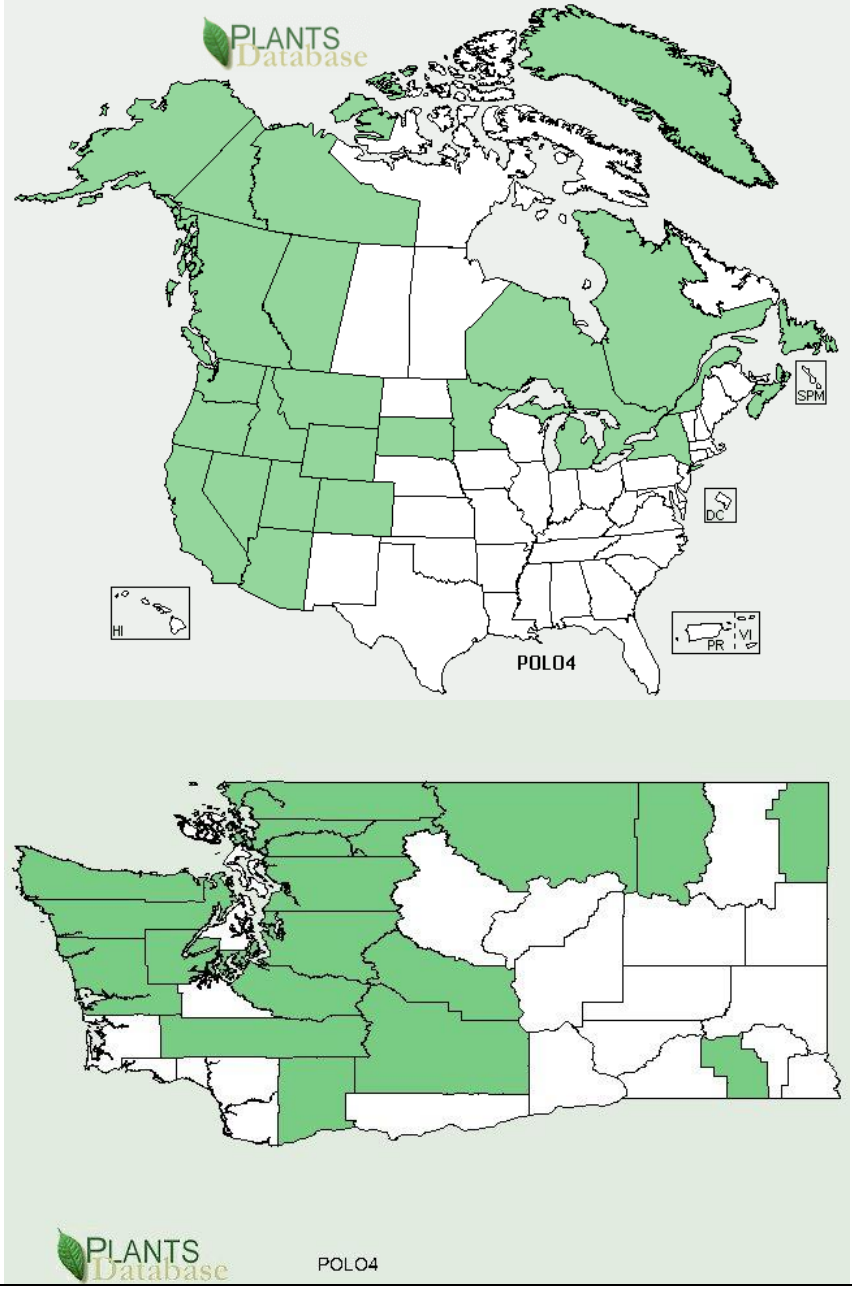
Plant Propagation Protocol for *Polystichum lonchitis*
ESRM 412 – Native Plant Production
Protocol URL: https://courses.washington.edu/esrm412/protocols/POLO4.*pdf*

TAXONOMY	
Plant Family	
Scientific Name	Dryopteridaceae
Common Name	Wood Fern
Species Scientific Name	
Scientific Name	*Polystichum lonchitis* (L.) Roth
Varieties	N/A
Sub-species	N/A
Cultivar	N/A
Common Synonym(s)	*Polystichum mohrioides* (Bory) C. Presl var. *lemmonii* (Underw.) Fernald (NRCS 2014) *Polypodium lonchitis* L. *Aspidium lonchitis* (L.) Sw. (Missouri Botanical Garden 2014)
Common Name(s)	Northern Holly Fern, Mountain Holly Fern (Missouri Botanical Garden 2014).
Species Code (as per USDA Plants database)	POLO4
GENERAL INFORMATION	

Geographical range (North America and Washington State) as per USDA Plants database	
Ecological distribution	Boreal and subalpine coniferous forests as well as alpine regions. (Floras of North America 2014)
Climate and elevation range	Individuals grow in moist and humid regions with cool summers to avoid summer drought. Elevation: 0-3200m above sea level (Floras of North America 2014)
Local habitat and abundance	*P. lonchitis* may be found growing in inhospitable rocky crevices or in alkaline soils (pH > 7.2) but has been known to survive in less basic conditions (LBJ Wildflower Center 2014; Mütter *et al.* 2008; Olsen 2007). *P. lonchitis* has been known to do better in crumbly, well-draining soils with some overhead protection from rainfall (Olsen 2007).
Plant strategy	*P. lonchitis* is not known to be a good competitor or stress-tolerator due to its

type / successional stage	specific soil and light demands making it a typically late-successional type plant. However, the plants large elevation range demonstrates that *P. lonchitis* can spread from alpine regions to the coast, but only if the coastal habitat is cooler than the alpine (Mütter *et al.* 2008).
Plant characteristics	This evergreen fern stands erect at 15-45 cm with a once-pinnate, narrow, linear-lanceolate blade (Olsen 2007). A very distinguishing characteristic of *P. lonchitis* is the spiky morphology of their spores which is useful in distinguishing them from other once-pinnate species (Floras of North America 2014).
PROPAGATION DETAILS	
Ecotype	Como d'Amitges, Spain; seeds collected in alpine system (Ballesteros 2006).
Propagation Goal	Gametophytes (Ballesteros 2006)
Propagation Method	Seed/spore (Ballesteros 2006)
Product Type	N/A
Stock Type	N/A
Time to Grow	N/A
Target Specifications	N/A
Propagule Collection Instructions	Fronds collected from up to twenty individuals in mid September. Fronds were laid out on glossy paper at room temperature and under light pressure for a week and spores that had fallen onto the paper after this time were collected into a glass vial after being sifted through a 0.074mm sieve (Ballesteros 2006).
Propagule Processing/Propagule Characteristics	N/A
Pre-Planting Propagule Treatments	Approximatly 1mg of spores were placed in Eppendorf tubes and stored in the dark at 25°C, 80°C, and 196°C (liquid nitrogen) for six months. Spores were defrosted at 40°C for 5 minutes and suspended in 1ml of liquid Dyer culture medium before being dispensed into seven 5.5mm petri dishes with 5 drops of a micropipette on a culture medium with 1% agar (Ballesteros 2006).
Growing Area Preparation / Annual Practices for Perennial Crops	5.5mm petri dishes with a culture medium with 1% agar (Ballesteros 2006).
Establishment Phase Details	Dishes were sealed with Parafilm and incubated with a 12h light photoperiod (daylight fluorescent tubes, photon irradiance 25-50µmol/m^2s in the 400-700nm regions) at 20°C (Ballesteros 2006).
Length of Establishment Phase	Petri dishes were incubated for 30 days but the first *P. lonchitis* spores germinated by the sixth day (Ballesteros 2006).
Active Growth	After 30 days germinated gametophytes were moved from petri dishes into

Phase	soil and left to develop into the sexual phase (Ballesteros 2006).
Length of Active Growth Phase	120 days (Ballesteros 2006).
Hardening Phase	N/A
Length of Hardening Phase	N/A
Harvesting, Storage and Shipping	N/A
Length of Storage	N/A
Guidelines for Outplanting / Performance on Typical Sites	N/A
Other Comments	
INFORMATION SOURCES	
References	Ballesteros, D., Estrelles, E., & A. M. Ibars. 2006. Responses of Pteridophyte spores to ultrafreezing temperatures for long-term conservation in Germplasm Banks, The Fern Gazette **17**:293-302. Floras of North America. 2014. Polystichum lonchitis (Linnaeus) Roth, Tent. Fl. Germ. 3(1): 71. 1799. <http://www.efloras.org/florataxon.aspx?flora_id=1&taxon_id=200004605> Downloaded on 17 May 2014. Missouri Botanical Garden. 2014. Polystichum lonchitis (L.) Roth. <http://www.tropicos.org/Name/26602436> Downloaded on 17 May 2014. Mütter, H., Birks, H. J. B., & A. Odland. 2008. The comparative ecology of Polystichum aculeatum, P. braunii, and P. lonchitis in Hordaland, western Norway. Nordic Journal of Botany **18**(3):267-288 Natural Resources Conservation Service. 2014. Polystichum lonchitis (L.) Roth, Northern hollyfern. <https://plants.usda.gov/core/profile?symbol=POLO4#> Downloaded on 17 May 2014. Olsen, S. 2007. Polystichum. Pages 322-358. Encyclopedia of Garden Ferns. Timber Press, Portland, Oregon, USA.
Other Sources Consulted (but that contained no pertinent information)	Frye, T. C., 1934. Polystichum. Pages 111-121. Ferns of the Pacific Northwest. The Metropolitan Press, Portland, Oregon, USA. Integrated Taxonomic Information System. 2014. Polystichum lonchitis (L.) Roth.

(full citations)	<http://www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=17686> Downloaded 17 May 2014. Lady Bird Johnson Wildflower Center. 2014. Polystichum Lonchitis. <http://www.wildflower.org/plants/result.php?id_plant=POLO4> Downloaded on 17 May 2014. Southwest Environmental Information Network. 2014. Polystichum loinchitis (L.) Roth. <http://swbiodiversity.org/seinet/taxa/index.php?taxon=Polystichum+lonchitis> Downloaded on 17 May 2014. Webster, E. B. 1918. The Ferns of the Olympics. Smith and Webster, Port Angeles, Washington, USA.
Protocol Author (First and last name)	John Easter
Date Protocol Created or Updated (MM/DD/YY)	05/17/2014