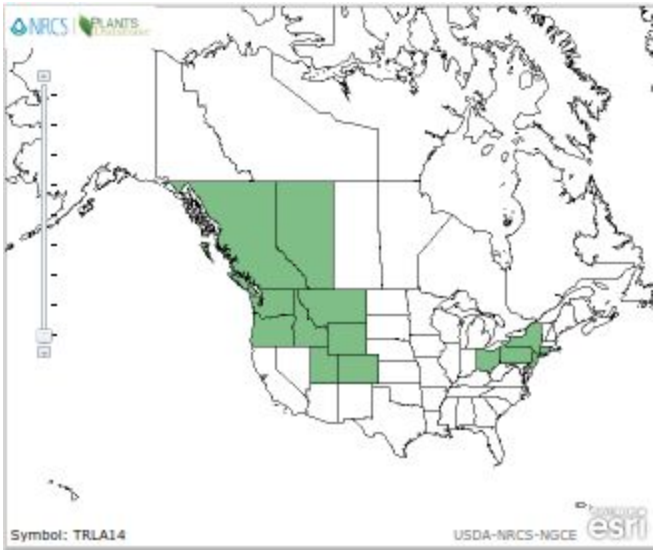
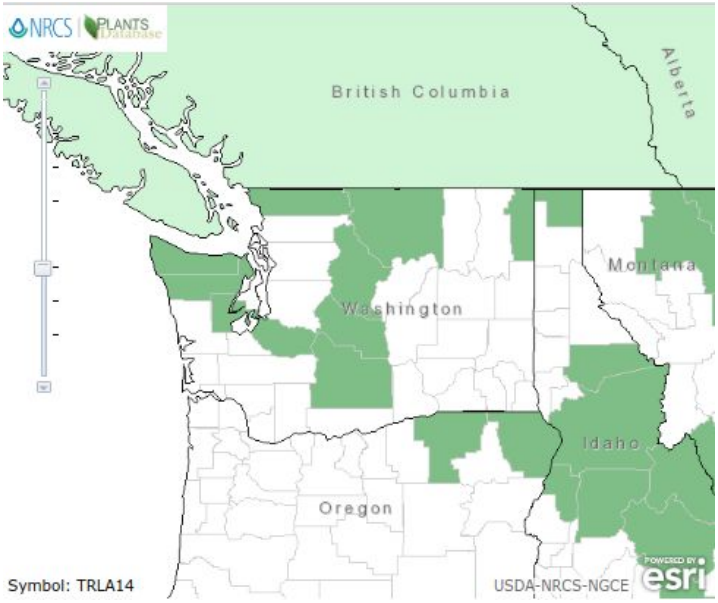
Plant Propagation Protocol for *Trollius laxus*
ESRM 412 – Native Plant Production
Protocol URL: https://courses.washington.edu/esrm412/protocols/TRLA14.pdf

Source: https://plants.usda.gov/java/largeImage?imageID=trla14_3h.jpg

TAXONOMY	
Plant Family	
Scientific Name	Ranunculaceae[1]
Common Name	Buttercup[1]
Species Scientific Name	
Scientific Name	*Trollius laxus* Salisb.[1]
Varieties	N/A
Sub-species	*Trollius laxus* Salisb. ssp. *albiflorus* (A. Gray) Á. Löve & D. Löve & Kapoor[1] *Trollius laxus* Salisb. ssp. *laxus*[1]
Cultivar	N/A
Common Synonym(s)	N/A
Common Name(s)	American globeflower[1] spreading globeflower[2] spreading globe-flower[3] American globe-flower[3] cabbage daisy[4]

Species Code (as per USDA Plants database)	TRLA14[1]
GENERAL INFORMATION	
Geographical range	 Source: https://plants.usda.gov/core/profile?symbol=TRLA14  Source: https://plants.usda.gov/core/profile?symbol=TRLA14
Ecological distribution	*Trollius laxus* is a globally rare perennial herb that typically grows in wetlands with cold, calcareous (alkaline) groundwater, including open fens and bogs, and along the edges of conifer swamps.[5] It can also occur in hardwood forests and woodlands.[5]

Climate and elevation range	Specific information on the climate and elevation range of *Trollius laxus* is unknown. However, *Trollius* species in general like cool, wet weather, and are often shade tolerant.[6]
Local habitat and abundance	Local habitats of *T. laxus* include meadows, seepage areas, and stream-banks.[4] It can also be found in snowbeds at high elevations and down into the subalpine zone along streams and in seepage areas.[4]
Plant strategy type / successional stage	*T. laxus* is suspected to be an early to mid-successional species because populations are likely to be suppressed by woody or herbaceous competitors.[2]
Plant characteristics	*T. laxus* is considered a perennial forb or herb.[1] It has basal leaves that are palmately divided with coarsely toothed margins.[2] Leaf size and stem height vary, with a maximum height of about 20 in (50cm).[2] The showy flowers are up to 2 in (5 cm) in diameter and are borne on the ends of the stems.[2] They have five to seven often yellow sepals that are petallike and broad, while the petals themselves are very reduced.[2] The fruits are aggregations of follicles, with each follicle containing 3-6 seeds on average.[3] *T. laxus* is closely related to the relatively common, widespread, western species *T. albiflorus*.[3]
PROPAGATION DETAILS	
Ecotype	N/A
Propagation Goal	Plants
Propagation Method	Seed
Product Type	Container (plug)
Stock Type	N/A
Time to Grow	Specific information for the time to grow *T. laxus* is unavailable.
Target Specifications	Specific information for target specifications to grow *T. laxus* is unavailable. Typically, container plants should have a well developed root system, without being rootbound before outplanting.
Propagule Collection Instructions	Peak flowering of *T. laxus* occurs in May and June and the fruits, which are aggregations of follicles, ripen in June and July.[5][7][8] Each follicle contains an average of 3 – 6 seeds.[8] Seeds are small, glossy, black, oblong in shape, and have no specialized dispersal structures.[8] There are no specific methods outlined for seed collection of *T. laxus*, except to collect after the follicles ripen in June and July.[8]

Propagule Processing/Propagule Characteristics	Specific information for the propagule processing/characteristics of *T. laxus* unavailable.
Pre-Planting Propagule Treatments	The seed of *Trollius* species should be sown in winter and placed outdoors to stratify for 90 days.[2] [9] [10] In early spring, seed should be moved to a propagation area at 55̊ -60̊ F (13̊-16̊ C).[9] Once seedlings have emerged, they should be thinned and moved to a cold frame.[9]
Growing Area Preparation / Annual Practices for Perennial Crops	Seedlings of *T. laxus* will grow better in calcareous soil than in acidic soil, if available.[10]
Establishment Phase Details	Specific information on the details of establishment of *T. laxus* unavailable.
Length of Establishment Phase	Seeds of *T. laxus* should germinate within two weeks after sowing.[10]
Active Growth Phase	Specific information on the active growth phase of *T. laxus* unavailable.
Length of Active Growth Phase	Seedlings emerging in spring typically reach blooming size the following growing season.[10]
Hardening Phase	Specific information for the hardening phase of *T. laxus* unavailable.
Length of Hardening Phase	Specific information for the length of hardening phase of *T. laxus* unavailable.
Harvesting, Storage and Shipping	Specific information for the harvesting, storage and shipping of *T. laxus* unavailable.
Length of Storage	Specific information for the length of storage of *T. laxus* unavailable.
Guidelines for Outplanting / Performance on Typical Sites	Individual plants should be outplanted 12 inches apart.[6]
Other Comments	
INFORMATION SOURCES	
References	(1) USDA, Natural Resources Conservation Service. The PLANTS Database- *Trollius laxus* Salisb. https://plants.usda.gov/core/profile?symbol=TRLA14 Accessed 2, May 2018. (2) Jones, K. *Trollius laxus Salisb. Spreading Globeflower*. New England Wild Flower Society; 2000 (3) eflora. Flora of North America. http://www.efloras.org/florataxon.aspx?flora_id=1&taxon_id=233501318 Accessed 5, May 2018. (4) Pojar, J, Mackinnon, A. Alaback, P.B. *Plants of the Pacific Northwest Coast: Washington,*

	Oregon, British Columbia and Alaska. Auburn, WA. Lone Pine Publishing; 1994. (5) NatureServe Explorer. An Online Encyclopedia of Life. http://explorer.natureserve.org/servlet/NatureServe?searchName=TROLLIUS+LAXUS Accessed 5, May 2018. (6) Byczynski, L. The Flower Farmer. Chelsea Green Publishing; 2008. (7) Rhoads, A. et al. Resource Recovery Plan for Spreading globeflower Trollius laxus Salisbury. Wild Resources Conservation Fund https://research.dcnr.pa.gov/GetPDF.ashx?1139+O+Trollius%20laxus%20resource%20recovery%20plan%20final.pdf Accessed 5, May 2018. (8) Scanga, Sara E.. *Population ecology of the rare wetland plant Trollius laxus (Ranunculaceae)*. State University of New York College of Environmental Science and Forestry, ProQuest Dissertations Publishing, 2009 (9) Seddon, G. Bicknell, A. *Plants Plus.* Rodale Press; 1987 (10) Brumback, W.E. 1988. Notes on propagation of rare New England species. Rhodora 91: 154-162.
Other Sources Consulted	Felbaum, Mitchell, et al. Endangered and Threatened Species of Pennsylvania. http://www.naturalheritage.state.pa.us/factsheets/14457.pdf Accessed 10, May 2018. Hill, L. *Secrets of Plant Propagation*. Storey Communications; 1985 Toogood, A. *Plant Propagation Made Easy*. Timber Press; 1994.
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