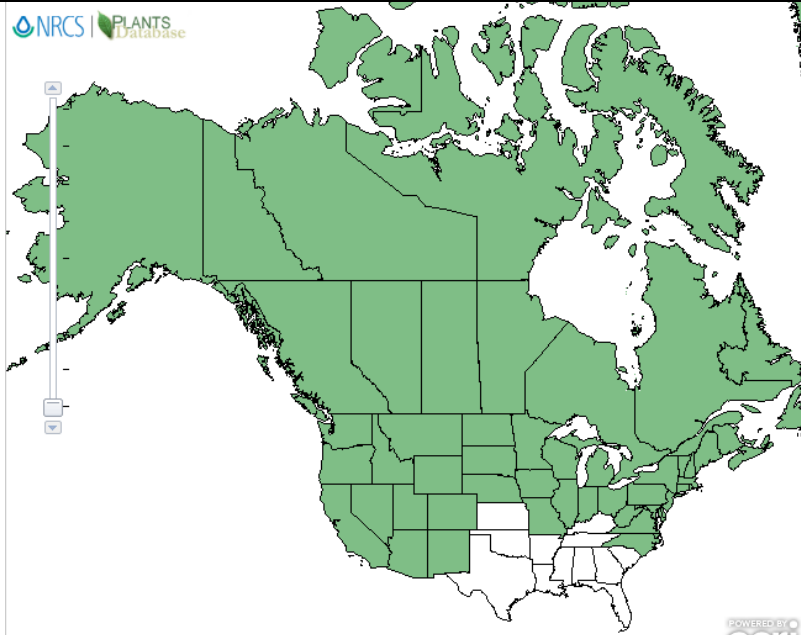
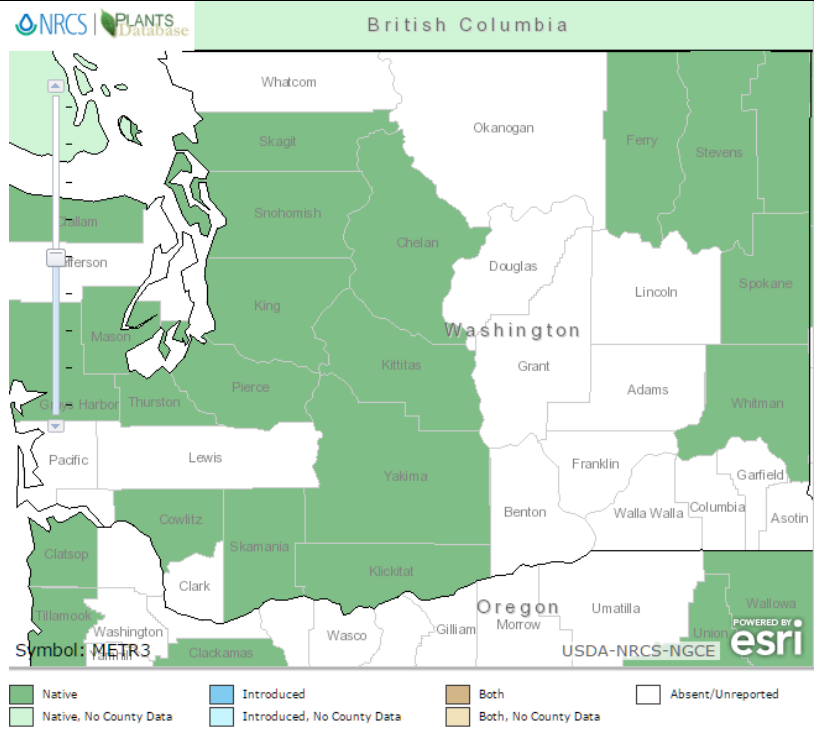


Plant Propagation Protocol for *Menyanthes trifoliata* L.

ESRM 412 – Native Plant Production

Protocol URL: <https://courses.washington.edu/esrm412/protocols/METR3.pdf>

TAXONOMY	
Plant Family	
Scientific Name	Menyanthaceae
Common Name	Bogbean (2), Buckbean (3)
Species Scientific Name	
Scientific Name	<i>Menyanthes trifoliata</i> L.
Varieties	var. <i>minor</i> Raf.
Sub-species	N/A
Cultivar	N/A
Common Synonym(s)	N/A
Common Name(s)	Bogbean (2), Buckbean (3)
Species Code (as per USDA Plants database)	METR3
GENERAL INFORMATION	
Geographical range	 <p>Symbol: METR3</p> <p>USDA-NRCS-NGCE esri</p> <p> Native Introduced Both Absent/Unreported </p> <p> Native, No County Data Introduced, No County Data Both, No County Data </p>

	 <p>Symbol: METR3</p> <p>USDA-NRCS-NGCE esri</p> <p>(1)</p>
Ecological distribution	<i>M. trifoliata</i> is considered a circumboreal species (1) that is typically found on the edges of ponds and marshy soils that are slightly acidic (4).
Climate and elevation range	<i>M. trifoliata</i> grows in low elevation areas that are flooded and/or on the edge of bodies of standing water. Found throughout most of the northern hemisphere.
Local habitat and abundance	Associated with common forbs and shrubs found near ponds and bogs familiar to the region.
Plant strategy type / successional stage	Bogbean is considered a very hardy plant that is capable of withstanding temperatures as low as -25 deg. C. and can grow in water up to 30 cm. in depth (4). Bogbean can also be invasive, utilizing long creeping surface rhizomes to aide in proliferation.
Plant characteristics	Forb/herb. <i>M. trifoliata</i> is a hardy perennial with a very fast growth rate, and is considered a hermaphrodite. (4)
<p align="center">PROPAGATION DETAILS</p> <p align="center">(all data collected from reference/source number two (2) and three (3), unless otherwise listed)</p>	
Ecotype	N/A
Propagation Goal	Plants
Propagation Method	Seed
Product Type	Container (plug)
Stock Type	N/A
Time to Grow	Explicit information regarding exact growth time is largely unverified. bogbean has been studied to start flowering in May through July, with seed collection starting in early summer in northern regions.
Target Specifications	Fully grown bogbean should reach a target size of 0.3 meter by 1 meter. Typically nursery target specifications will prepare young containerized plants for direct field planting.

Propagule Collection Instructions	Seeds are collected in the early summer.
Propagule Processing/Propagule Characteristics	N/A
Pre-Planting Propagule Treatments	Pre-planting regimes for <i>M. trifoliata</i> will require cold/wet stratification for proper germination to occur. Seeds are contained through the winter in containers filled with water, potentially going through multiple freeze-thaw cycles until spring.
Growing Area Preparation / Annual Practices for Perennial Crops	Direct seeding will occur in springtime, into a wetland soil mix and transferred into a greenhouse.
Establishment Phase Details	Keeping the seeds saturated with moisture is crucial for germination to occur in the greenhouse. Germination will continue unevenly through spring and summer.
Length of Establishment Phase	4-5 months
Active Growth Phase	The appearance of true leaves and sufficient development of roots will then be followed by transplanting them into an outdoor growing medium.
Length of Active Growth Phase	N/A
Hardening Phase	N/A
Length of Hardening Phase	N/A
Harvesting, Storage and Shipping	Seeds will need to be harvested in the summer, and stored in a cold/wet container.
Length of Storage	Seeds may be sown the approaching winter and early spring of the same cyclic year. (1 year)
Guidelines for Outplanting / Performance on Typical Sites	During the establishment phase, typical sites will yield approximately 75% germination rates by mid-august.
Other Comments	Bogbean may be grown in basket that are partially submerged with muddy pool margins. Full sunlight is preferred for optimal germination and establishment rates (5)

INFORMATION SOURCES

References	<p>1. USDA - Natural Resources Conservation Center. (n.d.). Plants Profile for <i>Menyanthes trifoliata</i> (buckbean). Retrieved May 22, 2016, from http://plants.usda.gov/core/profile?symbol=metr3</p> <p>2. Baskin, C., & Baskin, J. (n.d.). Native Plant Network Propagation Protocol Database. Retrieved May 23, 2016, from http://npn.rngr.net/renderNPNProtocolDetails?selectedProtocolIds=menyanth</p>
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	<p>aceae-menyanthes-2499 University of Kentucky</p> <p>3. Alaska Plant Materials Center. (n.d.). Native Plant Network Propagation Protocol Database. Retrieved May 23, 2016, from http://npn.rngr.net/renderNPNProtocolDetails?selectedProtocolIds=menyanthaceae-menyanthes-2864 Palmer, AK</p> <p>4. Plants for a Future. (n.d.). Menyanthes trifoliata Bogbean, Buckbean, Marsh Trefoil, PFAF Plant Database. Retrieved May 23, 2016, from http://www.pfaf.org/user/Plant.aspx?LatinName=Menyanthes trifoliata</p> <p>5. Royal Horticulture Society. (n.d.). Menyanthes trifoliata. Retrieved May 24, 2016, from https://www.rhs.org.uk/plants/details?plantid=1273</p>
Other Sources Consulted	N/A
Protocol Author	Christie Ha
Date Protocol Created or Updated	5/24/2016