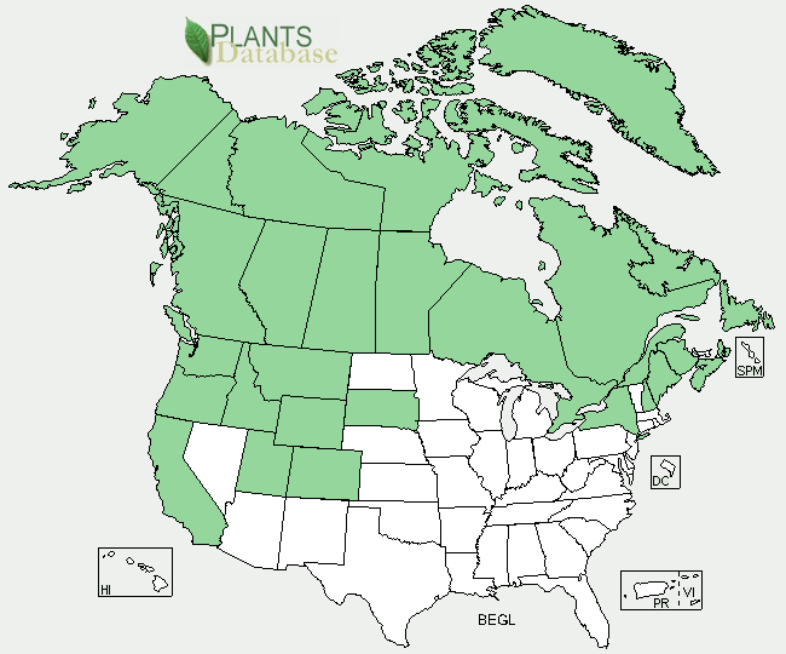
Plant Propagation Protocol for:

Betula glandulosa

ESRM 412 – Native Plant Production

Image Source: http://www.fs.fed.us/database/feis/plants/shrub/betgla/all.html (left)
http://www.pfaf.org/user/Plant.aspx?LatinName=Betula+glandulosa (right)

TAXONOMY	
Family Names	
Family Scientific Name:	[1]Betulaceae
Family Common Name:	[1]resin birch
Scientific Names	
Genus:	[1]*Betula*
Species:	[1]*glandulosa*
Species Authority:	[1]Michx.
Variety:	No information found
Sub-species:	No information found
Cultivar:	No information found
Authority for Variety/Sub-species:	No information found
Common Synonym(s):	[2]None
Common Name(s):	[2]bog birch, dwarf birch, glandular birch, resin birch, scrub birch, swamp birch
Species Code (as per USDA Plants database):	[1]BEOC2

GENERAL INFORMATION	
Geographical range (distribution maps for North America and Washington state)	 The above maps: USDA PLANTS Database
Ecological distribution:	[2] Bog birch occupies a wide variety of sites, ranging from rocky subarctic and alpine tundra to deep, organic, boreal soils. It is typically a wetland species occurring most commonly on moist, acidic, and nutrient-poor organic sites including fens, swamps, bogs, muskegs, wet meadows, lake and stream margins, and seepage areas. Bog birch is also found on upland sites including eskers, till ridges, rocky outcrops covered with shallow soil, cliffs, sandy hillsides, and rocky ridges. [2] Bog birch grows in a variety of soils, ranging from sandy and gravelly loam on river terraces to poorly drained, organic soils in bogs, muskegs, and other wetland habitats. It is tolerant of moderate salinity and pH ranging from 3.1 to 6.5. [8] Succeeds in a well-drained loamy soil in a sheltered position. Grows well in heavy clay soils. Shade tolerant. This species is native to areas with very cold winters and often does not do well in milder zones. It can be excited into premature growth in mild winters and this new growth is susceptible to frost damage

Climate and elevation range	[2] Bog birch is tolerant of cold temperatures. It is common in black spruce forests in the Yukon where the mean annual temperature is 27 °F (-3 °C). Frost tolerance in bog birch is high, and bog birch grows abundantly over large areas of permafrost. Bog birch tolerates severe winter temperatures by withdrawing water from the protoplast and freezing it in the cell walls. Elevation: Bog birch occurs between 1,300 and 11,000 feet (400-3,400 m) across its range.
Local habitat and abundance; may include commonly associated species	[2] In the boreal forests of interior Alaska and Canada, bog birch is found in many black spruce (*Picea mariana*) and white spruce (*P. glauca*) communities and is especially common at the northern and altitudinal limit of trees. In these northern environments, permafrost prevents the percolation of water, resulting in the development of muskegs, bogs, and ponds that often impede the growth of trees but support bog birch and other low-growing shrubs.
Plant strategy type / successional stage:	[2] Bog birch is shade intolerant. It is characteristic of canopy openings in black spruce woodlands in boreal Canada. It establishes from seed or, more commonly, by sprouting after fire and other disturbances and in many communities persists through subsequent successional stages. In many black spruce communities in central Alaska and northern Canada, bog birch appears soon after low- to moderate-severity fires and is dominant in the vegetation 6 to 25 years after fire. Trees begin to dominate after 25 to 30 years, but the low shrub layer of bog birch and associated species continues to expand and increase in cover. In black spruce woodlands in the Northwest Territories, bog birch is most common 15 to 20 years after fire but is also present in stands as old as 300 years
Plant characteristics (life form (shrub, grass, forb), longevity, key characteristics, etc)	[2] Bog birch is a deciduous, long-lived shrub. [3] About 1-2, procumbent at high elevations Plants are low and spreading to erect with 1 to several main stems. [2,4] Bog birch ranges from 8 inches (20 cm) tall on upland sites and in arctic environments to 10 feet (3 m) in drainages and in more southern areas. The bark is thin, smooth, and does not peel readily. Leaves are thick and leathery and range from 0.2 to 1.2 inches (0.5-3 cm) long and 0.2 to 0.8 inch (0.5-2 cm) wide. The inflorescences are catkins. Male catkins are 0.4 to 1 inch (10-25 mm) long and female catkins are 0.3 to 0.8 inch (7-20 mm) long. Fruits are narrow-winged, single-seeded samaras 1 to 1.5 mm long and wide. Rhizomes are 0.8 to 2.4 inches (2-6 cm) thick and are found in the top 2.4 inches (6 cm) of soil. Bog birch has an extensive root system. Roots are ectomycorrhizal, an adaptation to arctic and alpine soils that are generally low in inorganic nitrogen and phosphorus.

	 Source: [6] Valcular Plants of the Pacific Northwest
PROPAGATION DETAILS	
Ecotype	N/A
Propagation Goal:	[2] Plants
Propagation Method:	[2] Seed
Product Type:	[2] Containers- plug.
Stock Type:	No information found
Time to Grow:	[8]Seed - best sown as soon as it is ripe in a light position in a cold frame. Only just cover the seed and place the pot in a sunny position. Spring sown seed should be surface sown in a sunny position in a cold frame. If the germination is poor, raising the temperature by covering the seed with glass can help. When they are large enough to handle, prick the seedlings out into individual pots and grow them on in a cold frame for at least their first winter. Plant them out into their permanent positions in late spring or early summer, after the last expected frosts. If you have sufficient seed, it can be sown in an outdoor seedbed, either as soon as it is ripe or in the early spring - do not cover the spring sown seed. Grow the plants on in the seedbed for 2 years before planting them out into their permanent positions in the winter.
Target Specifications:	No information found
Propagule Collection (how, when, etc):	[2] Pre-chilling improves germination of bog birch seeds. Optimum germination temperature for many arctic species is 59 to 86 °F (15-30 °C). The germination rate of bog birch seeds collected from alpine sites in the White Mountains, New Hampshire, was 25% for refrigerated seeds and 4% for unrefrigerated seeds. Days required for germination ranged from 14 to 28 for refrigerated seeds and from 27 to 299 for unrefrigerated seeds.

Propagule Processing/Propagule Characteristics	[2]Seed viability varies with latitude. At the northern range limit of bog birch on Baffin Island, <0.5% of seeds were viable. Very few samaras contained seeds with fully developed embryos. At a southern site in subarctic Quebec, 70% of seeds were viable. Seeds that overwinter on plants remain viable until they disperse the following spring. [2]Seed germination and samara weight may be correlated. In a germination study in Kuujjuaq, Quebec, no seeds from samaras weighing <0.09 mg germinated, few samaras weighing <0.12 mg had seed that germinated, and all samaras weighing >0.34 mg had seed that germinated. Germination of wind-dispersed seeds may be highest on exposed mineral soils.
Pre-Planting Propagule Treatments (cleaning, dormancy treatments, etc):	No information found
Growing Area Preparation / Annual Practices for Perennial Crops:	No information found
Establishment Phase	[2]Seedling recruitment rates in bog birch populations are usually very low. Site disturbance by fire increases the likelihood of seedling establishment. Although recruitment from seed is almost nonexistent in northern bog birch populations, plants of all age classes were evident in a southern Quebec population. Seedling growth is very slow, and seedling mortality is often high.
Length of Establishment Phase:	No information found
Active Growth Phase:	No information found
Length of Active Growth Phase:	No information found
Hardening Phase:	No information found
Length of Hardening Phase:	No information found
Harvesting, Storage and Shipping (of seedlings):	No information found
Length of Storage:	No information found
Guidelines for Outplanting / Performance on Typical Sites:	No information found

Other Comments	[8]The plant is valuable for ground cover. An infusion of the plant is used as a hair conditioner and dandruff treatment.
INFORMATION SOURCES	
References (full citations):	[1] USDA- Natural Resourses Conservation Service. Access on May 13th 2012. Available: http://plants.usda.gov/java/profile?symbol=BEOC2 [2]Tollefson, Jennifer E. 2007. Betula glandulosa. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.fed.us/database/feis/plants/shrub/betgla/all.html2012, May 12]. [3]Huxley, Anthony (Chief Editor). *Dictionary of Gardening: The New Royal.* [A-C] Horicultural Society. New York: THE STOCKTON PRESS, 1992. Print. [4]Kozloff, Eugene N. *Plants of Western Oregon, Washington & British Columbia*. Portland, Oregon: Timber Press, 2005. Print. [5] Gilkey M., Dennis J. *HANDBOOK OF NORTHWESTERN PLANTS.* Oregon State University. Corvallis, Oregon: 1980. (Subalpines to alpine summits.???.) [6] Leo Hitchcock C., Cronquist A., Ownbey M., Thomson J.W. *Vascular Plants of the Pacific Northwest*. Part 2: SALICACEAE TO SAXIFRAGACEAE. Seattle: University of Washington Press. 1964. [7] Chachulsky, C., Haase, D., Rose R. *Propagation of Pacific Northwest Native Plants.* Corvallis, Oregon: Oregon State University Press, 1998. Print. [8] Plants for a Future: earth, plants, people. Accessed on May 14th, 2012. Available: http://www.pfaf.org/user/Plant.aspx?LatinName=Betula+glandulosa
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	Krussmann, Gerd. Manual of cultivated broad-leaved trees & shrubs. Vol. III, (PRU-Z). Portland, Oregon: Timber Press, 1978. Print. Filbert. M, Richter A. and Robson K. Encyclopedia of Northwest Native Plants for Gardens and Landscapes. Timnber Press, Inc: 2008. Print. Hartmann and Kester. Plant Propagation: principles and practices. 8th edition. NJ: Pearson Education, Inc, 2011. Print.
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