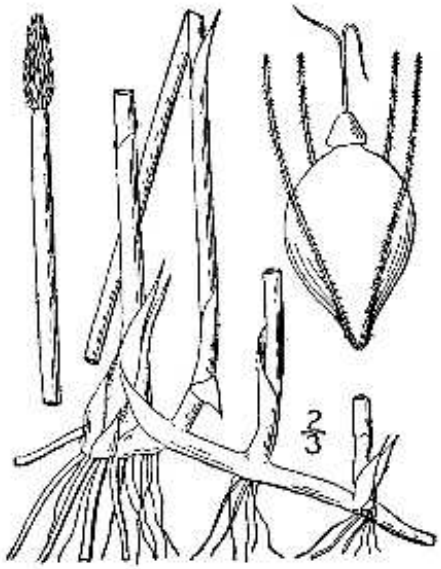
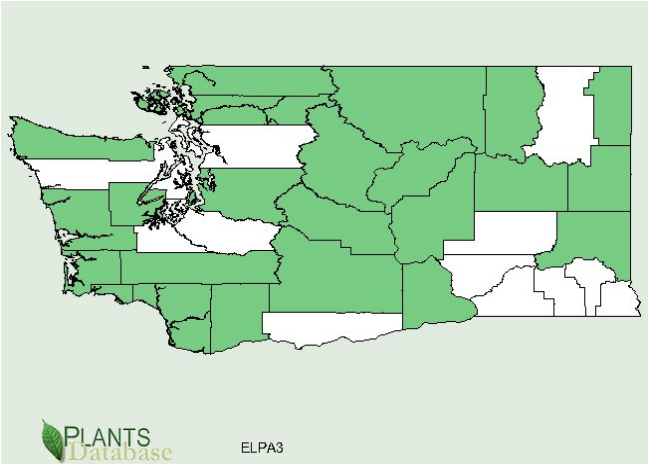
Plant Propagation Protocol for Creeping Spike-rush [*Eleocharis palustris*]
ESRM 412 – Native Plant Production



USDA-NRCS PLANTS Database / Britton, N.L., and A. Brown. 1913. *An illustrated flora of the northern United States, Canada and the British Possessions. 3 vols.* Charles Scribner's Sons, New York. Vol. 1: 314.

North American Distribution

Washington Distribution



USDA-NRCS PLANTS Database

TAXONOMY	
Family Names	
Family Scientific Name:	Cyperaceae
Family Common Name:	Sedges
Scientific Names	
Genus:	*Eleocharis*

Species:	*palustris*
Species Authority:	(L.) Roem. and Shult.
Variety:	*palustris*
Sub-species:	n/a
Cultivar:	n/a
Authority for Variety/Sub-species:	n/a
Common Synonym(s):	*Eleocharis palustris* (L) Roem. & Shult. var. *vigens* L.H. Bailey (Distribution in the Midwest and Northeast United States) (USDA) *Eleocharis macrostachya* Britt., *Eleocharis smallii* Britt., *Eleocharis xyridiformis* Fern & Brack. (Hauser)
Common Name(s):	Creeping spikerush, creeping spike-rush, common spikerush, common spike-rush, creeping spikesedge
Species Code:	ELPA3
GENERAL INFORMATION	
Geographical range:	See maps above
Ecological distribution:	Obligate wetland species.[10] Located along shorelines, in brackish waters, meadows, tidal wetlands, in shallow water.[6,7,8,9] Present in hydrologic zones 2,3,4 and 5.[5]
Climate and elevation range:	Low-mid elevations[8] from 0 – 1,340 m.[3] Temperate to cold temperature regions with minimum temperatures of -39^{o}C to -42^{o}C with a precipitation regime of 406-1520 mm.[3]
Local habitat and abundance:	Common in Washington, often associated with soft rush (*Juncus effuses*), sedges (*Carex* sp.), and hard stem bulrush (*Scirpus acutus*) throughout Washington[9] and in western Washington with coastal Douglas-fir (*Pseudotruga menziesii*).[3]
Plant strategy type / successional stage:	It grows rapidly and spreads by rhizomes and it is a nitrogen fixer.[7] Often occurs in disturbed wetlands where there are compacted mineral soils like in pastures, abandoned farms fields or drainage ditches.[9] Often an early-seral species but found in mid- and late-succession sites.[3] Moderately fire resistant and is a ground residual colonizer and secondary colonizer after fire.[3] Requires a minimum of 100 frost free days, is tolerant to drought at a low level, survives in water up to 1m deep, has low tolerance to salinity and no tolerance to shade.[10] Moderate growth rate.[10] Acidity tolerance is moderate.[5]
Plant characteristics:	Perennial graminoid growing singly or in clusters from a long, dark-brown rhizome, with only one terminal spikelet.[8]
PROPAGATION DETAILS – Reproductive	
Propagation Goal:	Plants
Propagation Method:	Seed
Product Type:	Plugs

Time to Grow:	2 to 3 months[5]
Target Specifications:	
Propagule Collection:	Collected by hand by stripping, cutting with shears[6] or by using a power seed harvester.[7] Seed ripens between late August and October and they are held in the seed case a long period of time.[7]
Propagule Processing/Propagule Characteristics:	A grocery bag of spikes will produce 2/3 to 1 cup of seed.[5]
Pre-Planting Propagule Treatments:	Use a hammer mill to release seed from stem and a No. 12 top screen separates the seed from debris. Air velocity is adjusted to clean chaff from seed.[7] No cold stratification is required for germination.[10] Light scarification followed by pre-chilling may enhance germination. Pre-chill in a mixture of water and sphagnum moss at 2^{o}C for 30 to 45 days.[6]
Growing Area Preparation / Annual Practices for Perennial Crops:	Seed requires light, moisture and heat for germination: seed should not be covered with soil, but pressed it soil lightly, soil should stay consistently moist and the greenhouse temperature hot at 32 to 38^{o}C.[6]
Establishment Phase:	1 to 2 weeks[11]
Length of Establishment Phase:	
Active Growth Phase:	
Length of Active Growth Phase:	
Hardening Phase:	
Length of Hardening Phase:	
Harvesting, Storage and Shipping:	Seeds are recalcitrant (do not survive drying and storing); store in water at 3^{o} C to mimic natural environment[2]
Length of Storage:	Seeds to not survive drying and storing[2]
Guidelines for Outplanting / Performance on Typical Sites:	Transplant at 30 to 45 cm spacing and plants will fill in spaces within next years. Saturation of soil should not exceed 8 cm during the first growing season and fluctuating water levels will help to facilitate spreading.[6] Planting for a dense cover in 1yr should be spaced at 0.3m, 2yr at .6 and in 3yr at 0.9m.[5]
Other Comments:	This species is useful for soil stabilization in wetland and riparian ecosystems, because it establishes dense root systems. The roots also form a matrix of beneficial bacteria and the plant is useful for waste water treatment.[6] Aphids can feed on the stem, but are generally not a problem.[7]
PROPAGATION DETAILS – Bartow[1]	
Ecotype:	Lane Co., Oregon.
Propagation Goal:	Seeds
Propagation Method:	Seeds
Product:	Cone-tainers and propagules (seeds, cutting, poles etc.)
Target Specifications:	Grow plugs that will be transplanted in raised beds for seed increase

Propagule Processing/Propagule Characteristics:	Used an air screen to clean seeds.
Growing Area Preparation / Annual Practices for Perennial Crops:	Sown into cone-tainers filled with Sunshine #1 - a non-soil, peat-based media. Amendments used were Miromax (for micro-nutrients) and Osmocote 14-14-14 (a slow-release fertilizer). These flats received 5 weeks warm stratification.
Establishment Phase:	5 weeks
Other Comments:	Germination may take less time in a hot greenhouse that is above 25^{o}C. Plants did not flower the first year.
PROPAGATION DETAILS – Wild Harvest	
Ecotype:	Interagency Riparian/Wetland Plant Development Project 5 state service area in Aberdeen, ID. [4]
Propagation Goal:	Plants
Propagation Method:	Vegetative
Product Type:	Directly transplanted into field.
Stock Type:	6x6cm harvested plants[4]
Target Specifications:	Plant that establishes, reproduces and spreads.
Propagule Collection:	Digging with a shovel no more than 0.37m^2 of material from a 1.1-1.5m^2 plot to a depth of 15cm to include large amounts of root mass. Above ground biomass was clipped to height of 25cm.[4] No more than 0.09m^2 of species should be harvest from 0.4m^2 area to reduce disturbance.[4]
Harvesting, Storage and Shipping:	Plants were stored at a temperature of 29^{o}C.[4]
Guidelines for Outplanting / Performance on Typical Sites:	Plants were divided into 6x6cm plugs using a shovel. Plants were outplanted soon after harvest and soil was kept around roots to reduce stress. Plants were spaced 46cm apart.[4] Planting for a dense cover in 1yr should be spaced at 0.3m, 2yr at 0.6 and in 3yr at 0.9m.[5]
Other Comments:	Wild harvested plants performed better than greenhouse propagated plants, but this could be because greenhouse propagated plants were out-planted later in the summer.[4]
INFORMATION SOURCES	
References:	[1]Bartow, Amy. 2007. Propagation protocol for production of *Eleocharis palustris* Roemer & J.A. Schultes seeds; USDA NRCS - Corvallis Plant Materials Center, Corvallis, . In: Native Plant Network. URL: http://www.nativeplantnetwork.org [15 May 2012]. Moscow (ID): University of Idaho, College of Natural Resources, Forest Research Nursery.
	[2]Baskin, Carol C., and Jerry M. Baskin. 1998. *Seeds: ecology, biogeography, and evolution of dormancy and germination*. San Diego, Calif: Academic Press.
	[3]Hauser, A. Scott. 2006. *Eleocharis palustris.* 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/ [2012, May 15].
	[4]Hoag, J. Chris and Sellers, Michael E. April, 1995. “Use of Greenhouse

	Propagated wetland Plants Versus Live Transplants to Vegetate Constructed or Created Wetlands." Interagency Riparian/Wetland Plant Development Project, USDA-Natural Resources Conservation Service, Plant Materials Center, P.O. Box 296, Aberdeen, ID 83210
	[5]Hoag, Chris J, Wyman, Sandra K., Bentrup, Gary, Holzworth, Larry, Ogle, Daniel G., Carleton, Joe, Berg, Forrest and Leinard, Bob. Feb 2001. Users Guide to Description, Propagation, and Establishment of Wetland Plant Species and Grasses for Riparian Areas in the Intermountain West. USDA-NRCS. [May 15, 2012]. http://efotg.sc.egov.usda.gov/references/public/WY/pm5.pdf
	[6]Hoag, J. Chris. May, 2006. "Plant Fact Sheet – Creeping Spikerush, *Eleocharis palustris* (L.) Roemer & J.A. Schultes." USDA NRCS Aberdeen PMC, Aberdeen, ID.
	[7]Ogle, Dan. September 2005. "Plant Guide - Creeping Spikerush, *Eleocharis palustris* (L.) Roemer & J.A. Schultes." USDA NRCS Idaho State Office, Boise, Idaho.
	[8]Pojar, Jim and MacKinnon, Andy. 1994. Plants of the Pacific Northwest Coast. Lone Pine: Vancouver, British Columbia. Pg. 226.
	[9]Stevens, M. L., Vanbianchi, R., & Washington (State). 1993. *Restoring wetlands in Washington: A guidebook for wetland restoration, planning, and implementation*. Olympia: Washington State, Dept. of Ecology.
	[10]USDA, NRCS. 2012. The PLANTS Database (http://plants.usda.gov, 15 May 2012). National Plant Data Team, Greensboro, NC 27401-4901 USA.
	[11]USDA-NRCS. Wetland Fact Sheet – Creeping Spikerush (*Eleocharis palustris*). The Interagency Riparian/Wetland Project. Aberdeen, ID. [May, 15, 2012] http://www.plant-materials.nrcs.usda.gov/pubs/idpmcfselpa3.pdf
Other Sources Consulted:	Hartmann, Hudson Thomas, and Dale E. Kester. 1975. *Plant propagation: principles and practices*. New Delhi: Prentice-Hall.
Protocol Author:	Lindsey Hamilton
Date Protocol Created:	5/15/12