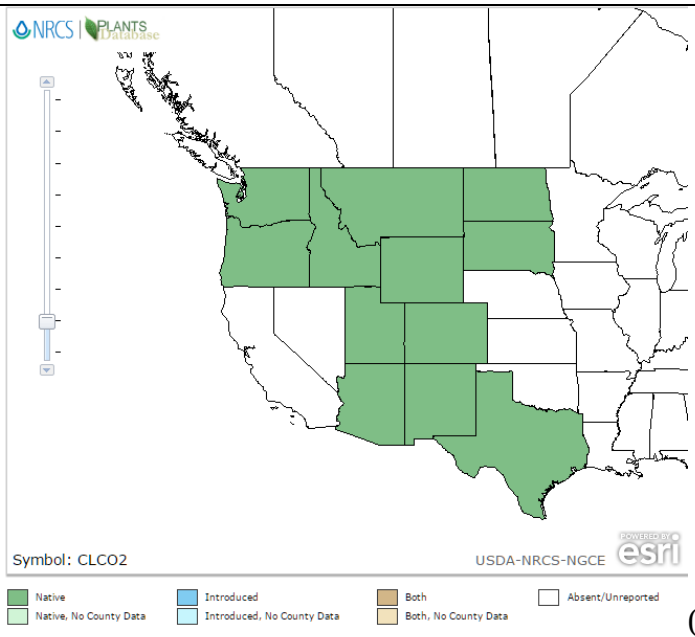
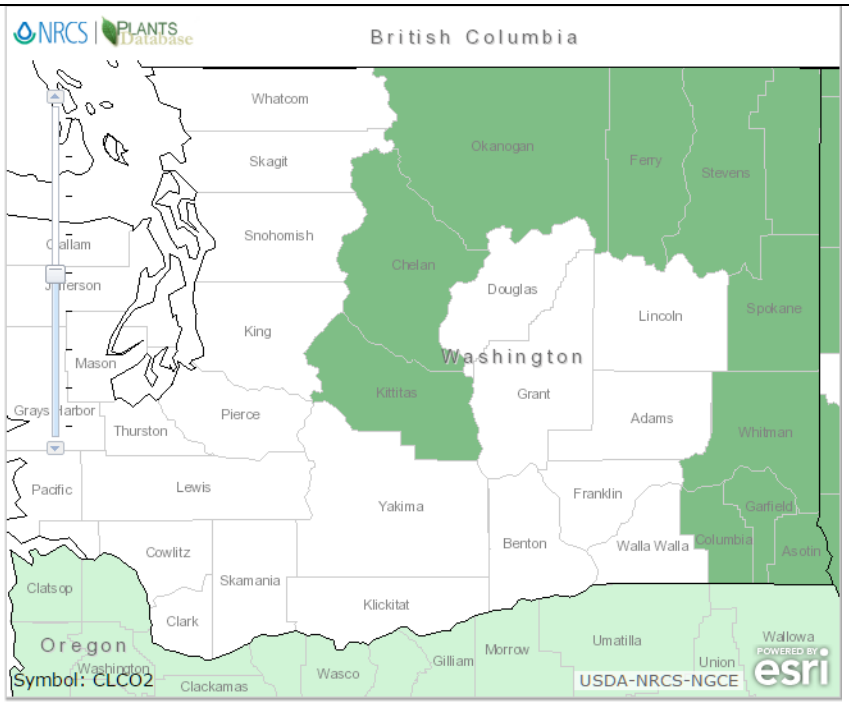
Plant Propagation Protocol for *Clematis columbiana* (Nutt.) Torr. & A. Gray
ESRM 412 – Native Plant Production
Protocol URL: https://courses.washington.edu/esrm412/protocols/*CLCO2.pdf*

TAXONOMY	
Plant Family	
Scientific Name	Ranunculaceae
Common Name	Buttercup
Species Scientific Name	
Scientific Name	*Clematis columbiana* (Nutt.) Torr. & A. Gray
Varieties	var. *tenuiloba* (A. Gray) J. Pringle
Sub-species	N/A
Cultivar	N/A
Common Synonym(s)	N/A
Common Name(s)	Rock clematis
Species Code (as per USDA Plants database)	CLCO2
GENERAL INFORMATION	
Geographical range	 (1)

	 (1)
Ecological distribution	Typically found in open areas, near slopes in montane and subalpine zones. (3)
Climate and elevation range	Lies within USDA delineated Hardiness Zones 4-8 (2), and found in mountainous regions with an elevation of 5,580 ft. to 10,500 ft. (5)
Local habitat and abundance	Commonly found in proximity to Subalpine firs and Beargrass habitats. (3) Not significantly abundant.
Plant strategy type / successional stage	*Clematis columbiana* is known as a climber, and can reach heights of 3 meters, shading out and intertwining with other plants. Resistant to certain pathogens including honey fungus and predation from rabbits. (2)
Plant characteristics	*Clematis Columbiana* is considered a perennial belonging to the dicot group, and has the ability to twine around other species. (1)
PROPAGATION DETAILS (all data collected from reference/source number three (3), unless otherwise listed)	
Ecotype	N/A
Propagation Goal	Plants
Propagation Method	Vegetative
Product Type	Container (plug)
Stock Type	800 ml containers
Time to Grow	~1 year
Target Specifications	Target specifications should include height measurements of roughly 4 cm. with roots forming a firm plug in their respective containers.
Propagule Collection Instructions	Vegetative propagation methods will involve softwood stem cuttings collected from viable plants around early June.
Propagule Processing/Propag	Cuttings from healthy plants should be kept in a moist/cold environment before treatment occurs. Seed density: 1,000,000 seeds/kg

ule Characteristics	
Pre-Planting Propagule Treatments	Stem cuttings should measure close to 3 cm. in length and 0.4 cm. in diameter, and collected in late June, or when flowering is prevalent. Treatment of the cuttings may involve the use of a rooting powder such as 8000 ppm Hormex.
Growing Area Preparation / Annual Practices for Perennial Crops	1:1 ratio of a sand and perlite potting medium, accompanied with a mist application method of watering. 800 ml containers with adequate drainage points (2).
Establishment Phase Details	Roughly 38% of the plant should establish as root with 50% of the cuttings producing well branched roots roughly 4 cm in length.
Length of Establishment Phase	7 weeks
Active Growth Phase	Following transfer of cuttings into 800 ml containers containing a 6:1:1 ratio of milled spaghnum peat, perlite, and vermiculite, application of ~ 2 grams of a controlled release fertilizer (Osmocote) is advised. Cuttings are then irrigated in a shadehouse for 4 weeks and moved into full sun exposure.
Length of Active Growth Phase	8 weeks
Hardening Phase	Light application of a 10-20-20 liquid NPK (nitrogen, phosphate, potassium) fertilizer at 200 ppm in August and September. Irrigation should be dialed down by October prior to winterization.
Length of Hardening Phase	5 months
Harvesting, Storage and Shipping	Collect seeds from mature plumose achenes when they've turned a brown color in late September and cleaned with a hammermill. Store overwinter under an insulating foam cover and snow.
Length of Storage	Seed longevity may last up to 2 years. 1.3 years total time required for entire harvest cycle.
Guidelines for Outplanting / Performance on Typical Sites	N/A
Other Comments	Young, rudimentary embryos may not germinate until the following year, following a ripening period.

INFORMATION SOURCES

References	1. USDA - Natural Resources Conservation Center. (n.d.). Plants Profile for Clematis columbiana (rock clematis). Retrieved May 20, 2016, from http://plants.usda.gov/core/profile?symbol=clco2 2. Plants for a Future. (n.d.). Clematis columbiana Rock Clematis PFAF Plant Database. Retrieved May 20, 2016, from http://www.pfaf.org/user/Plant.aspx?LatinName=Clematis columbiana

	3. Luna, T. (n.d.). Native Plant Network Propagation Protocol Database. Retrieved May 21, 2016, from http://npn.rngr.net/renderNPNProtocolDetails?selectedProtocolIds=ranunculaceae-clematis-140&referer=wildflower West Glacier, Montana 4. Washington Native Plant Society. (n.d.). Washington Native Plant Society: Photograph of Clematis Columbiana. Retrieved May 21, 2016, from http://www.wnps.org/plants/clematis_columbiana.html 5. Montana Field Guide. (n.d.). Slender-lobed Clematis - Clematis columbiana var. tenuiloba. Retrieved May 22, 2016, from http://fieldguide.mt.gov/speciesDetail.aspx?elcode=PDRAN08142
Other Sources Consulted	N/A
Protocol Author	Christie Ha
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