ARPA7
Plant Propagation Protocol for *Arenaria paludicola*
ESRM 412 – Native Plant Production
Helen J. Wilson

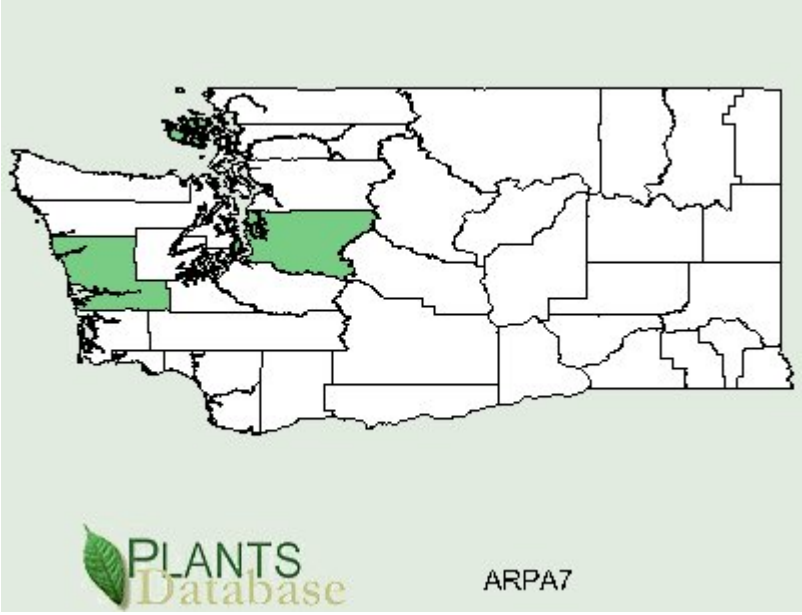

Image 1: McCloud


Image 2: McCloud

TAXONOMY	
Family Names	
Family Scientific Name:	*Arenaria paludicola* B.L. Rob.
Family Common Name:	Pink Family
Scientific Names	

Kingdom	*Plantae* – Plants
Subkingdom	*Tracheobionta* – Vascular plants
Superdivision	*Spermatophyta* – Seed plants
Division	*Magnoliophyta* – Flowering plants
Class	*Magnoliopsida* – Dicotyledons
Subclass	*Caryophyllidae*
Order	*Caryophyllales*
Family	*Caryophyllaceae* – Pink family
Genus	*Arenaria* L. – sandwort

Species *Arenaria paludicola* B.L. Rob. – marsh sandwort	
Genus:	See Above
Species:	See Above
Species Authority:	B. L. Robins
Variety:	N/A
Sub-species:	N/A
Cultivar:	N/A
Authority for Variety/Sub-species:	N/A
Common Synonym(s)	Minuartia paludicola House Alsinopsis paludicola A. Heller Arenaria palustris S. Watson (not A. palustris Gay) Alsine palustre Kellogg (Pacific)
Common Name(s):	Marsh Sandwort
Species Code	ARPA7 (USDA)
GENERAL INFORMATION	
Geographical range (distribution maps for North America and Washington state)	 In United States (USDA)

	 In Washington State (USDA)
Ecological distribution:	Plants have been found in areas with shallow standing water and with no standing water and growing in saturated, acidic organic bog soils. (DNR)
Climate and elevation range	Mediterranean Climate, although historically reported as far north as Pierce County, Washington. This species is seen from sea level to 1476 ft. (DNR)
Local habitat and abundance; may include commonly associated species	Mostly in swamps, mostly along the west coast of the U.S. Grows mainly in wetlands ar freshwater marshes and can grow in saturated acidic bog soils and sandy substrates with high organic content. (DNR). Listed as "Endangered" in the United States and California. Listed as "Extirpated" in Washington State. (USDA). Global Conservation Status is "G1", meaning critically imperiled and at very high risk of extinction due to extreme rarity (often 5 or fewer populations), very steep declines, or other factors. (Nature) Marsh sandwort is found in association with Gambel's watercress, another endangered plant, stream orchids, bur-ree sedges, and rushes. (Answers, Beacham's)
Plant strategy type / successional stage	Perennial
Plant characteristics:	This hairless perennial has trailing, rooting, and shining flaccid stems that are up to 21 in (70 cm) long. The leaves are linear to linear-lanceolate, ¾ to 2 in. (2 to 5 cm) long, 1/16 ¼ in. (2 to 5 mm) broad, thin, and rough-margined. The white flowers are solitary in the axils of scarcely reduced leaves. The pedicels are ¾ to 2 in. (2 to 5 cm) long. The sepals are 1/8 in. (3 to 4 mm) long, lanceolate, acute, and indistinctly netted-veined. The petals are oblong and from ½ to twice as long as the calyx. The filaments are connate at the extreme base. There are 3 styles. The capsule is spherical/rounded-ovoid, barely equaling the sepals, and 3-valved. The seeds are about 1/32 in. (0.8 mm) long, plump, blackish, smooth and shiny. (DNR)
PROPAGATION DETAILS	

Ecotype	N/A
Propagation Goal	Plants, cuttings, seeds. (USFWSJ)
Propagation Method	Seed or vegetative. (USFWSJ)
Product Type	Container plug, Propagules
Stock Type:	
Time to Grow (from seeding until plants are ready to be outplanted):	In collaboration with the U.S. Fish and Wildlife Service, efforts to enhance the tiny wild populations are being made by propagating vegetative cuttings of genetically distinct individuals of *Arenaria paludicola* and *Nasturtium gambelii* from all known natural populations. These cuttings are being grown for reintroduction at the Santa Barbara Botanic Garden and the University of California, Irvine Arboretum. The propagation protocol requires that vegetative cuttings carefully be taken from wild stock, and their cu stems dipped in the root-promoting hormone Rootone before potting in an artificial wet-propagation environment. These plant fragments are grown for several months in special wet-propagation basins as new roots develop, with each cutting being cultivated individually in submerged pots. (Nerhus)
Target Specifications (size or characteristics of target plants to be produced):	Unknown
Propagule Collection (how, when, etc):	Unknown
Propagule Processing/Propagule Characteristics (including seed density (# per pound), seed longevity, etc):	Unknown
Pre-Planting Propagule Treatments (cleaning, dormancy treatments, etc):	Unknown
Growing Area Preparation / Annual Practices for Perennial Crops (growing media, type and size of containers, etc):	Unknown
Establishment Phase (from seeding to germination):	Unknown
Length of	Unknown

Establishment Phase:	
Active Growth Phase (from germination until plants are no longer actively growing):	Unknown
Length of Active Growth Phase:	Unknown
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):	Unknown
Length of Hardening Phase:	Unknown
Harvesting, Storage and Shipping (of seedlings):	Unknown
Length of Storage (of seedlings, between nursery and outplanting):	Unknown
Guidelines for Outplanting / Performance on Typical Sites (e.g., percent survival, height or diameter growth, elapsed time before flowering):	Unknown
Other Comments (including collection restrictions or guidelines, if available):	Based on descriptions of the plant as a species that roots from stem nodules, (USFWSA) would theorize a vegetative propagation technique would be part of the recovery plan. Cuttings could be propagated in a greenhouse under conditions similar to the outplanting site. Soil samples from existing sites could be used to inoculate propagation soil in a percentage of containers to see if there are beneficial microorganisms needed to keep the plant healthy. (Dumroese) Since this is a long, loose, floppy plant, I would assume that outplanting would have to take place before the plants became unmanageable in size. Seeds: Any pre-treatment of seeds would need to duplicate outplanting site conditions a

	closely as possible. Since this is a rare species, I would plant seeds in the wetland equivalent of propagation flats to begin with, and use pricking to transplant germinants. (Dumroese) The goal for the Fish & Wildlife Service is to restore at least 5 populations of at least 500 individuals each. (USFWS5)
INFORMATION SOURCES	
References (full citations):	Answers.com citation of Beacham's Guide to the Endangered Species URL: http://www.answers.com/topic/arenaria-paludicola May 15, 2011 DNR Descriptive Page for *Arecaria paludicola* . Description adapted from Hitchcock E Al. 1964 URL: http://www1.dnr.wa.gov/nhp/refdesk/fguide/pdf/arepal.pdf Dumroese, R. Kasten, Tara Luna, Thomas D. Landis, editors. *Nursery Manual for Nativ Plants, A Guide for Tribal Nurseries*. *Volume 1, Nursery Management.* United States Department of Agriculture, December 2008. Flora of North America, *Arenaria paludicola* page, URL: http://www.efloras.org/florataxon.aspx?flora_id=1&taxon_id=250060022 Accessed May 7, 2011 Hitchcock, C.L., A. Cronquist, M. Ownbey, and J. W. Thompson 1964 *Vascular Plants The Pacific Northwest,* Part 2: Salicaceae to Saxifrageaceae. University of Washington Press. Seattle WA 597pp. NatureServe Explorer: Explanation of Global Status Ratings http://www.natureserve.org/explorer/granks.htm Nerhus, Barry S. Jr. Propagation and Reintroduction of *Arenaria paludicola*URL: http://web.due.uci.edu/urop/symp/2007_spring/0298229455_version1.doc Pacific Biodiversity Institute, Arenaria paludicola page http://www.pacificbio.org/initiatives/ESIN/Plants/Arenaria%20paludicola/Arenaria%20paludicola.ht May 15, 2011 USDA Listing ARPA7 http://plants.usda.gov/java/profile?symbol=ARPA7 (USFWS5) US Fish & Wildlife 5 year Review, June 2008 http://www.fws.gov/ecos/ajax/docs/five_year_review/doc1932.pdf (USFWSA) US Fish & Wildlife Spotlight Species Action Plan for 2010-2014 http://ecos.fws.gov/docs/action_plans/doc3181.pdf (USFWSJ) US Fish & Wildlife Service Journal Entry, Jan 25, 2011 http://www.fws.gov/arsnew/print/print_report.cfm?arskey=28972

	Images: 1. McCloud, Dr. Malcolm. http://www1.dnr.wa.gov/nhp/refdesk/fguide/pdf/arepal.pdf 2. McCloud, Dr. Malcolm. http://www1.dnr.wa.gov/nhp/refdesk/fguide/pdf/arepal.pdf
Other Sources Consulted	Califlora Taxon Report 652 http://www.calflora.org/cgi-bin/species_query.cgi?where-calrecnum=652 Center for Plant Conservation http://www.centerforplantconservation.org/About/Staff/Staff.asp Google Maps Site of Oso Flaco Lake, location of 2 remaining wild sites for *A. paludicol* http://maps.google.com/maps?q=google+earth&oe=utf-8&rls=org.mozilla:en-US:official&client=firefox-a&um=1&ie=UTF-8&sa=N&hl=en&tab=wl May 15 2011. Guadalupe-Nipomo Dunes Center URL: http://www.dunescenter.org/aboutus/visitorcenter.html Accessed May 7, 2011 Pojar, James and Andy Mackinnon. *Revised Plants of the Pacific Northwest Coast, Washington, Oregon, British Columbia & Alaska.* Lone Pine Publishing, Vancouver BC 2004. (USFWSR11) US Fish & Wildlife Service Recovery Plan, Updated May 15, 2011. Web Page URL: http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=Q25H Accessed May 15, 2011 (USFWSR98)Fish & Wildlife Service Recovery Plan, 9-28-1998 URL: http://www.fws.gov/ecos/ajax/docs/recovery_plan/980928b.pdf
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