Template - Plant Propagation Protocol
ESRM 412 – Native Plant Production
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This template is modified from that available at:
http://www.nativeplantnetwork.org/network/SampleBlankForm.asp

TAXONOMY	
Family Names	
Family Scientific Name:	Rosaceae
Family Common Name:	Rose family
Scientific Names	
Genus:	*Geum*
Species:	*macrophyllum*
Species Authority:	Willd
Variety:	Na
Sub-species:	Na
Cultivar:	Na
Authority for Variety/Sub-species:	GEUMAC
Common Synonym(s)	
Genus:	Na
Species:	Large leaved avens
Species Authority:	Na
Variety:	Na
Sub-species:	Na
Cultivar:	Na
Authority for Variety/Sub-species:	Na
Common Name(s):	Large leaved avens
Species Code (as per USDA Plants database):	GEUMAX
GENERAL INFORMATION	
General Distribution (geographical range (states it occurs in), ecosystems, etc):	Found in western North America, from Alaska to Baja California, as far east as to the great lakes and nova scotia. Occurs were precipitation ranges from 12-55 inches. In mostly moist, partially shaded areas such as moist forest openings, stream banks, meadows and shrub thickets. (USDA 2004) For the species, wetland indicator status is FACW+ (US Fish and Wildlife Service 1988).
Climate and elevation range	Found from sea level to the subapline, temperate areas. (Rickett 1973)
Local habitat and abundance; may	May be a wetland indicator. (US Fish and Wildlife

include commonly associated species	Service 1988)
Plant strategy type / successional stage (stress-tolerator, competitor, weedy/colonizer, seral, late successional)	Early successional, fairly stress tolerant if condition are right (rich soils), not a major competitor. (Rickett 1973)
PROPAGATION DETAILS	
Ecotype (this is meant primarily for experimentally derived protocols, and is a description of where the seed that was tested came from):	Washington
Propagation Goal (Options: Plants, Cuttings, Seeds, Bulbs, Somatic Embryos, and/or Other Propagules):	Plants
Propagation Method (Options: Seed or Vegetative):	Seed
Product Type (options: Container (plug), Bareroot (field grown), Plug + (container-field grown hybrids, and/or Propagules (seeds, cuttings, poles, etc.))	Container (plug)
Stock Type:	116 ml containers (Evens etal 2004).
Time to Grow (from seeding until plants are ready to be outplanted):	4 months (Norman 1993)
Target Specifications (size or characteristics of target plants to be produced):	Stock Type: Container seedling Height: 6-9 cm, 4 to 6 leaves Caliper: n/a Root System: Firm plug in container. (Evens etal 2004).
Propagule Collection (how, when, etc):	Seeds are collected in late summer to early fall once the seeds are brown and the inflorescence is dry. Once the fruit achenes turn brown they are hand-stripped from the inflorescence, collected in paper bags and kept well ventilated (Skinner and David M) 2005
Propagule Processing/Propagule Characteristics (including seed density (# per pound), seed longevity, etc):	Seeds can be rubbed free from fruit genitally. Then placed in an air column separator for cleaning. Seed Density: 794,000 seeds/lb (USDA 2004). Seed longevity: 3 to 5 years (Stored at 3 to 5 degrees C in a sealed container) (Lyons 1993).
Pre-Planting Propagule Treatments (cleaning, dormancy treatments, etc):	Seed dormancy is classified as physiological dormancy (Baskin 1998). Some unpublished tests were run at the Pullman PMC that showed only a 5% germination from unstratified seed. When the seeds were given 30 days of cool, moist

	stratification they germinated at 48%. With 60 days of cool, moist stratification the seeds germinated at 98%. When seeds were given 90 days of cool, moist stratification, then followed by cool, outdoor growing conditions the results were 90% germination, (although these plants were not ready to be transplanted to the field during this same spring) (Skinner 2005).
Growing Area Preparation / Annual Practices for Perennial Crops (growing media, type and size of containers, etc):	Grown in green house or outdoor nursery using direct seeding. Cover seeds using a growing media "70% 6:1:1 milled sphagnum peat, perlite, and vermiculite and 30% sand with Osmocote controlled release fertilizer (13N:13P2O5:13K2O; 8 to 9 month release rate at 21C) and Micromax fertilizer (12%S, 0.1%B, 0.5%Cu, 12%Fe, 2.5%Mn, 0.05%Mo, 1%Zn)" (Evens etal 2004). Green house temperatures should be between 21 and 25 Degrees C.
Establishment Phase (from seeding to germination):	Keep medium moist until germination, witch appears to be uniform and rapid; 7 to 10 days after sowing in the greenhouse. (Skinner 2005)
Length of Establishment Phase:	1 to 3 weeks
Active Growth Phase (from germination until plants are no longer actively growing):	Keep plants watered deeply every other day, fertilizing bi-weekly with 13-13-13 liquid NPK at 100 ppm or another fertilizer containing micro-nutrients (Evens etal 2004).
Length of Active Growth Phase:	2 to 3 weeks
Hardening Phase (from end of active growth phase to end of growing season; primarily related to the development of cold-hardiness and preparation for winter):	Depending on weather conditions plants may be moved to the cold frame in late March or early April. They are should be watered every other day when weather is cool, and every day when hot and dry. (Skinner 2005).
Length of Hardening Phase:	2-4 weeks
Harvesting, Storage and Shipping (of seedlings):	Total Time To Harvest: 4 months Harvest Date: September Storage: In cooler just above freezing (Evans etal 2004)
Length of Storage (of seedlings, between nursery and outplanting):	5 months
Guidelines for Outplanting / Performance on Typical Sites (eg, percent survival, height or diameter growth, elapsed time before flowering):	Outplant in late summer Height should be 6-9 cm, with 4 to 6 leaves. (Norman 1993).
Other Comments:	Species should be well protected during over wintering when in containers, they are more susceptible to winter damage than other native species (Larrison 1974).

	Various Native American tribes used the roots and leaves for different medicinal purposes (Parish 1996).
INFORMATION SOURCES	
References:	Evans, Jeff; Hosokawa, Joy; Luna, Tara; Wick, Dale. 2004. Propagation protocol for production of container Geum macrophyllum Willd. plants (116 ml conetainers); Glacier National Park, West Glacier, Montana. In: Native Plant Network. URL: http://www.nativeplantnetwork.org (accessed 9 May 2007). Moscow (ID): University of Idaho, College of Natural Resources, Forest Research Nursery. Seed Germination Theory and Practice, Second Edition, Deno, Norman, published 1993. Seeds: Ecology, Biogeography, and Evolution of Dormancy and Germination, Baskin and Baskin, Academic Press, 1998. Skinner, David M. 2005. Propagation protocol for production of container Geum macrophyllum Willd. Var. perincisum (Rydb.) Raup plants; Pullman Plant Materials Center, Pullman, Washington. In: Native Plant Network. URL: http://www.nativeplantnetwork.org (accessed 9 May 2007). Moscow (ID): University of Idaho, College of Natural Resources, Forest Research Nursery. Larrison, Earl J., Grace W. Patrick, William H. Baker, and James A. Yaich. 1974. Washington Wildflowers. The Seattle Audubon Society. Seattle, WA. 376 pp. Lyons, C.P. 1997. Wildflowers of Washington. Lone Pine Publishing, Renton, WA. 192 pp. Parish, Roberta, Ray Coupe, and Dennis Lloyd (eds.). 1996. Plants of Southern Interior British Columbia. Lone Pine Publishing, Vancouver, BC, Canada. 463 pp. Rickett, Harold W. 1973. Wildflowers of the United States: The Central Mountains and Plains. Vol. 6. (3 parts). McGraw Hill, New York. USDA, NRCS. 2004. The PLANTS Database, Version 3.5 (http://plants.usda.gov). National Plant Data Center,

	Baton Rouge, LA 70874-4490 USA. US Fish and Wildlife Service. 1988. National list of vascular plant species that occur in wetlands. US Fish & Wildlife Service Biological Report 88 (24).
Other Sources Consulted (but that contained no pertinent information):	Burton, M. Philip J. 2001. Development and testing of native grasses and legumes for seeding in the Northern B.C. Interior. FRBC project SB96031-RE
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