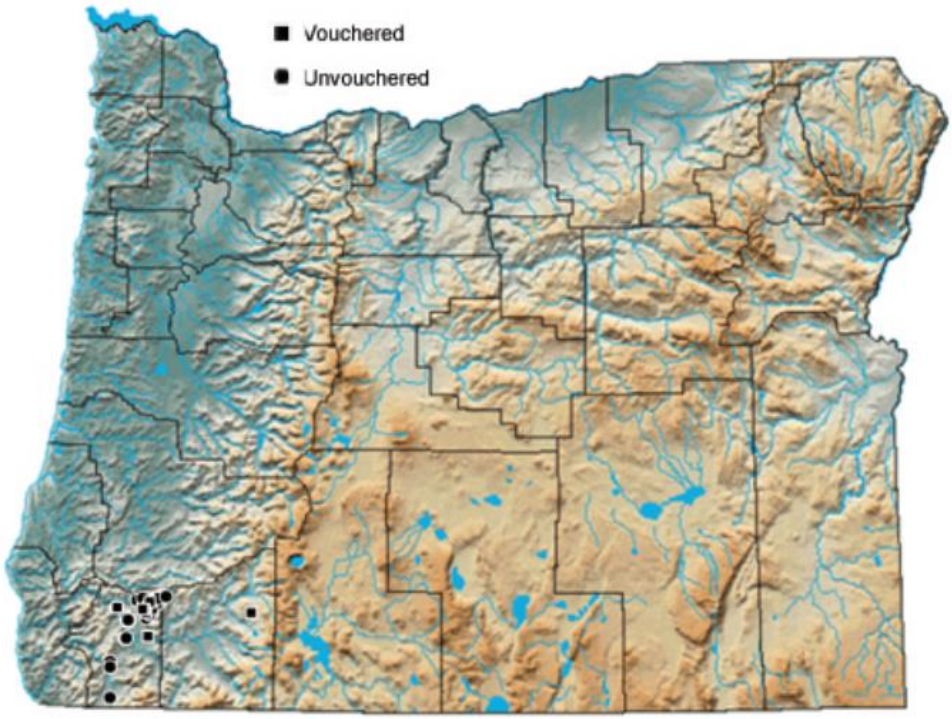
Plant Propagation Protocol for *Camassia howellii*
ESRM 412 – Native Plant Production
URL: https://courses.washington.edu/esrm412/protocols/2023/CAHO12.pdf

Photo by Gerald D. Carr (OregonFlora)

Oregon distribution

Source: USDA PLANTS Database

Occurrences



Source: OregonFlora

TAXONOMY	
Plant Family	
Scientific Name	Asparagaceae
Common Name	Asparagus family
Species Scientific Name	
Scientific Name	*Camassia howellii* S. Watson
Varieties	None
Sub-species	None
Cultivar	
Common Synonym(s)	*Quamasia howellii (S. Watson) Coville*
Common Name(s)	Howell's camas Howell camas Howell camassia
Species Code (as per USDA Plants database)	CAHO12
GENERAL INFORMATION	
Geographical range	Southwestern Oregon (Josephine and Jackson counties), Siskiyou National Forest. See above maps.
Ecological distribution	Found in seasonally wet-mesic meadows and ecotones between grassland and coniferous (Jeffrey pine or Douglas fir) forests[1], typically growing on serpentine soils[9]
Climate and elevation range	Temperate climates 200-400 m in elevation[3].
Local habitat and abundance	Approximately 23 occurrences of wild populations (as of 2014), most with a few hundred individuals each[1].
Plant strategy type / successional stage	Seral
Plant characteristics	Monocotyledonous perennial[4] geophytic herb. Clustered underground bulbs 1-3 cm across, narrow leaves 20-60 cm long, many radially symmetrical deep blue-violet pedicellate flowers borne on raceme[5]. Inflorescences 15-40 cm long producing shiny green capsule fruits[2]. Flowering occurs in late spring (April-June) 1-2 weeks later than sympatric populations of *Camassia leichtinii*[3]. Putative hybrids occur with this species[9].
PROPAGATION DETAILS	
Vegetative Propagation from Bulbs[7]	
Ecotype	
Propagation Goal	Bulbs
Propagation Method	Vegetative
Product Type	Container or field grown
Stock Type	
Time to Grow	4-5 years[6]
Target Specifications	At least 3-7 leaf scales on bulbs[6], or flower production.
Propagule Collection Instructions	Divide bulbs in autumn or winter after leaf senescence.

Propagule Processing/Propagule Characteristics	Bulbs may survive storage in dry conditions at temperatures no lower than 68 degrees Fahrenheit[8].
Pre-Planting Propagule Treatments	Bulbs may require cold temperatures to break dormancy.
Growing Area Preparation / Annual Practices for Perennial Crops	Growing in sandy soil or media may make bulb collection easier. Deep containers may be preferable as bulbs can reach depths of up to 15 cm.
Establishment Phase Details	None
Length of Establishment Phase	No information available.
Active Growth Phase	No information available.
Length of Active Growth Phase	Early spring to midsummer when plants enter dormancy.
Hardening Phase	Fertilizer can be applied in autumn.
Length of Hardening Phase	No information available.
Harvesting, Storage and Shipping	No information available.
Length of Storage	No information available.
Guidelines for Outplanting / Performance on Typical Sites	No information available.
PROPAGATION DETAILS	
Propagation from Seed[7]	
Ecotype	
Propagation Goal	Seeds
Propagation Method	Seed
Product Type	Container or field grown, seeds
Stock Type	
Time to Grow	4-5 years
Target Specifications	Flower production
Propagule Collection Instructions	Mature seeds drop from dry capsules in mid-summer. Collect seeds by shaking open capsules in a bag.
Propagule Processing/Propagule Characteristics	Seeds may survive storage for several years under cool, dry conditions.
Pre-Planting Propagule Treatments	Seeds may require cold stratification (required for other *Camassia* species).
Growing Area Preparation / Annual Practices for Perennial Crops	No information available.
Establishment Phase Details	Keep media moist during establishment by misting with water once per day.
Length of Establishment Phase	Germination occurs about four weeks after seeds are sown.
Active Growth Phase	Irrigate seedlings to field capacity when water content falls below 85%.

Length of Active Growth Phase	Early spring to midsummer
Hardening Phase	Plants are not likely to need significant care during hardening as their leaves senesce after the active growth period is complete.
Length of Hardening Phase	Midsummer to winter
Harvesting, Storage and Shipping	No information available.
Length of Storage	No information available.
Guidelines for Outplanting / Performance on Typical Sites	No information available.
Other Comments	Very little information is available on propagation methods for this species, so methods applicable to all *Camassia* were included in this protocol. Though no ethnobotanical information was found on *Camassia howellii*, it is likely that it has been cultivated by Indigenous peoples through methods similar to those used for other camas species, such as controlled burning and application of marine-derived fertilizers to camas beds. Collection from wild populations should not be done without a permit.
INFORMATION SOURCES	
References	See below
Other Sources Consulted	See below
Protocol Author	Milena Matthews
Date Protocol Created or Updated	05/07/23

References:

[1]*NatureServe Explorer 2.0.* (n.d.). https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.135229/Camassia_howellii [Accessed 5 May 2023]

[2]*Camassia howellii S.Watson.* (n.d.). http://www.worldfloraonline.org/taxon/wfo-0000762877. [Accessed 5 May 2023]

[3]Camassia howellii - FNA. (n.d.). http://beta.floranorthamerica.org/Camassia_howellii. [Accessed 5 May 2023]

[4]*Camassia howellii S. Watson*. (n.d.). USDA PLANTS Database. https://plants.usda.gov/home/plantProfile?symbol=CAHO12. [Accessed 5 May 2023]

[5]*Camassia howellii*. (2019, August). OregonFlora. https://oregonflora.org/pages/content/camhow.pdf

[6]Carney, M. C., Tushingham, S., McLaughlin, T., & Guedes, J. D. (2021). Harvesting strategies as evidence for 4000 years of camas (*Camassia quamash*) management in the North American Columbia Plateau. *Royal Society Open Science*, 8(4). https://doi.org/10.1098/rsos.202213

[7]Davis, M. C. (2018, May 29). *Determining the Influence of Nutrition and Temperature on the Growth and Development of Camassia spp*. ScholarsArchive@OSU. https://ir.library.oregonstate.edu/concern/graduate_thesis_or_dissertations/db78tj303

[8]*Camassia*. (n.d.) North Carolina Extension Gardener Plant Toolbox. https://plants.ces.ncsu.edu/plants/camassia/ [Accessed 5 May 2023]

[9]*Camassia howelli S. Watson*. (n.d.). https://oregonflora.org/taxa/index.php?taxon=3547 [Accessed 6 May 2023]

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Camassia howellii. (n.d.). Oregon Flora Image Project. http://www.botany.hawaii.edu/faculty/carr/ofp/cam_how.htm

Flowering Plants of the Rough & Ready Creek Watershed. (n.d.). Oregon Wild. https://oregonwild.org/sites/default/files/featured-imgs/rough_and_ready_plant_list_2015.pdf