Plant Propagation Protocol for *[Insert Species]*
ESRM 412 – Native Plant Production

TAXONOMY	
Family Names	Achillea millefolium (1.)
Family Scientific Name:	Asteraceae (1.)
Family Common Name:	Sunflower (10.), Aster family (1.)
Scientific Names	Achillea lanulosa (10.)
Genus:	Achillea L (1.)
Species:	Achillea millefolium L. (1.)
Species Authority:	
Variety:	Achillea millefolium L. var. borealis (Bong.) Farw. (1.)
Sub-species:	
Cultivar:	
Authority for Variety/Sub-species:	
Common Name(s):	Bloodwort, carpenter's weed, hierba de las cortaduras milfoil, plumajillo (1.), western yarrow, common yarrow, wooly yarrow (13.)
Species Code (as per USDA Plants database):	ACIMI2 (1.)
GENERAL INFORMATION	
Geographical range (distribution maps for North America and Washington state)	

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	(6.) Common yarrow is a cosmopolitan weed originally native to Europe and western Asia. Today it grows in temperate regions worldwide. In the U.S. it occurs in disturbed areas, road shoulders, meadows and fields from Texas to Florida and north to southern Canada. In Europe, yarrow is a ubiquitous weed in hedgerows, pastures and fields, and seldom allowed near respectable gardens. (7.)
Ecological distribution (ecosystems it occurs in, etc):	Elm-ash-cottonwood, Douglas-fir, Ponderosa pine, Fir-spruce, Sagebrush, Desert shrub, Cahaparral-mountain shrub, Pinyon-juniper, Mountain grasslands, Prairie, Wet grasslands, Alpine. (13.)
Climate and elevation range	
Local habitat and abundance; may include commonly associated species	Western yarrow occurs in a variety of plant communities across its wide distribution. It is not usually a community dominant (13.)
Plant strategy type / successional stage (stress-tolerator, competitor, weedy/colonizer, seral, late successional)	Western yarrow is a pioneer species everywhere it is found. It is an invader species on disturbed rangeland sites. Western yarrow also appears to be tolerant of competition but not tolerant of excessive shade. It is usually present in the earliest stages of vegetation development and persists throughout succession. It dominates on overgrazed high summer ranges, where the undisturbed climax vegetation would be made up of wheatgrasses. (13.)
Plant characteristics (life form (shrub, grass, forb), longevity, key characteristics, etc)	Forb Fern-like foliage with white, compact head flowers. Used as medicinal herb. Often used as ground cover; spreads by rhizomes and can become too aggressive for some gardens. Controls soil erosion. Adapted throughout North America. Prefers sun to partial shade; drought tolerant. Blooms summer to fall. (11.) Flowering Period: April, May, June, July, August, September, October. Fruits: The brown, flattened, oblong to ovate nut-like seed is small, dry and hairless. Size is about 2 mm long.
PROPAGATION DETAILS	
Ecotype (this is meant primarily for experimentally derived protocols, and is a description of where the seed that was tested came from):	Achillea millefolium var. alpicola Yarrow (Alpine/subalpine ecotype) (3.) Pullman area (10.)
Propagation Goal (Options: Plants, Cuttings, Seeds,	Plant (1.)

Bulbs, Somatic Embryos, and/or Other Propagules):	
Propagation Method (Options: Seed or Vegetative):	Seed (10.)
Product Type (options: Container (plug), Bareroot (field grown), Plug + (container-field grown hybrids, and/or Propagules (seeds, cuttings, poles, etc.))	Tight root plug in container (10.)
Stock Type:	
Time to Grow (from seeding until plants are ready to be outplanted):	3 months (10.)
Target Specifications (size or characteristics of target plants to be produced):	In summer yarrow sends up erect, grayish, usually unbranched stems, 1-3 ft (0.3-0.9 m) tall. The fifty or more small, about 0.25 in (0.6 cm) across with whitish flowerheads are borne in flat to domed clusters, 2-3 in (5-7.6 cm) in diameter. (7.) USDA Hardiness Zone: 3-9 (4.) Height: 18-36” Spread: 24-26” Upright, basal rosette of leaves. Fine leaves with flower heads of 3-5” and flowers can be yellow, pink, or white with leaves colored gray-green.(4.)
Propagule Collection (how, when, etc):	Seeds are collected when they are a light tan in color and easily removed from the inflorescence. Heads are cut from the plants at this point and stored in paper bags at room temperature until cleaning. (11.) Collect seed heads in late summer/ fall. Allow seed heads to air-dry indoors for at least a week before cleaning. Crush with a rolling pin to remove the nutlets, Sow indoors in late winter or sow outdoors in April. (8.)
Propagule Processing/Propagule Characteristics (including seed density (# per pound), seed longevity, etc):	Seeds per pound: 2,800,000. Seeding rate: 1 oz./2,500 sq. ft. (12.) 4 years (10.) Seed heads are rubbed to separate and then cleaned with an air column separator. Larger amounts are threshed with a hammermill and cleaned with air screen equipment. Cleaned seed is stored at 40 degrees F. and 40% relative humidity. We determined 2,835,000 seeds/lb for this ecotype. (11.)
Pre-Planting Propagule Treatments (cleaning, dormancy	Material was threshed by hand and seed was cleaned using an air- screen machine and an air-density separator. (5.)

treatments, etc):	
Growing Area Preparation / Annual Practices for Perennial Crops (growing media, type and size of containers, etc):	Grow yarrow in well-drained soil but water regularly. The species and many of the cultivars are resistant to drought once established. (7.)
Establishment Phase (from seeding to germination):	Media is kept moist during germination. Germination is usually begins in 6-7 days and is complete in two weeks. Total length is 2 weeks. (11.)
Length of Establishment Phase:	2 weeks (11.)
Active Growth Phase (from germination until plants are no longer actively growing):	Plants grow quickly after germination. They are water deeply every other day and fertilized once per week with a water soluble, complete fertilizer containing micronutirents. (11.)
Length of Active Growth Phase:	60 days (11.)
Hardening Phase (from end of active growth phase to end of growing season; primarily related to the development of cold-hardiness and preparation for winter):	Plants are moved to a cold frame in late March or early April, depending on weather. (11.)
Length of Hardening Phase:	3-4 weeks (11.)
Harvesting, Storage and Shipping (of seedlings):	
Length of Storage (of seedlings, between nursery and outplanting):	
Guidelines for Outplanting / Performance on Typical Sites (eg, percent survival, height or diameter	Plants are transplanted to the field in early May. Survival in increase plantings approaches 100%. Survival rates for transplants on sites with existing vegetation may be lower. Plants may be short lived but perpetuate themselves well by abundant seed production. Preliminary results from direct seeding trials in the field suggest that seed sown in the fall establishes at a higher rate than seed sown in the spring. (11.)

growth, elapsed time before flowering):	Divide in the Spring. (4.)
Other Comments (including collection restrictions or guidelines, if available):	Achillea Millefolium- the herb with antiseptic and anti-inflammatory actions. It was named after the Greek Trojan war hero, Achilles. Achillea Millefolium provides much-needed relief from swelling and pain, alleviates symptoms of irritable bowel syndrome and prevents stomach ulcers. (2.)
INFORMATION SOURCES	
References (full citations):	1. Achillea millefolium L. var. borealis (Bong.) Farw.. United States Department of Agriculture: Natural Resources Conservation Service. 10 February 2009 <http://plants.usda.gov/java/profile?symbol=ACMI2>. 2. Achillea Millefolium - the herb with antiseptic and anti-inflammatory actions. 03 March 2008 The Healthier Life. 12 February 2009 <http://www.thehealthierlife.co.uk /natural-remedies/herbs/achillea-millefolium-antiseptic-anti-inflammatory-01001.html>. 3. Achillea millefolium var. alpicola. 2002 HOME. 12 February 2009 <http://www.cwnp.org/oka/pg/awind/acmillefoliumal.html>. 4. Achillea millefolium Yarrow. 5 November 2007 Washington Native Plant Society. 12 February 2009 <http://www.wnps.org/landscaping/herbarium/pages/achillea-millefolium.html>. 5. Bartow, Amy. THE 2007 FEDERAL HIGHWAY ADMINISTRATION ANNUAL REPORT: . 20 December 2007 CORVALLIS PLANT MATERIALS CENTER. 10 February 2009 <http://www.plant-materials.nrcs.usda.gov/pubs/orpmcpr7964.pdf>. 6. "Country Distribution." Online Image. United States Department of Agriculture: Natural Resources Conservation Service. No date. 12 February 2009 <http://plants.usda.gov/java/county?state_name=Washington&statefips=53&symbol=ACMI2>. 7. Christman, Steve. Achillea millefolium. 23 October 2003 FLORIDATA. 10 February 2009 <http://www.floridata.com/ref/A/achi_mil.cfm>. 8. Growing Native Plants from Seed. 3 November 2007 Washington Native Plant Society. 12 February 2009 <http://www.wnps.org/education/resources/documents/Garden_Links/growing_from_seed.pdf>.

	9. Herbaceous Ornamental Plants. 14 June 2004 Oregon State University. 12 February 2009 <http://oregonstate.edu/dept/ldplants/achill1.htm>. 10. Longevity of seeds in ideal storage. 16 October 2008 Hill Gardens of Maine. 12 February 2009 <http://www.hillgardens.com/seed_longevity.htm>. 11. Skinner, David M. 2003. Propagation protocol for production of container *Achillea millefolium* L. plants; USDA NRCS - Pullman Plant Materials Center, Pullman, Washington. < http://www.nativeplantnetwork.org/network/view.asp?protocol_id=2148>. 12. Yarrow. 2006 Stock Seed Farms. 10 February 2009 <http://www.stockseed.com/wildflowers_product_display.asp?pid=388>. 13. http://www.fs.fed.us/database/feis/plants/forb/achmil/all.html#LIFE%20FORM (Forest Services Website down temporarility)
Other Sources Consulted (but that contained no pertinent information) (full citations):	
Protocol Author (First and last name):	Anna Cleveland
Date Protocol Created or Updated (MM/DD/YY):	05/15/09

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