

Western Oregon Forest Ecology

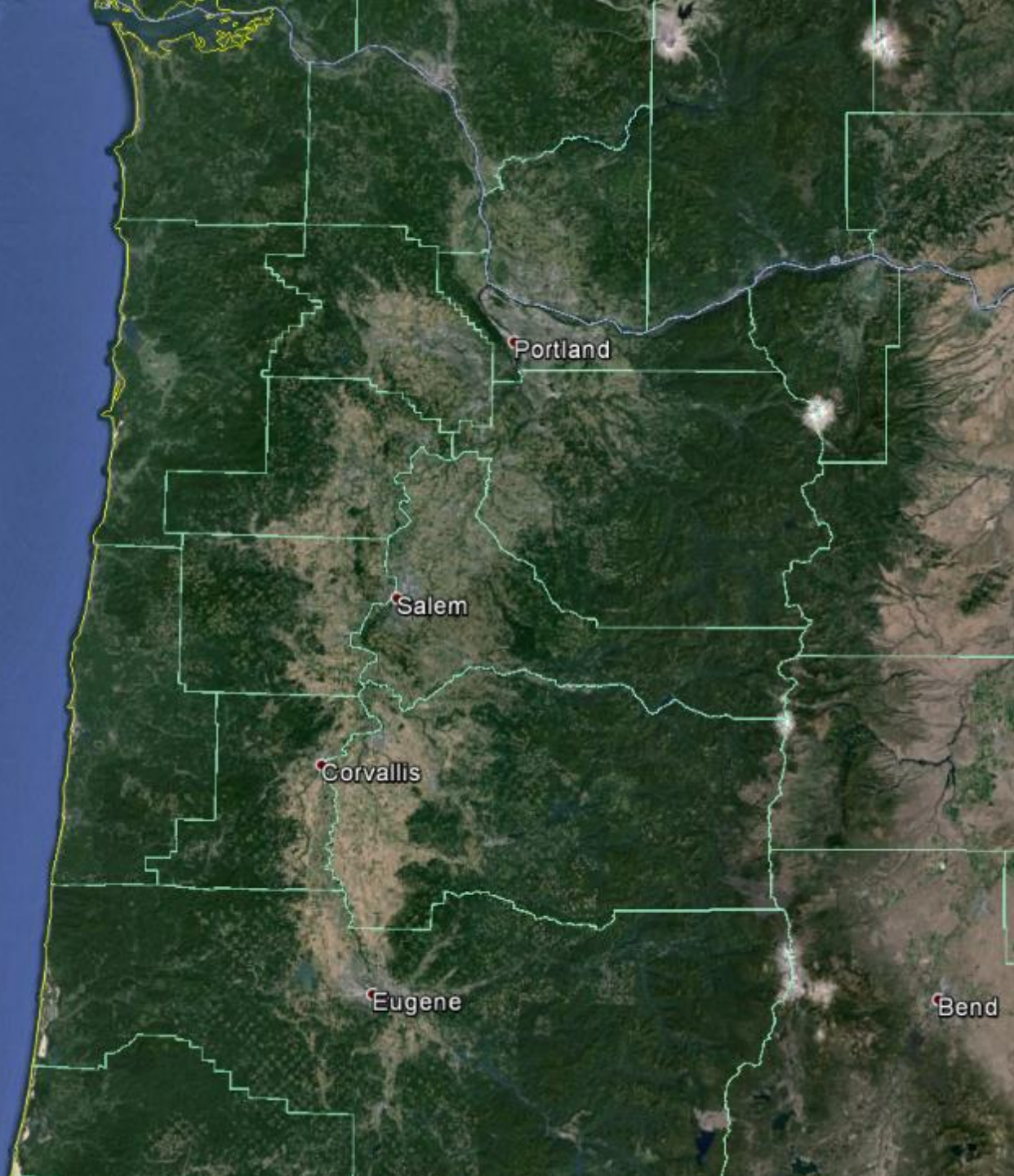


Michael Ahr, Forest Conservationist





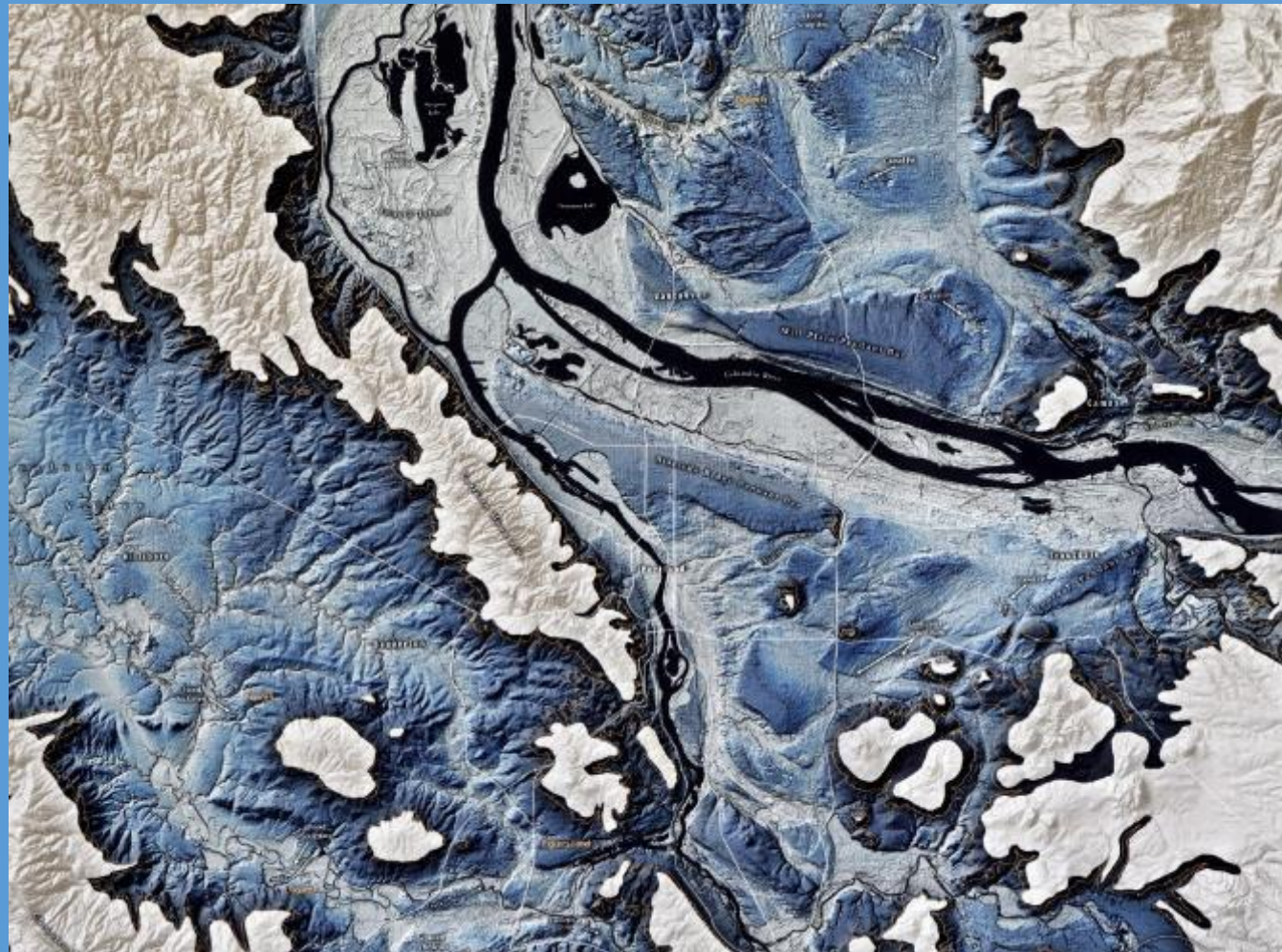
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Soil & Water Conservation District



Outline

- Geology
- Forest Types
- Common NW Tree Species
- Successional Stand Types
- Brief History of Forest Management
- Effects on NW Ecosystems
- Current Forest Ownership/Composition

Missoula Floods



*Oregon Dept. of Geology and
Mineral Industries*

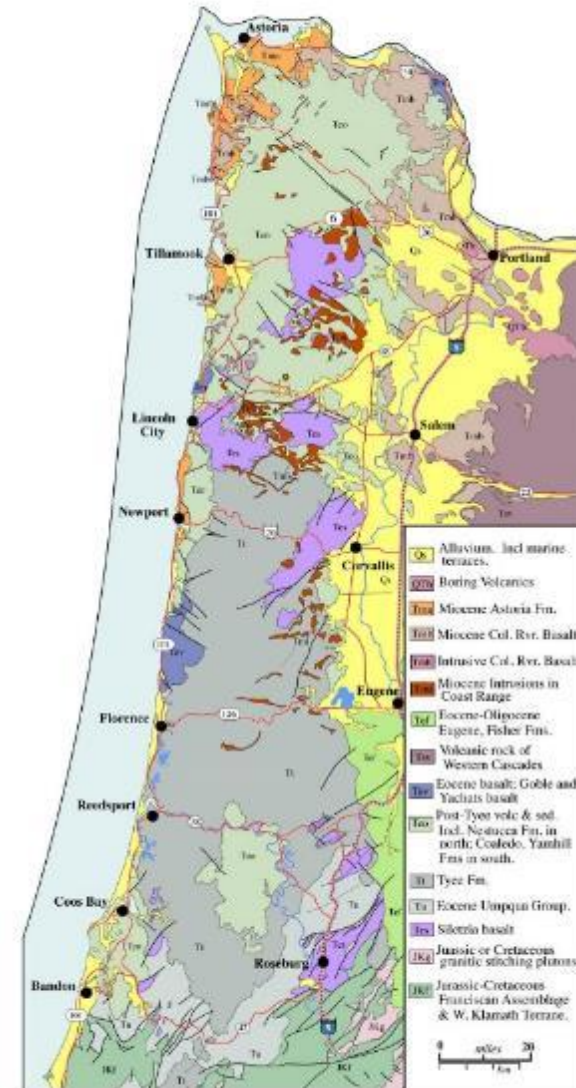
West Hills/ Forest Park



COAST RANGE

- Ancient volcanic mountain chain
- Uplifted Land
- Sedimentary Rock
- Basalt deposits from lava
- Volcanic deposits erode slowly
- Glacial history: not significant
- Loess deposited on West Hills

Oregon Coast Range





Soil

- High in Organic Matter
- Well drained
- Sometimes shallow
- Significant clay content
 - Stores nutrients
 - Increases water holding capacity



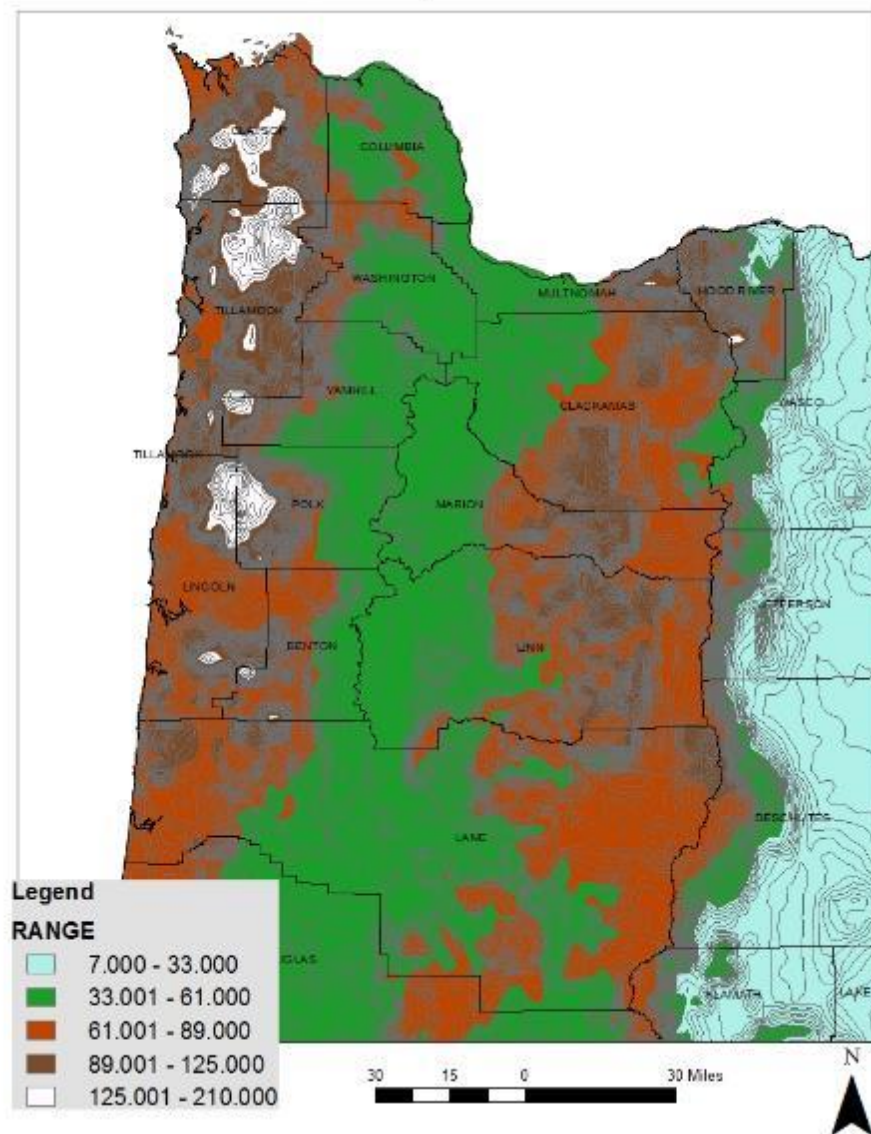
Max Taylor



Rainfall

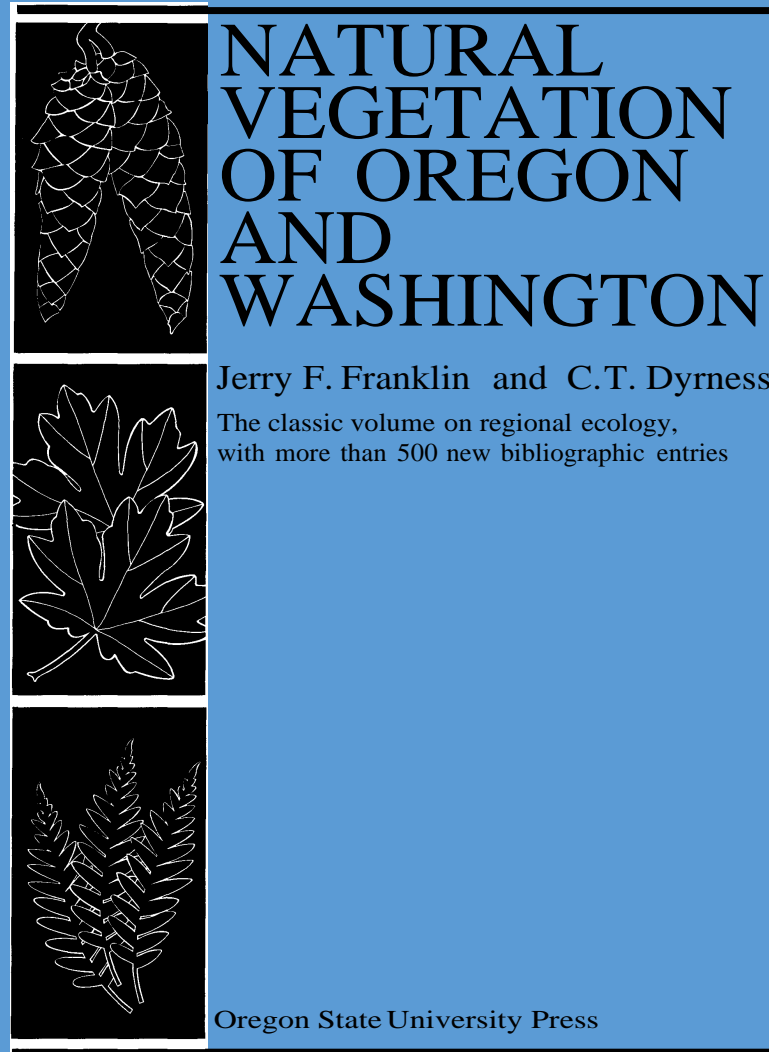
- Portland:
40-45"
- Tillamook County Coast
Range:
195-205"

Precipitation



Forests of Western Oregon & Washington

- Western hemlock
- Willamette Valley
- Sitka spruce



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published
by Forest
Service in
1973

Reprinted
in 1988
(OSU
Press)



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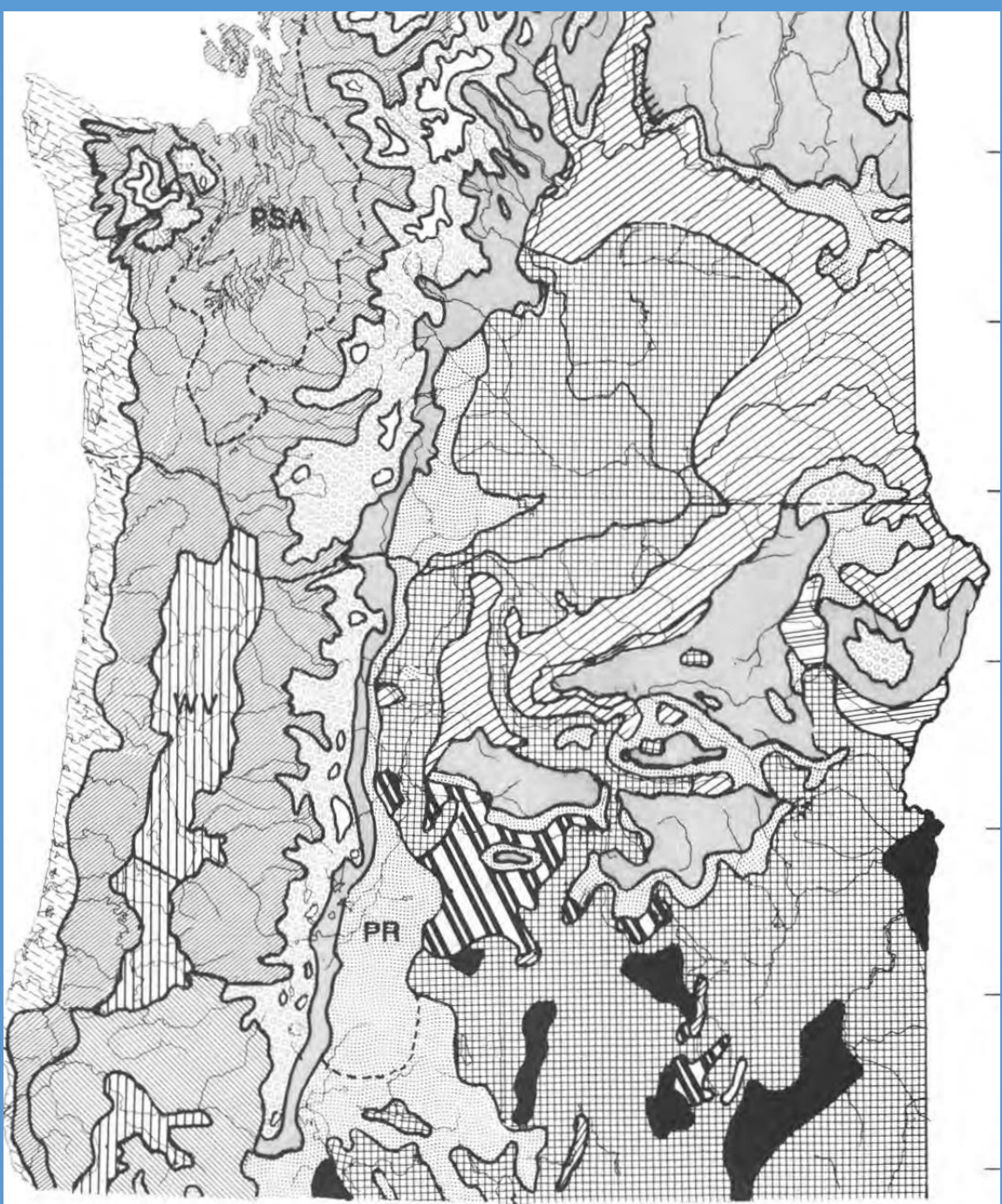


Figure 27. Generalized vegetation map of Oregon and Washington (based partially on Hayes (1959), Kuchler (1964), and Poulton (1962)).

Conifer Forests

- Conifers dominate western Oregon & Washington
 - In much of northern hemisphere, hardwoods dominate in temperate region
 - Stressful habitats or pioneer species
- We're rarely limited by precipitation or elevation
- "Every single coniferous *genus* represented finds it's largest specific representative here (PNW)"
 - *Pseudotsuga, Tsuga, Thuja, Abies, Picea, Pinus, etc.*

Western Hemlock

- Most extensive zone in western PNW
- Most important for timber production
- This is our “Douglas-fir zone”
- Douglas-fir can be the first colonizer and/or major component of 400-600 year old “Old Growth”
- Other significant species: western redcedar, grand fir, bigleaf maple, red alder
- Sword fern, vine maple, salal, Oregon-grape, trillium, etc



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Western Hemlock



Willamette Valley

- Drier and warmer
- Oak Forest
 - Oregon white oak
 - California black oak (further south)
- Conifer Forest
 - Douglas-fir
 - Grand fir
 - Incense-cedar (south)
 - Ponderosa pine (more to the south)

Oak Woodland



Oak Savannah

Sensitive species



Sitka spruce

- Coastal – a few kilometers in width
 - Northern California to Alaska
 - Below 400 foot elevation (mostly)
- Western hemlock, western redcedar, Douglas-fir, and grand fir are also abundant
- Red alder dominates some sites
- Very dense understories with shrubs such as salmonberry and huckleberry



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Sitka spruce



Common NW Tree Species (Quick ID course)

Conifers

- Douglas-fir
- Western redcedar
- Western hemlock
- Grand fir
- Pacific yew
- Ponderosa pine
- *Maybe noble fir,
western white pine*

Hardwoods

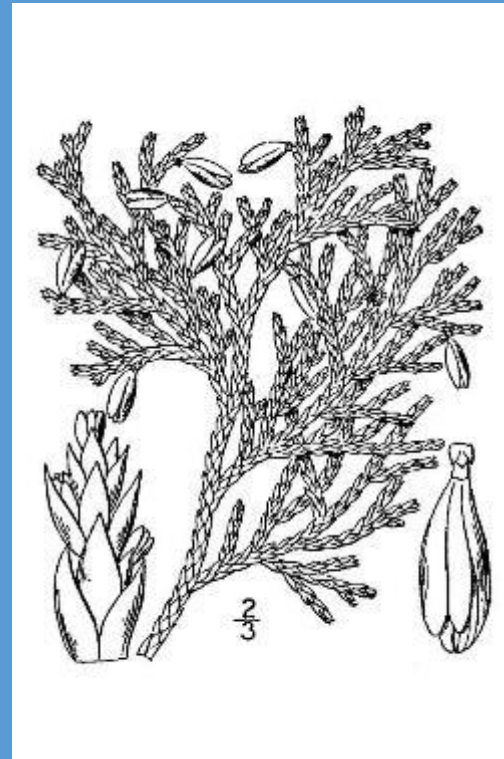
- Bigleaf maple
- Red alder
- Bitter cherry
- Oregon white oak
- Black cottonwood
- Pacific dogwood
- Oregon ash

Needles vs Scales - Conifer

Needles



Scales





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Western redcedar



Conifers with Needles



Grand fir (*Abies grandis*)

Conifers with Needles



Douglas-fir (*Pseudotsuga menziesii*)

Conifers with Needles



Western hemlock
(*Tsuga heterophylla*)



Common NW Tree Species (Quick ID course)

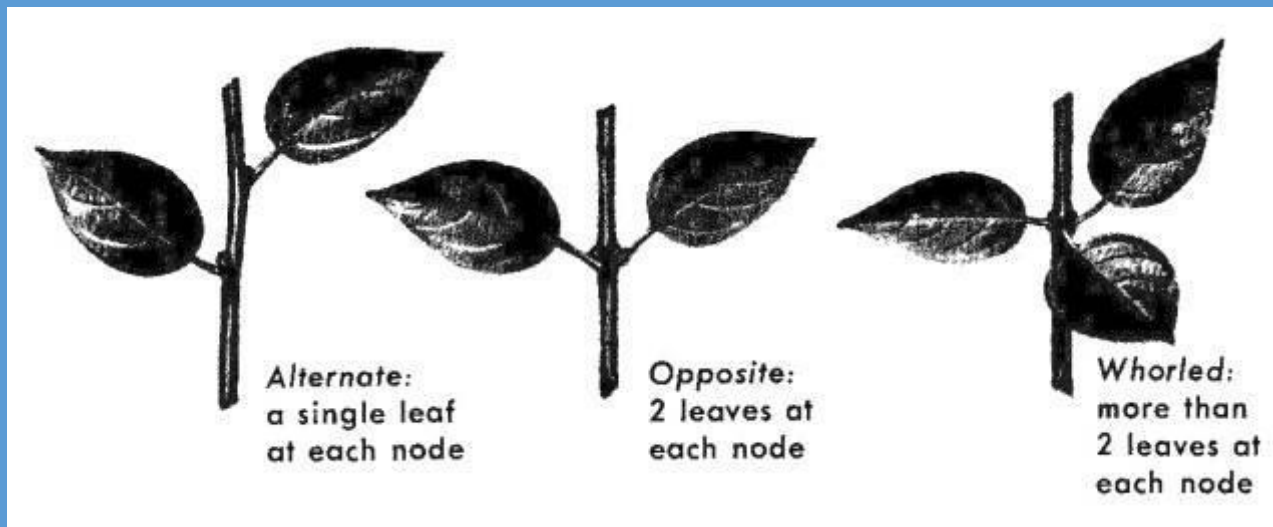
Conifers

- Douglas-fir
- Western redcedar
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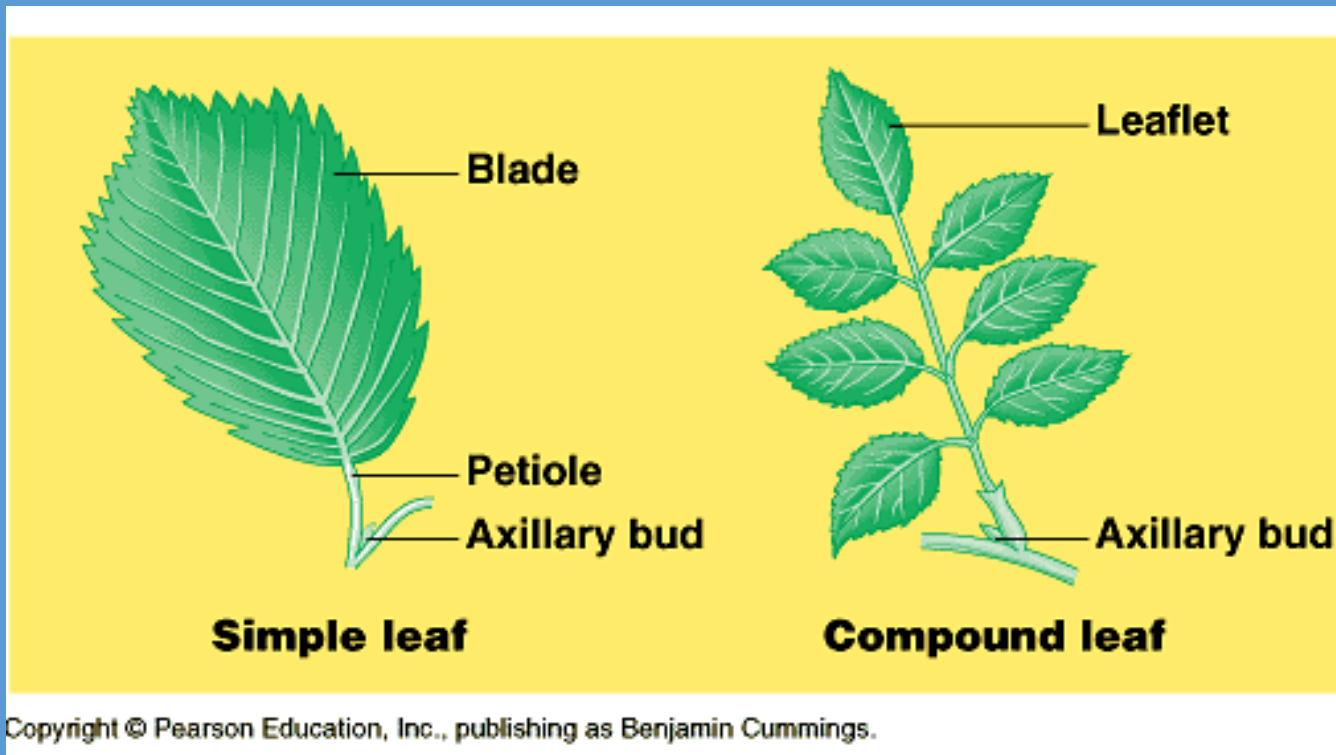
Hardwoods

- Bigleaf maple
- Red alder
- Bitter cherry
- Oregon white oak
- Black cottonwood
- Pacific dogwood
- Oregon ash

Opposite vs Alternate Leaves - Broadleaf



Simple vs Compound Leaves



Opposite Leaves

Maple

Ash

Dogwood

Elderberry



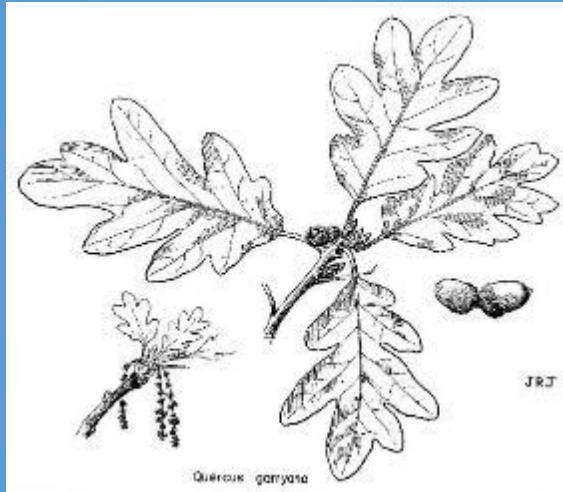
Bigleaf maple

Others: snowberry, mockorange, twinberry

Alternate Leaves



Bitter cherry



Oregon white oak



Red alder

Successional Processes of NW Forests

Stand Types

- Stand initiation (0-20 years)
- Young stand (20-50 years)
- Mid-aged stand (50-100 years)
- Old stand (100+ years)



Stand Initiation (0-20 years)

- Planting
- Competition



2011



2012



2013



2014

Stand Initiation (0-20 years)



Young Stand (20-50 years)

- Stem exclusion
- Understory exclusion
- Growth slows down at end of this range



20 years old
350 TPA
8.4" DBH
100% conifer
145 ft² Basal Area

Young Stand (20-50 years)



30 years old
325 TPA
4.7" DBH
45% conifer
44 ft² Basal Area

Douglas-fir
Bitter cherry
Red alder
Bigleaf maple
Western redcedar
Pacific dogwood



Mid-Aged Stand (50-100 years)

- Larger trees
- Structure development
- Understory is back, or even better





Mid-Aged Stand (50-100 years)



Mid-Aged Stand (50-100 years)





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Mid-Aged Stand (50-100 years)



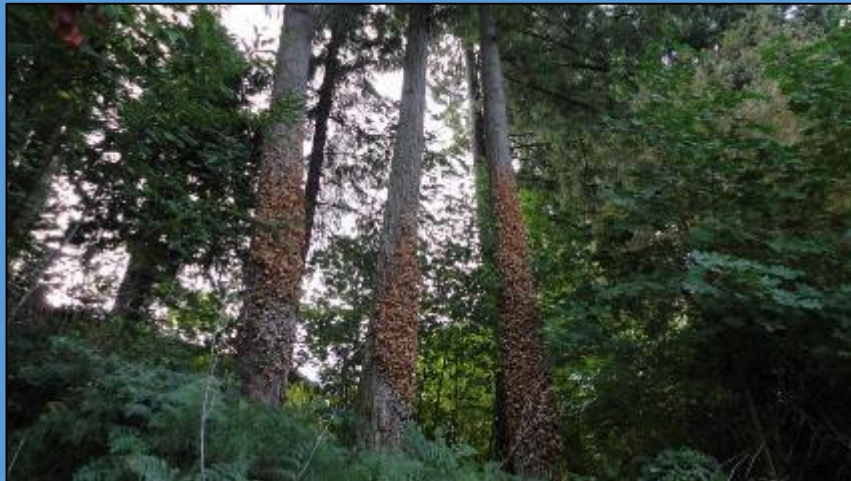
Mid-Aged Stand (50-100 years)



Mid-Aged Stand (50-100 years)



Mid-Aged Stand (50-100 years)



Old Stand (100+ years)

- Larger trees and smaller trees
- Horizontal layers
- Structure development
- Understory is robust



Old Stand (100+ years)





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Old Stand (100+ years)



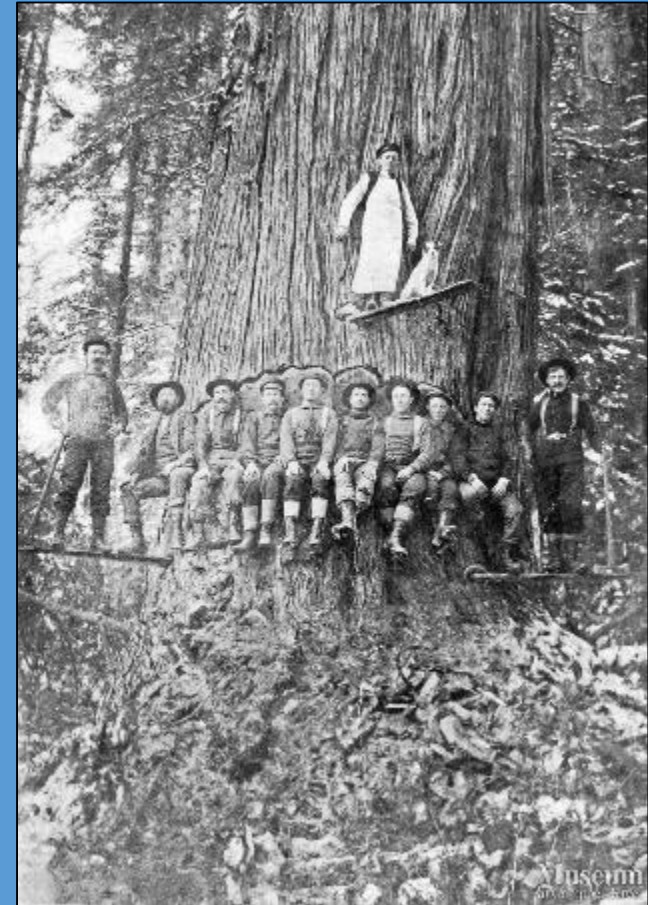
Old Growth?



Brief History of NW Forest Management

3 notable periods of logging

- Late 1800s
- World War II
- 1990s



Brief History of NW Forest Management



Tillamook Burn: 6 year curse

4 fires (1933-1951)

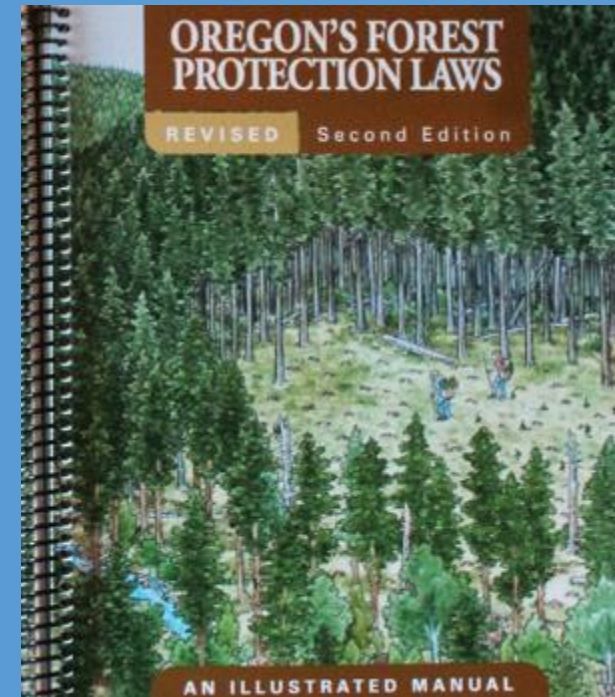


Maxine Leach

Brief History of NW Forest Management

Oregon Forest Practices Act

- 1971
- First in nation
- Replant after harvest
- Protect streams and wetlands
- *Much more...*





1990

Image U.S. Geological Survey

Google earth



1994

Image U.S. Geological Survey

Google earth



2015

Google earth

Brief History of NW Forest Management

- Clearcutting



Brief History of NW Forest Management

- Thinning



Effects of management on ecosystems

- Stream buffers
- Planted buffers
- Fish Habitat
- Early Seral Habitat
- Storing Carbon
- Biodiversity



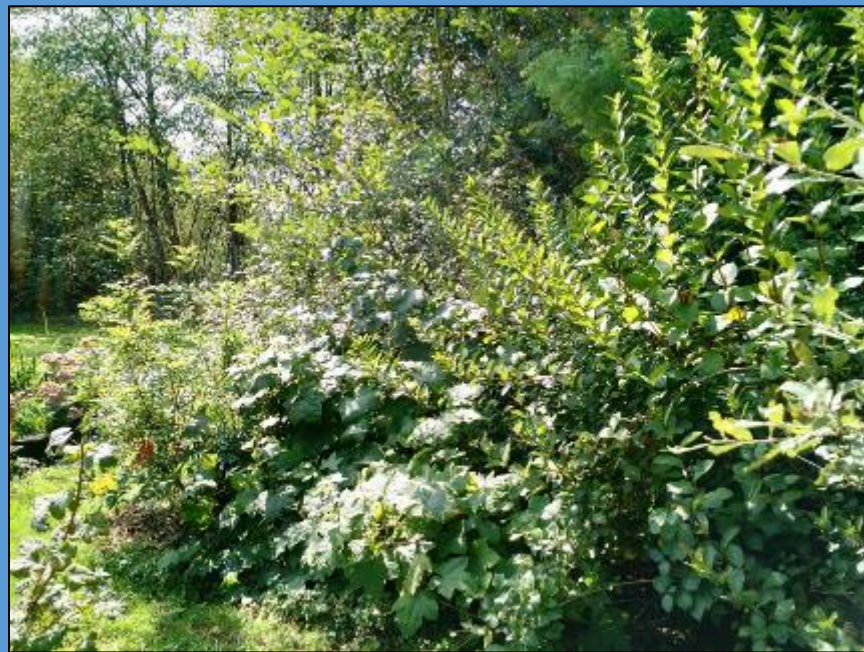


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Stream Buffers



Planted buffers - restoration



Fish Habitat





Early Seral Habitat



Early Seral Habitat



Carbon Storage

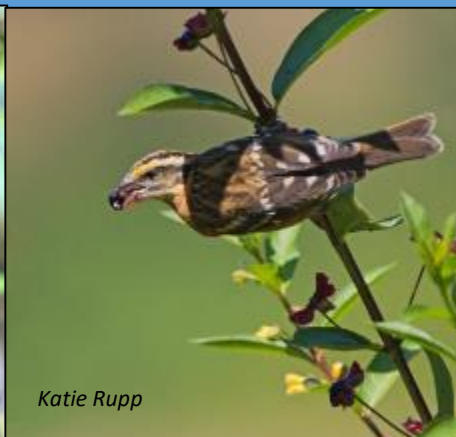
- Forests can store carbon
- Mitigate greenhouse gas emissions
- Douglas-fir forests
 - Wood volume: Grow ~180 cubic feet per acre per year
- The Pinchot Institute –
www.pinchot.org



Biodiversity



Nicole Ahr



Katie Rupp



Roy Siegel



Corinne Bacher



Current Forest Composition

Forest cover

- 47% Oregon
- 52% Washington

top 10 states and u.s. total production (in millions of board feet) ⁽²⁰⁾

	2007	2008	2009	2010	2011	2012	2013	% of u.s. total for 2013
Oregon	6,176	4,724	3,829	3,994	4,134	4,659	5,119	17.1%
Washington	4,763	3,885	3,241	3,637	3,685	3,763	3,942	13.2%
Georgia	2,309	1,920	1,518	1,714	1,914	2,273	2,366	7.9%
Alabama	2,242	1,594	1,274	1,465	1,626	1,943	2,103	7.0%
Arkansas	2,215	1,615	1,493	1,576	1,675	1,964	2,026	6.8%
California	2,309	1,920	1,442	1,435	1,623	1,838	1,937	6.5%
Mississippi	1,998	1,598	1,446	1,532	1,708	1,743	1,849	6.2%
North Carolina	1,649	1,407	1,242	1,289	1,388	1,635	1,687	5.6%
Idaho	1,752	1,344	1,105	1,258	1,353	1,494	1,647	5.5%
Texas	1,652	1,406	1,238	1,188	1,308	1,292	1,385	4.6%
...								
TOTAL U.S.	35,158	29,177	23,420	24,802	26,505	28,257	29,950	

Current Forest Composition

	Oregon		Washington		
Forestland	Acres	%	Acres	%	
Total	29,984,000		22,119,000		
Federal	17,995,300	60%	9,538,000	43%	
State	1,019,300	3%	2,683,000	12%	
County/Municipal	186,100	1%	362,000	2%	
Native American Tribal	475,100	2%	1,678,000	8%	
Private	10,308,200	34%	7,858,000	36%	
Large >5000 ac	5,984,100	58%	4,614,000	59%	Industrial
Small <5000 ac	4,324,100	42%	3,244,000	41%	Non-industrial

About 59,000 jobs

About 41,000 “direct” jobs

Family Forestland - Oregon

- **148,000 Owners (2006 data)**
 - 137,000 own <50 acres
 - 86,000 own 1-9 acres
 - 51,000 own 10-49 acres
- **Land Tenure**
 - 140,000 owners answered question
 - 10,000 are “new,” owned less than 10 years....
 -and they’re virtually all in the 10-49 acre category

*2006 National Woodland Owner Survey
USDA Forest Service
Forest Inventory & Analysis Program*

Family Forestland - Oregon

- **Aging population**
 - 41% > 65 years old
 - 32% > 75 years old
- **Focus on 10-49 acre owners**
 - 79% are younger than 65
 - 38% younger than 55
- **Intergenerational Land Transfer**
- **Ties to the land**

<http://www.tiestotheland.org/>

*2006 National Woodland Owner Survey
USDA Forest Service
Forest Inventory & Analysis Program*