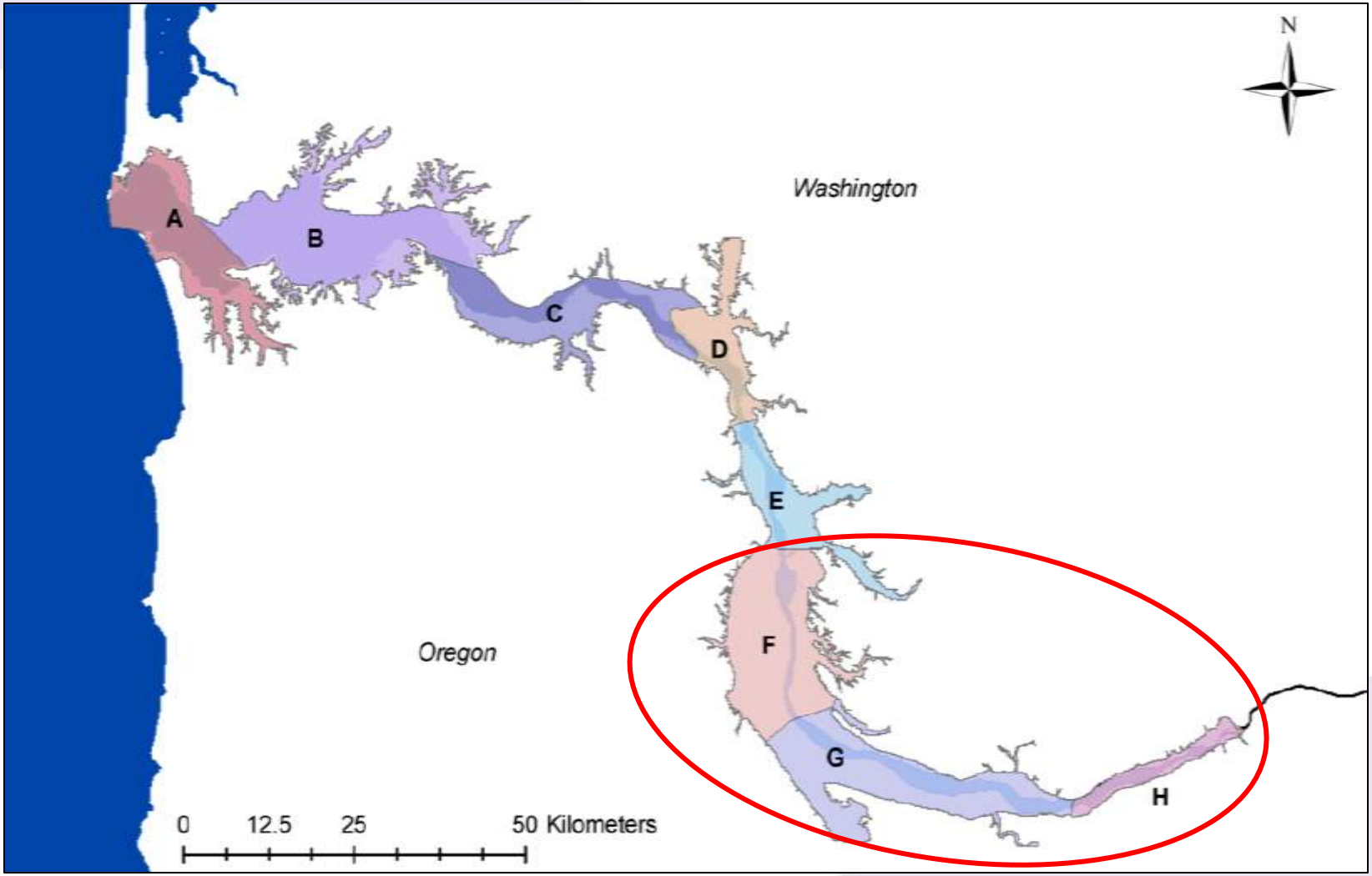
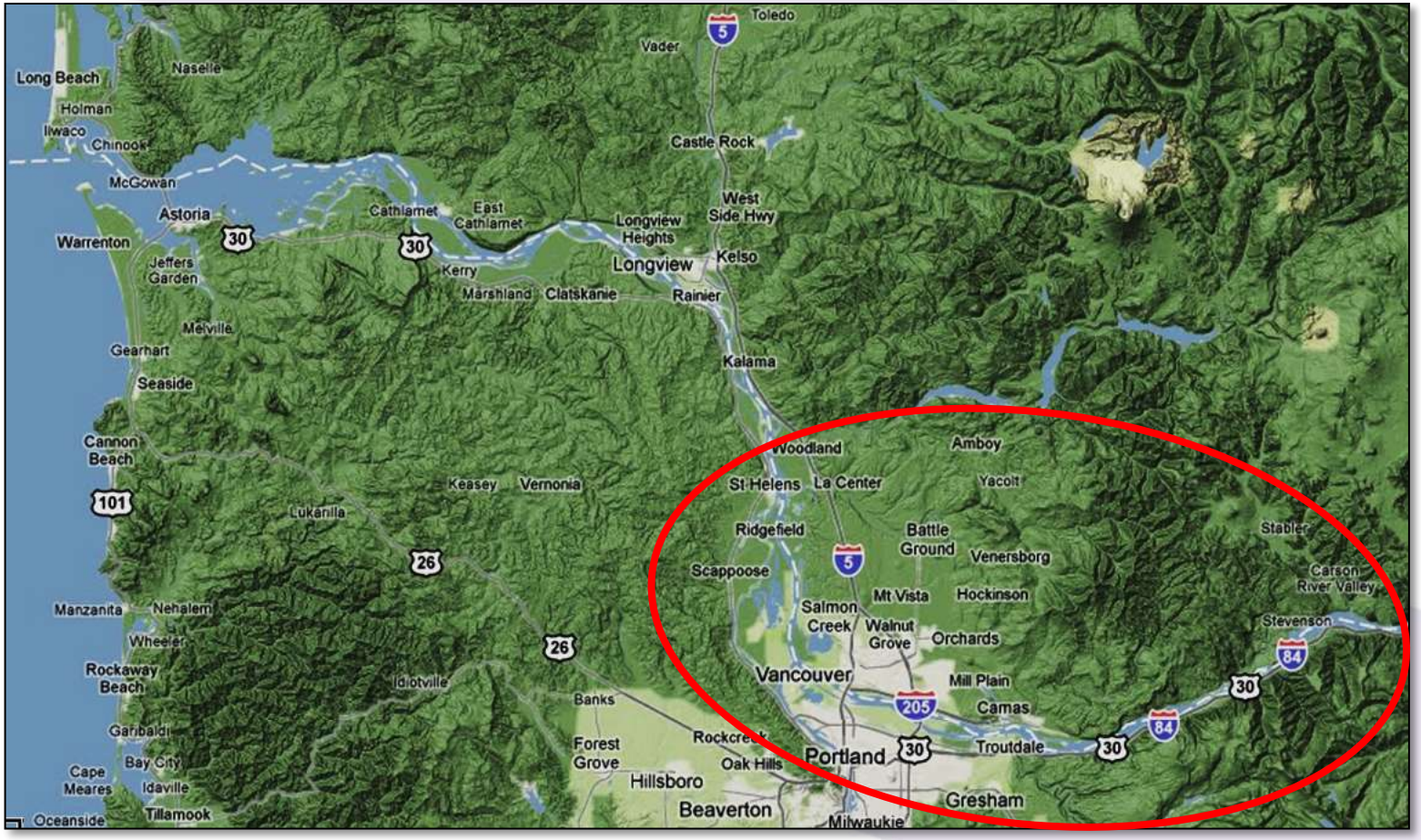
Lower Columbia River Floodplain Habitat Revegetation in a Changing Climate

Lower Columbia Estuary Partnership

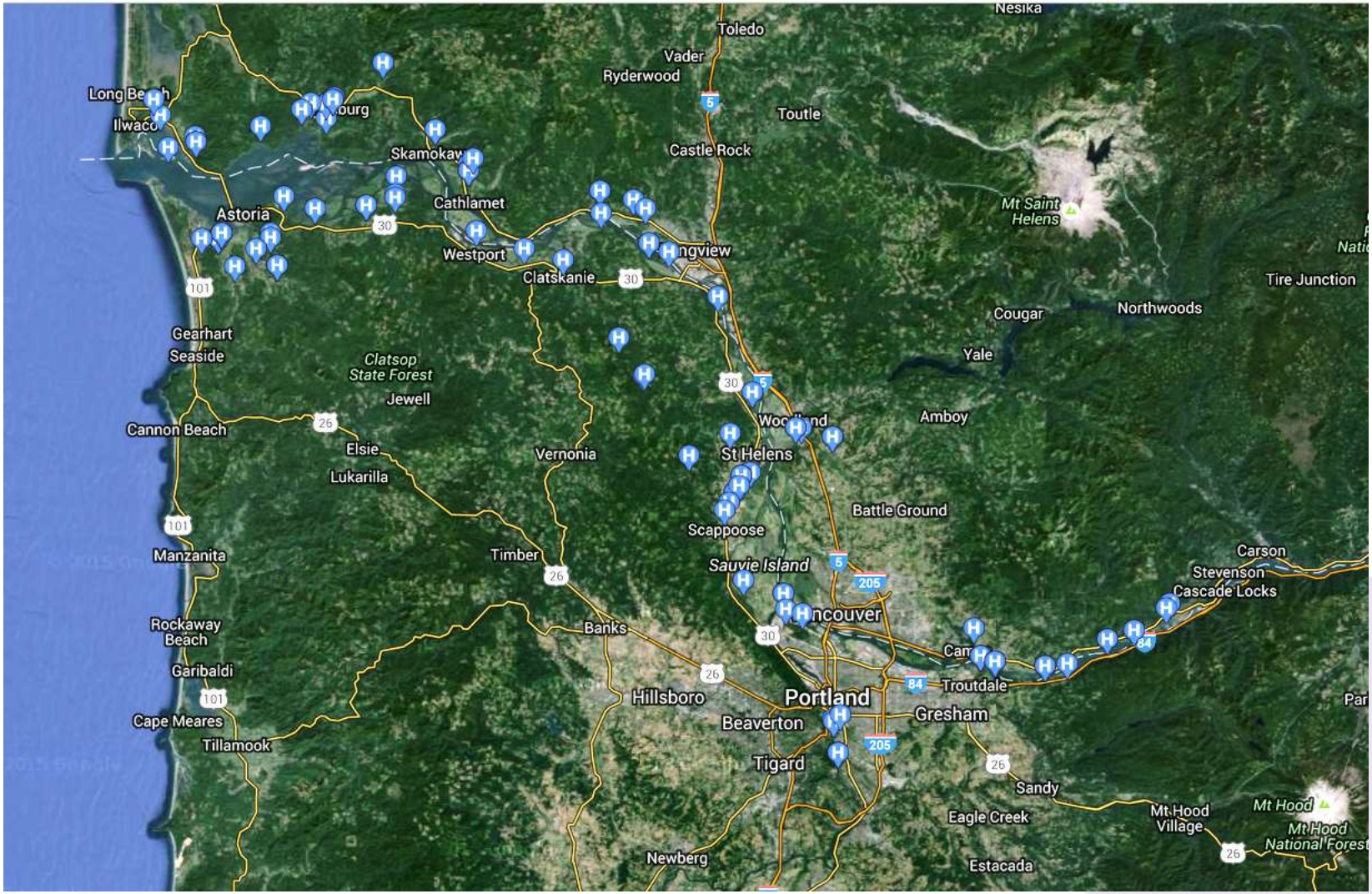
Marshall Johnson, Lower Columbia Estuary Partnership


N
Washington
Oregon
A
B
C
D
E
F
G
H
0
12.5
25
50 Kilometers


Toledo
Vader
Long Beach
Naselle
Holman
Ilwaco
Chinook
Castle Rock
McGowan
Astoria
Cathlamet
East Cathlamet
Longview Heights
West Side Hwy
Warrenton
Jeffers Garden
Kerry
Longview
Kelso
Marshland
Clatskanie
Rainier
Melville
Gearhart
Kalama
Seaside
Cannon Beach
Woodland
Amboy
Keasey
Vernonia
St Helens
La Center
Yacolt
Lukarilla
Ridgefield
Battle Ground
Stabler
Scappoose
Venersborg
Carson River Valley
Mt Vista
Hockinson
Manzanita
Nehalem
Salmon Creek
Walnut Grove
Orchards
Stevenson
Wheeler
Rockaway Beach
Idiotville
Vancouver
Mill Plain
Banks
Camas
Garibaldi
Forest Grove
Rockcreek
Oak Hills
Portland
Troutdale
Bay City
Cape Meares
Idaville
Hillsboro
Gresham
Beaverton
Tillamook
Oceanside
Milwaukie
5
30
101
26
205
84

Habitat Restoration Program

Restoration Project With Funding Through Estuary Partnership



Horsetail Creek Floodplain Restoration

Thousand Acres Floodplain Restoration

La Center Wetlands Floodplain Restoration

Restoration of native vegetation:

- Preserve existing established vegetation
- Control competitive weeds prior to planting
- Minimize ground disturbance and soil compaction
- Keep healthy topsoil on top
- Use correct elevations to support the plant community
- Use the appropriate species
- Budget for establishment

"**Toolbox approach**" to managing ecosystem responses to climate change feature three basic adaptive strategies:

(1) promoting resistance to change,

(2) promoting resilience to change, and

(3) facilitating response to change

(Joyce et al. 2009, Millar et al. 2007, Spies et al. 2010, Stephens et al. 2010)

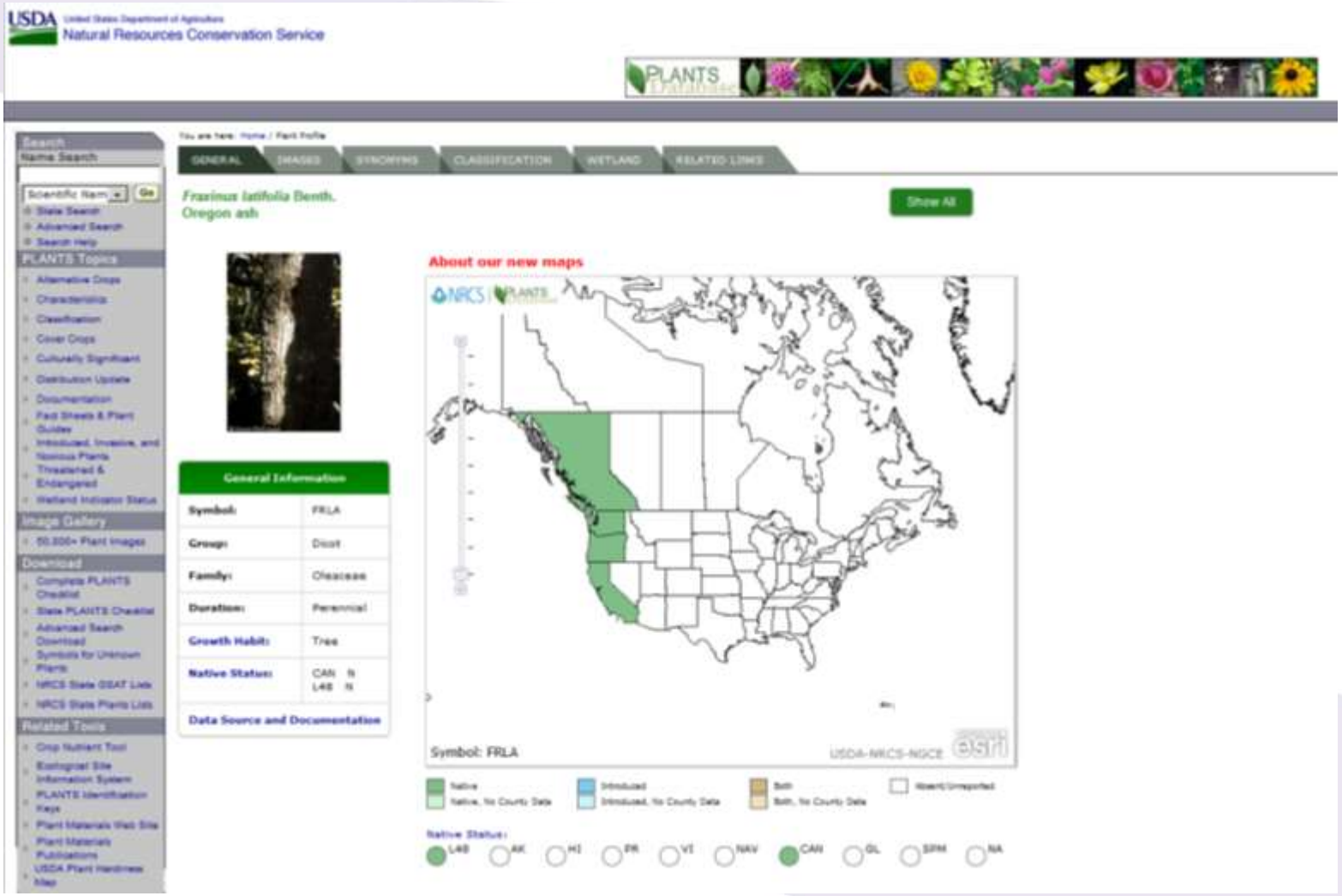
USDA United States Department of Agriculture

Climate Change Effects on Vegetation in the Pacific Northwest: A Review and Synthesis of the Scientific Literature and Simulation Model Projections

David W. Peterson, Becky K. Kerns, and Erich K. Dodson

Forest Service
Pacific Northwest Research Station
General Technical Report PNW-GTR-900
September 2014

PLANTS Database: USDA, NRCS

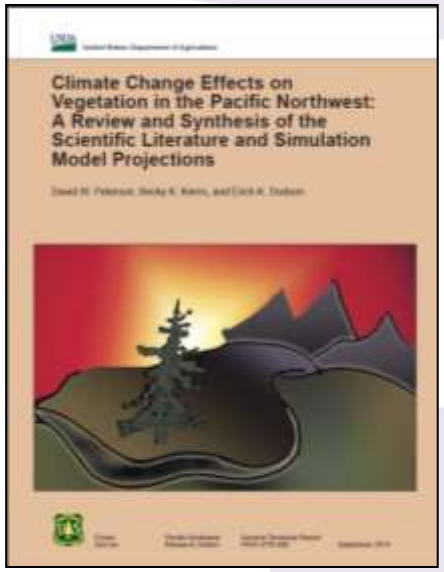


Citation: PLANTS Database: USDA, NRCS. 2016. The PLANTS Database (http://plants.usda.gov, 18 May 2016). National Plant Data Team, Greensboro, NC 27401-4901 USA.

Impact of climate change on Lower Columbia estuary floodplains:

- Increased winter precipitation and flooding
- Decreased snowpack resulting in decreased spring and early summer flooding
- Decreased summer and early fall precipitation

Drought tolerance?

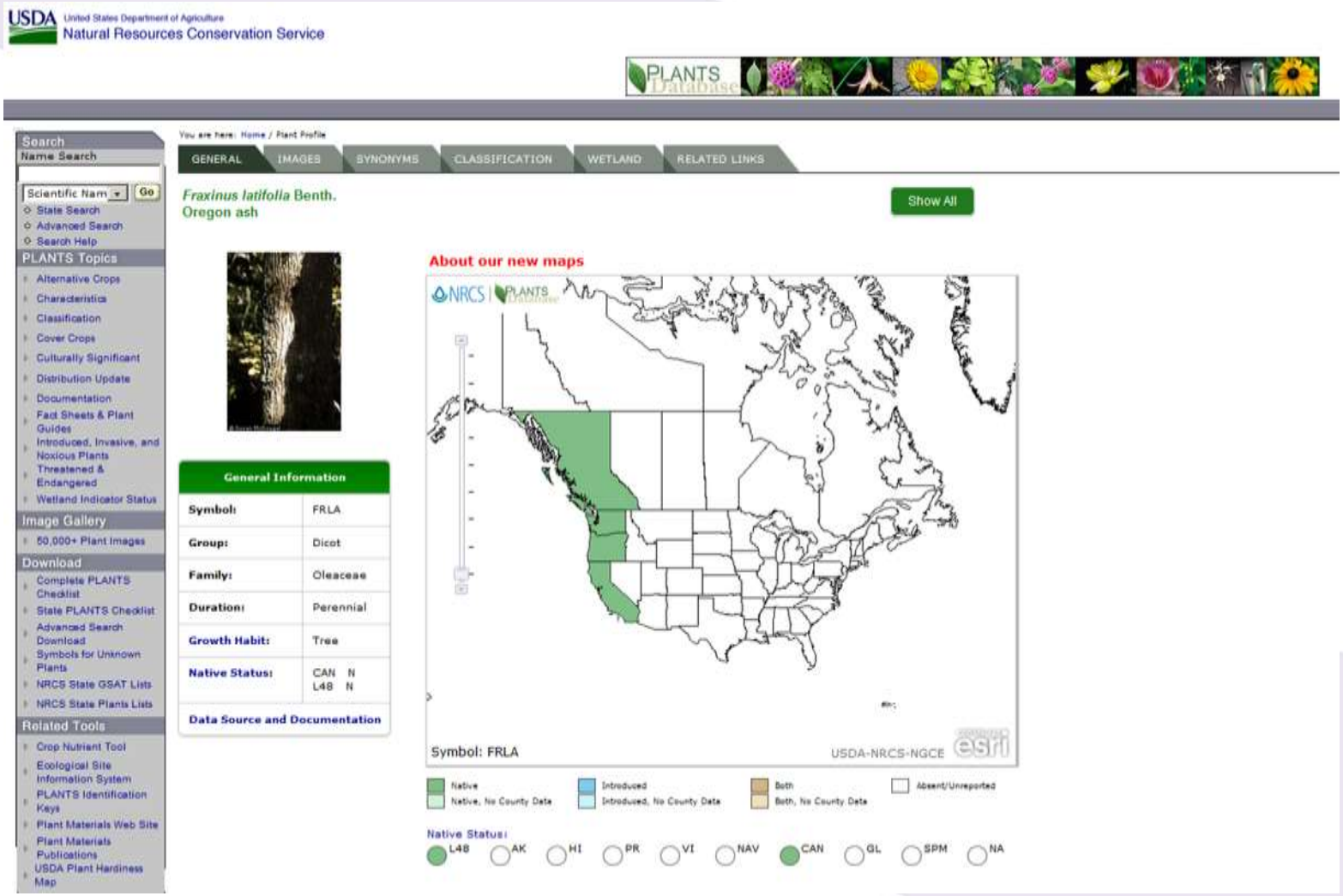


"Species differ in their tolerances of heat and drought stress, so stress-related mortality tends to favor some species over others and can produce significant changes in vegetation structure and composition (Koepke et al. 2010, Mueller et al. 2005)."

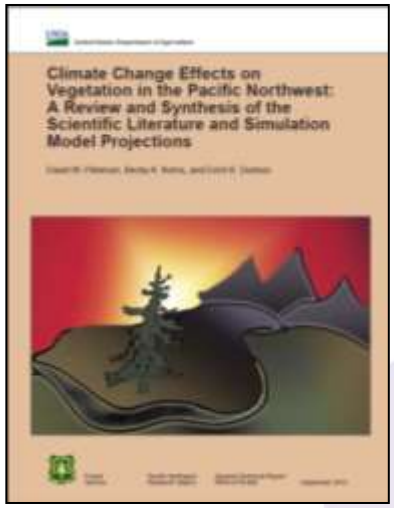
Defined for the PLANTS database as:
"…relative tolerance of the plant to drought conditions compared to other species with the same growth habit from the same geographical region…."

Species	**Drought Tolerance?**
Oregon white oak *(Quercus garryana)*	High
Oregon ash (*Fraxinus latifolia*)	No data (FACW)
Black cottonwood (*Populus trichocarpa*)	Low
Red alder (*Alnus rubra*)	Medium
Sitka willow (*Salix sitchensis*)	Medium
Pacific willow (*Salix lasiandra*)	Low
Scouler's willow (*Salix scouleriana*)	No data (FACW)
Redstem dogwood (*Cornus sericea*)	Low
Red elderberry (*Sambucus racemosa*)	No data (FACU)
Nutka rose (*Rosa nutkana*)	Low
Clustered rose (*Rosa pisocarpa*)	No data (FAC)
Snowberry (*Symphoricarpos albus*)	High
Pacific ninebark (*Physocarpus capitatus*)	Low
Black twinberry *(Lonicera involucrata)*	Low
Douglas spirea (*Spiraea douglasii*)	Medium

Species	Drought Tolerance?
Oregon white oak *(Quercus garryana)*	High
Oregon ash (*Fraxinus latifolia*)	No data (FACW)
Black cottonwood (*Populus trichocarpa*)	Low
Red alder (*Alnus rubra*)	Medium
Sitka willow (*Salix sitchensis*)	Medium
Pacific willow (*Salix lasiandra*)	Low
Scouler's willow (*Salix scouleriana*)	No data (FACW)
Redstem dogwood (*Cornus sericea*)	Low
Red elderberry (*Sambucus racemosa*)	No data (FACU)
Nutka rose (*Rosa nutkana*)	Low
Clustered rose (*Rosa pisocarpa*)	No data (FAC)
Snowberry (*Symphoricarpos albus*)	High
Pacific ninebark (*Physocarpus capitatus*)	Low
Black twinberry *(Lonicera involucrata)*	Low
Douglas spirea (*Spiraea douglasii*)	Medium


USDA United States Department of Agriculture
Natural Resources Conservation Service
PLANTS Database
Search
Name Search
Scientific Nam
Go
State Search
Advanced Search
Search Help
PLANTS Topics
Alternative Crops
Characteristics
Classification
Cover Crops
Culturally Significant
Distribution Update
Documentation
Fact Sheets & Plant Guides
Introduced, Invasive, and Noxious Plants
Threatened & Endangered
Wetland Indicator Status
Image Gallery
50,000+ Plant Images
Download
Complete PLANTS Checklist
State PLANTS Checklist
Advanced Search Download
Symbols for Unknown Plants
NRCS State GSAT Lists
NRCS State Plants Lists
Related Tools
Crop Nutrient Tool
Ecological Site Information System
PLANTS Identification Keys
Plant Materials Web Site
Plant Materials Publications
USDA Plant Hardiness Map
You are here: Home / Plant Profile
GENERAL
IMAGES
SYNONYMS
CLASSIFICATION
WETLAND
RELATED LINKS
Fraxinus latifolia Benth.
Oregon ash
Show All
About our new maps
General Information
Symbol: FRLA
Group: Dicot
Family: Oleaceae
Duration: Perennial
Growth Habit: Tree
Native Status: CAN N
L48 N
Data Source and Documentation
NRCS PLANTS Database
Symbol: FRLA
USDA-NRCS-NGCE
esri
Native
Native, No County Data
Introduced
Introduced, No County Data
Both
Both, No County Data
Absent/Unreported
Native Status:
L48
AK
HI
PR
VI
NAV
CAN
GL
SPM
NA

Trailing edge of range?



Velocity of Change is a concept referring to the rates at which plant and animal species would have to migrate in the future to track their current environmental conditions (Loarie et al. 2009).

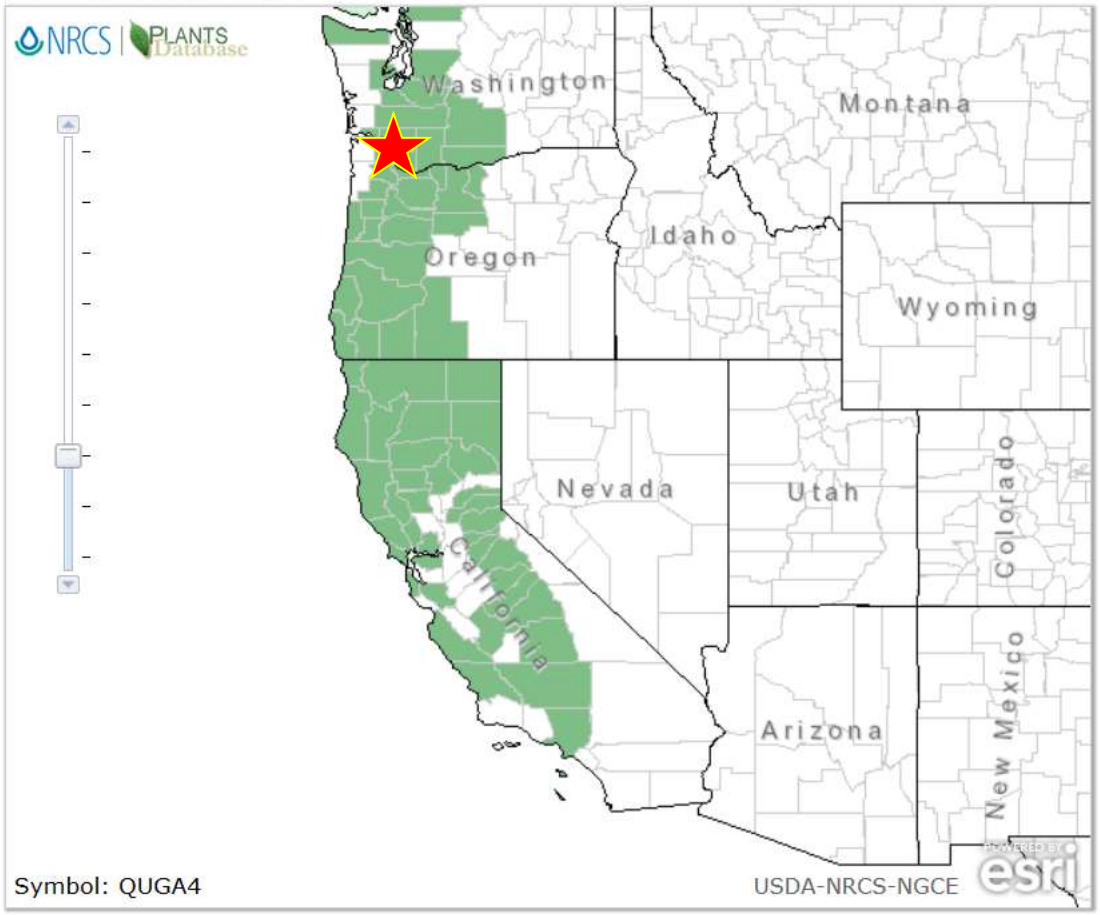
"Biogeographical models suggest that most plant species will have to migrate in response to changing climate in the next century or face dramatic reductions in species ranges and possible extinction."

Quercus garryana Douglas ex Hook.
Oregon white oak

Show All

General Information	
Symbol:	QUGA4
Group:	Dicot
Family:	Fagaceae
Duration:	Perennial
Growth Habit:	Shrub Tree
Native Status:	CAN N L48 N
Characteristics	
Plant Guide (pdf) (doc)	
Data Source and Documentation	

About our new maps

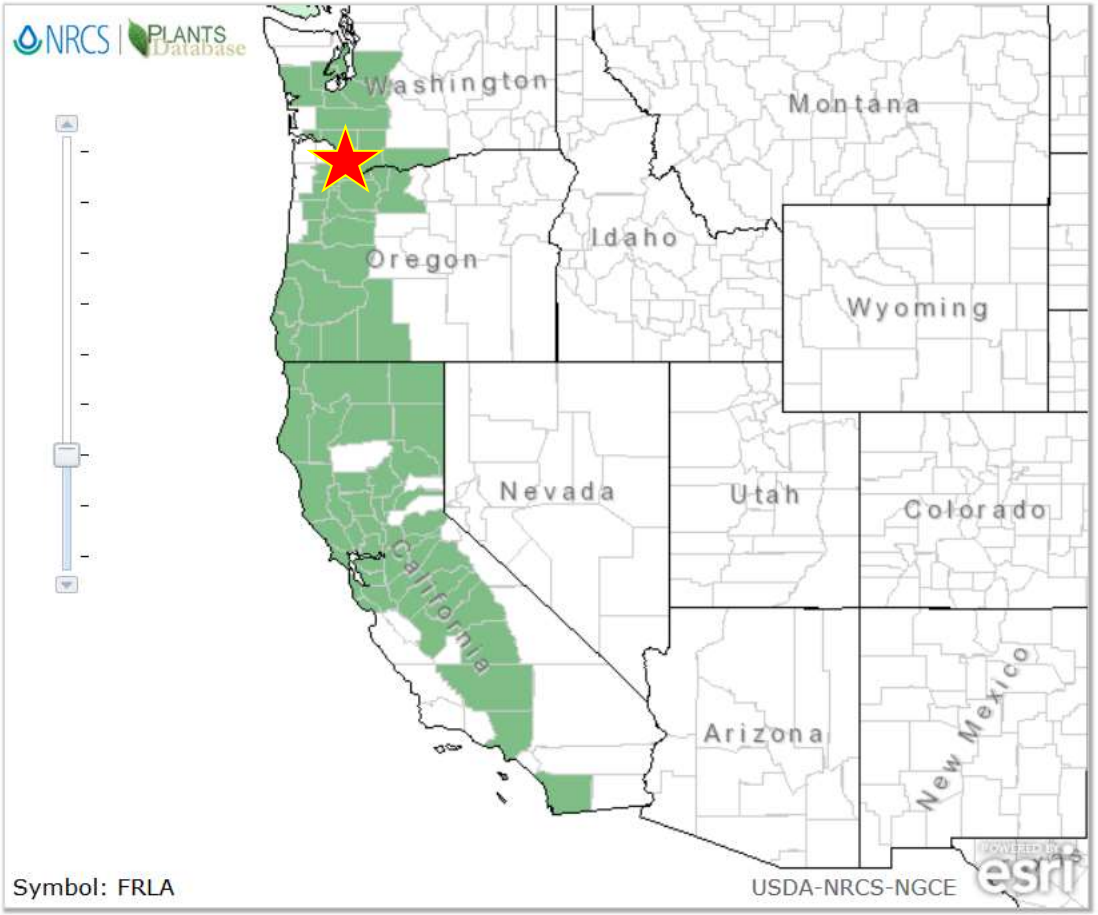


Fraxinus latifolia Benth.
Oregon ash

Show All

General Information	
Symbol:	FRLA
Group:	Dicot
Family:	Oleaceae
Duration:	Perennial
Growth Habit:	Tree
Native Status:	CAN N L48 N
Data Source and Documentation	

About our new maps

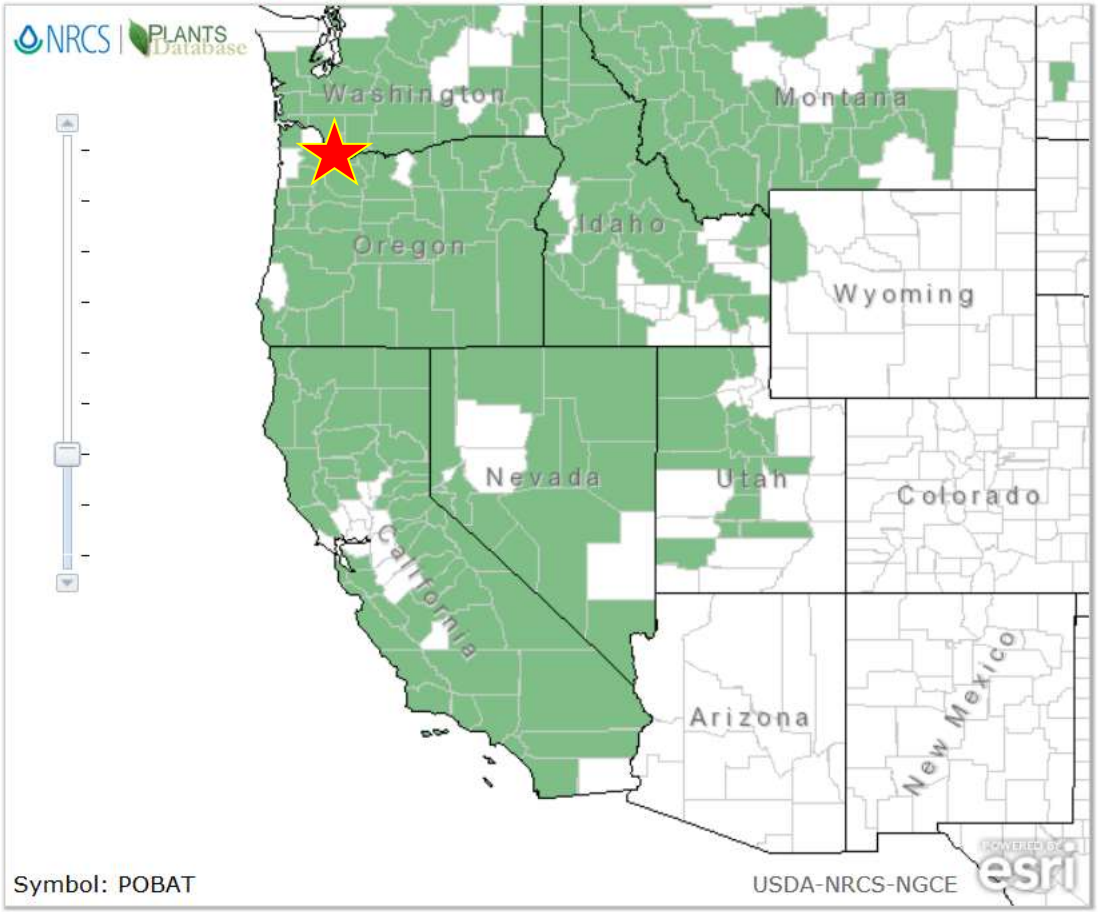


Populus balsamifera **L. subsp. *trichocarpa* (Torr. & A. Gray ex Hook.) Brayshaw**
black cottonwood

Show All

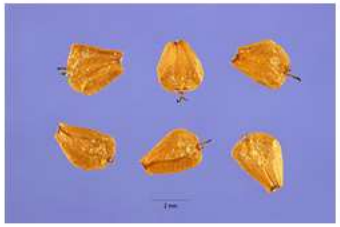
General Information	
Symbol:	POBAT
Group:	Dicot
Family:	Salicaceae
Duration:	Perennial
Growth Habit:	Tree
Native Status:	AK N CAN N L48 N
Characteristics	
Plant Guide (pdf) (doc)	
Data Source and Documentation	

About our new maps



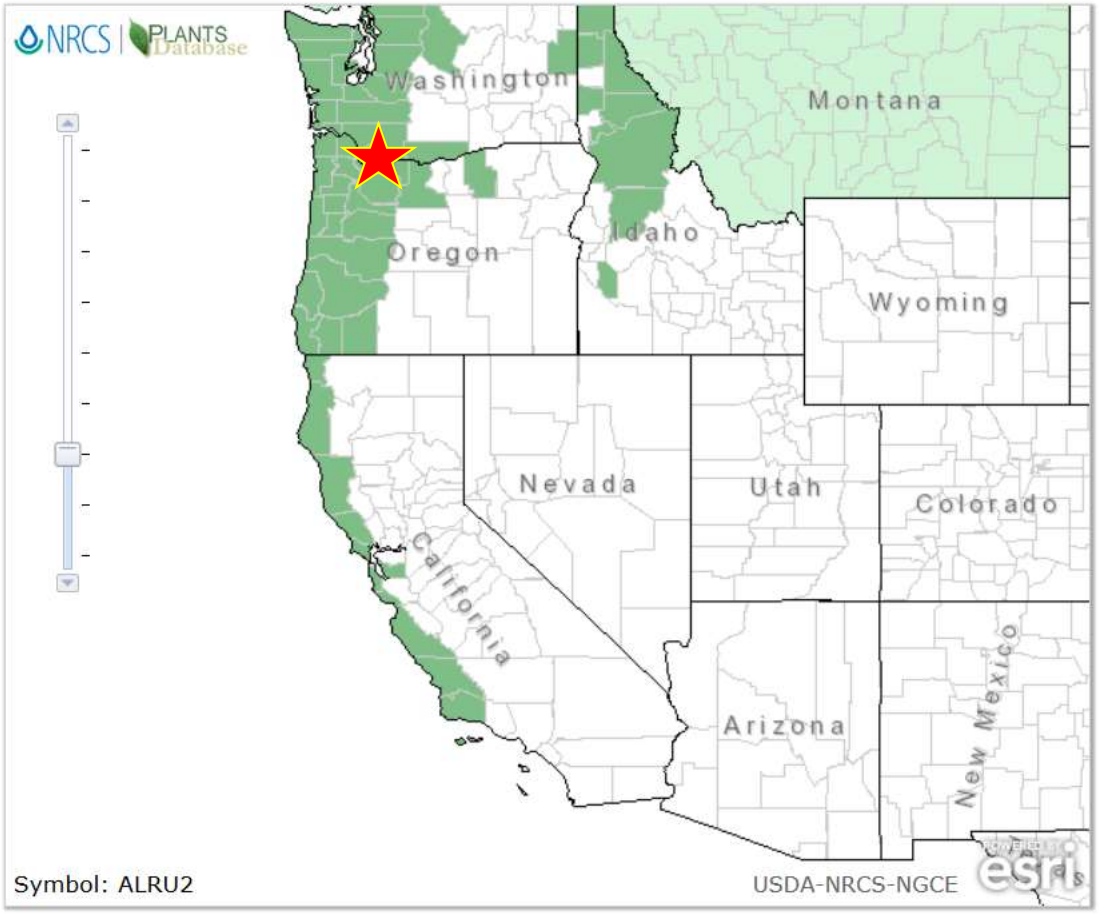
Alnus rubra Bong.
red alder

Show All



General Information	
Symbol:	ALRU2
Group:	Dicot
Family:	Betulaceae
Duration:	Perennial
Growth Habit:	Tree
Native Status:	AK N CAN N L48 N
Characteristics	
Plant Guide (pdf) (doc)	
Data Source and Documentation	

About our new maps

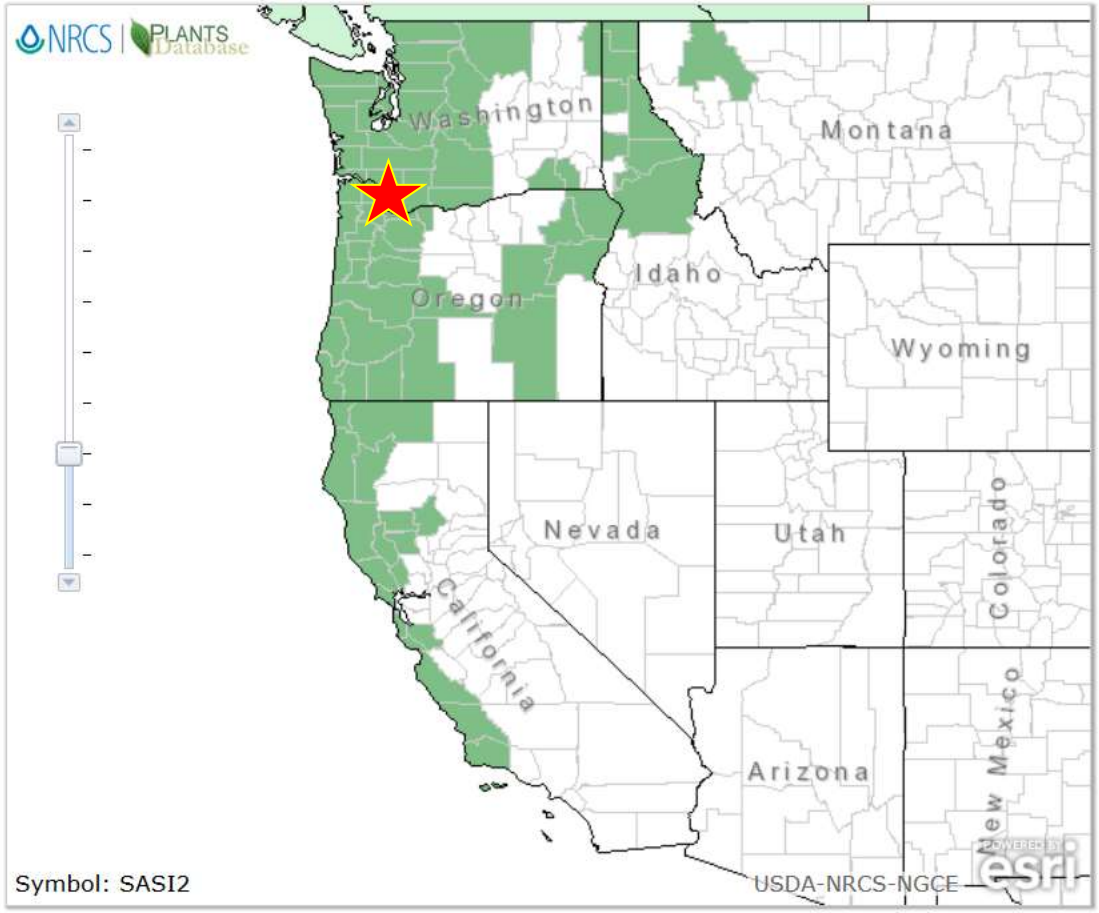


Salix sitchensis Sanson ex Bong.
Sitka willow

Show All

General Information	
Symbol:	SASI2
Group:	Dicot
Family:	Salicaceae
Duration:	Perennial
Growth Habit:	Shrub Tree
Native Status:	AK N CAN N L48 N
Characteristics	
Plant Guide (pdf) (doc)	
Data Source and Documentation	

About our new maps

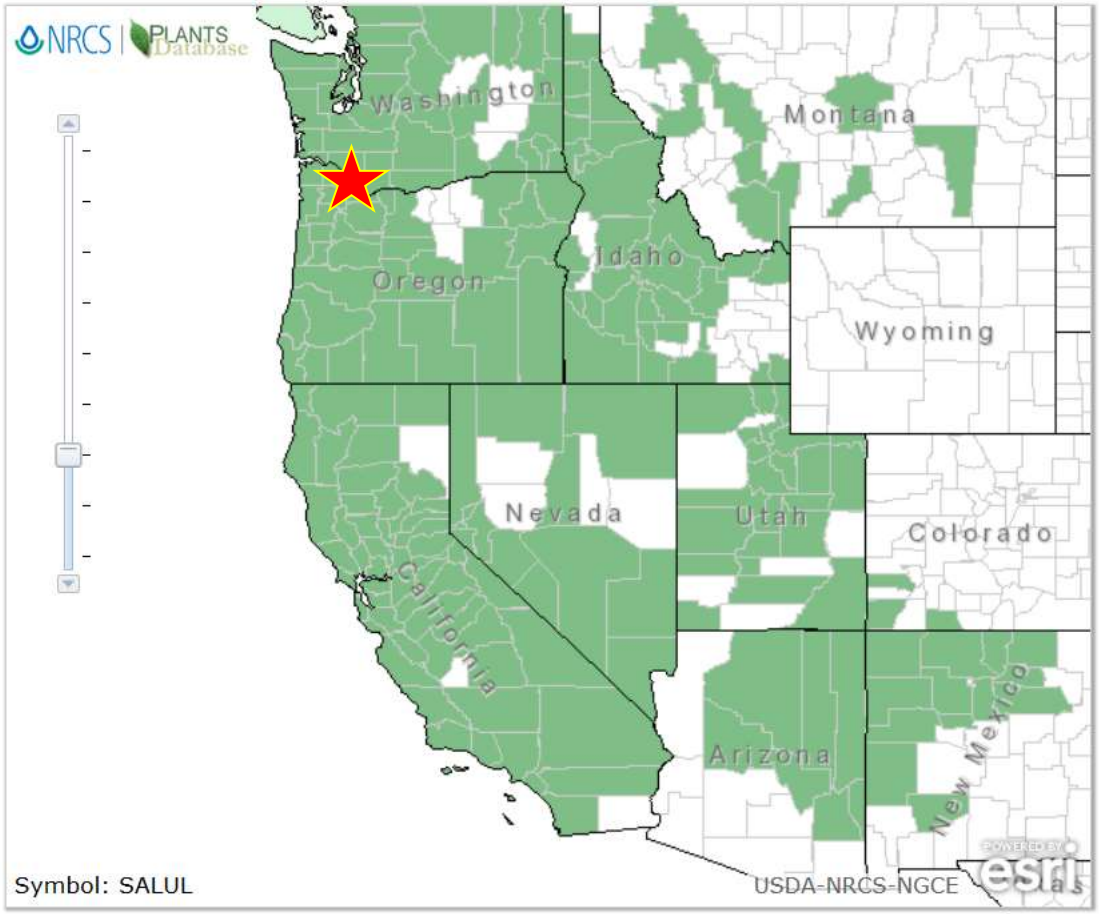


***Salix lucida* Muhl. subsp. *lasiandra* (Benth.) A.E. Murray**
Pacific willow

Show All

General Information	
Symbol:	SALUL
Group:	Dicot
Family:	Salicaceae
Duration:	Perennial
Growth Habit:	Shrub Tree
Native Status:	AK N CAN N L48 N
Characteristics	
Plant Guide (pdf) (doc)	

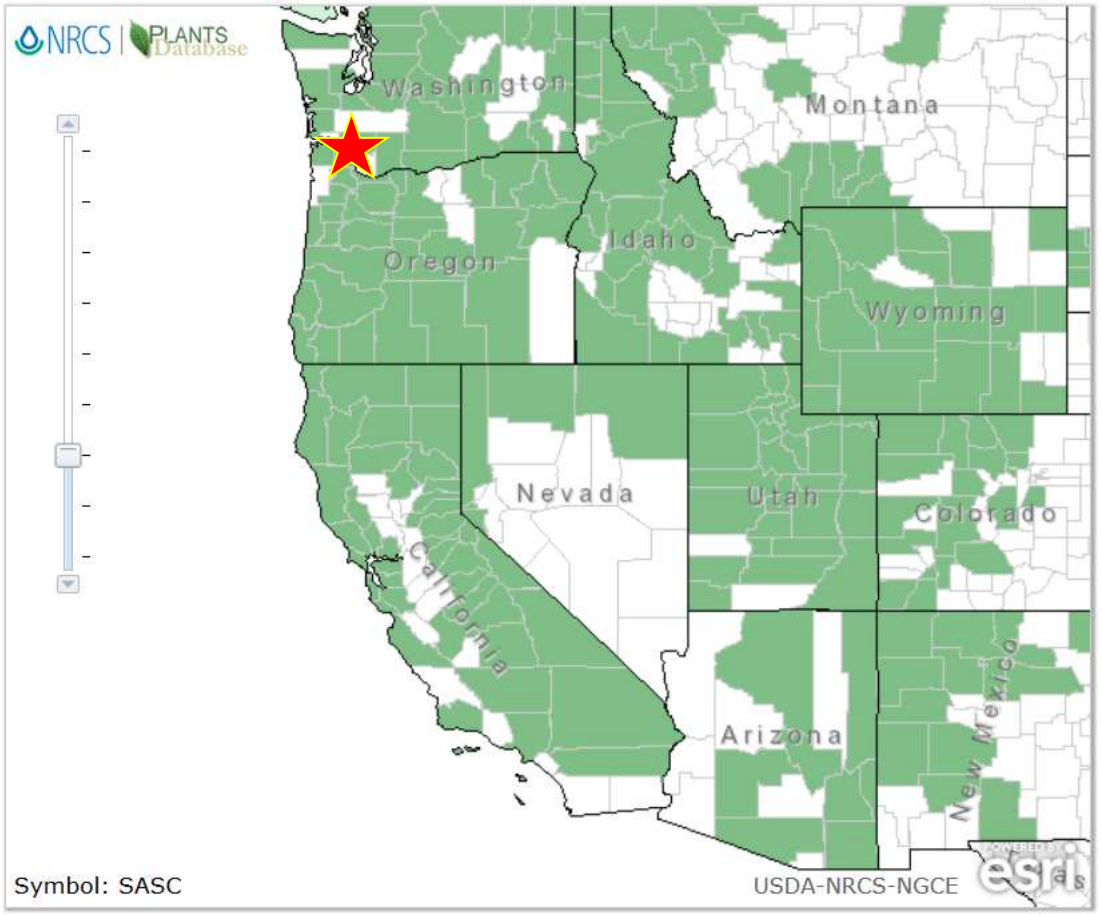
About our new maps



Scouler's willow

General Information	
Symbol:	SASC
Group:	Dicot
Family:	Salicaceae
Duration:	Perennial
Growth Habit:	Shrub Tree
Native Status:	AK N CAN N L48 N
Data Source and Documentation	

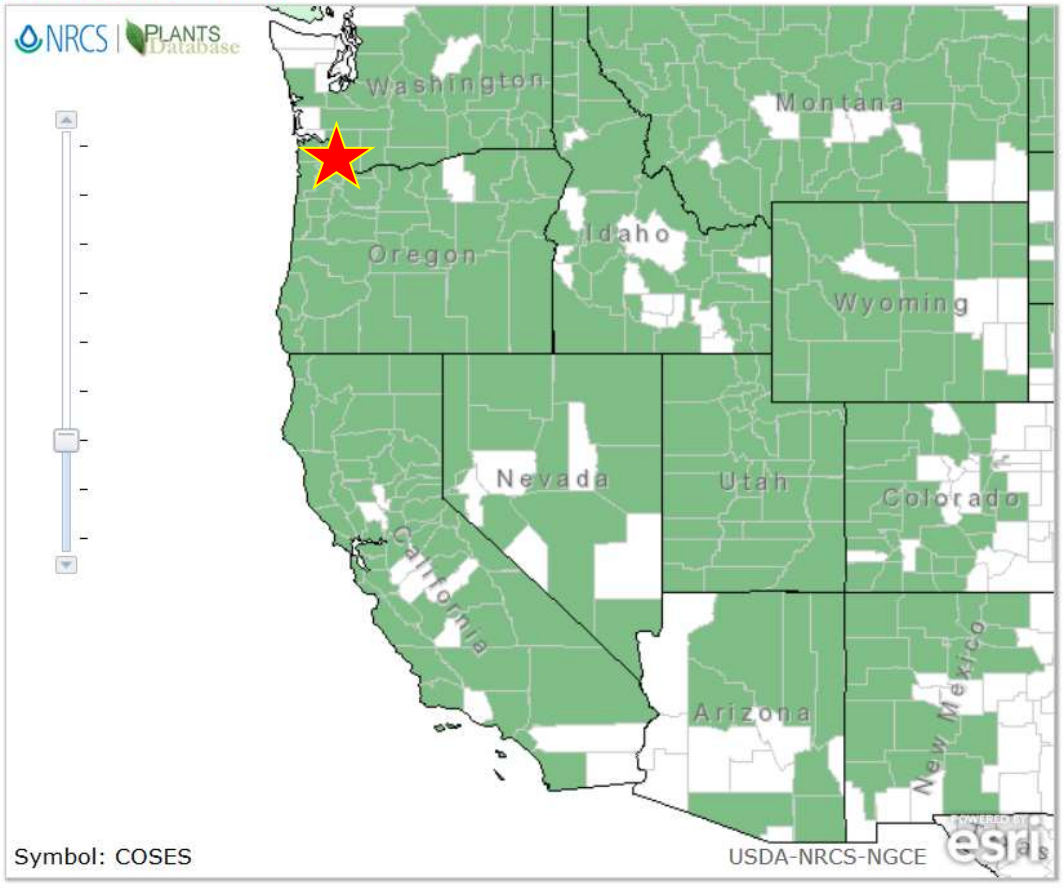
About our new maps



Cornus sericea* L. subsp. *sericea
redosier dogwood

Show All

About our new maps



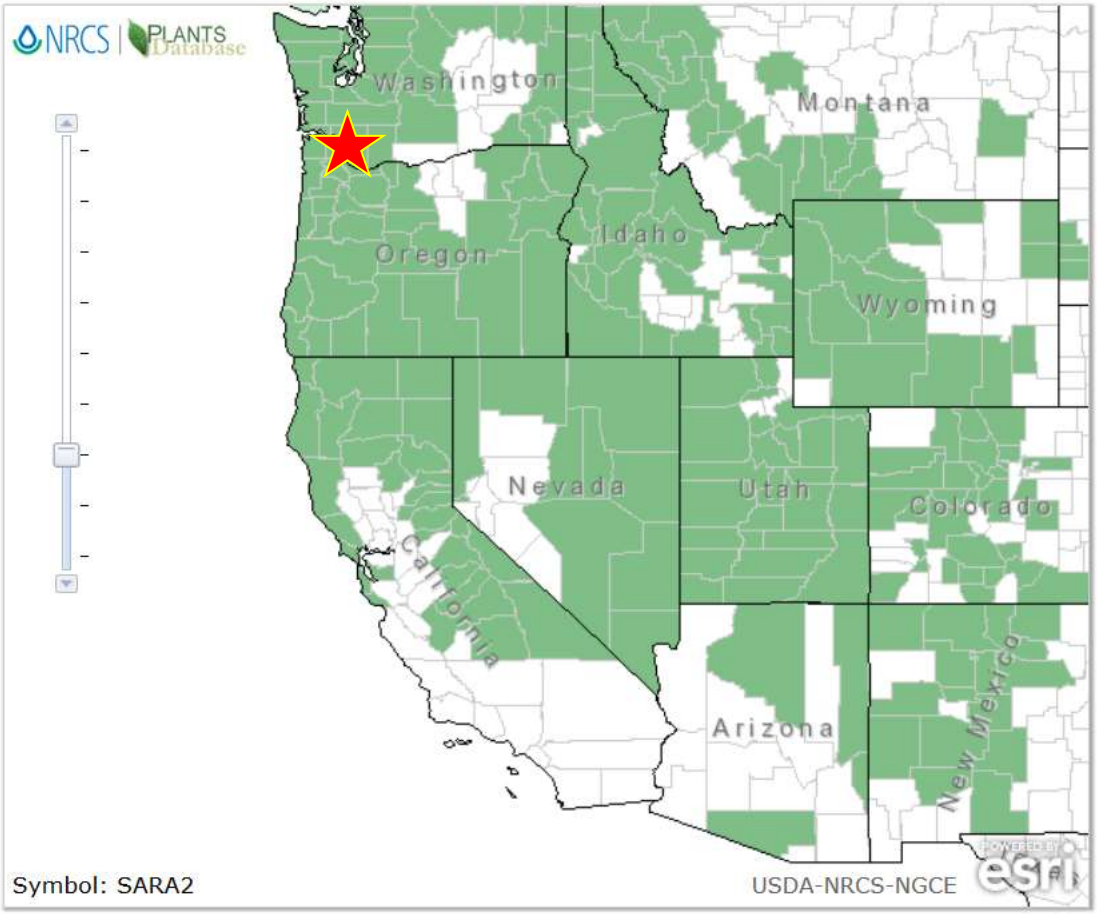
General Information	
Symbol:	COSES
Group:	Dicot
Family:	Cornaceae
Duration:	Perennial
Growth Habit:	Shrub Tree
Native Status:	AK N CAN N L48 N SPM N
Other Common Names:	Siberian dogwood Tatarian dogwood
Characteristics	
Fact Sheet (pdf) (doc) **Plant Guide** (pdf) (doc)	

Sambucus racemosa L.
red elderberry

Show All

General Information	
Symbol:	SARA2
Group:	Dicot
Family:	Caprifoliaceae
Duration:	Perennial
Growth Habit:	Shrub Tree
Native Status:	AK N CAN N L48 N
Fact Sheet (pdf) (doc)	
Data Source and Documentation	

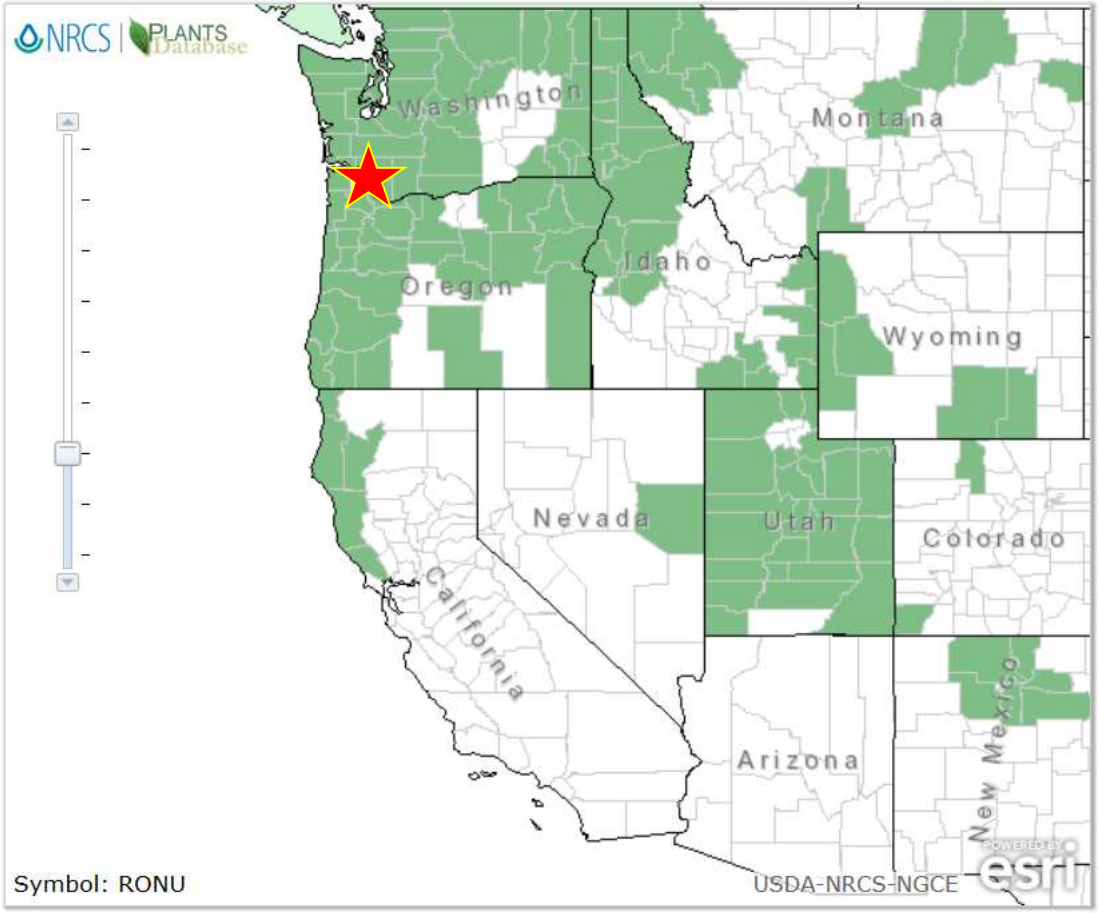
About our new maps



***Rosa nutkana* C. Presl**
Nootka rose

Show All

About our new maps



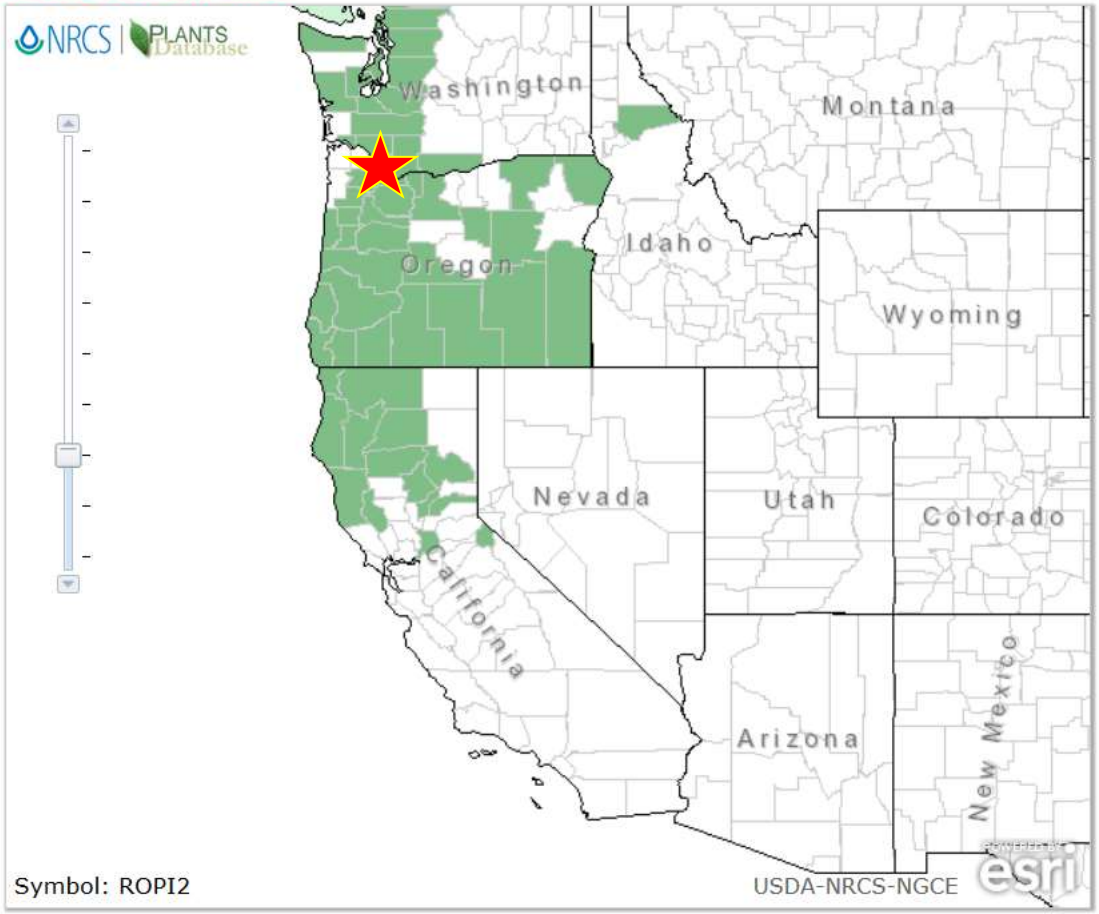
General Information	
Symbol:	RONU
Group:	Dicot
Family:	Rosaceae
Duration:	Perennial
Growth Habit:	Subshrub
Native Status:	AK N CAN N L48 N
Characteristics	
Plant Guide (pdf) (doc)	

***Rosa pisocarpa* A. Gray**
cluster rose

Show All

General Information	
Symbol:	ROPI2
Group:	Dicot
Family:	Rosaceae
Duration:	Perennial
Growth Habit:	Subshrub
Native Status:	CAN N L48 N
Data Source and Documentation	

About our new maps

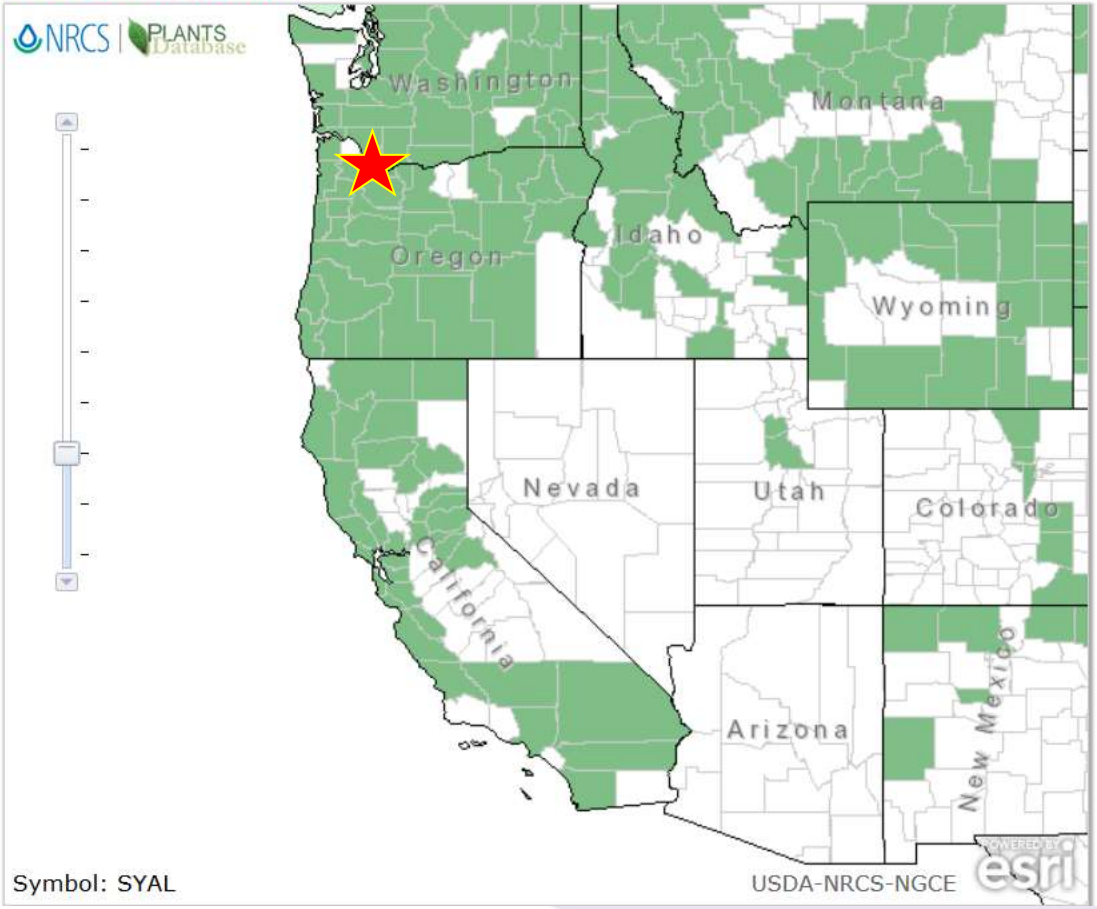


Symphoricarpos albus **(L.) S.F. Blake**
common snowberry

Show All

General Information	
Symbol:	SYAL
Group:	Dicot
Family:	Caprifoliaceae
Duration:	Perennial
Growth Habit:	Shrub Subshrub
Native Status:	AK N CAN N L48 N
Characteristics	
Fact Sheet (pdf) (doc)	

About our new maps

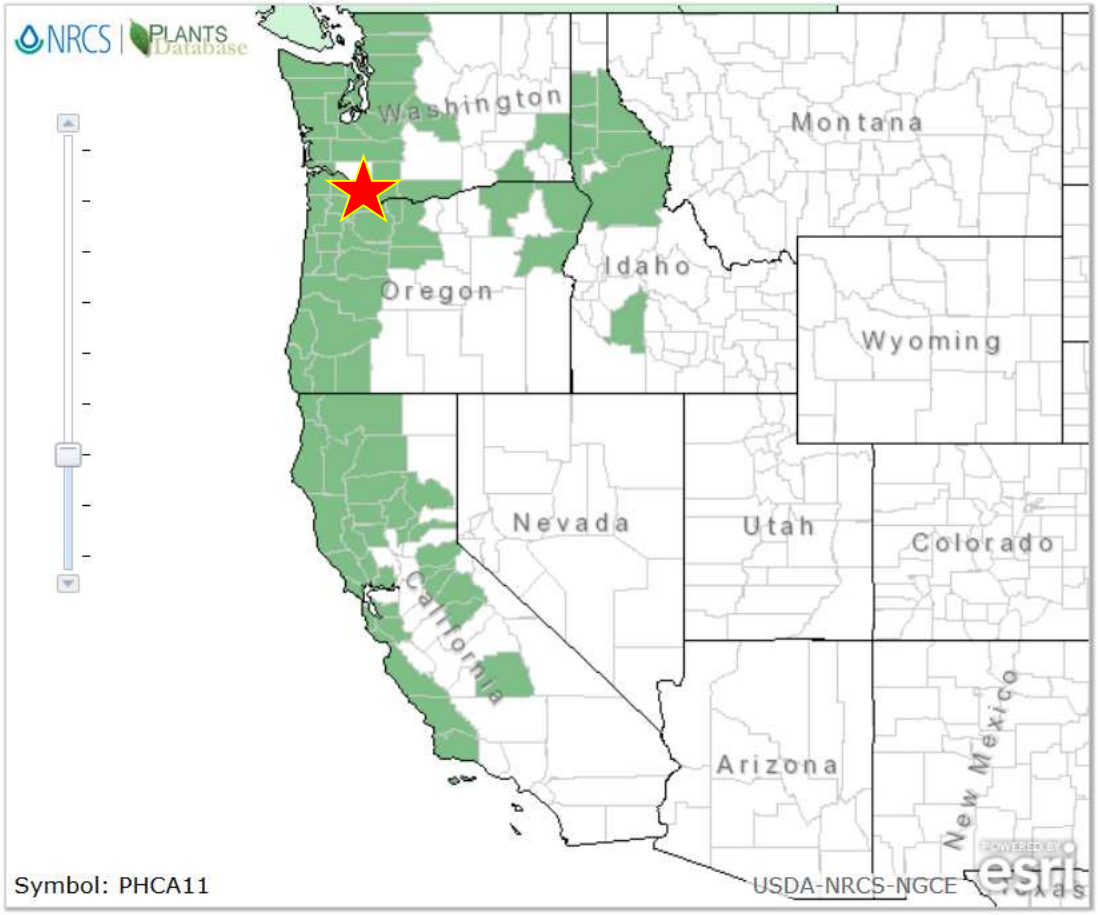


Physocarpus capitatus (Pursh) Kuntze
Pacific ninebark

Show All

General Information	
Symbol:	PHCA11
Group:	Dicot
Family:	Rosaceae
Duration:	Perennial
Growth Habit:	Shrub
Native Status:	AK N CAN N L48 N
Characteristics	
Fact Sheet (pdf) (doc)	
Data Source and Documentation	

About our new maps

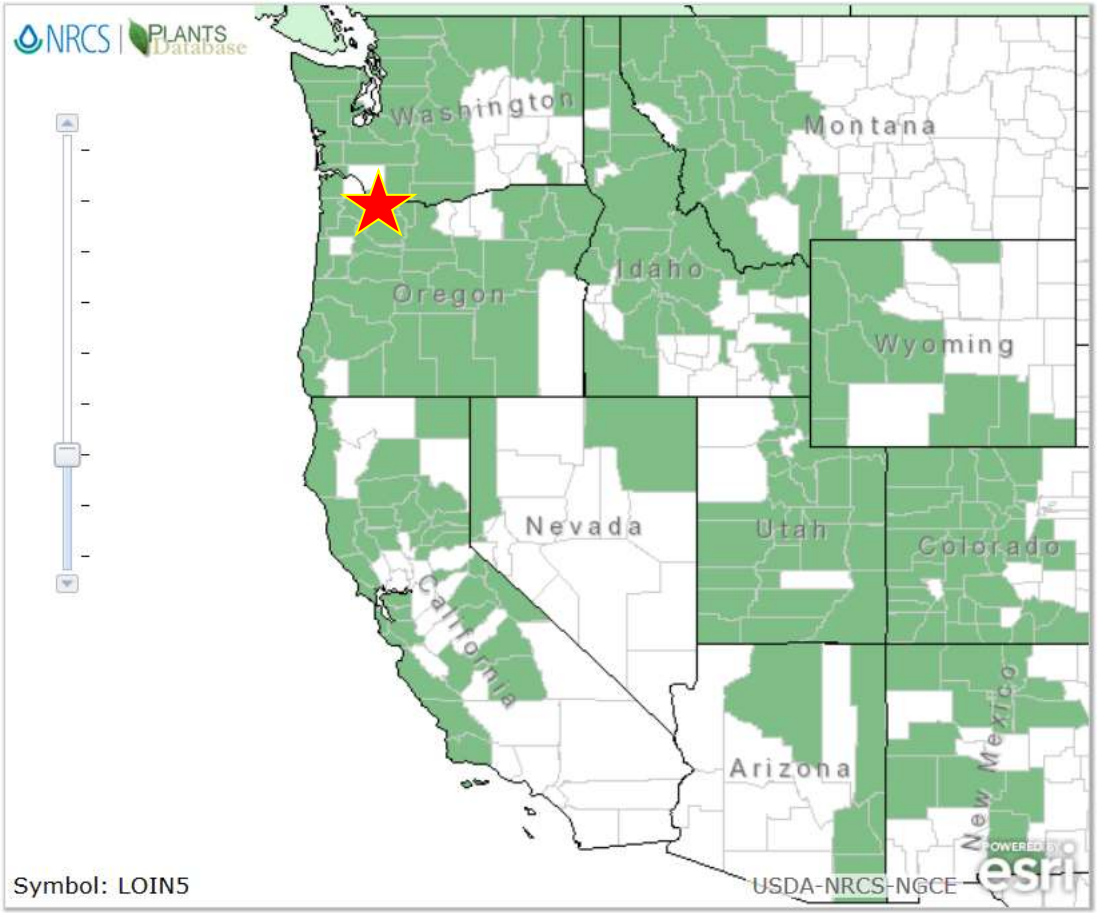


Lonicera involucrata **(Richardson) Banks ex Spreng.**
twinberry honeysuckle

Show All

General Information	
Symbol:	LOIN5
Group:	Dicot
Family:	Caprifoliaceae
Duration:	Perennial
Growth Habit:	Shrub
Native Status:	AK N CAN N L48 N
Characteristics	
Fact Sheet (pdf) (doc) **Plant Guide** (pdf) (doc)	
Data Source and Documentation	

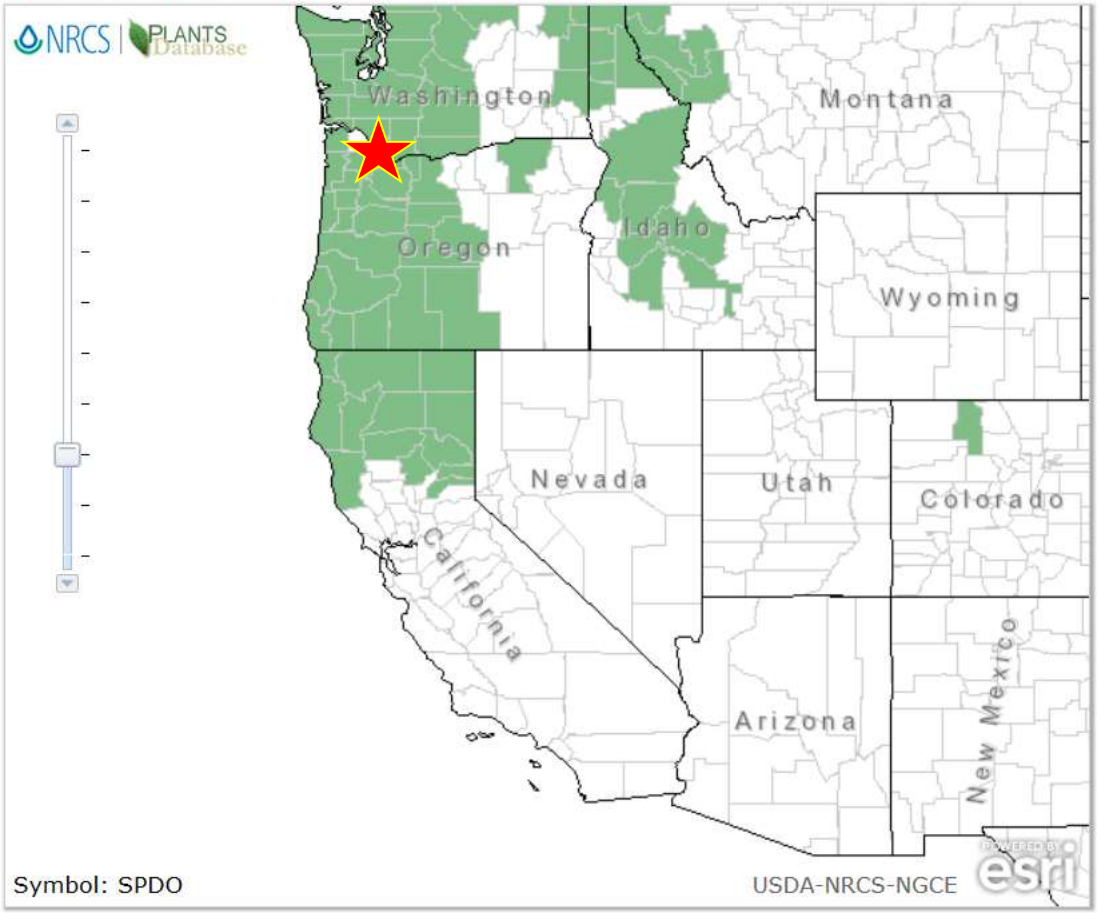
About our new maps



Spiraea douglasii Hook.
rose spirea

Show All

About our new maps



General Information	
Symbol:	SPDO
Group:	Dicot
Family:	Rosaceae
Duration:	Perennial
Growth Habit:	Shrub
Native Status:	AK N CAN N L48 N
Characteristics	
Fact Sheet (pdf) (doc)	
Data Source and Documentation	

Species	**Trailing edge?**
Oregon white oak *(Quercus garryana)*	No
Oregon ash (*Fraxinus latifolia*)	No
Black cottonwood (*Populus trichocarpa*)	No
Red alder (*Alnus rubra*)	Maybe
Sitka willow (*Salix sitchensis*)	Maybe
Pacific willow (*Salix lasiandra*)	No
Scouler's willow (*Salix scouleriana*)	No
Redstem dogwood (*Cornus sericea*)	No
Red elderberry (*Sambucus racemosa*)	No
Nutka rose (*Rosa nutkana*)	Yes
Clustered rose (*Rosa pisocarpa*)	Yes
Snowberry (*Symphoricarpos albus*)	No
Pacific ninebark (*Physocarpus capitatus*)	Maybe
Black twinberry *(Lonicera involucrata)*	Maybe
Douglas spirea (*Spiraea douglasii*)	Yes

Species	Trailing edge?
Oregon white oak *(Quercus garryana)*	No
Oregon ash (*Fraxinus latifolia*)	No
Black cottonwood (*Populus trichocarpa*)	No
Red alder (*Alnus rubra*)	Maybe
Sitka willow (*Salix sitchensis*)	Maybe
Pacific willow (*Salix lasiandra*)	No
Scouler's willow (*Salix scouleriana*)	No
Redstem dogwood (*Cornus sericea*)	No
Red elderberry (*Sambucus racemosa*)	No
Nutka rose (*Rosa nutkana*)	Yes
Clustered rose (*Rosa pisocarpa*)	Yes
Snowberry (*Symphoricarpos albus*)	No
Pacific ninebark (*Physocarpus capitatus*)	Maybe
Black twinberry *(Lonicera involucrata)*	Maybe
Douglas spirea (*Spiraea douglasii*)	Yes

Does the species have more phenotypic plasticity?

- physiological processes (respiration and growth rates)
- morphology (height, leave size, allocation to roots)
- and reproduction (methods, timing)

Is the species adapted to more frequent disturbance?

"Recent evidence suggests that invasive plants may be better able to adjust to rapid changes in abiotic conditions by tracking seasonal temperature trends and shifting their phenologies (e.g., earlier spring warming)" (Willis et al. 2010).

Species	**Expert recommendations?**
Oregon white oak *(Quercus garryana)*	
Oregon ash (*Fraxinus latifolia*)	Use less
Black cottonwood (*Populus trichocarpa*)	Use less
Red alder (*Alnus rubra*)	
Sitka willow (*Salix sitchensis*)	
Pacific willow (*Salix lasiandra*)	Use less
Scouler's willow (*Salix scouleriana*)	
Redstem dogwood (*Cornus sericea*)	
Red elderberry (*Sambucus racemosa*)	
Nutka rose (*Rosa nutkana*)	
Clustered rose (*Rosa pisocarpa*)	Use more
Snowberry (*Symphoricarpos albus*)	Use more
Pacific ninebark (*Physocarpus capitatus*)	Use more
Black twinberry *(Lonicera involucrata)*	Use more
Douglas spirea (*Spiraea douglasii*)	Use more

Lower Columbia River Floodplain Habitat Revegetation in a Changing Climate

Lower Columbia Estuary Partnership

Marshall Johnson, Lower Columbia Estuary Partnership