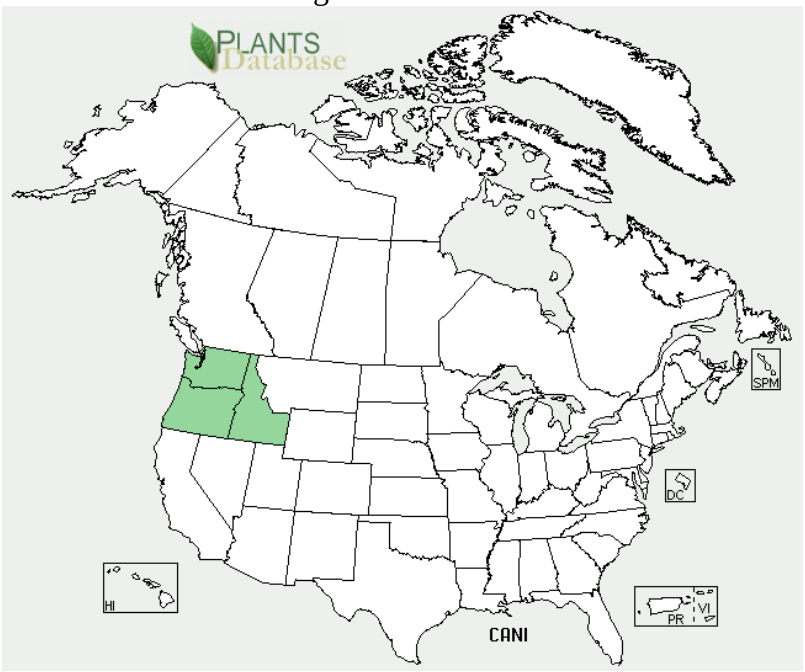
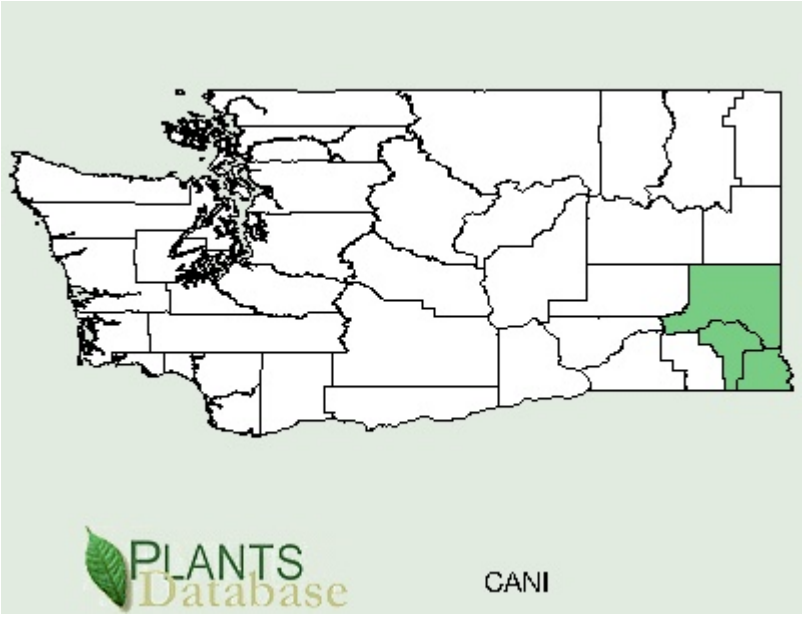
Plant Propagation Protocol for *Calochortus nitidus*
ESRM 412 – Native Plant Production
Spring 2008

(Gerritsen 2007)

TAXONOMY	
Family Names	
Family Scientific Name:	Liliaceae
Family Common Name:	Lily family
Scientific Names	
Genus:	*Calochortus*
Species:	*nitidus*
Species Authority:	Dougl.
Common Name(s):	Broad-fruit mariposa

Species Code:	CANI
GENERAL INFORMATION	
Geographical range:	Limited geographical range in South East corner of Washington, North East corner of Oregon and several counties in Idaho.  (USDA NRCS 2007)  (USDA NRCS 2007)
Ecological distribution:	In Washington it occurs most often in meadows at low elevation (WA Native Plant Society 2006). Also occurs in moist swales between hills and the Blue Mountains in Idaho (WA DNR

	1997).
Climate and elevation range:	Unique environments that *Calochortus nitidus* can be found in warrant a climate that has relatively high rainfall and moderate temperatures (Lichthardt 1999). Can be found at elevations between 1500-6400 feet (WA DNR 1997)
Local habitat and abundance:	*C. nitidus* is considered a threatened species in Washington state and is ranked S1 by the Washington Natural Heritage Program. This means that it is critically imperiled within Washington state with 5 or fewer occurrences. Washington state has also assigned it an Endangered status which indicates that it is in danger of disappearing from Washington state all together (WA NHP 2008). It is also ranked S3 by the Idaho Conservation Data Center which designates it as rare or uncommon in Idaho with an occurrence of 21-100 (Skinner 2007). It is also listed as a species of concern for the federal government meaning that the species appears to be rare but there is little information on the matter (WA NHP 2008). Associated plants include the following: Idaho fescue (Festuca idahoensis), bluebunch wheatgrass (Agropyron spicatum), prairie junegrass (Koeleria cristata), and prairiesmoke (Geum triflorum) (WA DNR 1997).
Plant strategy type / successional stage:	Prefers sites in good ecological conditions and is at a disadvantage to annual grasses and invasive species. Response to fire is unknown (WA DNR 1997).
Plant characteristics:	A perennial herb from deep-seated bulb (WA Native Plant Society). Has a showy purple flower with deep purple crescents. Fruit is a capsule with three distinct wings. May also be confused with *C. macrocarpus* which has is similar but does not have winged fruit and *C. eurycarpus* which has a purple blotch rather than a crescent. Both species are found within the range of *C. nitidus* (WA DNR 1997). Some *Calochortus* species can live for up to 60 years, but the lifespan of C. nitidus is still unknown (McGary 2001).
PROPAGATION DETAILS	
Ecotype:	Ecotype is usually not revealed due to its endangered and/or threatened status.
Propagation Goal:	Seeds since bulbs do not survive well after transplanting (Skinner 2007).
Propagation Method:	Seed
Product Type:	Propagules (seeds, cuttings, poles, etc.)
Stock Type:	Field grown
Time to Grow:	4 years (Skinner 2007)
Target Specifications:	Flowering and seeding
Propagule Collection:	Collection can occur early to mid august when the capsule is beginning to split. Seeds are gathered and stored in paper bags or envelopes until processing (Skinner 2007).
Propagule Processing/Propagule	First the capsules are crushed by hand to release the seeds.

Characteristics:	Then the coarse material gets sifted out with a hand screen. An air column separator is used to clean the seed. The wings of the capsule must be broken crossways to access the seeds (Skinner 2007).
Pre-Planting Propagule Treatments:	Seeds are sown directly into the ground starting early December and begin emerging in mid-April. A period of cold-moist stratification is necessary as well as cool spring temperatures (Skinner 2007).
Growing Area Preparation / Annual Practices for Perennial Crops:	Seeds should be planted no more than 1/8 of an inch deep and lightly covered (Skinner 2007). Soil levels must be deep enough to allow for the bulb to reach the necessary depth (McGary 2001).
Establishment Phase:	Control of other vegetation is critical since other species can easily hinder growth. Weeds should therefore carefully be removed by hand (Skinner 2007).
Length of Establishment Phase:	1 growing season (Skinner 2007).
Active Growth Phase:	Weeding must be continued through this point. Non-reproductive plants will senesce in June and begin growing again in early spring of the next year. Active growth phase appears to vary widely among individual flowers from year to year (Skinner 2007).
Length of Active Growth Phase:	3-4 years
Guidelines for Outplanting / Performance on Typical Sites (eg, percent survival, height or diameter growth, elapsed time before flowering):	Planting seeds directly into ground will allow for growth. Constant monitoring of herbivory and weeding is necessary for establishment of seedlings (Skinner 2007). Ideal locations for most *Calochortus* are sunny, well-drained areas where bulbs can be somewhat dry during the summer months (Bryan 2002).
Other Comments (including collection restrictions or guidelines, if available):	No insects or disease found to affect the species but is popular among the herbivores including deer, pocket gophers and other small rodents (Skinner 2007). Great care should be handled before collecting seeds due to the endangered status and appropriate steps must be followed.
INFORMATION SOURCES	
References (full citations):	Bryan, John E. 2002. Bulbs. Timber Press: Portland, OR. Gerritsen, Mary. 2007. *Calochortus nitidus*. Pacific Bulb Society wiki, Pacific Bulb Society, Pasadena, CA. URL: http://www.pacificbulbsociety.org/ pbswiki/index.php/CalochortusSpeciesFour. (accessed June 3, 2008). Lichthardt, Juanita. March 1999. Action Plan for Sensitive Species on the Clearwater National Forest. Idaho Fish and Game- Idaho Conservation Data Center, Boise, Idaho. URL: http://www.fs.fed.us/r1/clearwater/terra_org/plants /action_plan/actionpl.htm (accessed June 3, 2008).

	McGary, Mary Jane. 2001. Bulbs of North America. Timber Press: Portland, OR. Skinner, David M. 2007. Propagation protocol for production of *Calochortus nitidus* Dougl seeds (field grown); USDA NRCS - Pullman Plant Materials Center, Pullman, Washington. In: Native Plant Network. URL: http://www.nativeplantnetwork.org (accessed 3 June 2008). Moscow (ID): University of Idaho, College of Natural Resources, Forest Research Nursery. USDA NRCS. 2007. The PLANTS Database (http://plants.usda.gov, June 3, 2008). National Plant Data Center, Baton Rouge, LA 70874-4490 USA. WA DNR and USDI Bureau of Land Management. 1997. Calochortus nitidus. Washington Department of Natural Resources, Natural Heritage Program, Olympia, Washington. URL: http://www1.dnr.wa.gov/nhp/refdesk/ fguide/pdf/cani.pdf (accessed June 3, 2008). WA NHP. February 2008. List of Plants Tracked by the Washington Natural Heritage Program. Washington Department of Natural Resources, Washington Natural Heritage Program, Olympia, Washington. URL: http://www1.dnr.wa.gov/nhp/refdesk/lists/plantrnk.html. (accessed June 3, 2008). WA Native Plant Society. 2006. *Calochortus nitidus*. Burke Museum of Natural History and Culture, University of Washington, Seattle, WA. URL: http://biology.burke.washington.edu/herbarium/imagecollection/ (accesed June 3, 2008).
Other Sources Consulted (but that contained no pertinent information) (full citations):	Barner, Jim. 2007. Propagation protocol for production of *Calochortus macrocarpus* Dougl. seeds; USDA FS - R6 Bend Seed Extractory, Bend, Oregon. In: Native Plant Network. URL: http://www.nativeplantnetwork.org (accessed 3 June 2008). Moscow (ID): University of Idaho, College of Natural Resources, Forest Research Nursery.
Protocol Author (First and last name):	Brandon Neuhaus
Date Protocol Created or Updated:	06/04/2008

Note: This template was modified by J.D. Bakker from that available at: http://www.nativeplantnetwork.org/network/SampleBlankForm.asp