



# Mixed Conifer Forests

## An Overview

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*"Ecosystems are not only more complex than we think, but more complex than we can think."*

---Frank Egler

"Everything should be made as simple as possible, but not simpler."

--Albert Einstein

"Git R Done"

--Larry the Cable Guy

# A Definition of Moist Mixed Conifer Forests

## **Diverse** Forest Type where:

1. Grand fir, white fir, Douglas-fir are the late-successional species
2. Old shade-intolerant/fire-tolerant species:
  - Ponderosa pine, Douglas-fir, or western larch
3. Low to mixed-severity fire regime
4. Not too hot and dry, not too cold and wet
5. More productive than Ponderosa Pine and dry MC
6. Ecosystems altered by human activity



A photograph of a forest with a person standing for scale. The forest is filled with tall, thin trees and a dense canopy of green leaves. The ground is covered in brown pine needles and fallen branches. A person wearing a light-colored shirt and dark pants is standing in the middle ground, providing a sense of scale to the large trees. The text is overlaid on the bottom left of the image.

## Really About

- Ecosystem change
- Desirability of change
- What we want from these forests in the future



# How to find it:

## Potential (PVT)

- Theoretical climax vegetation on a site
- Understory plant community, tree regen
- Environment of a plant community
- **Rough** surrogate for disturbance regime
- Classification system for National Forests
- Types Vary among National Forests

## Current Vegetation

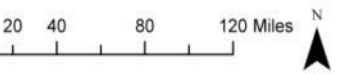
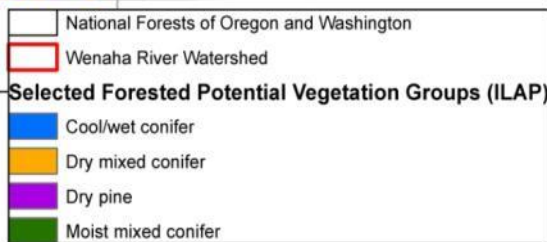
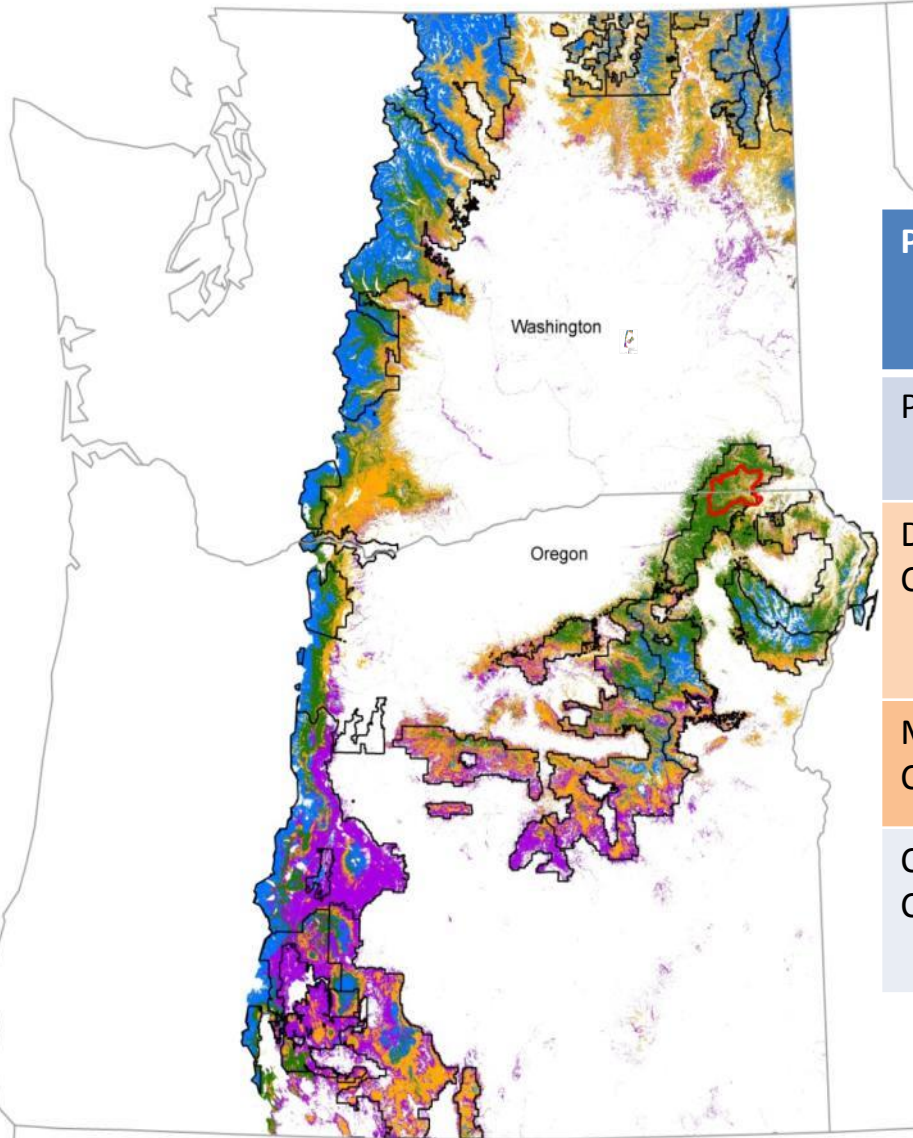
- Actual structure, age and composition of vegetation
- Product of
  - Local Environment
  - Disturbance history
  - Local seed sources
  - Biotic interactions
- Lack locally valid maps
- Field check it



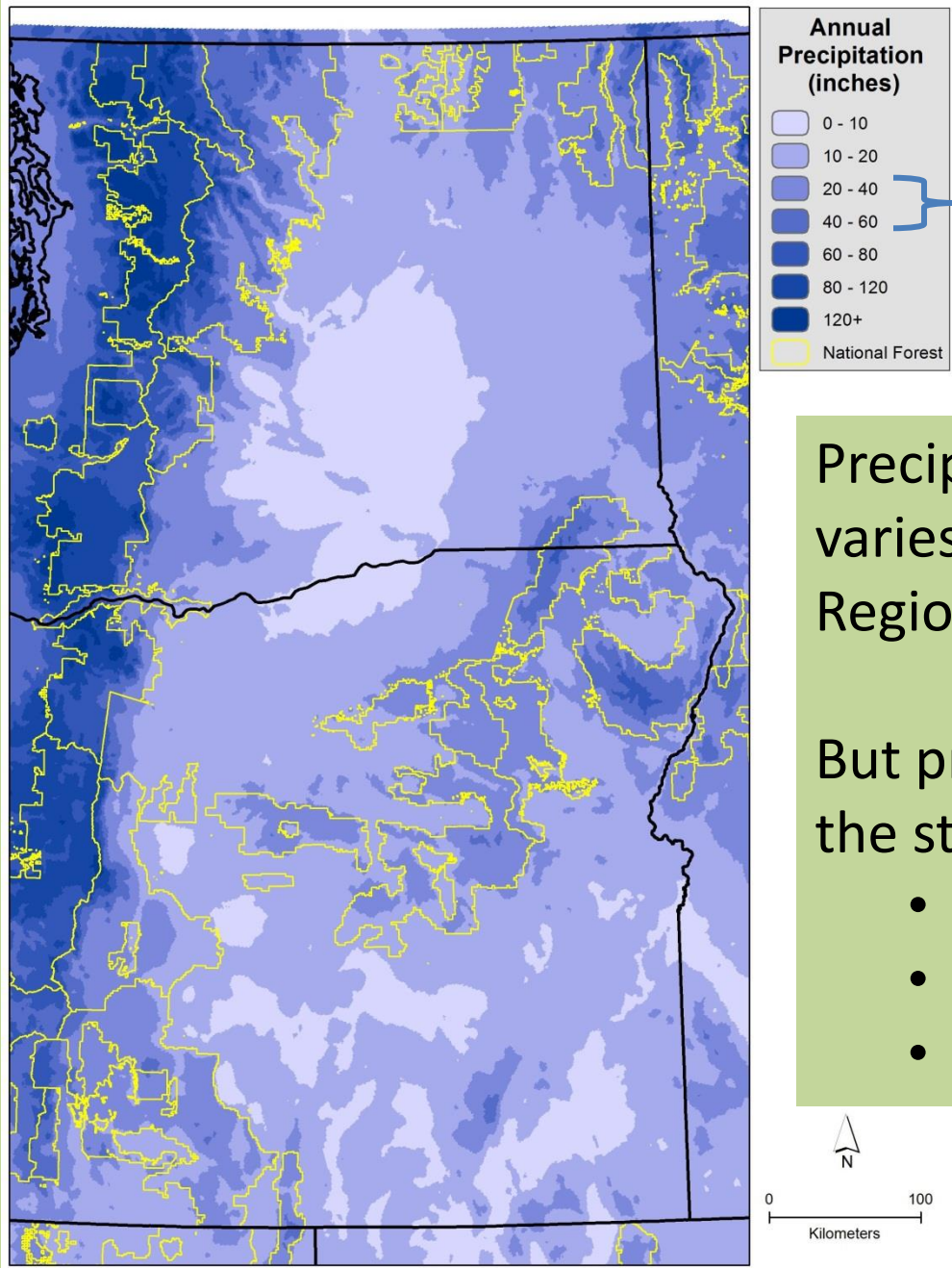
# Major Potential Vegetation Groups

PVT Group	Includes	Area in Ha (federal lands)
Pine	Ponderosa, Lodgepole dry	1,167,600
Dry Mixed Conifer	Grand fir warm, Douglas-fir dry, Mixed conifer dry	1,692,613
Moist Mixed Conifer	Grand fir/White fir cool, moist	1,099,100
Cool, Wet Conifer	Subalpine fir, mt. Hemlock, W. Hemlock	1,247,346

**2,791,713 ha  
(6,895,531 ac)**







Dry to Moist MC

Precipitation varies across the mixed conifer Region from dry to wet

But precipitation is only part of the story of moisture availability

- Local climate
- Soil
- Topography



# Old growth mixed-conifer Central Oregon

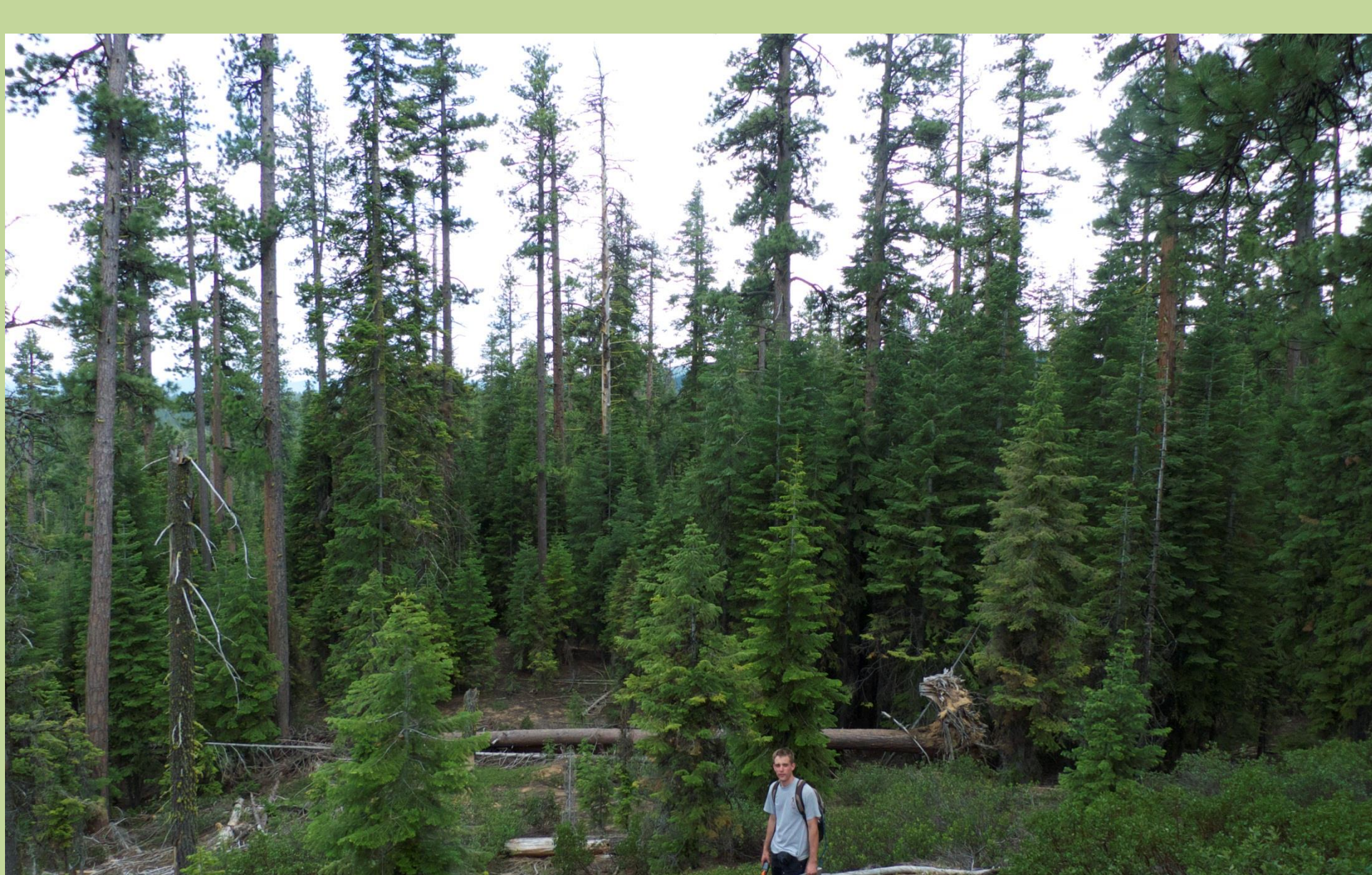
*Xeric Dry-mixed conifer*



*Mesic Wet-mixed conifer*







**Moist-Dry Mixed Conifer  
Grand Fir, Deschutes NF**



**Moist Mixed Conifer  
Grand Fir, Malheur NF**







Moist Mixed Conifer  
Douglas-fir, East Cascades WA



**Wet/Cool Mixed Conifer**  
**Grand fir, Umatilla NF**





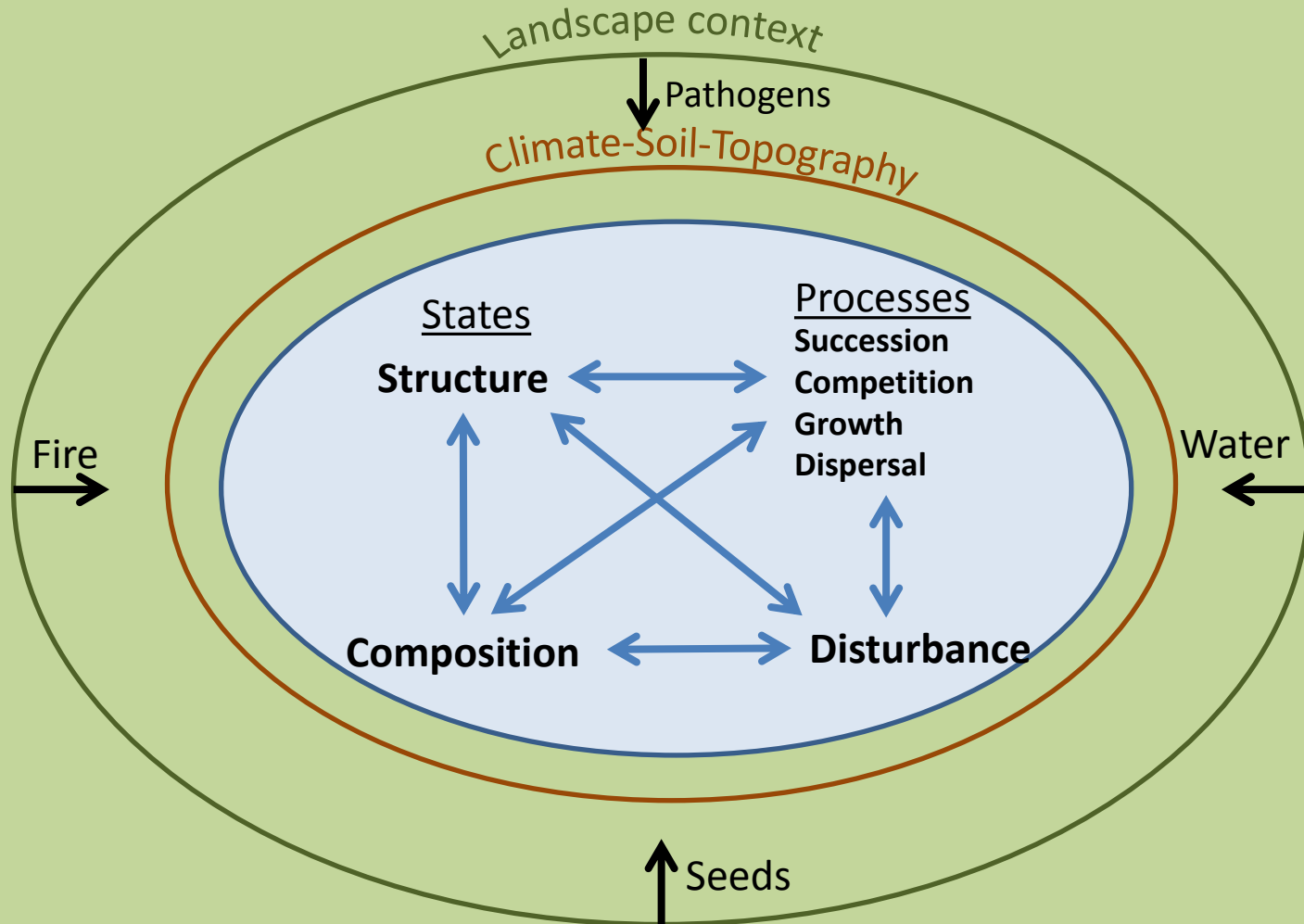
**Wet/Cool Mixed Conifer**  
**Subalpine fir**  
**Umatilla NF**





# How to think about Mixed Conifer Forests:

## More than structure and PVT at a site

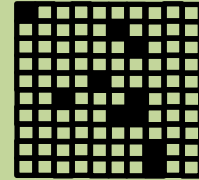




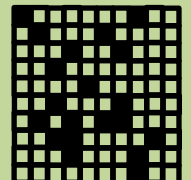
# Fire Severity Classification

Agee 1990

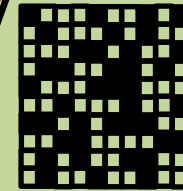
- Low—0-20% canopy tree mortality
- Mixed 20-70% canopy mortality
- High > 70% mortality



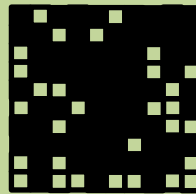
10%



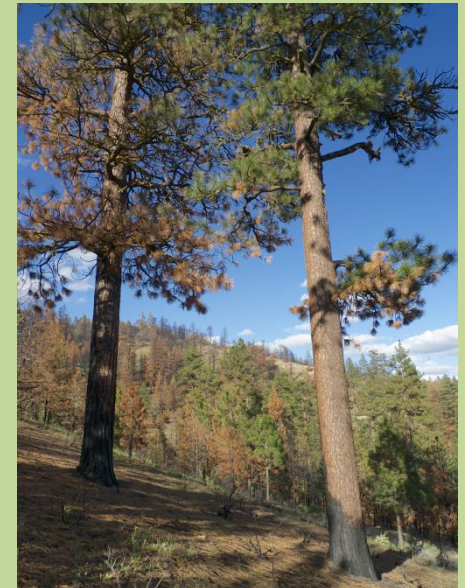
20%

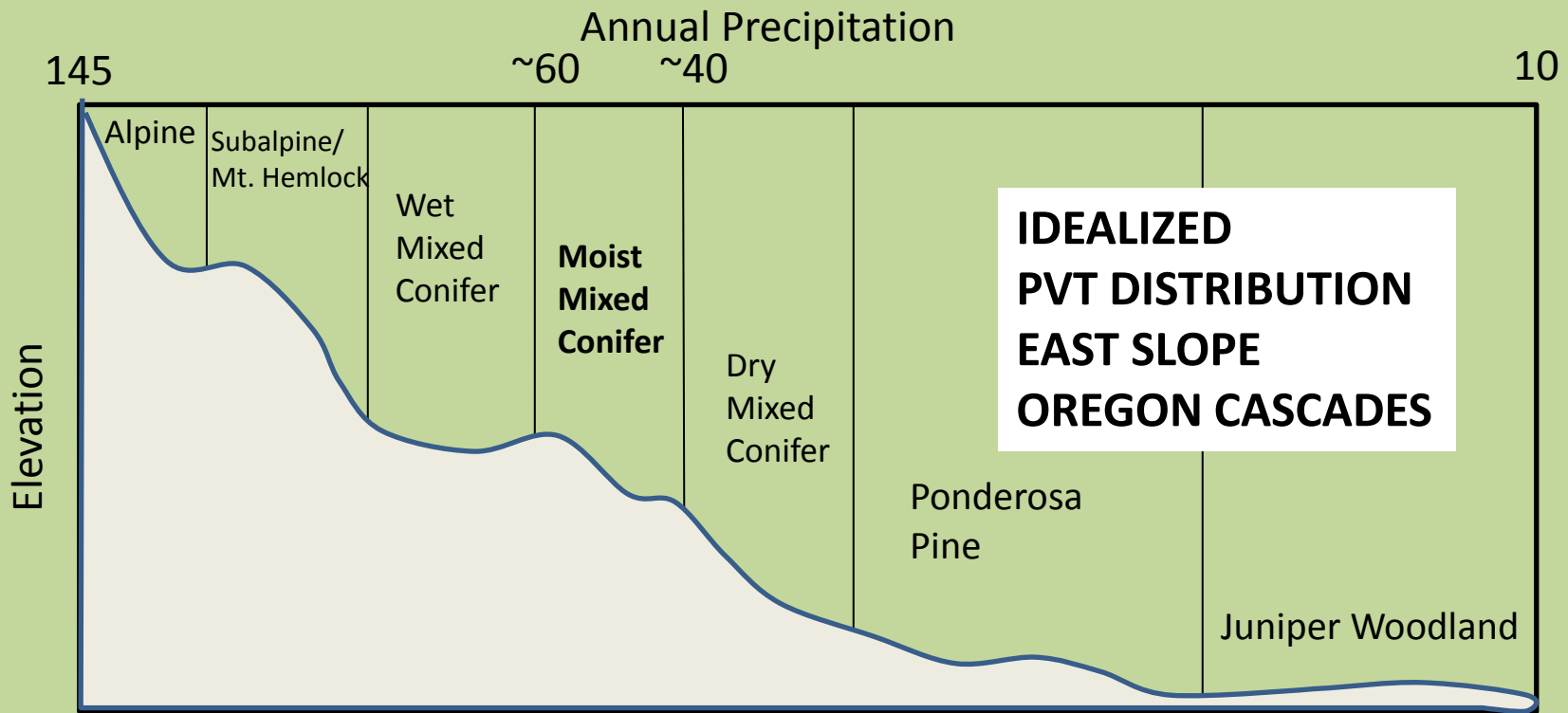


40%

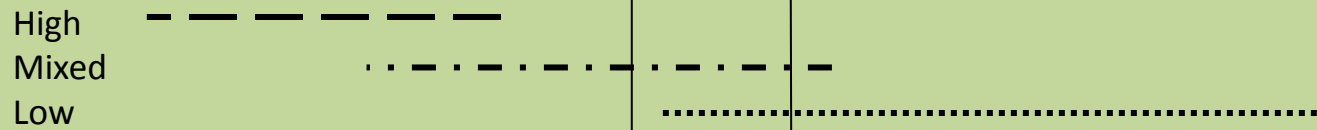


70%

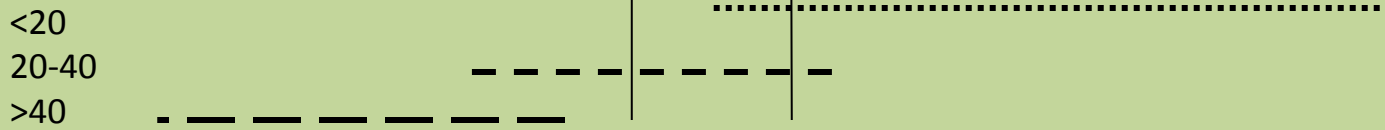




**Fire Severity**

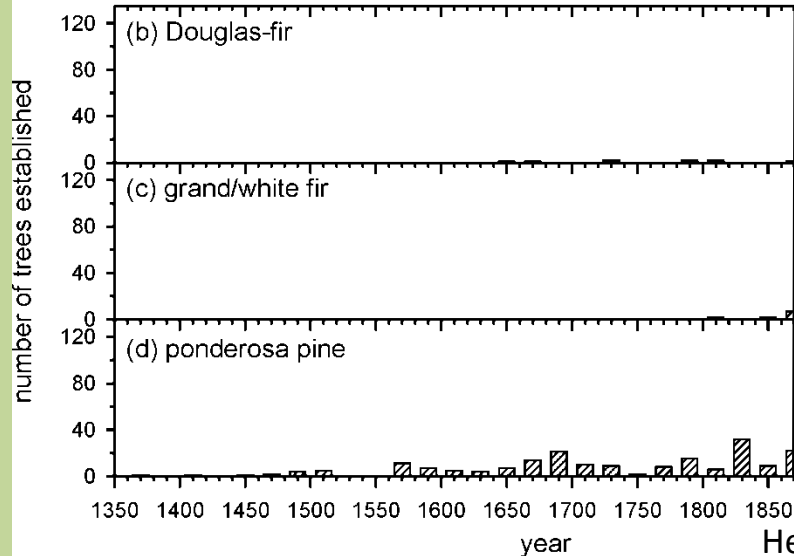
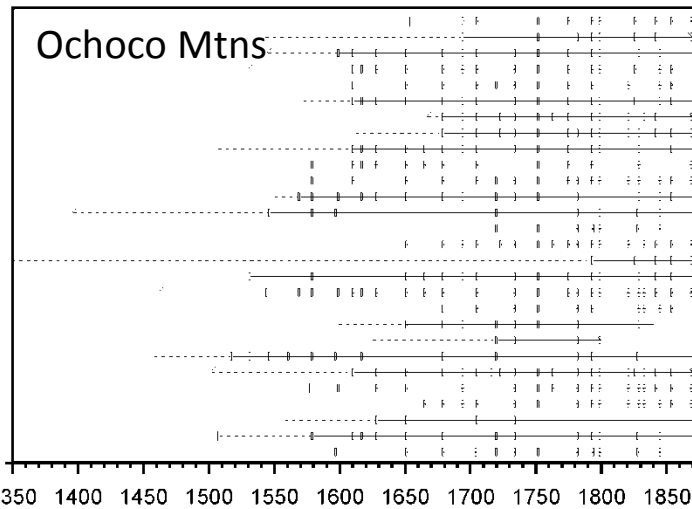
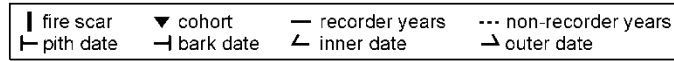


**Fire Interval yrs**





# Altered landscapes and fire regimes





Grand fir takes over  
Seed sources matter





# Current Landscapes

Fire Exclusion, High Severity Fire, Plantations



# Consequences of Change in Dry and Moist Mixed-Conifer Forest

- **Increases:**
  - Stand Density
  - Risk of high severity fire
  - Mortality from insects and disease
  - Shade tolerant tree species and seed sources
  - Habitat for dense-forest wildlife species
- **Decreases:**
  - Large old pines and other fire tolerants
  - Regeneration of pine and other fire tolerants
  - Growth rates of fire tolerant species
  - Resilience in face of fire, pathogens, drought
  - Habitat for species of open old pine forests



# Key Points

- Diverse forest in a variable and dynamic landscape
- Dry, Moist and Wet MCF are often intermixed; Dry and Moist can have similar disturbance regimes in some ecoregions
- Grand fir and other shade tolerants encroaching into both dry and moist mixed conifer sites
- Finding DMC, MMC and WMC requires triangulation between maps of PVT and current vegetation



# Key Points

- Not really about a PVT--Really about altered ecosystems current vegetation, and future forests
- Numerous ecological consequences—not just density
- Many of the changes are undesirable, but some may be desirable
- Take multi-scale perspective (patch to landscape) and assess tradeoffs



A photograph of a dense forest of tall evergreen trees. The trees are mostly green with some brown, dead branches. The ground is covered in brown leaves and fallen logs. A large, thick tree trunk is prominent in the foreground on the right side. The text "Thank You" is overlaid in the center of the image.

Thank You