Early Seral Through Time

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Early seral vegetation is a short part of successional sequence
High Severity Fire

Mixed-Severity Fire

- Young with dead old growth trees
- Mature
- Early old growth
- Mid old growth
- Late old growth
Topics

• What is early seral?
• Disturbance effects
• Successional pathways
• Regional patterns and trends
A Definition and Characteristics

• An stage in forest succession that is the immediate product of a disturbance that removes most of the canopy cover

• Characteristics
  – Less than 20% canopy cover remaining
  – Large enough patch for light-demanding species
  – Has biological legacies from previous forest
  – Short lived, depending site productivity
Components of Early Seral

• Loss of tree canopy
• And reduction or loss one or more of following:
  – Standing trees
  – Understory vegetation
  – Forest floor litter
  – Large woody debris
  – Soil organic matter
  – Tree roots
High Severity Wildfire

HOH Fire

Tillamook Fire

Yacolt Burn
Landslides in Coast Range

Photo by Rob Pabst
Long-lived early seral related to land-use history and site conditions
Early Seral on Intensively Managed Forest Land
Gap Disturbances
Gap Size Effect Dense Conifer Forests

Diameter/Ht Ratio = 0.5

ES plant species infrequent

Diameter/Ht Ratio = 1.0

ES plant species begin to appear
Fire as a gap process in dry, fire-prone forests
Successional Pathways

ES

Young trees with dead legacies

Mature trees DF - WH/WH

Old-growth DF/WH

DF Douglas-fir
WH Western hemlock
/ Overstory/understory
Early seral creation in the Biscuit Fire
Historical Range of Variability
Oregon Coast Range
% of Landscape

Early Seral: 10-25%
Old Growth: 35-60%
Three Centuries Of Simulated Pre-Columbian Fire History in Oregon Coast Range

By Nonaka, Wimberly and Spies
Fire Synchrony in Western Oregon and Washington

Study

- Desolation Peak
- Mt. Rainier
- Bull Run
- Humbug Creek
- Blue River
- Bear-Martens
- Coast Range
- Augusta Creek
- Little River
- Oregon Caves

Percent of Study Area Burned in 25-year Intervals

- 20–29%
- 30–49%
- >50%

Weisberg and Swanson 2003
Douglas-fir establishment was regionally episodic during periods of widespread fire.

Warm
Dry
Climate
Periods

Alan Tepley, HJ Andrews Forest
Timing of post-wildfire establishment for different historical fire periods in western Cascades

Tepley et al. 2013
Trends in Canopy Cover Following Clear-cutting on National Forests

Coast Range

Western Cascades

Yang et al. 2005
Wildfire
Conversion of Old Forest to Early Successional 1993-2003

Percent Loss of Older Forest on a Decadal Basis By Province

Based on Moeur and Spies et al. 2005
Fire starts from lightning 2003-2012
Suppressed by fire crews
Large Wildfires 2003-2012
Fire Size, Frequency and Suppression

Number of Fires vs. Size of Fires

Fires we can suppress

Very small
Moderate Weather

Very Large
Extreme Weather
Projected Change in Forest Vegetation Under Current Policy, Oregon Coast Range

- Open Forest
- Remnants
- Broadleaf
- Small Mixed/Conifer
- Medium Mixed/Conifer
- Large Mixed/Conifer
- Very Large Mixed/Conifer

Initial (1996) Period 10 (2046) Period 20 (2096)
Conclusions

• All ES Share the same element: Loss of tree canopy cover to low levels (e.g. <20%)
• A transitory stage that lasts 15 ~ 30 years depending on site productivity and vegetation type
• Disturbances produce different kinds of ES vegetation structure
Conclusions

• Rate of ES creation has varied over time under historical fire regime
• May now have less ES than historical on westside as a result of fire suppression
• ES created by intensive forest management is not the same as that created by natural disturbances
Thank You