

Old-growth On Federal Lands

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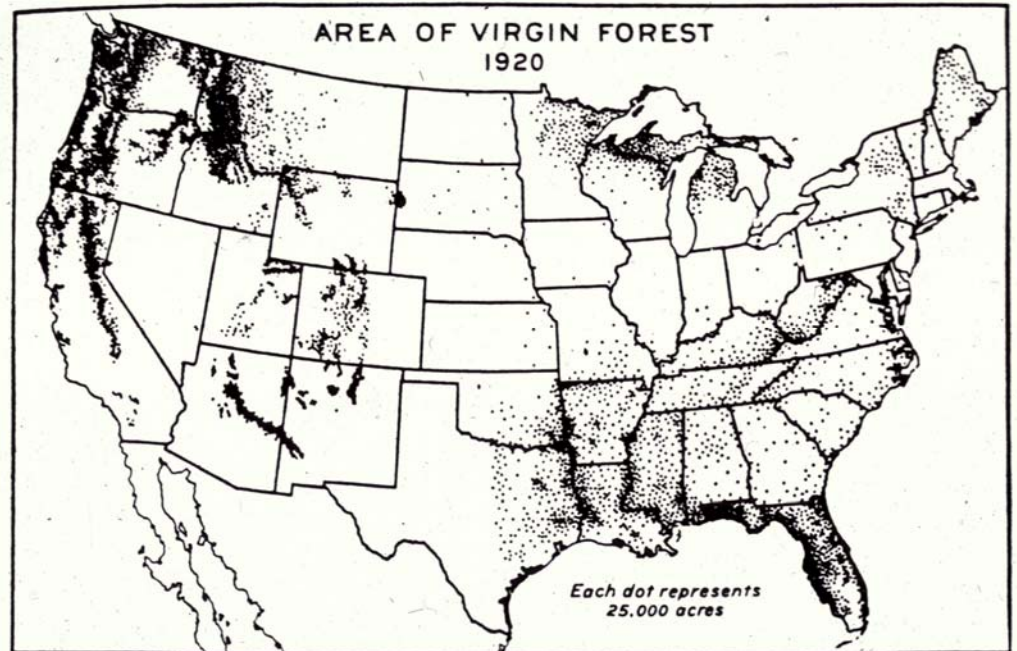
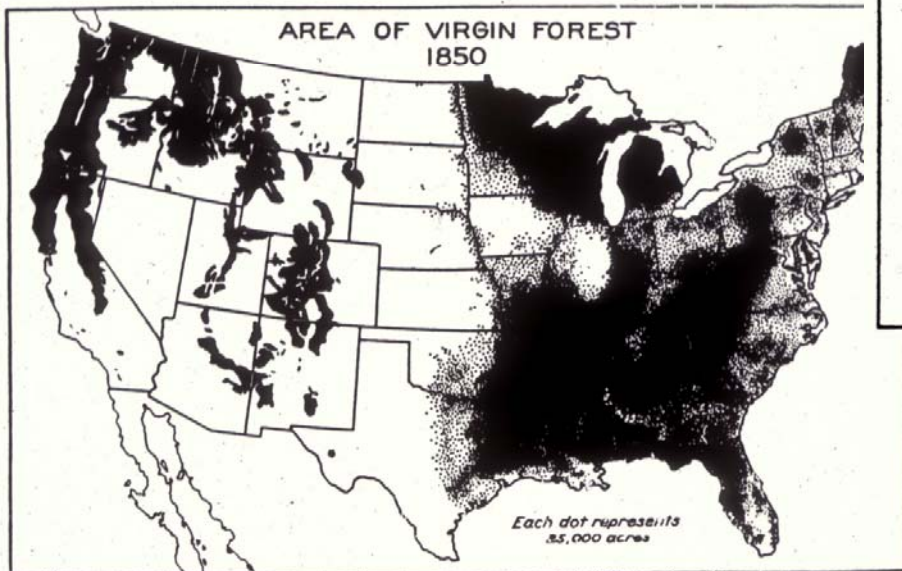
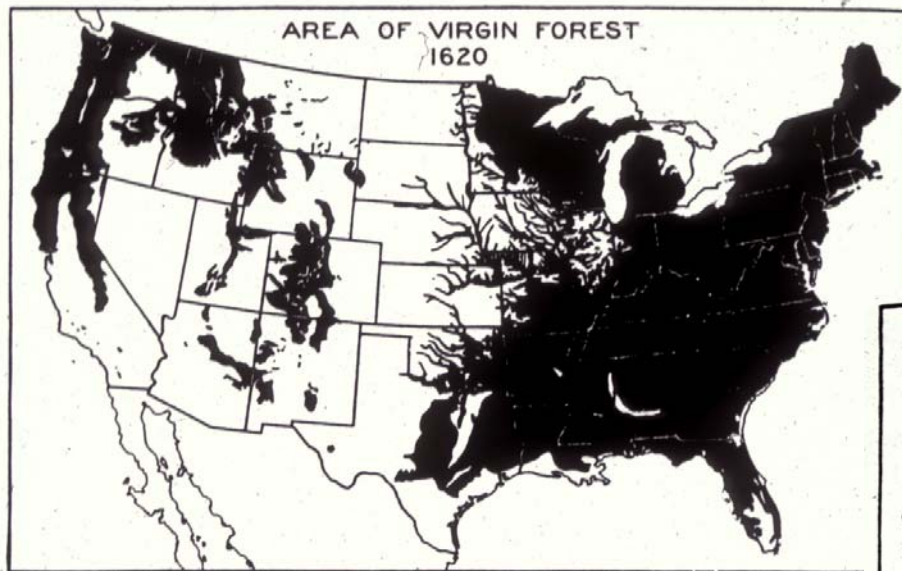
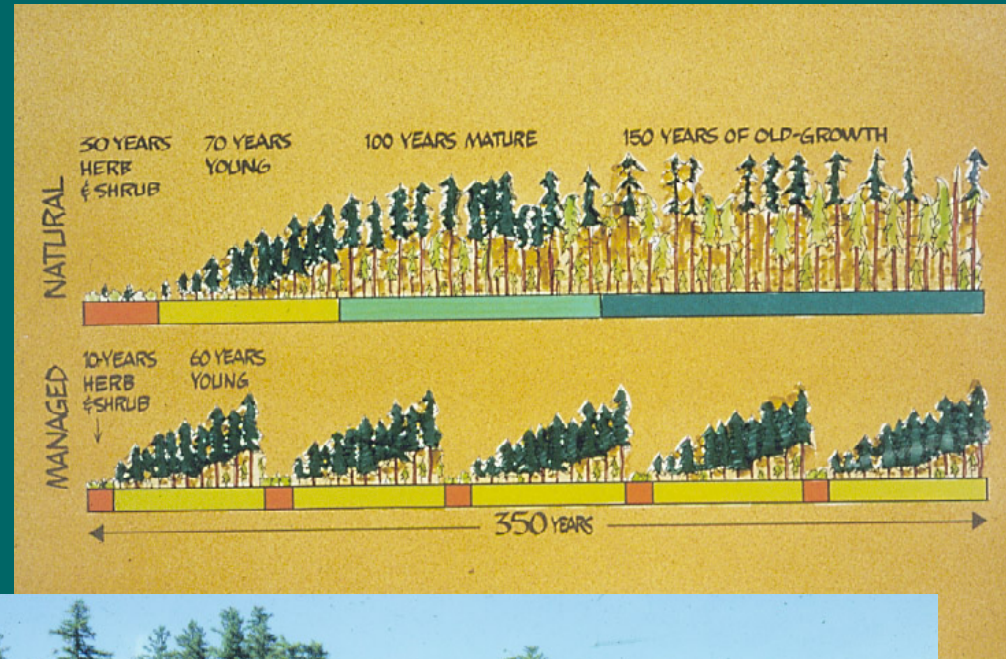


Fig. 8.1 Extent of uncut 'virgin' forest in 1620, 1850, and 1920. Areas of forests are based on estimates by states. Each dot represents 25 000 acres. Dots are not all correctly located: The Black Swamp region of northwestern Ohio, for instance, was almost a solid forest in 1850. Reprinted with permission of publisher from W. B. Greeley (1925), *Economic Geography* 1: 4-5.

Conversion of old growth to Douglas-fir Plantations on 40 to 70 year rotations



Outline

- Definitions
- Ecology
- Historical reference
- Geographic variation

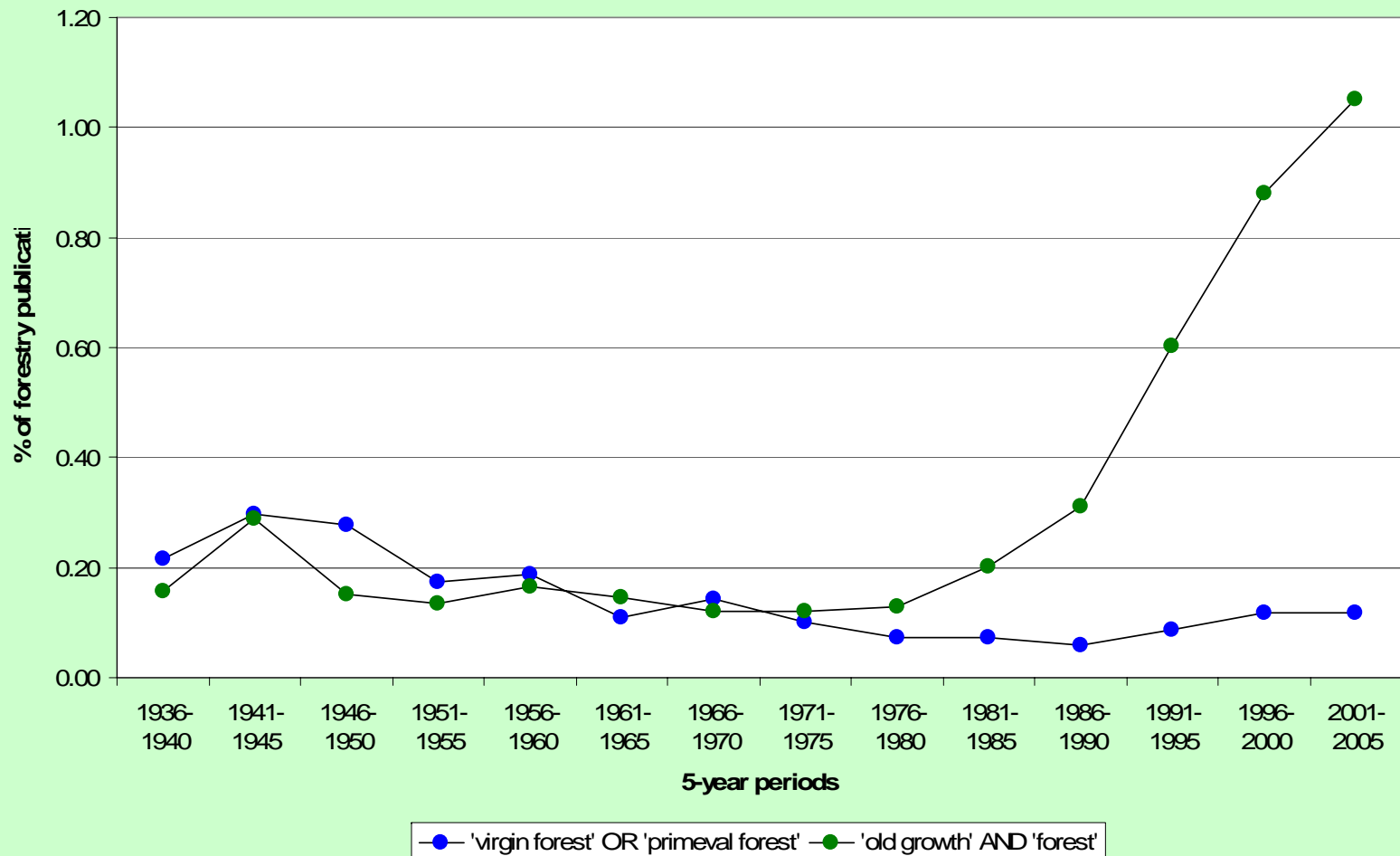
Outline

- The Northwest Forest Plan
 - How much
 - Changes and threats
 - Targets and efforts to reach them
- Policy problems and options

Changing Terminology in Forest Ecology

Forest Science (Forestry Abstracts): % of forestry publications* from 1936-2005 with reference to phrases in any data-base field pertaining to old forests

**Defined as all publications in the Forest Science data base*



Generic USFS Definition

Old-growth forests are ecosystems distinguished by old trees and related structural attributes. Old-growth encompasses the later stages of stand development that typically differ from earlier stages in a variety of characteristics, which may include tree size, accumulations of large dead woody material, number of canopy layers, species composition and ecosystem function”

Process vs Structural Definitions

Oliver and Larson (1990) “Old growth implies a uniformity of process....stands composed entirely of trees which have developed in the absence of allogenic processes.

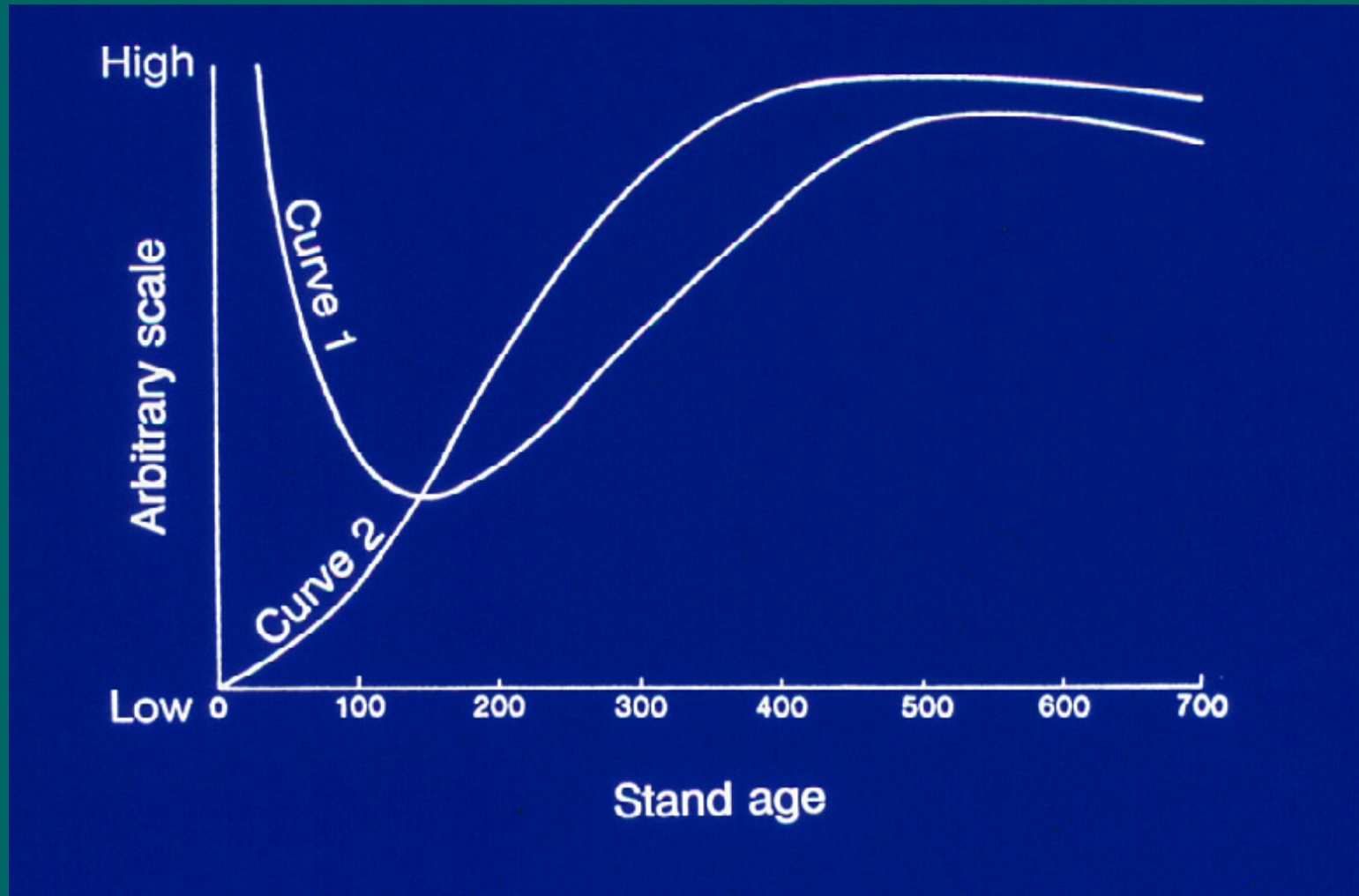
Allogenic = external to the stand (e.g. fire)

A structural definition: PNW Research Note 447 (1986)

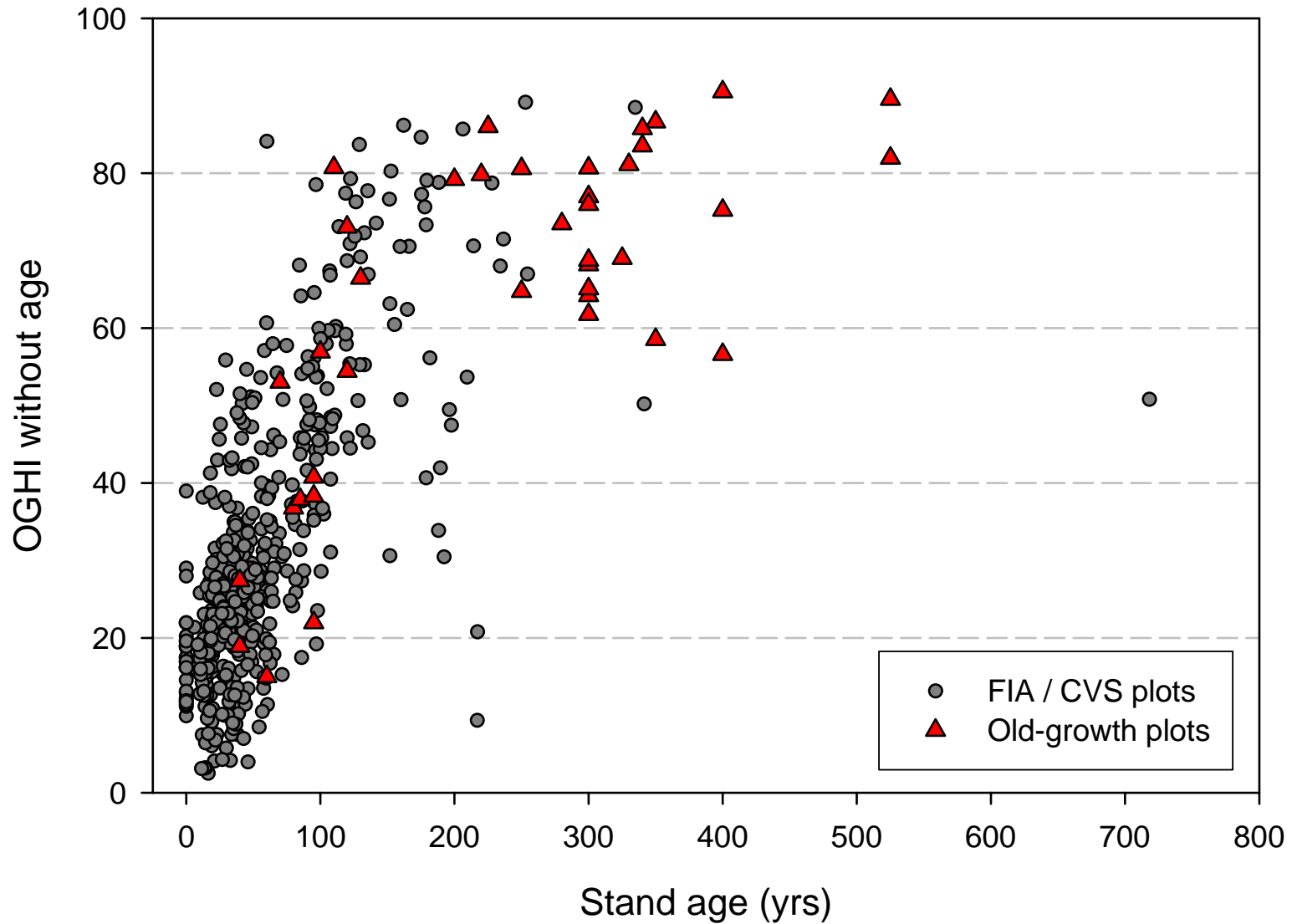
- Douglas-fir on western hemlock sites
- 2 or more tree species
- Douglas-fir => 8/acre >32 in dbh or >200 years old
- Tolerant associates => 12/ac and 16 in dbh
- Deep multilayered canopy
- Snags =>4/ac > 20 in dbh and 15 ft tall
- Logs =>15 tons/ac => 24 in dbh and 50ft long

A structural index approach

Based on tree size, variation in tree size, snags and logs



Old-Growth Habitat Index (OGHI) (*structure-based, age not included*)
for GNN629 inventory plots in the Oregon Coast Range



Examples of classifications of Douglas-fir Stand development

Typical Age	Oliver and Larson 1990	Franklin et al. 2002
0	Stand initiation	Legacy
20		Pioneer Establish
30	Stem exclusion	Canopy closure
80	Understory rein.	Maturation
150	Old-growth	Vertical divers.
300		Horizontal divers.
800-1200		Pioneer loss

Legacy/Disturbance

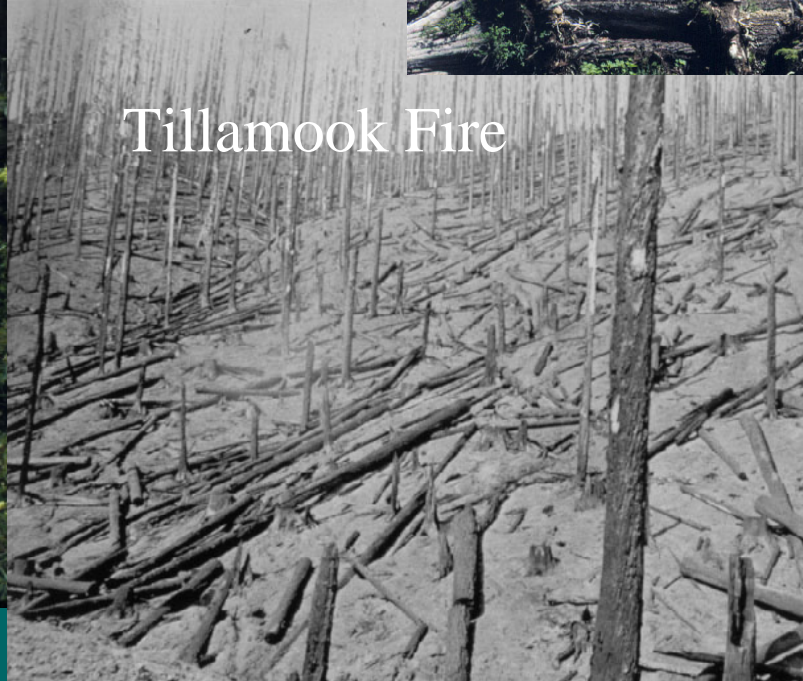
HOH Fire



Wind Storm



Tillamook Fire



Establishment



Canopy Closure/Competitive Exclusion stages

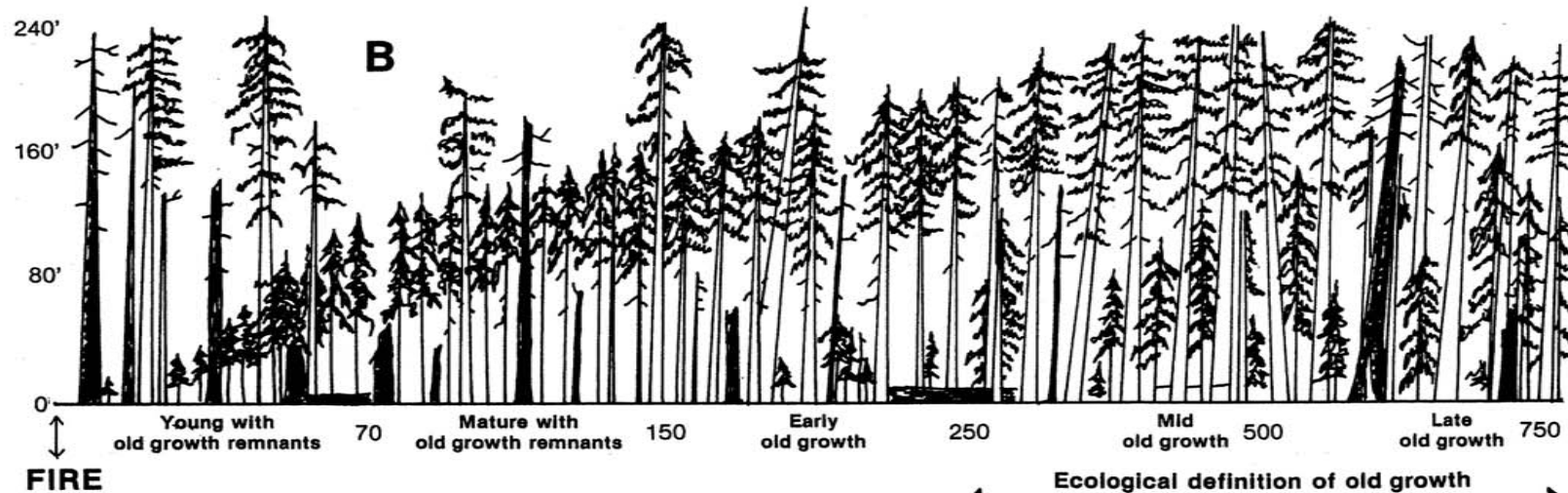
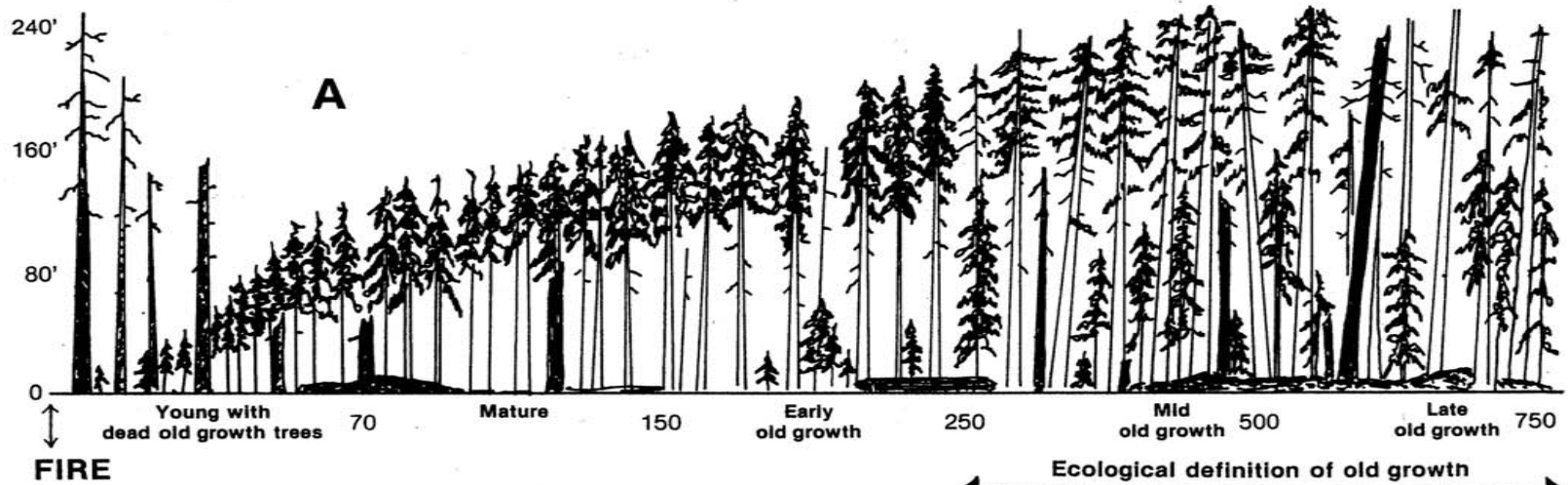


Maturation/Vertical Diversification Stages



Horizontal Diversity/Pioneer loss





Mixed Severity Fire Regimes

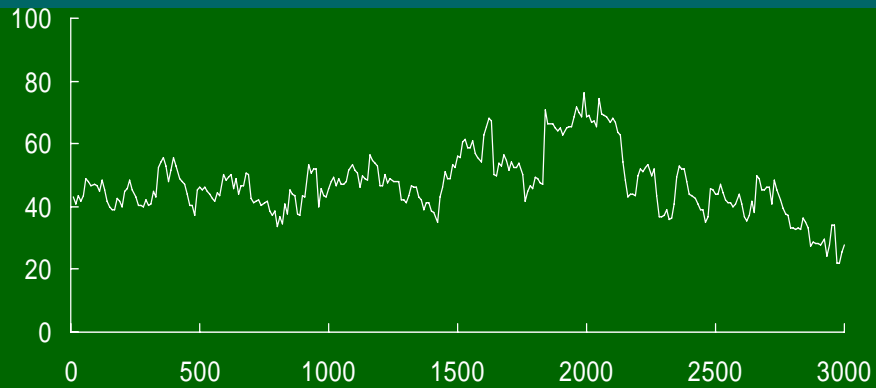


Stand Age



Three Centuries Of Simulated Pre-Columbian Fire History in Oregon Coast Range

By Nonaka
Wimberly and Spies

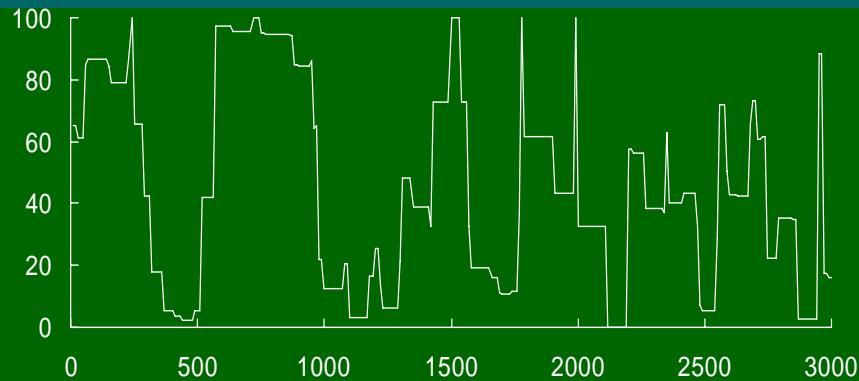


a) Province Scale
(2,250,000 ha)

% Old Growth



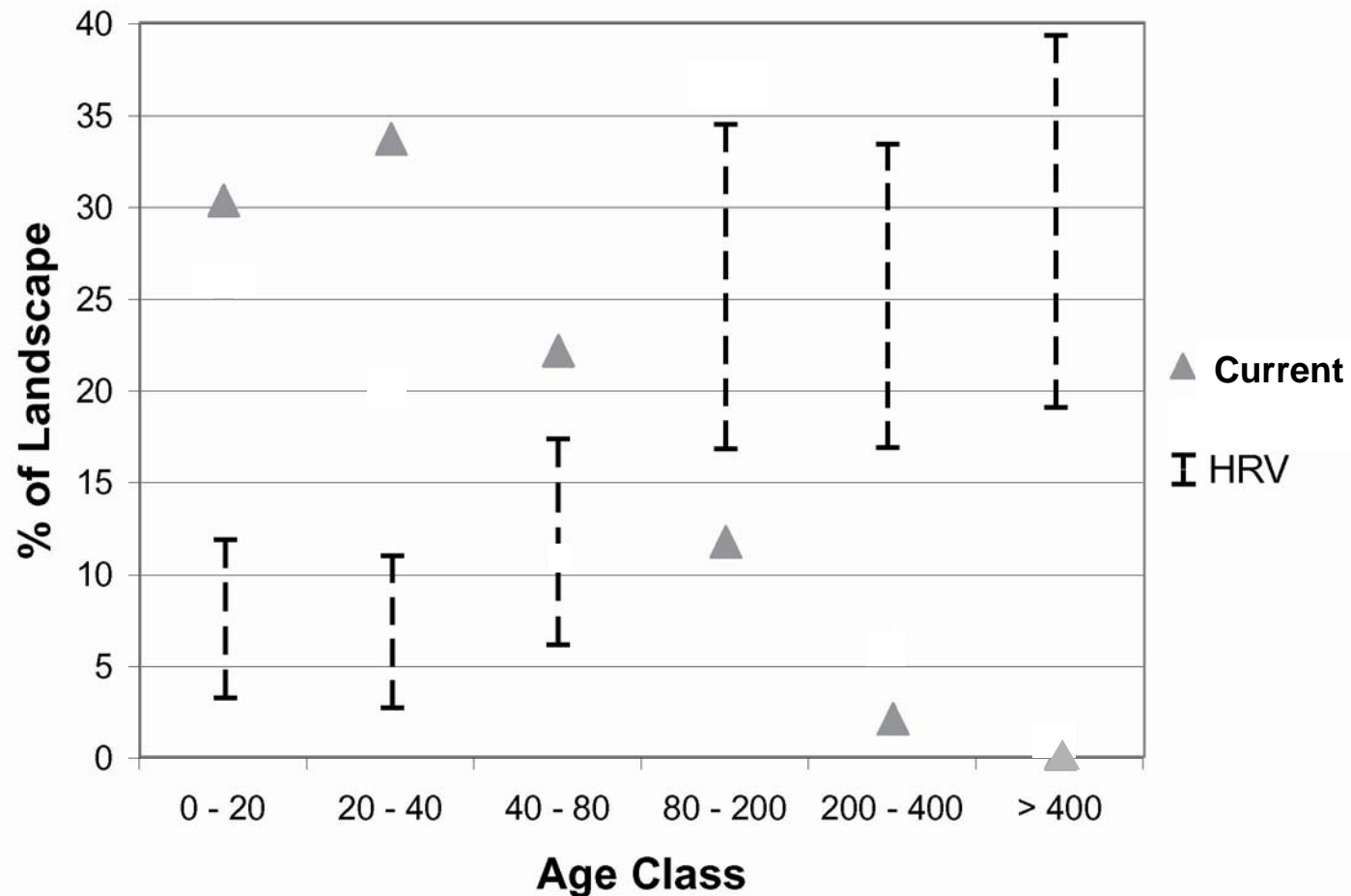
b) National Forest Scale
(302,500 ha)

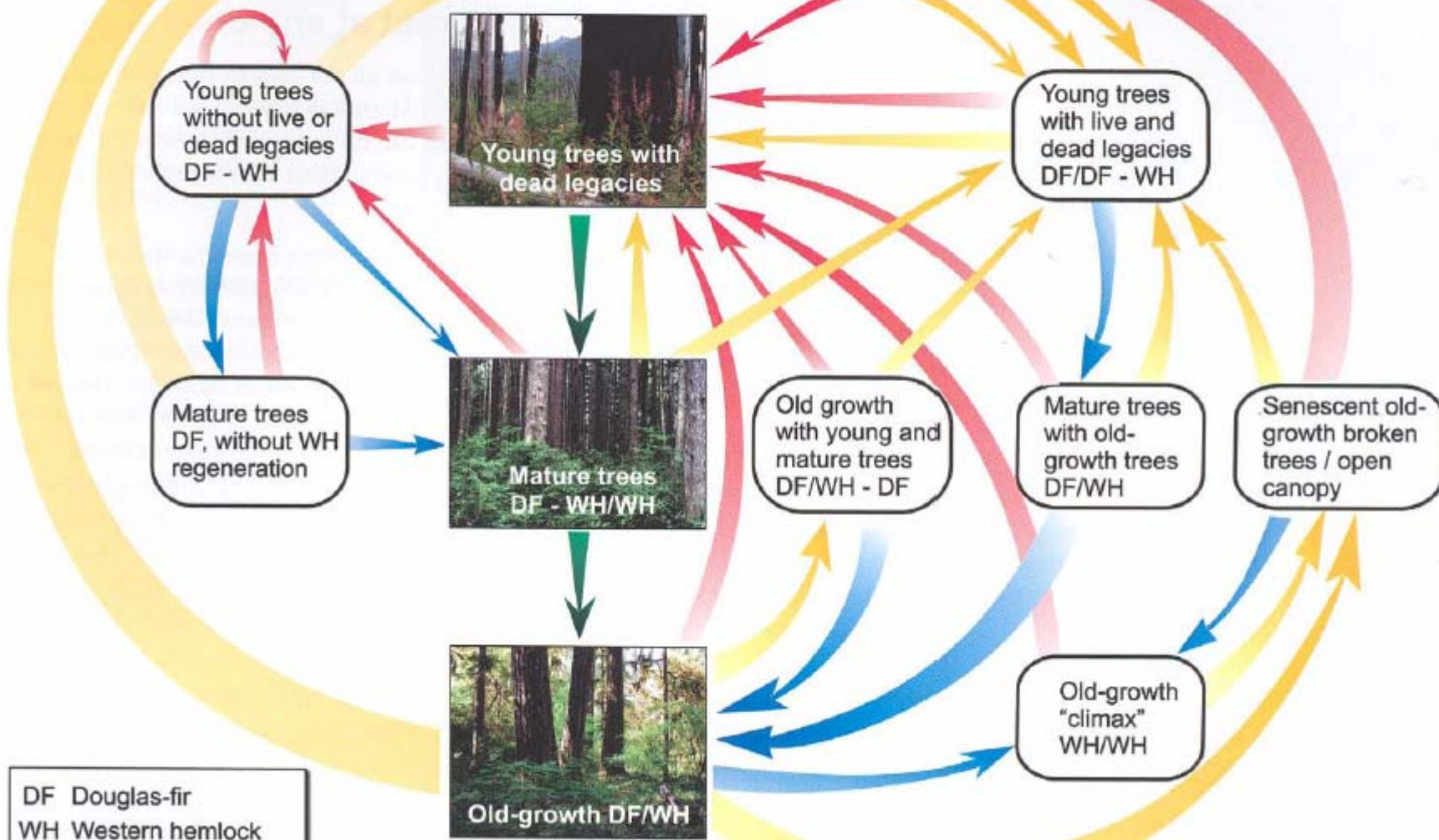
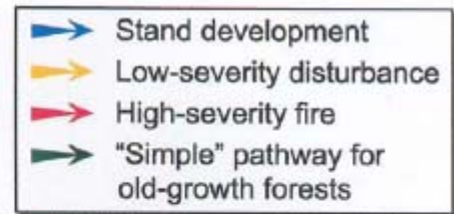


c) Reserve Scale
(40,000 ha)

Years Before Present

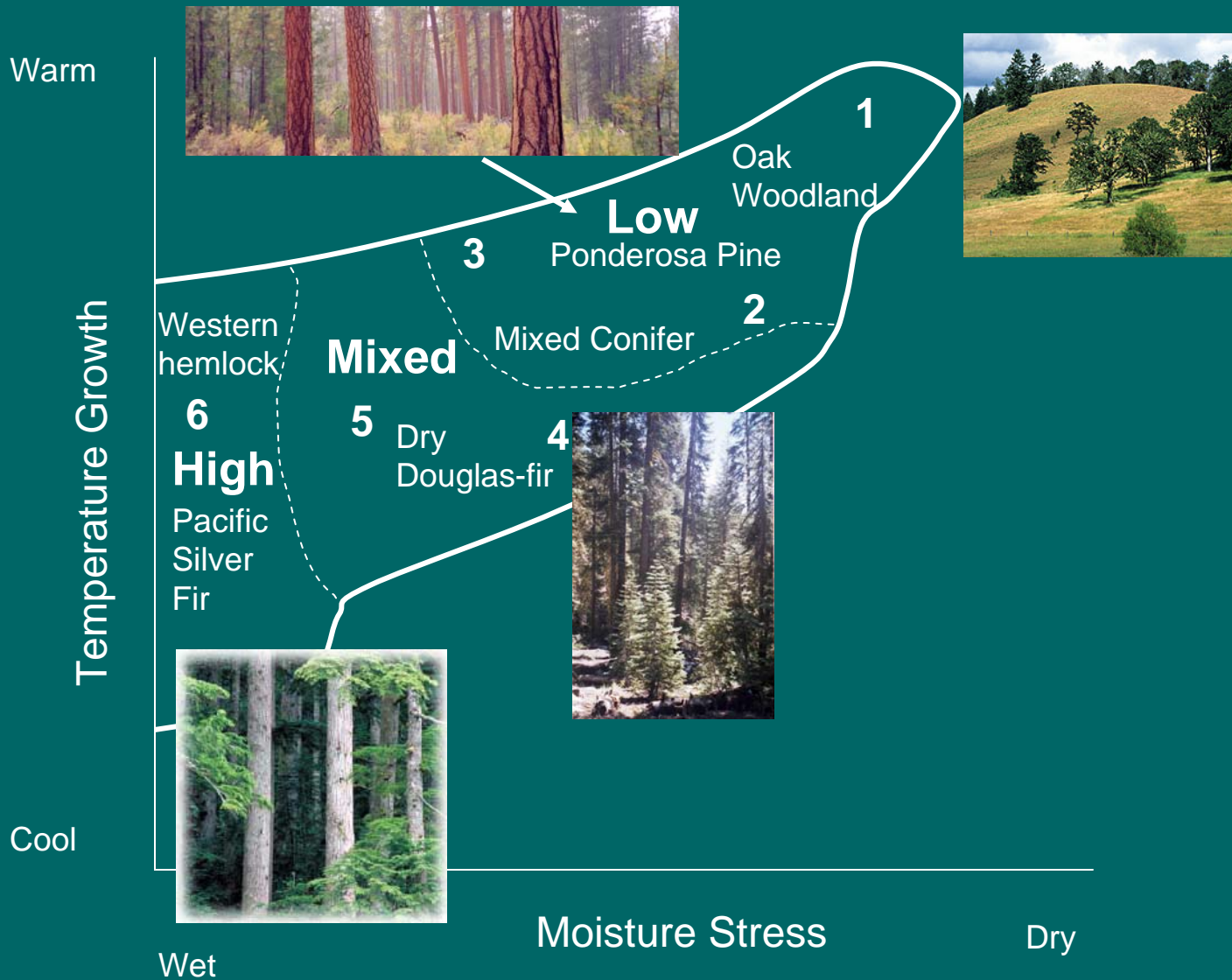
Simulated Historical Range of Variation in Age Classes in Oregon Coast Range Over a 1000 year period





DF Douglas-fir
 WH Western hemlock
 / Overstory/understory

Fire Severity Regimes and Forest Types of the PNW Region



Based on Agee 1993

Coastal Douglas- fir/hemlock Also Spruce/Hemlock

High Severity

100-300+ yr return interval

Large patch sizes

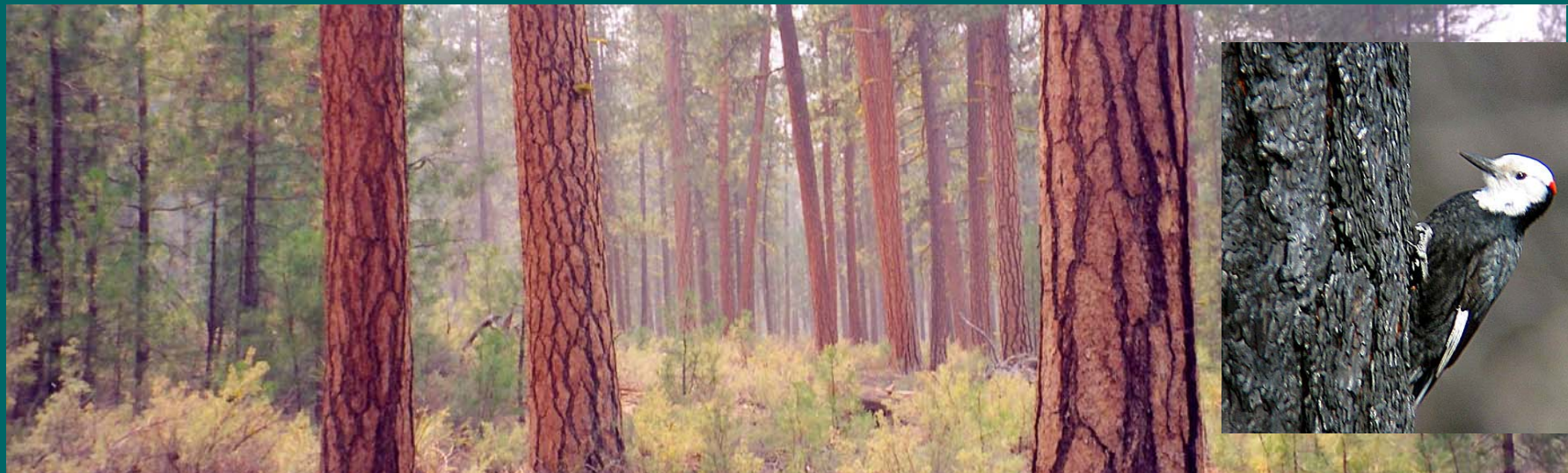


Ponderosa Pine/Mixed Conifer in Eastern Cascades

Low to moderate severity
Mixed severity pattern
8-50 year frequency
Patchy severity pattern



Different types of Old Growth in Fire Prone Landscapes



Courtesy of Norm Johnson

Mixed Conifer/Evergreen Forests SW Oregon

Low to high severity
Mixed severity pattern
25-100 year frequency

Heterogeneity in a mixed-conifer forest under a low to moderate severity fire regime



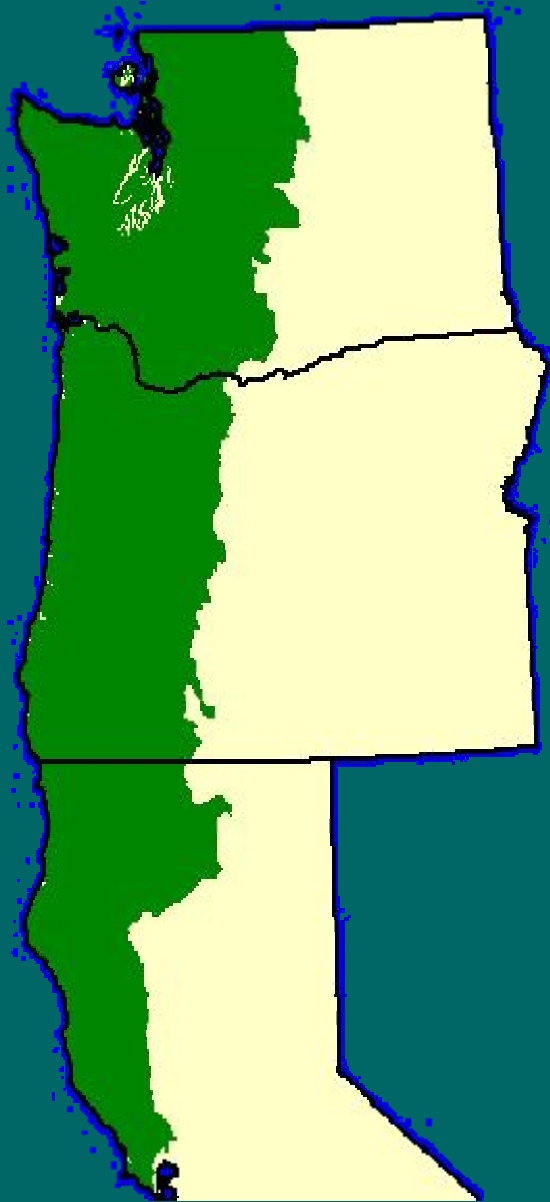
Franklin et al. 1996

Patchy Douglas-fir/Mixed Conifer/Hardwood--
Mixed severity fire



Variation in fire severity in Biscuit Fire





Forest Ecosystem Management: An Ecological, Economic, and Social Assessment

Report of the Forest Ecosystem
Management Assessment Team
(FEMAT)

July 1993

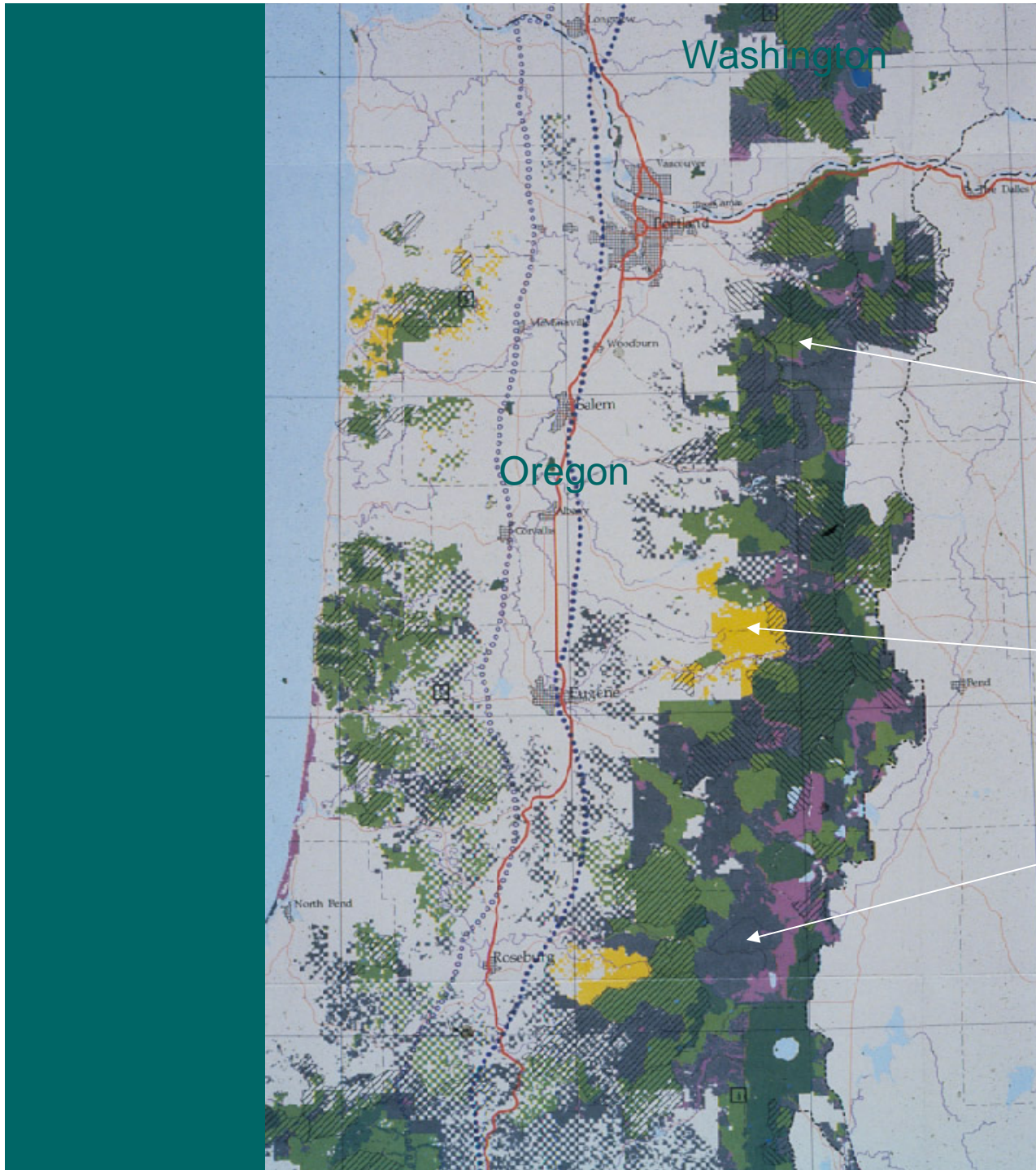
Major Objectives of the Plan

- Habitat to provide for viability of northern spotted owl and marbled murrelets
- Habitat for viable populations of other old-growth associated species

Major Objectives of the Plan

100 year horizon

- Habitat on federal lands for viable populations of salmonids
- Connected old-growth forest ecosystem on federal lands
- Attain greatest economic and social contributions and meet requirements of environmental laws



Major Land Allocations

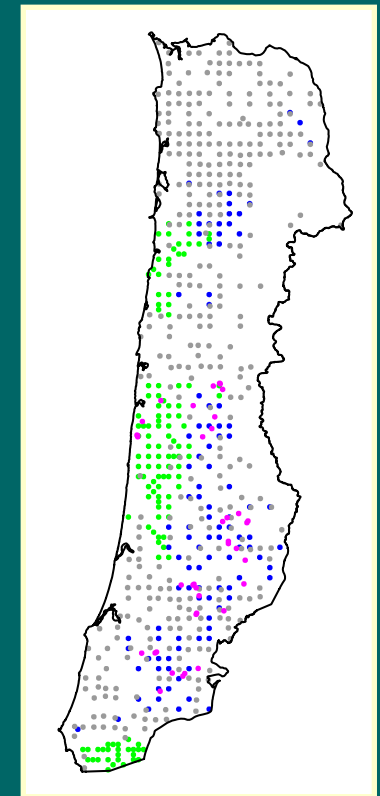
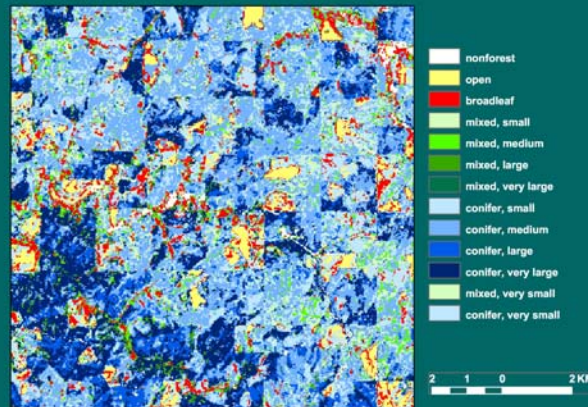
Late successional Reserves

Adaptive Management Areas

Matrix

Monitoring Old-growth

- Vegetation structure and composition from:
 - Inventory plot grid
 - Vegetation mapping with TM imagery
 - Change analysis with TM imagery



How much and where?

Table 1. Area of older forest on all federal land by definition in NWFP area (table 11, Moeur et al. 2005)

ML	7,800,000 ac
LMS	2,700,000 ac

ML = Medium-Large: \Rightarrow 20 in quadratic mean diameter,
single or multi-story

LMS = Large Multi-story: \Rightarrow 30 in quadratic mean diameter,
multi-story

Table 2. Area of older forest (ML definition) in Northwest Forest Plan by State. Reserves do not include riparian reserves. (Acreages are somewhat lower than in Table 1 because of smaller landbase used). (Figure 21a, Moeur et al. 2005).

	Oregon	Washington	California	Total
All lands	3,500,000	1,550,000	2,250,000	7,200,000
Reserves	2,200,000 (63%)	1,250,000 (81%)	1,400,000 (62%)	4,850,000 (67%)
Nonreserve	1,300,000	300,000	750,000	2,350,000

Table 3. Area (1,000s of acres) and percentage of older forest on federal and non-federal land in Oregon in NWFP area (From Spies 2006)

Oregon	Federal		Nonfederal		Federal % of Total	
Province	Medium -Large	Large Multi-story	ML	LMS	ML	LMS
Coast	523	296	727	268	42	52
E Cascades	223	27	94	5	70	83
W Cascades	1,910	734	268	60	88	92
Klamath	719	384	233	87	76	81
Willamette	4.6	0	194	0	2	0

Medium-Large (ML): =>20 in quadradic mean diameter, single or multi-story
 Large Multi-story: => 30 in quadradic mean diameter, multi-story

How much older forest (>100 years) did we have
on Federal in the NWFP Region before
Euroamerican settlement?

23 million acre land base

~ 50 to 75% was forest with older trees (~100+ years) (based
on historical and simulation studies)

Historically: 11.5 to 16.1 million acres of 100 + forest

Today: 7.8 million acres (ML definition)

45 to 67 percent of the historical amount

What is the target amount in the NWFP area?

- **7.7 million acres** of ML for (Oregon and Washington) in large reserves (FEMAT page IV-70)
- Currently about **3.45 million** acres in large reserves (Mouer et al. 2005)

What are efforts to reach
Target?

Current Late Successional Reserve-Matrix Concept In the Northwest Forest Plan

Activities Allowed:

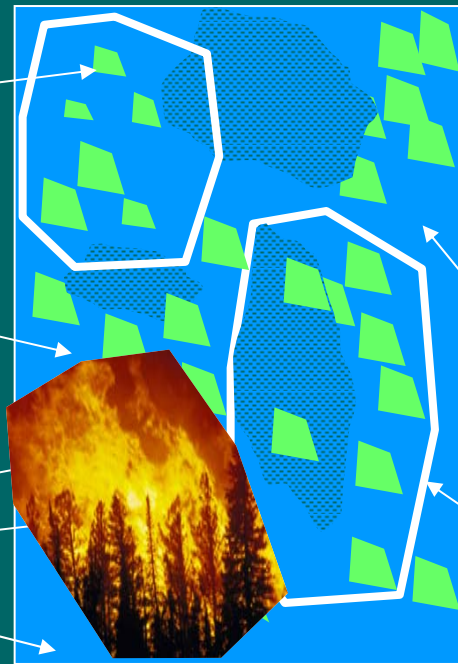
All Provinces

Thin
Plantations

Timber
Production

Fire- Frequent Provinces

Fuel
Reduction



Older Forest



Younger Natural Forest

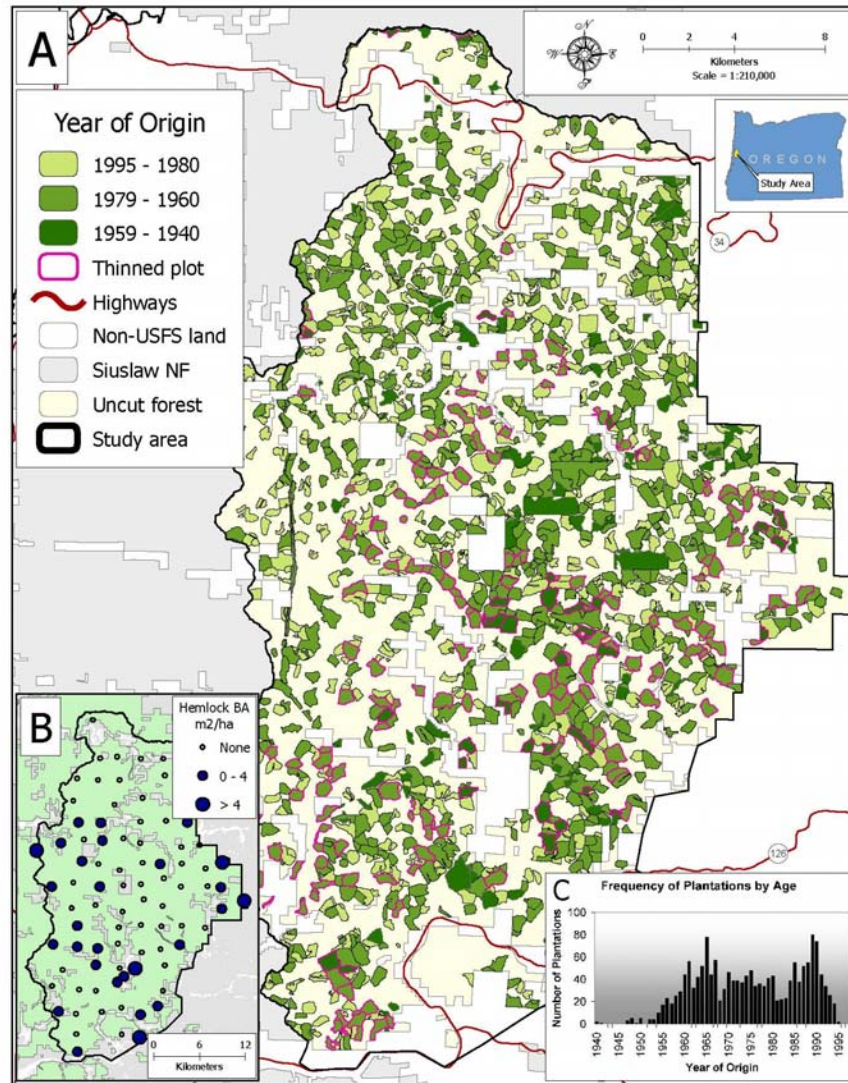


Younger
Forest/
Plantation

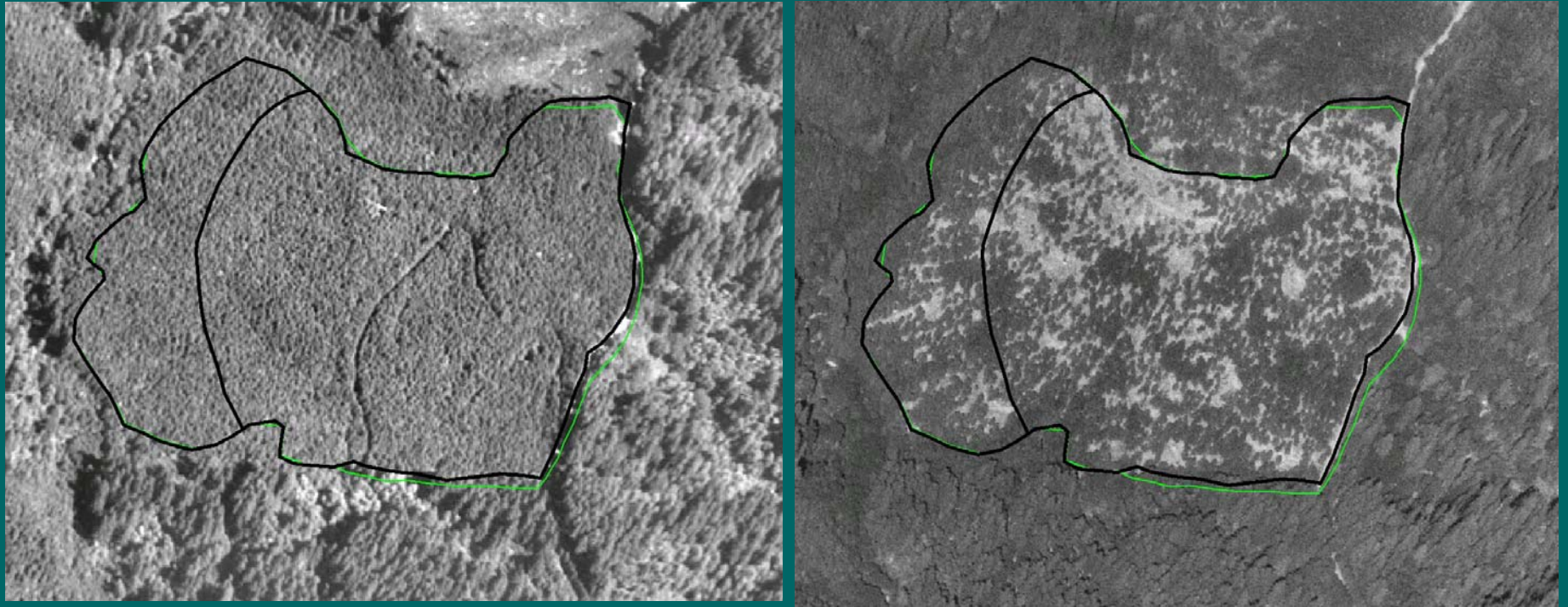
Matrix

Reserve

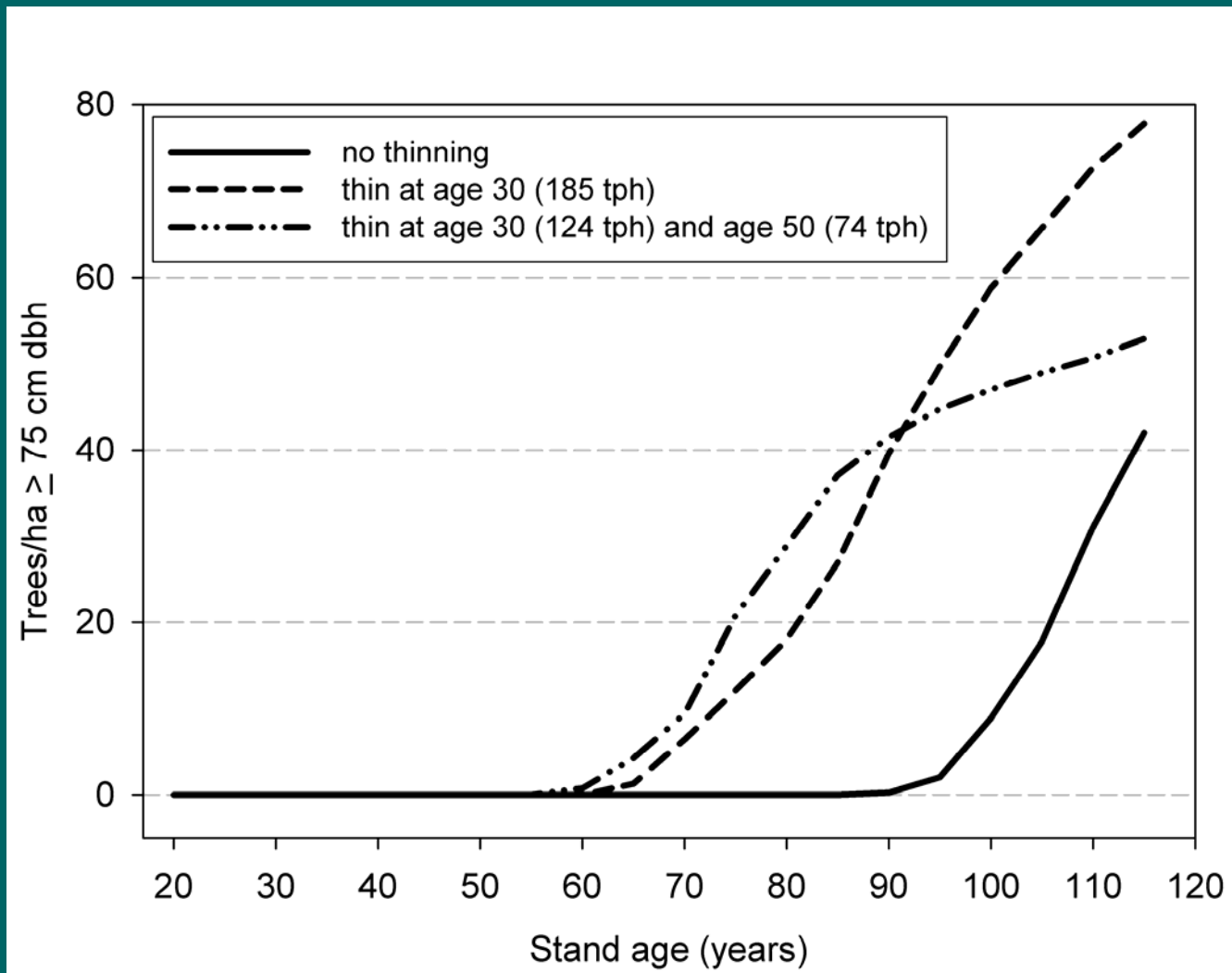
Distribution of Plantations In a Late Successional Reserve in Coastal Oregon



Diversification of young plantations using variable density Thinning



Simulated Effects of Thinning and No Thinning on Density of Large Conifers



Dynamics and Threats

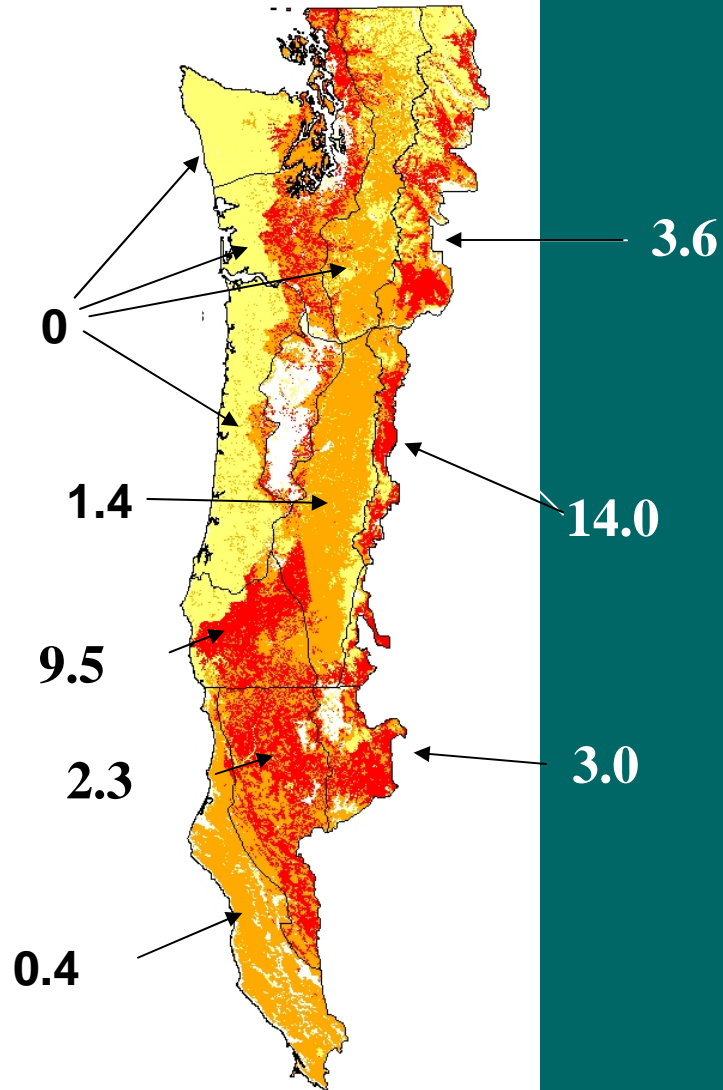
Loss of Old Forest to Wildfire in 10 years

Expectation: 2.5%

Actual: 1.9%



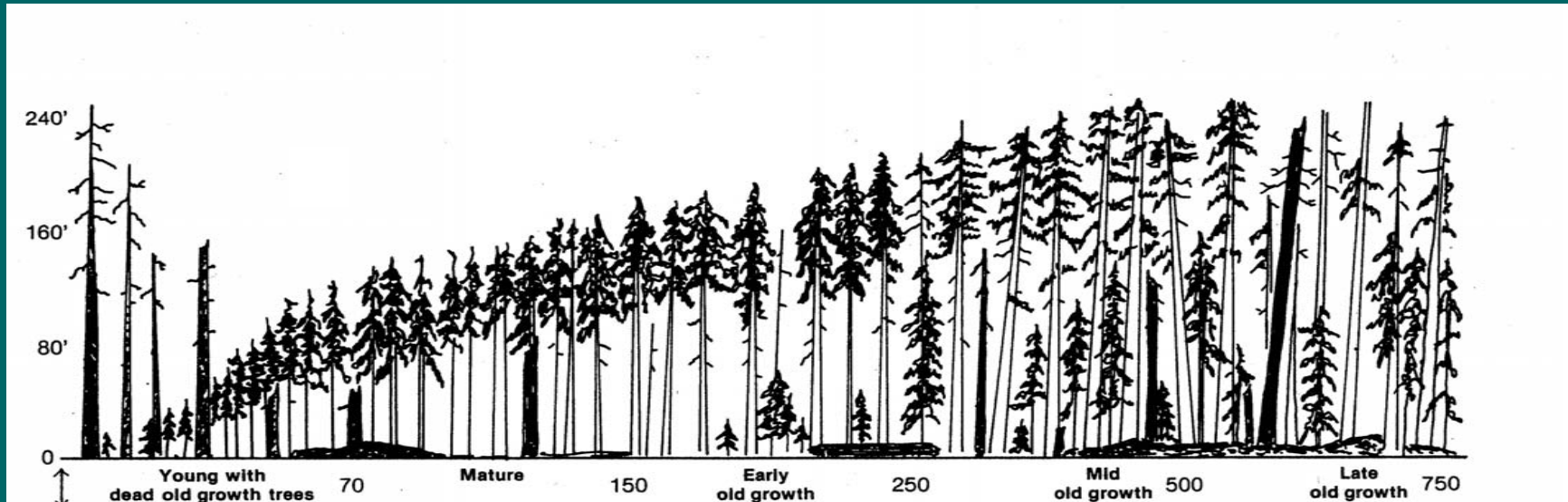
Percent Loss of Older Forest on a Decadal Basis By Province



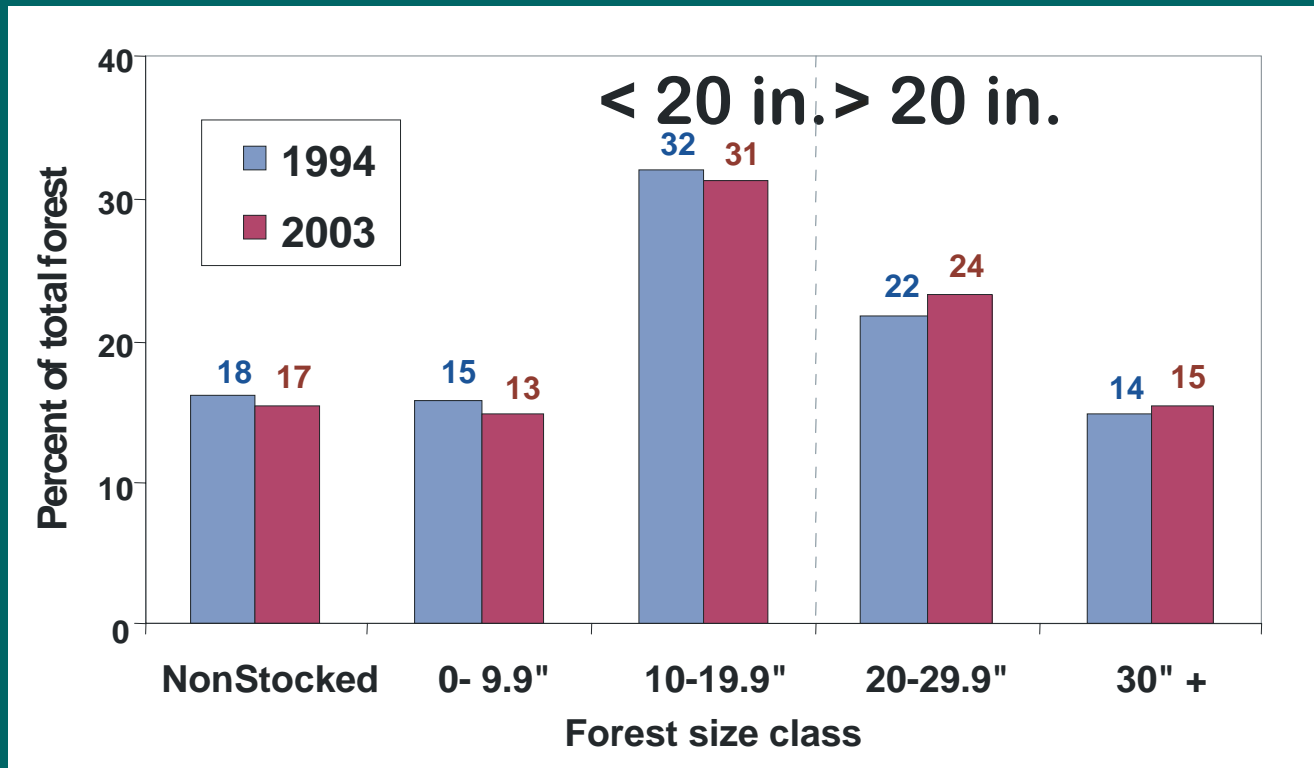
Net Gain in Older Forest in 10 yrs

Expectation: 11%

Actual: 19%



- Much Less Old Forest Logged in Matrix
- Less loss to wildfire than expected
- Size Distribution of All Forests Across Landscape



Climate Change?

➤ Direct effects

- Growth
- Regeneration
- Within Stand Mortality

➤ Indirect effects

- Wildfire
- Insects and disease

Some observations on the Northwest Forest Plan

Some Outcomes and “Surprises”

- Increase in “older” forest in just 10 years
- Losses to wildfire, while large still fell within overall expectation
- Losses to fire high in some areas
- Owl populations declined at higher rate than expected in parts of range
- More timber harvested from reserves than from matrix

The Old-Growth Policy Problem

- A policy that allows old growth logging but does not implement it does not make many stakeholders happy
 - Those who value old growth for non-commodity reasons don't like a federal policy that allows cutting old growth
 - Those who want more revenue from timber on the federal lands are concerned that wood production targets set in the Plan have not been met because old growth has not been cut

Multiple Choice Question:

Current Federal old-growth policies are:

- a) Not working
- b) Working but have significant short comings
- c) Working but need some fine tuning
- d) Protecting old growth from logging but not fire
- e) Not politically sustainable in the longer run because of lack of long-term source of timber revenue
- f) Not ecologically sustainable in the longer run because of lack of strategy to deal with landscape dynamics and climate change

How much do we need?

➤ Species approaches



➤ Historical dynamics approaches



➤ Socio-political approaches



Some alternatives

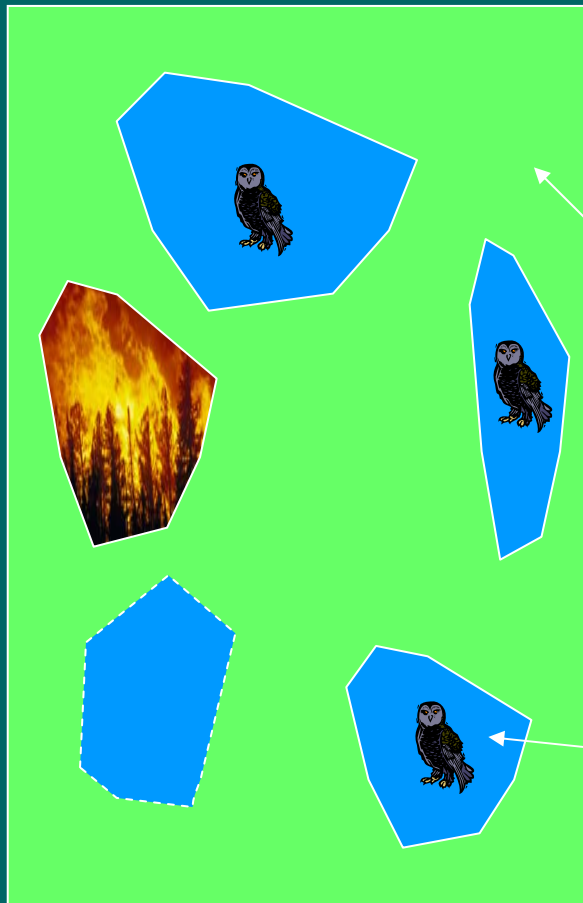
- Stay the course
 - Continued stress
 - Have 30 + years of thinning in plantations
- Redesign the Plan to focus timber production on younger forests and plantations while protecting the remaining old growth
 - Timber production effects?
 - Landscape/biodiversity effects?
 - Need agreement on definition

Alternatives continued

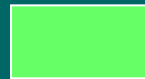
- Incremental/fragmentary changes in federal plans
 - e.g. BLM does own thing
 - Cumulative effects not clear
- Don't break landscape up into reserves and production lands but have a goal for distribution of successional stages that management is moving toward
 - Requires trust
 - Most appropriate for fire-prone landscape
 - Complicated for planning

Alternative Landscape Designs for Maintaining Owl Habitat and Old-growth Diversity in Fire Prone Forests

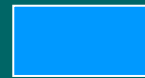
Matrix = Treated forest/Open OG



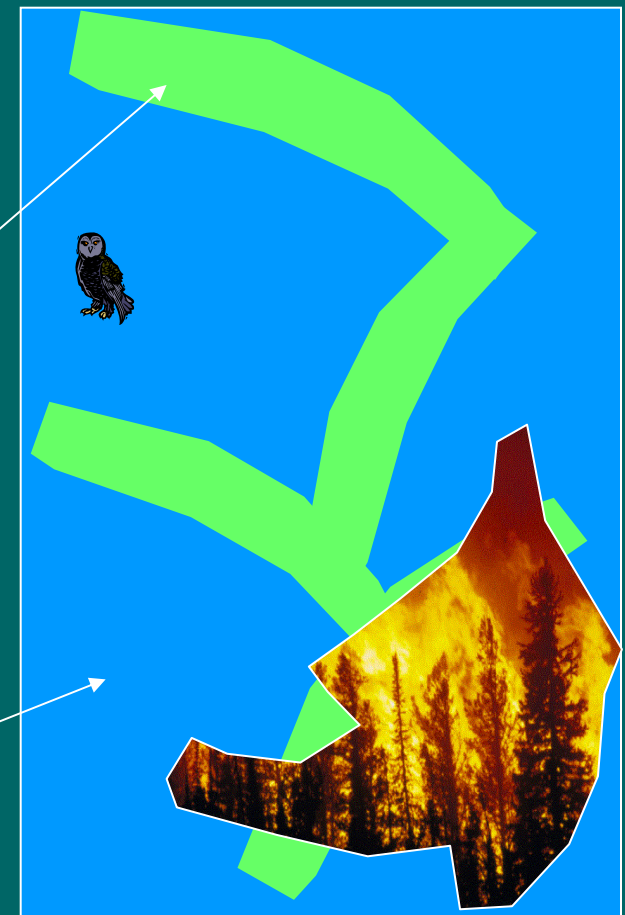
Fuel Treatment
Open Old Growth



Limited or
no fuel Treatment
Dense Old Growth



Matrix = Owl habitat/Dense OG



Conclusions

- Society will never agree on a definition and it will change
- But, managers and policy makers still need definitions to make decisions on the ground
- Old growth has become an icon for social and political reasons resulting in overly simple thinking about its conservation and unintended consequences
- Current federal policies have improved the outlook for conservation of old growth on federal lands relative to the pre 1990's period--BUT

- Plans still call for logging some of the remaining old growth
- But, implementation has largely avoided cutting old growth
- Thus, timber production targets have fallen short
- Restoration efforts in fire-prone old growth forest have fallen short and many acres of old growth there have burned up

Suggestions

- Still need definitions but should be broadly based in science and social perspectives
- Think beyond the old growth icon—conserving biodiversity means recognizing variation, dynamics, scale and other forests in addition to older forests

Suggestions continued

- Rethink Reserves—especially in dry landscapes
- Think across landscapes including non-federal lands
- Rethink economics—ecosystem goods and services
- Reinvigorate adaptive management to adapt to change



How much older forest (>100 years) did we have in the NWFP
Region before Euroamerican settlement?

All ownerships: 56 million acres

Assume stand replacement fires every 150 to 300 years

50 to 75% of that was forest with older trees (~>100 years)
28 million to 42 million acres

Today: 12.2 million acres of ML older forest

Approximately 29 to 43 percent left