

**Plant Propagation Protocol for Little Sagebrush**  
 ESRM 412 – Native Plant Production



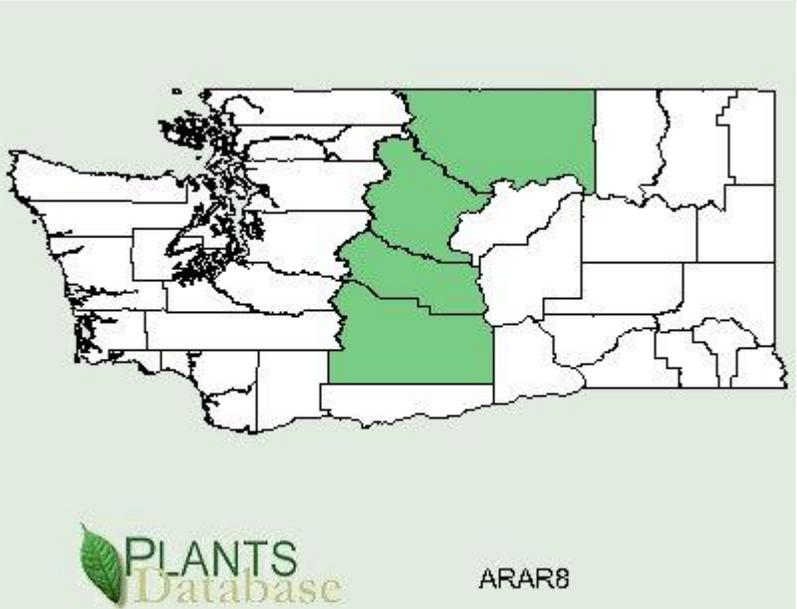
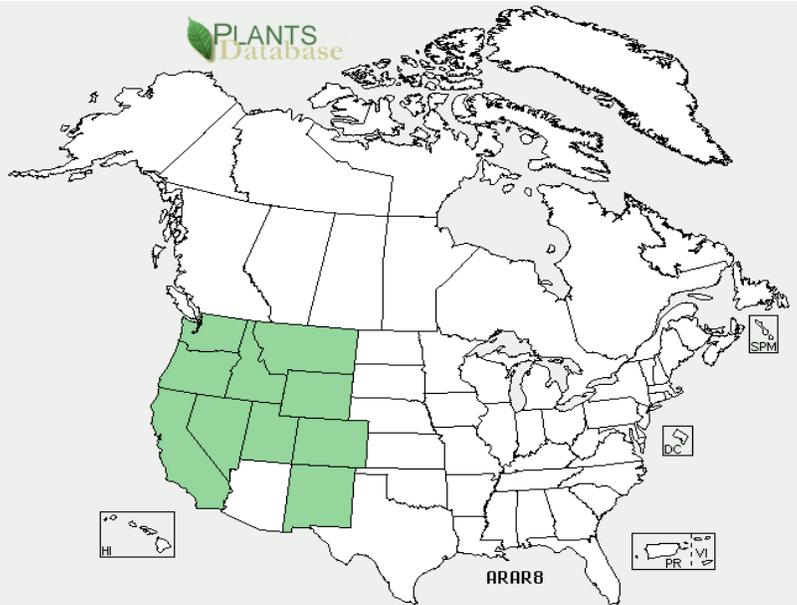
**TAXONOMY**

<b>TAXONOMY</b>	
Family Names	
Family Scientific Name:	Asteraceae
Family Common Name:	Aster
Scientific Names	
Genus:	<i>Artemisia</i>
Species:	<i>arbuscula</i>
Species Authority:	L.
Variety:	
Sub-species:	
Cultivar:	
Authority for Variety/Sub-species:	
Common Synonym(s) (include full scientific names (e.g., <i>Elymus glaucus</i> Buckley), including variety	<a href="#"><i>Artemisia arbuscula</i> Nutt. ssp. <i>arbusculads</i></a> <a href="#"><i>Artemisia arbuscula</i> Nutt. ssp. <i>longicaulis</i> Winward &amp; McArthur</a> <a href="#"><i>Artemisia arbuscula</i> Nutt. ssp. <i>longiloba</i> (Osterh.) L.M. Shultz</a> <a href="#"><i>Artemisia arbuscula</i> Nutt. ssp. <i>thermopola</i> Beetle (9)</a>

or subspecies information)	
Common Name(s):	Little sagebrush, low sagebrush
Species Code (as per USDA Plants database):	ARAR8

**GENERAL INFORMATION**

Geographical range (distribution maps for North America and Washington state)



Ecological distribution

Local distribution indicates this species may be product of unique soils. (9)

(ecosystems it occurs in, etc):	
Climate and elevation range	Cool to cold and dry in summer. (9)
Local habitat and abundance; may include commonly associated species	Dry rocky slopes and ridges in mountains, dry foothills and flats. Found in soils deeper than scablands (10") but generally shallower and stonier than where big sage occurs (24" average). (5) (4)  Common associations include <i>Festuca idahoensis</i> , <i>Danthonia unispicata</i> , <i>Poa sandbergii</i> and <i>Antennaria dimorpha</i> . (4) (8)
Plant strategy type / successional stage (stress-tolerator, competitor, weedy/colonizer, seral, late successional)	Information not available
Plant characteristics (life form (shrub, grass, forb), longevity, key characteristics, etc)	Low shrub, 16 inches or less, with rounded form. Stems are erect. Has taproot and spreading fibrous roots. Leaves are deciduous, alternate, hairy and wedge-shaped with 3 lobes on tip and approximately 1/2 inch in length. Flowers are narrow, spike-like and less than 3/4 inch in width; sessile in leaf axils. Bracts have shingle-like orientation and are yellow. Fruit is glabrous achene. (5)
<b>PROPAGATION DETAILS</b>	
Ecotype (this is meant primarily for experimentally derived protocols, and is a description of where the seed that was tested came from):	N/A
Propagation Goal (Options: Plants, Cuttings, Seeds, Bulbs, Somatic Embryos, and/or Other Propagules):	Plants
Propagation Method (Options: Seed or Vegetative):	Seed
Product Type (options: Container (plug), Bareroot (field grown), Plug + (container-field	Container, bareroot

grown hybrids, and/or Propagules (seeds, cuttings, poles, etc.))	
Stock Type:	
Time to Grow (from seeding until plants are ready to be outplanted):	Information not available
Target Specifications (size or characteristics of target plants to be produced):	Seedlings
Propagule Collection (how, when, etc):	Seeds are collected by beating branches into bags. Harvesting is much easier when they are dry. Harvesting too late can result in aborted fruits. (1)
Propagule Processing/Propagule Characteristics (including seed density (# per pound), seed longevity, etc):	1,814,400 seeds/lb. Seeds are not long-lived in warehouse storage generally maxing out at 2-3 years, though 5 years has been reached given close attention to optimum moisture (6-8%) and temperature (<10 °C). (1)
Pre-Planting Propagule Treatments (cleaning, dormancy treatments, etc):	Purity is a challenge with this species—often less than 10% seed by dry weight. Screening and fanning to reduce sticks and other debris can raise this level to 50%. Dormancy and light requirements are removed through moist chilling stratification between 0-3.3 °C for about 10 days. (1) (7)
Growing Area Preparation / Annual Practices for Perennial Crops (growing media, type and size of containers, etc):	Germination is best achieved by mimicking natural conditions.
Establishment Phase (from seeding to germination):	Seed should be sown in nursery beds in fall or winter at a density that will produce 50 seedlings per square foot. They should be covered with ¼ inch of soil and light straw mulch (7)
Length of Establishment Phase:	Can take 20 weeks or more under conditions simulating snow cover for montane populations. In populations adapted to warmer desert conditions, germination can occur in a week (1)
Active Growth Phase (from	Not available

germination until plants are no longer actively growing):	
Length of Active Growth Phase:	Not available
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):	Not available
Length of Hardening Phase:	Not available
Harvesting, Storage and Shipping (of seedlings):	Not available
Length of Storage (of seedlings, between nursery and outplanting):	Seedlings should be planted at 1-2 years of age. (7)
Guidelines for Outplanting / Performance on Typical Sites (eg, percent survival, height or diameter growth, elapsed time before flowering):	Not available
Other Comments (including collection restrictions or guidelines, if available):	<p>Standard conservative collection methods apply to ensure genetic integrity and minimal ecosystem impact.</p> <p>Transplanting wildlings has been a successful restoration technique. (8)</p> <p>The Artemisia genus is one of the few groups of native shrubs that can be successfully propagated through direct seeding. (8)</p>
<b>INFORMATION SOURCES</b>	
References (full citations):	1) Bonner, Franklin and Karrfalt, Robert, eds. The Woody Plant

	<p>Seed Manual. Agricultural Handbook No. 727. USDA – Forest Service. Washington, DC.</p> <p>2) Dumroese, R. Kasten et al. 2009. Nursery manual for native plants: A guide for tribal nurseries - Volume 1: Nursery management. U.S. Department of Agriculture, Forest Service. Agriculture Handbook 730. Washington, D.C. US.</p> <p>3) Everett, Richard et al. Propagation of Nevada shrubs by stem cuttings. <i>Journal of Range Management</i> Vol. 31, No. 6 (1978).</p> <p>4) Franklin, Jerry F. &amp; C. T. Dyrness. Natural Vegetation of Oregon and Washington. 1988. Oregon State University Press, Corvallis OR.</p> <p>5) Johnson, Charles G. Common Plants of the Inland Pacific Northwest. 1998. USDA – Forest Service.</p> <p>6) Kozloff, Eugene. Plants of Western Oregon, Washington and British Columbia. 1976. Timber Press. Portland, OR.</p> <p>7) Schopmeyer, C.S. Seeds of woody plants in the United States. 1974. USDA – Forest Service. Heckman Bindery. Manchester, IN.</p> <p>8) Steinberg, Peter D. 2002. <i>Artemisia arbuscula</i>. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: <a href="http://www.fs.fed.us/database/feis/">http://www.fs.fed.us/database/feis/</a></p> <p>9) USDA – NRCS. 2002. The PLANTS Database, National Plant Database Center, Baton Rouge, LA. (<a href="http://plants.usda.gov">http://plants.usda.gov</a>).</p> <p>10) USDA – Forest Service. 2011. Low Sagebrush Ecological Series. <a href="http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fsbdev7_002608.pdf">http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fsbdev7_002608.pdf</a>. (15 May 2011).</p>
Other Sources Consulted (but that contained no pertinent	Baskin, Jerry and Carol Baskin. Seeds—Ecology biogeography and evolution of dormancy and germination. 1998. Academic Press. San Diego, CA.

<p>information) (full citations):</p>	<p>Hartman, Hudson et al. Plant Propagation Principles. 2002. Prentice-Hall, Inc., Upper Saddle River, NJ.</p> <p>Native Plant Network. 2011. Propagation Protocol Search. &lt;Plant Network. <a href="http://www.nativeplantnetwork.org">http://www.nativeplantnetwork.org</a> (17 May 2011)&gt;.</p> <p>Rose, Robin. Propagation of Pacific Northwest Native Plants. 1998. Oregon State University Press, Corvallis, OR.</p> <p>USFS. Range Plant Handbook. USDA – Forest Service. 1988. Dover Publications. Mineola, NY.</p> <p>Young, James A, &amp; Young, Cheryl G. Seeds of Woody Plants in North America. 1992. Dioscorides Press. Portland, OR.</p>
<p>Protocol Author (First and last name):</p>	<p>Jon Klacik</p>
<p>Date Protocol Created or Updated (MM/DD/YY):</p>	<p>15 May 2011</p>

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