii* (R. Br.) Ser. var. *rossii* [HC] (Giblin).
Sub-species	*Geum rossii* (R. Br.) Ser. var. *turbinatum* (Rydb.) C.L. Hitchc, *Geum rossii* (R. Br.) Ser. var. *depressum* (Greene) C.L. Hitchc, *Geum rossii* (R. Br.) Ser. var. *rossii* [HC] (Giblin).
Cultivar	
Common Synonym(s)	*Geum rossii* (R. Br.) Ser. var. *turbinatum* (Rydb.) C.L. Hitchc, *Geum rossii* (R. Br.) Ser. var. *depressum* (Greene) C.L. Hitchc, *Geum rossii* (R. Br.) Ser. var. *rossii* [HC] (Giblin).
Common Name(s)	Alpine avens, Ross' avens (The American Southwest).
Species Code (as per USDA Plants database)	GERO2 (USDA NRCS).
GENERAL INFORMATION	

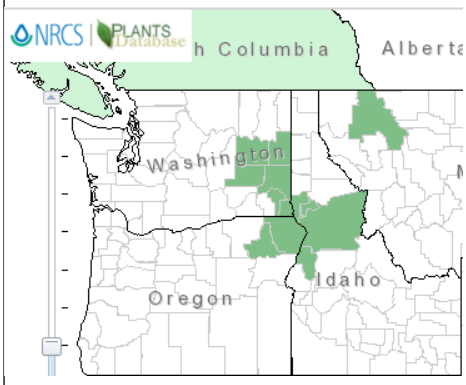
Geographical range	Native range for each subspecies:



Geum rossii var. *depressum* Ross' avens | *Geum rossii* var. *rossii* Ross' avens | *Geum rossii* var. *turbinatum* Ross' avens

For *Geum rossii* (R. Br.) Ser.:





Ecological distribution	Upper slopes in arctic zones, moist to mesic environments, generally occurs in soils made from crystalline parent material (Cooper 1997).
Climate and elevation range	Climate: High-elevation alpine regions, with strong winds and steep slopes. Moist mineral soils. Summers are dry and hot, whereas winters are moist and cold (Montana National Heritage Program). Elevation Range: 9,800-10,400 ft (Montana National Heritage Program).
Local habitat and abundance	Local habitat: High-elevation open areas. Often in deep, moist soils. Found in abundance in rocky alpine zones (Washington State DNR). Commonly associated species: *Pinus albicaulis, Heuchera cylindrica, Polystichum lemmonii, Silene acualis, Polemonium pulcherrimum, Lupinis lepidus* var. *lobbii, Phlox diffusa, Eremogone capillaris,* and *Carex* spp. (Washington State DNR).
Plant strategy type / successional stage	Rhizomatous species (Klinkenberg 2017), susceptible to out-competition by invasive species in times of disturbance, late successional species (flowers through August) (Giblin).
Plant characteristics	Herbaceous perennial forb. Forms dense thickets due to scaly rhizomes. Has basal pinnate leaves that are between 4-12cm long. Mature plants flower and fruit (Department of Geography UBC & UBC Herbarium).
PROPAGATION DETAILS	
Ecotype	N/A
Propagation Goal	Container (plug). Although *Geum rossii* is rhizomatous, propagation is done almost primarily by seed (Baskin, Baskin 2002). This preserves the species' biodiversity, as it is not abundant throughout its native region.
Propagation Method	Seed (Baskin, Baskin 2002).
Product Type	Container (plug) (Baskin, Baskin 2002).
Stock Type	Container (Baskin, Baskin 2002).
Time to Grow	One growing season (Baskin, Baskin 2002).
Target Specifications	Plants in small containers can be outplanted.
Propagule Collection Instructions	*Geum rossii* blooms in mid-July, so seed collection should be done after the flowers and fruits die off -- around late August through mid-September (Central Yukon Species Inventory Project).

Propagule Processing/ Propagule Characteristics	Seeds are collected before they enter dormancy. If planted immediately into proper soil media, the seed will germinate regardless of whether or not it is exposed to light, as long as the temperature cycle resembles its natural climate. There needs to be a cold period before the warm "spring" (Baskin, Baskin 2002).
Pre-Planting Propagule Treatments	Temperature must resemble alpine regions during seed dormancy. Seeds do not require cleaning or storing if they are planted directly from the mother plant.
Growing Area Preparation / Annual Practices for Perennial Crops	Grown to be planted as plugs in small containers. Growing media must resemble alpine soils with high mineral content.
Establishment Phase Details	N/A -- no information found.
Length of Establishment Phase	One dormancy season, one growing season (Baskin, Baskin 2002).
Active Growth Phase	N/A -- no information found.
Length of Active Growth Phase	Plants are not actively growing during the cold winter months, so their active growth phase lasts from spring through early fall (Baskin, Baskin 2002).
Hardening Phase	N/A -- no information found.
Length of Hardening Phase	N/A -- no information found.
Harvesting, Storage and Shipping	No time needed to store plants. Can be outplanted as soon as they are germinated in a container (plug) form (Baskin, Baskin 2002).
Length of Storage	No time needed to store plants. Can be outplanted as soon as they are germinated in a container (plug) form (Baskin, Baskin 2002).
Guidelines for Outplanting / Performance on Typical Sites	Can be outplanted as soon as they are germinated in a container (plug) form (Baskin, Baskin 2002).

Other Comments	Much more research is needed to truly understand the seasonal and reproductive cycles of *Geum rossii*. The information found was very scarce and unsubstantiated when compared to more abundant species.

INFORMATION SOURCES

References	Baskin, C., & Baskin, J. (2002). Native Plant Network. Retrieved May 28, 2019, from https://npn.rngr.net/renderNPNProtocolDetails?selectedProtocolIds=rosaceae-geum-1527&referer=wildflower Camp, P., & Gamon, J. G. (2011). Geum rosii (R. BR) ser. var. Depressum (Greene). *The Rare Plants of Washington*. Retrieved from https://www.dnr.wa.gov/publications/amp_nh_gerod.pdf Central Yukon Species Inventory Project. (n.d.). Geum rossii: Ross's Aven. Retrieved May 28, 2019, from https://www.flora.dempstercountry.org/0.Site.Folder/Species.Program/Species2.php?species_id=Geum.rossi Cooper, S. V. (n.d.). Community Field Guide--Report. Retrieved May 28, 2019, from http://mtnhp.org/ecology/Guide_Report.asp?elcode=CEGL001965 EFlora. (n.d.). Flora of North America. Retrieved May 28, 2019, from http://www.efloras.org/florataxon.aspx?flora_id=1&taxon_id=250100227 Giblin, D. (n.d.). Geum Rosii. Retrieved May 28, 2019, from http://biology.burke.washington.edu/herbarium/imagecollection/taxon.php?Taxon=Geum%20rossii Klinkenberg, B. (2017). E-Flora BC: Electronic Atlas of the Flora of British Columbia. Retrieved May 28, 2019, from http://linnet.geog.ubc.ca/Atlas/Atlas.aspx?sciname=Geum rossii var. rossii Montana Natural Heritage Program. (n.d.). Ross' Avens - *Geum rossii*. Retrieved May 28, 2019, from http://fieldguide.mt.gov/speciesDetail.aspx?elcode=PDROS0S0E0 Natural Resources Conservation Service. (n.d.). Geum rossii (R. Br.) Ser. Show All Ross' avens. United States Department of Agricultre. Retrieved May 28, 2019, from https://plants.usda.gov/core/profile?symbol=gero2. The American Southwest. (n.d.). Geum Rosii, Alpine Avens. *The American Southwest*. Retrieved May 28, 2019, from https://www.americansouthwest.net/plants/wildflowers/geum-rossii.html.

Other Sources Consulted	Longterm Ecological Research. (n.d.). Niwot Ridge Flora. Retrieved May 28, 2019, from http://niwot.colorado.edu/life/flora-topic/niwot-_ridge_flora
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