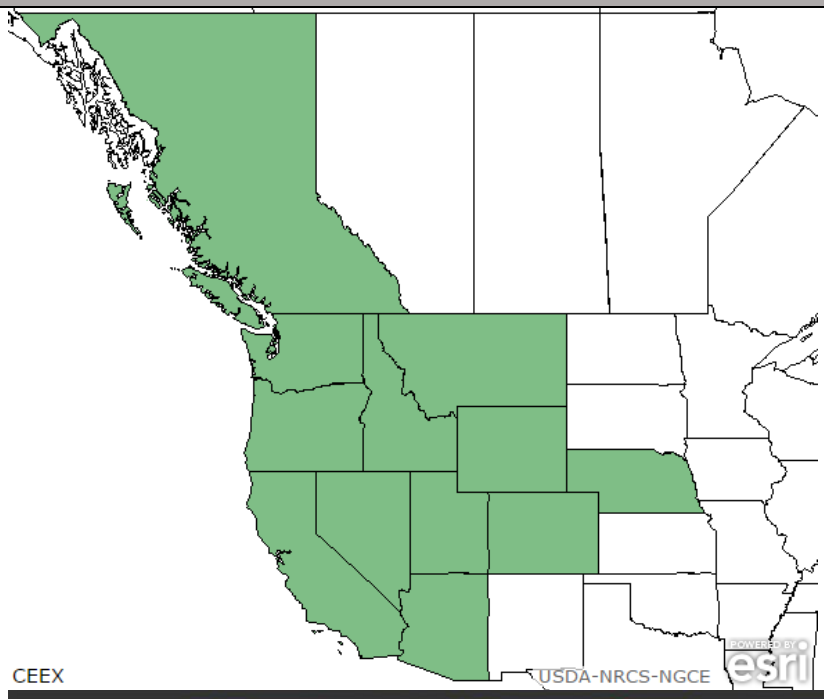
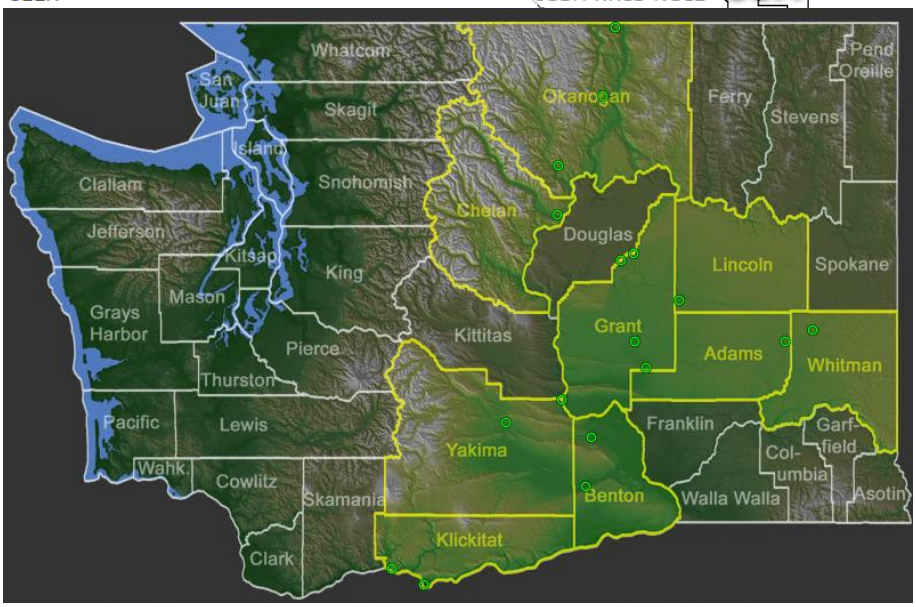
Plant Propagation Protocol for *Centaurium exaltatum*
ESRM 412 – Native Plant Production
Protocol URL: https://courses.washington.edu/esrm412/protocols/*CEEX.pdf*

TAXONOMY	
Plant Family	
Scientific Name	Gentianaceae
Common Name	Gentian
Species Scientific Name	
Scientific Name	Centaurium exaltatum (Griseb.) W. Wight ex Piper
Varieties	
Sub-species	
Cultivar	
Common Synonym(s)	Centaurium nuttallii (S. Watson) A. Heller Cicendia exaltata Griseb. Zeltnera exaltata (Griseb.) G. Mans.
Common	Desert Centaury

Name(s)	
Species Code	CEEX
GENERAL INFORMATION	
Geographical range	  Centaurium exaltatum can be found in most of the western United States as well as British Columbia . Within Washington state it is found east of the cascades (the image above shows in which counties specimens were collected, NOT the full extent of range).
Ecological distribution	Coastal Sage Scrub, Chaparral, Creosote Bush Scrub, Wetland-Riparian
Climate and elevation	Precipitation range for this species is from 8” to 18” annually and the elevation range is from 900 to 2200 ft. This species requires at least 120 frost free days,

range	and grows in temperatures above 52°F.
Local habitat and abundance	Centaurium exaltatum prefers moist alkaline soils, and is commonly associated with these species: alkali saltgrass (Distichlis spicata), rush species (Juncus spp.), common witchgrass (Panicum capillare), foxtail barley (Hordeum jubatum) and American bulrush (Schoenoplectus pungens var. longispicatus)
Plant strategy type / successional stage	Centaurium exaltatum prefers alkaline soils (up to 9 pH). This species does not reproduce vegetatively, and must grow anew from seeds every year. Because of this populations year to year can vary widely based on environmental conditions. Species survival depends on the seed bank, and seed dispersal via water, waterfowl, and small mammals.
Plant characteristics	Annual forb with single to many stalks that grow from 5 to 25 cm tall. Flowers can have 4 or 5 petals, and are often purple or white.
PROPAGATION DETAILS	
Ecotype	
Propagation Goal	Seeds
Propagation Method	Seed
Product Type	Propagules: more seeds
Stock Type	
Time to Grow	3 to 6 months until seeds can be collected.
Target Specifications	Mature specimens that have flowered and produced fruit.
Propagule Collection Instructions	Collect fruit in the summer before the capsules dry out and release the seeds. Fruits are slender capsules, 12 to 18 mm long, containing numerous, small, egg-shaped, pitted, and brown seeds
Propagule Processing/Propagule Characteristics	2,000,000 seeds per pound.
Pre-Planting Propagule Treatments	Cleaning: Pods were rubbed by hand to remove seed. Seeds are then sized using Laboratory Test Sieves, mesh size 50. Lot was then air-screened using an office Clipper, with a top screen, 50 x 50 wire and a bottom screen, blank, low speed, and low air. (for Centaurium arizonicum)
Growing Area Preparation / Annual Practices for Perennial Crops	Preparing moist, (slightly) alkaline soils of a medium or coarse texture will benefit this species the most. It should also be noted that Centaurium exaltatum does not like shade, fire, or drought.

Establishment Phase Details	Stratification is not required, and seeds have high germination rates under white light.
Length of Establishment Phase	2 weeks
Active Growth Phase	Summer
Length of Active Growth Phase	3 months.
Hardening Phase	None.
Length of Hardening Phase	None.
Harvesting, Storage and Shipping	Follow the same seed cleaning method above, and store in 33 to 38°F with low relative humidity.
Length of Storage	Possibly up to a few years in cold storage.
Guidelines for Outplanting / Performance on Typical Sites	Sowing seeds into the seed bank in early spring is the most effective outplanting technique. Not enough studies have been done with this species for reliable sowing density and in-situ germination rates.
Other Comments	
INFORMATION SOURCES	
References	USDA NRCS National Plant Data Team. "Centaurium Exaltatum (Griseb.) W. Wight Ex Piper." *USDA Plants Database*. N.p., n.d. Web. <https://plants.usda.gov/core/profile?symbol=CEEX>. "Centaurium Exaltatum (Griseb.) Piper." *The Calflora Database*. N.p., n.d. Web. <http://www.calflora.org/cgi-bin/species_query.cgi?where-calrecnum=1859>. Pringle, James S. "Zeltnera Exaltata." *Jepson EFlora*. N.p., n.d. Web. <http://ucjeps.berkeley.edu/eflora/eflora_display.php?tid=81828>. "Centaurium Exaltatum - (Griseb.) W. Wight Ex Piper." *NatureServe: An Online Encyclopedia of Life*. N.p., Nov. 2016. Web. <http://explorer.natureserve.org/servlet/NatureServe?searchSpeciesUid=ELEMENT_GLOBAL.2.142556>.

	Barner, Jim. "Centaurium (arizonicum)." *Native Plant Network Propagation Protocol Database*. N.p., 2007. Web. <https://npn.rngr.net/renderNPNProtocolDetails?selectedProtocolIds=gentianaceae-centaurium-3398>. Symonds, Josie. "Western Centaury (Zeltnera Exaltata)." *Plant Species at Risk Fact Sheet*. N.p., Feb. 2015. Web. <http://www.env.gov.bc.ca/okanagan/documents/Plant_SAR_Fact_Sheets/Zeltnera_exaltata.pdf>. Giblin, David, and Don Knoke. "Zeltnera Exaltata." *WTU Herbarium*. N.p., n.d. Web. <http://biology.burke.washington.edu/herbarium/imagecollection.php?Genus=Zeltnera&Species=exaltata>. Zivkovic, S., M. Devic, B. Filipovic, Z. Giba, and D. Grubisic. "Effect of NaCl on Seed Germination in Some Centaurium Hill. Species (Gentianaceae)." *Archives of Biological Sciences* 59.3 (2007): 227-31. Web. <http://www.doiserbia.nb.rs/img/doi/0354-4664/2007/0354-46640703227Z.pdf>.
Other Sources Consulted	
Protocol Author	Luke Russell
Date Protocol Created or Updated	05/21/17