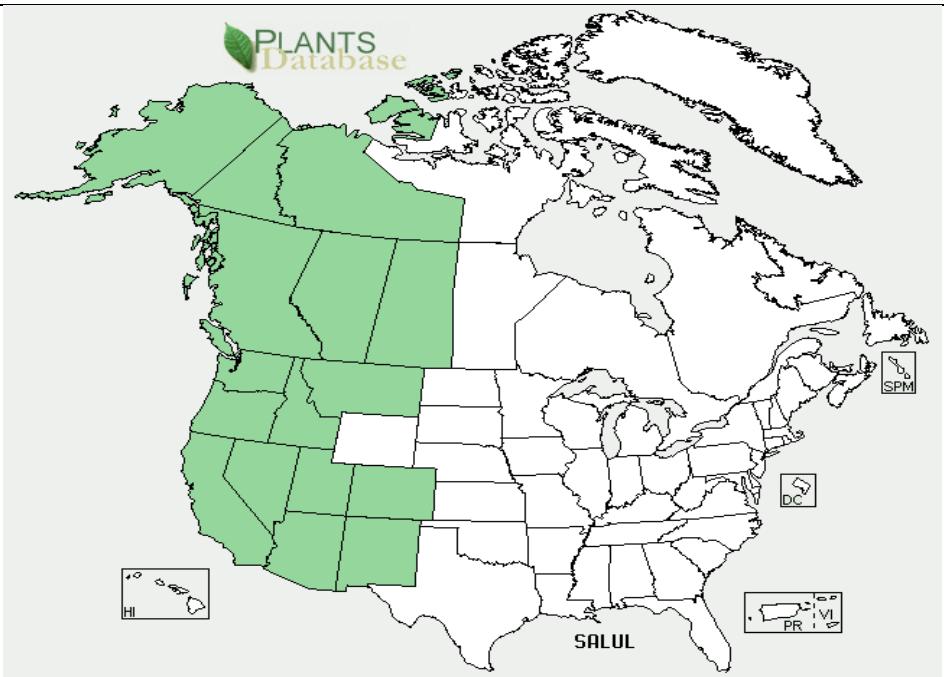
Plant Propagation Protocol for *Salix lucida ssp. lasiandra*
ESRM 412 – Native Plant Production
Spring 2008

TAXONOMY	
Family Names	
Family Scientific Name:	*Salicaceae*
Family Common Name:	Willow
Scientific Names	
Genus:	*Salix*
Species:	*lucida*
Species Authority:	Muhl
Variety:	
Sub-species:	*lasiandra*
Cultivar:	
Authority for Variety/Sub-species:	(Benth.)E. Murray
Common Synonym(s):	*Salix arguta* Andersson *Salix arguta* Andersson var. *erythrocoma* (Andersson) Andersson *Salix arguta* Andersson var. *lasiandra* (Benth.) Andersson *Salix lancifolia* Andersson *Salix lasiandra* Benth. *Salix lasiandra* Benth. var. *abramsii* C.R. Ball *Salix lasiandra* Benth. var. *lancifolia* (Andersson) Bebb *Salix lasiandra* Benth. var. *lyallii* Sarg. *Salix lasiandra* Benth. var. *macrophylla* (Andersson) Little *Salix lasiandra* Benth. var. *recomponens* Raup *Salix lucida* Muhl. var. *macrophylla* Andersson *Salix lyallii* (Sarg.) A. Heller *Salix speciosa* Nutt., non Host nec Hook. & Arn.
Common Name(s):	Pacific Willow, yellow willow
Species Code:	SALUL
GENERAL INFORMATION	

Geographical range:	
Ecological distribution (ecosystems it occurs in, etc):	
Climate and elevation range	Low to mid elevations.
Local habitat and abundance; may include commonly associated species	This species is often found in riverbanks, floodplains, lakeshores, and wet meadows often standing in quiet river backwaters. It grows best in a sunny position scattered at low elevations along major rivers[i]. Sites typically have a high water table year-round[ii].
Plant strategy type / successional stage:	Seral, rapidly colonizes disturbed areas.
Plant characteristics:	Perennial tree/shrub, short-lived, deciduous, rapid growth, growing 20-60ft, blooming in mid-spring, male and female flowers occur on separate plants in catkins. Yellow, inconspicuous flowers. Serrated, lanceolate leaves. Fruit is a capsule. After fruits ripen, seeds are dispersed from spring to early summer[iii].
PROPAGATION DETAILS	
Ecotype:	
Propagation Goal:	Plants
Propagation Method (Options: Seed or Vegetative):	Vegetative
Product Type:	Bareroot
Stock Type:	

Time to Grow:	About 1 year.
Target Specifications:	12 in
Propagule Collection:	
Propagule Processing/Propagule Characteristics:	Very small seeds, around 11,000,000/lb. Hardwood cuttings are collected from stooling beds or from wild collections in late winter before budbreak and cut to 8 to 10 inch lengths. Cuttings can be wrapped, bundled and stored in the cooler until they are stuck into field beds[iv]
Pre-Planting Propagule Treatments:	
Growing Area Preparation / Annual Practices for Perennial Crops:	Prefers a damp, heavy soil.
Establishment Phase:	Cuttings are stuck by hand in prepared field beds during early spring to a depth of 6 inches. Soil is firmed around stems after sticking to remove air pockets and irrigated after planting. Beds are irrigated as surface begins to dry. Rooting occurs when field soils warm in later spring and rapidly produce root growth[iv].
Length of Establishment Phase:	
Active Growth Phase:	
Length of Active Growth Phase:	Spring and summer[v].
Hardening Phase:	Around the end of August, with decreased irrigation rates.
Length of Hardening Phase:	1 month.
Harvesting, Storage and Shipping:	Lifting window is during mid November when cuttings are completely dormant. Cuttings are hand lifted after the beds have been undercut at a depth of 12 inches using a lifter[iv].
Length of Storage:	
Guidelines for Outplanting / Performance on Typical Sites:	5-9ft spacing within rows. Disease prone willows can decline in growth rate after 10-15 years and may need to be replaced, or the beds rotated[vi]. Willows have a rooting percentage of ninety to one-hundred percent and the rooting number is not promoted by rooting hormones[viii].
Other Comments:	If propogating by seed, seeds are not dormant and germinate rapidly, usually within 12 to 24 hours of dispersal if a moist seedbed is reached[vii]. Germination rates increase with increased amounts of light[ii]. Maximum storage period is four to six weeks with germination rates dropping off fast after ten days at room temperature[viii].

INFORMATION SOURCES	
References:	See below
Other Sources Consulted:	King County Native Plant Guide website http://dnr.metrokc.gov/wlr/PI/go-native/PlantDisplay.aspx?PlantID=10 (Last accessed 6/4/08) NCCSP Website http://www.nccsp.org/scientific_knowledge/specific-education-projects/oregon-big-tree-registry-1/pacific-willow (Last accessed 6/4/08)
Protocol Author:	Erik Injerd
Date Protocol Created or Updated:	6/4/08

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

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[i] MacKinnon, A., J. Pojar, & R. Coupe´ 1992. *Plants of the northern British Columbia*. Lone Pine Publishing, Canada.

[ii] Uchytil, Ronald J. 1989. Salix lucida subsp. lasiandra. 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/. (Last accessed 5/20/08).

[iii] Brinkman, Kenneth A. 1974. Salix L. willow. In: Schopmeyer, C. S., technical coordinator. Seeds of woody plants in the United States. Agric. Handb. 450. Washington, DC: U.S. Department of Agriculture, Forest Service: 746-750.

[iv] Zeidler, Scott; Justin, John. 2003. Propagation protocol for vegetative production of field-grown *Salix lucida* Benth. ssp. *lasiandra* (Benth.) E. Murr. plants (1+0); Utah Division of Forestry, Fire and State Land - Lone Peak Nursery, Draper, Utah. In: Native Plant Network. URL: http://www.nativeplantnetwork.org (Last accessed 4 June 2008). Moscow (ID): University of Idaho, College of Natural Resources, Forest Research Nursery.

[v] USDA Plants Database Website http://plants.usda.gov/java/charProfile?symbol=SALUL (Last accessed 5/20/08).

[vi] Crowder, Wayne; Darris, Dale 1999. Producing Pacific Northwest Native Trees and Shrubs in Hardwood Cutting Blocks or Stooling Beds. USDA Plant Materials Program. Technical Notes, Plant Materials No.24.

[vii] Densmore, Roseann; Zasada, John. 1983. Seed dispersal and dormancy patterns in northern willows: ecological and evolutionary significance. Canadian Journal of Botany. 61: 3207-3216.

[viii] Dirr, M.A. & C.W. Heuser, Jr. 1987. *The reference manual of woody plant propagation: from seed to tissue culture*. Varsity Press, Athens, Georgia.

Plant Data Sheet

Salix lucida ssp. lasiandra (pacific willow)

Photo courtesy of http://elib.cs.berkeley.edu/cgi/img_query?enlarge=8253+3202+4148+0020

Range

Found at the interior of Alaska and Yukon Territory and south along the coast to California and New Mexico along the Rocky Mountains.

Climate, elevation

Elevation occurrence includes a range of sea level – 8,000 feet above sea level. It cannot grow in the shade, needs full sun and moist-wet soils.

Local occurrence (where, how common)

Woodland, canopy, riverbanks, stream banks, freshwater swamps, moist alluvial bottomlands, and roadside ditches.

Habitat preferences

Riparian zones with wet soil and full sun. It likes heavy soils like clay.

Plant strategy type/successional stage (stress-tolerator, competitor, weedy/colonizer, seral, late successional)

It is a pioneer or early seral species that can be found on moist alluvial soil. Flooding helps keep this species established due to its flood resistance.

Associated species

Populus balsamifera trichocarpa, Salix lutea, S. exugua, Cornus sericea, Salix boothii, S. drummondiana, Alnus incana ssp. tenuifolia, Alnus rubra, Populus trichocarpa.

May be collected as: (seed, layered, divisions, etc.)

Seeds are very tiny, most commonly collected as cuttings.

Collection restrictions or guidelines
Cuttings are generally collected the same day as installation due to fast sprouting of root formations. Seeds can be collected before the capsule breaks, so frequent observation is recommended, should be around late summer, early fall.

Seed germination (needs dormancy breaking?)
Germination is quickly accomplished with a moist seedbed. Germination will take place within 12-24 hours of reaching the moist seedbed. Light increases germination rates.

Seed life (can be stored, short shelf-life, long shelf-life)
Very small seed life, only 4-6 weeks when stored at room temperature.

Recommended seed storage conditions
Storage can be extended to 1 month with storage in a sealed bag in the refrigerator.

Propagation recommendations (plant seeds, vegetative parts, cuttings, etc.)
Vegetative cuttings are the easiest. Taking a cutting of the current year to fourth year growth is recommended. Take them in late winter, early spring (November – February). Seeds can be sown on a moist medium with adequate light very easily.

Soil or medium requirements (inoculum necessary?)
Seeds can be grown on moist sand. If pre-rooting the vegetative cuttings, a mixture of 1:2 peat moss and sand that has been wetted is the best choice.

Installation form (form, potential for successful outcomes, cost)
Due to high sprouting of buds, vegetative cuttings are the easiest and best way for success. The key is having a wet soil.

Recommended planting density
Plant approximately 1-2 feet apart.

Care requirements after installed (water weekly, water once etc.)
Make sure the water level is continuously wet. Vegetative cuttings like wet soils, especially clay soils.

Normal rate of growth or spread; lifespan
This species is a fast growing tree (2-3m in one year), but a short-lived tree (~25 years).

Sources cited
1.) http://elib.cs.berkeley.edu/cgi/img_query?enlarge=8253+3202+4148+0020
2.) http://www.ecy.wa.gov/programs/sea/pubs/93-30/table3.html
3.) http://www.fs.fed.us/database/feis/plants/tree/sallas/all.html
4.) http://www.scs.leeds.ac.uk/cgi-bin/pfaf/arr_html?Salix+lasiandra&CAN=LATIND

5.) http://www.fs.fed.us/r6/uma/native/ts76.htm

Data compiled by: Kevin Klein 9 May 2003