Northwest Forest Plan

Interagency Regional Monitoring Program

Status and Trends of Late-successional and Old-growth Forests

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Questions

How effective is the Northwest Forest Plan in reaching desired amounts and distributions of older forests on federal lands?

1. **The amount and distribution of older forest**

2. **The spatial arrangement of older forest stands, interior areas, edges, and distance between stands**

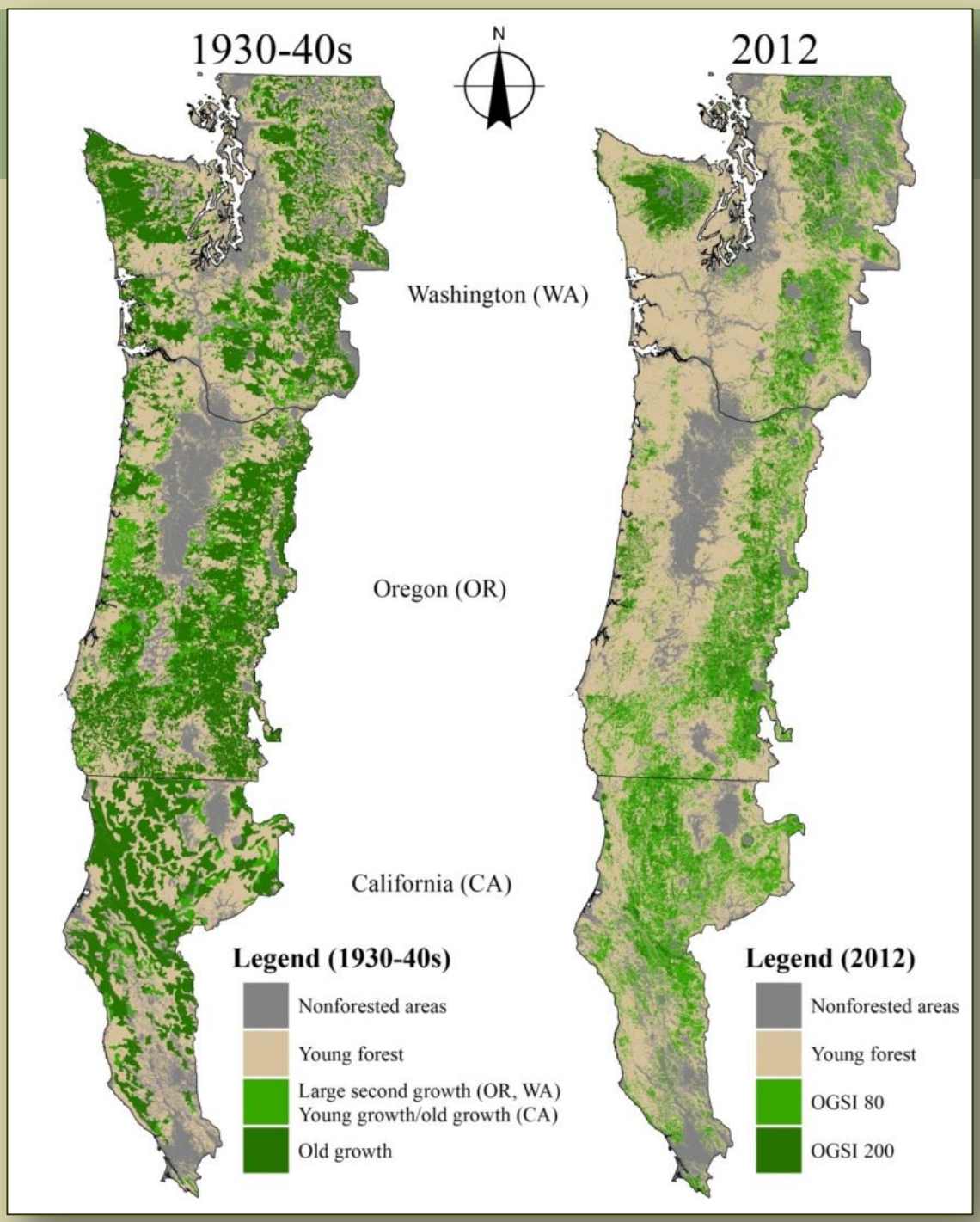
3. **Changes as a result of forest disturbances and ingrowth since 1994**

Approach

- **Thematic Mapper (TM) Satellite Imagery**
- **Forest inventory plots**
- **Integration of imagery and plots with statistical software (GNN and LandTrendr)**
- **Accuracy assessment**

Then

Now


1930-40s
N
2012
Washington (WA)
Oregon (OR)
California (CA)
Legend (1930-40s)
Nonforested areas
Young forest
Large second growth (OR, WA)
Young growth/old growth (CA)
Old growth
Legend (2012)
Nonforested areas
Young forest
OGSI 80
OGSI 200

Outline

- **Old growth definitions: A new approach**
  - **Before: LS or OG--Yes or No**
  - **New: Old growth as a continuum**
- **Answers to the big questions: area, change, harvest, fire**
- **Spatial patterns: connectivity, disturbance, recruitment**
- **Expectations**

BROAD FOREST VEGETATION ZONES

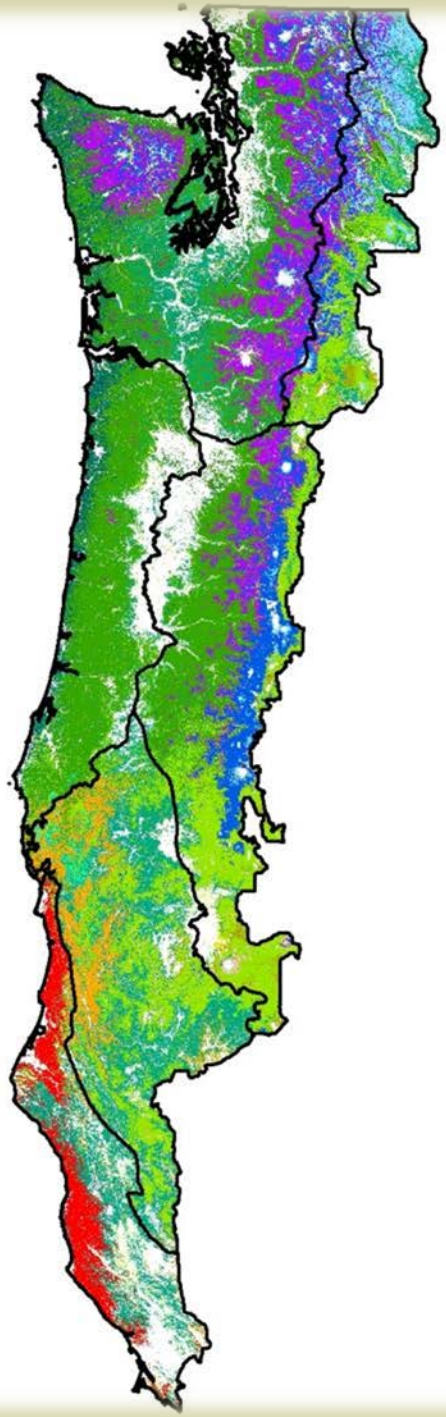
N
W E
S

Legend

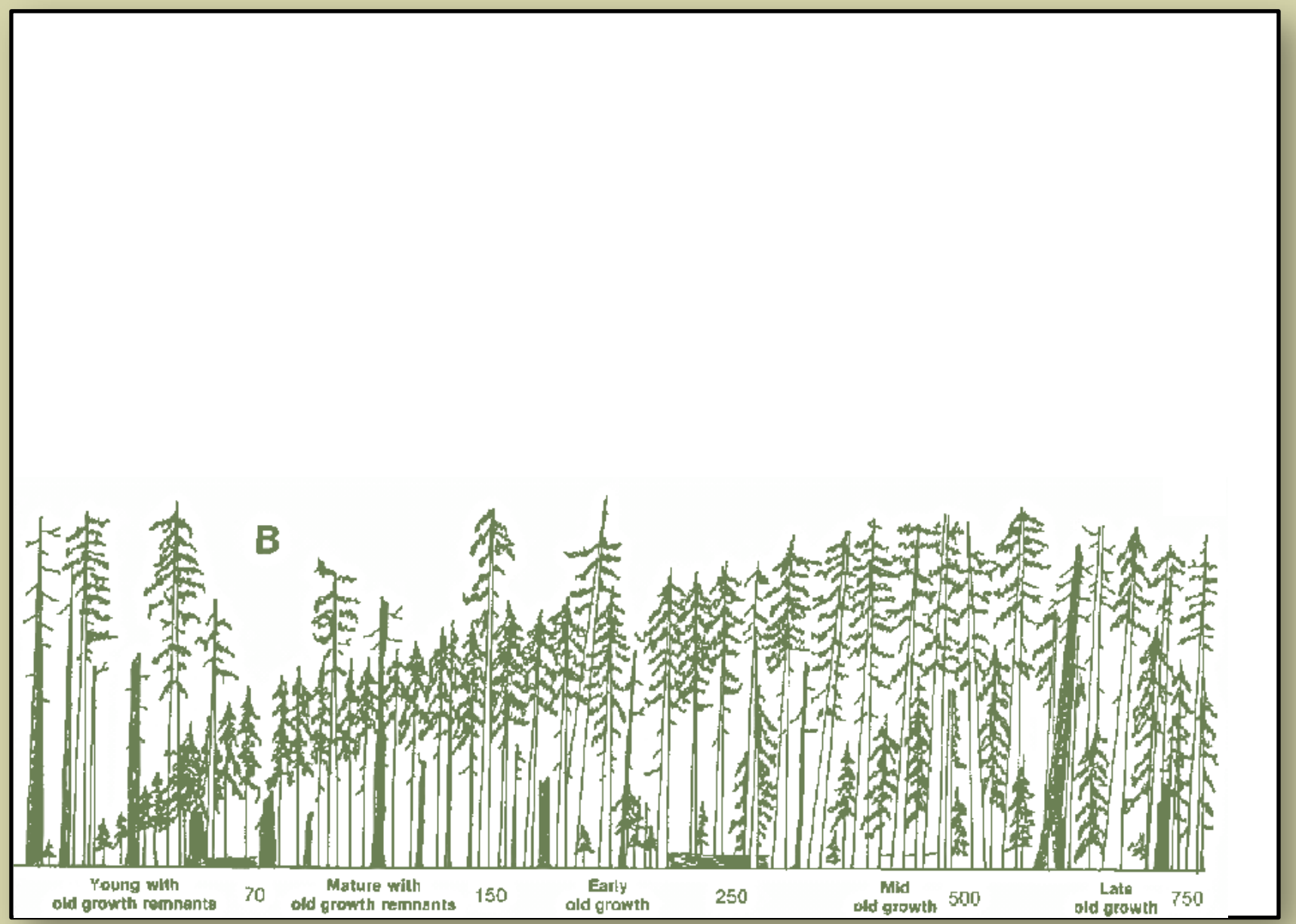
GNN MODEL REGIONS

VEGZONE

- DOUGLAS-FIR
- GRAND/WHITE FIR
- JUNIPER
- LODGEPOLE
- MOUNTAIN HEMLOCK
- OAK WOODLAND
- OTHER PINE
- PONDEROSA PINE
- PORT ORFORD CEDAR
- REDWOOD
- RIPARIAN HARDWOOD
- SHASTA RED FIR
- SILVER FIR
- SITKA SPRUCE
- SUBALPINE
- TANOAK
- WESTERN HEMLOCK
- WESTERN REDCEDAR



Spies and Franklin. 1988. Old growth and forest dynamics in the Douglas-fir region of western Oregon and Washington. Natural Areas Journal. 8: 190-201.



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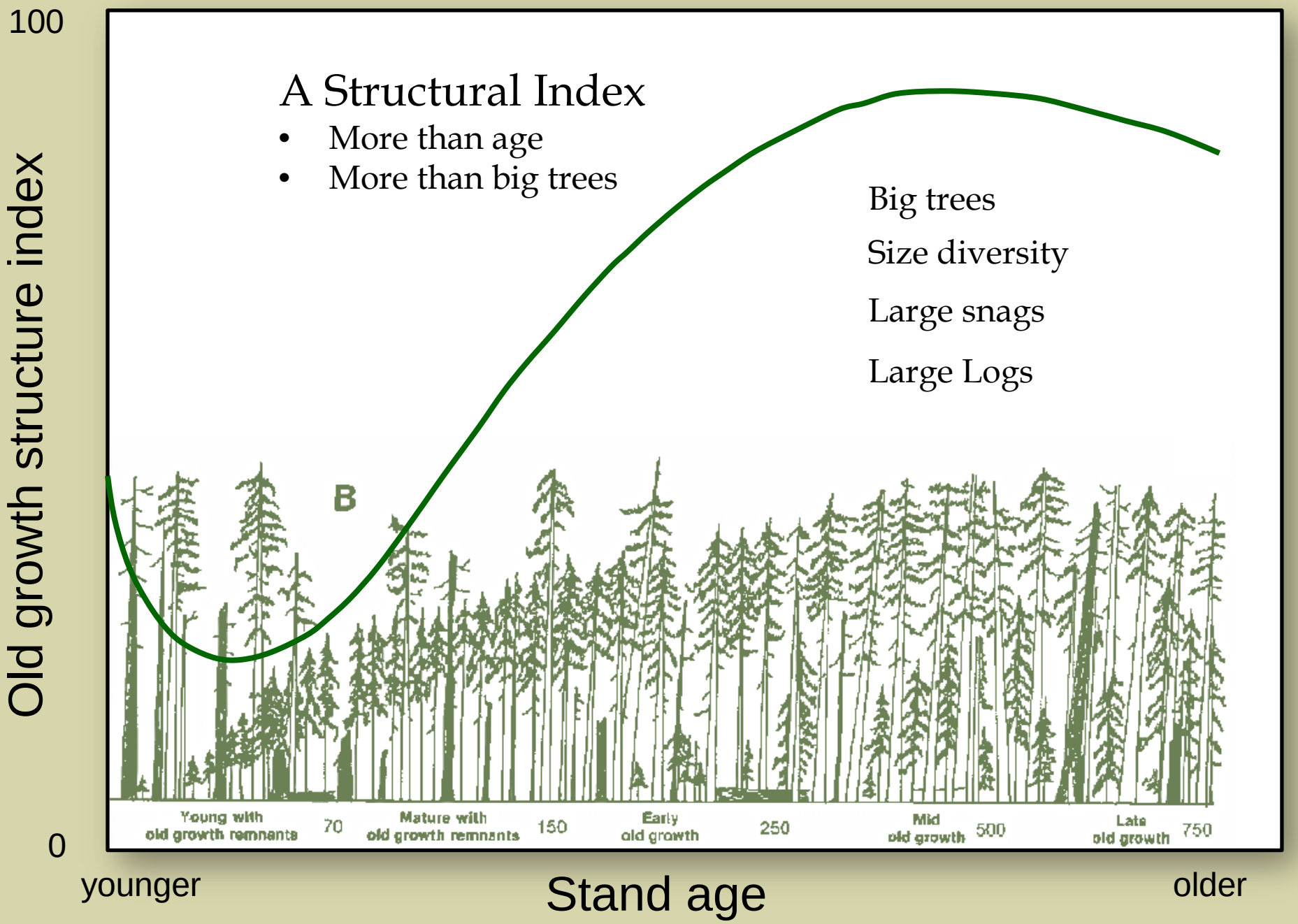
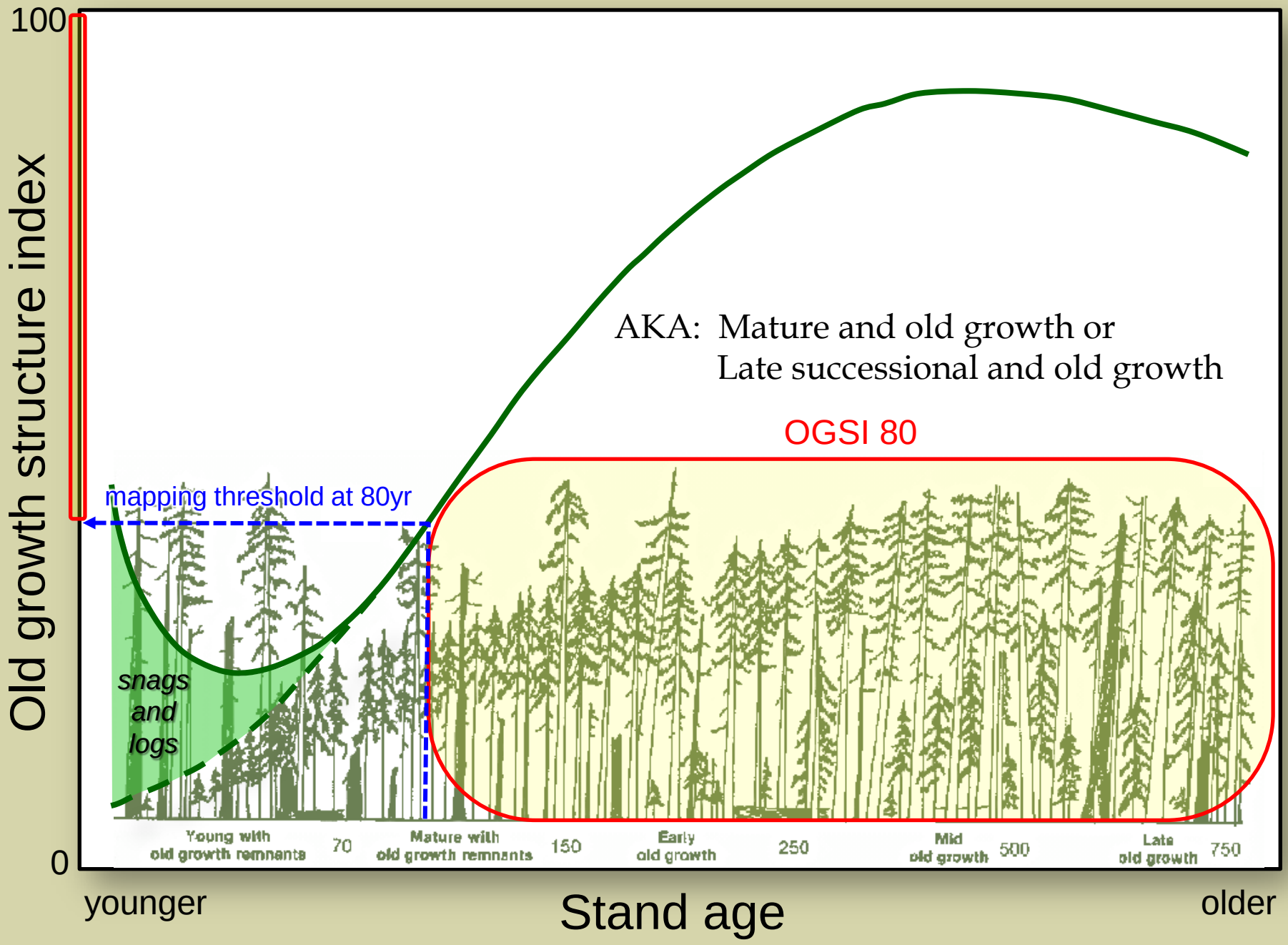
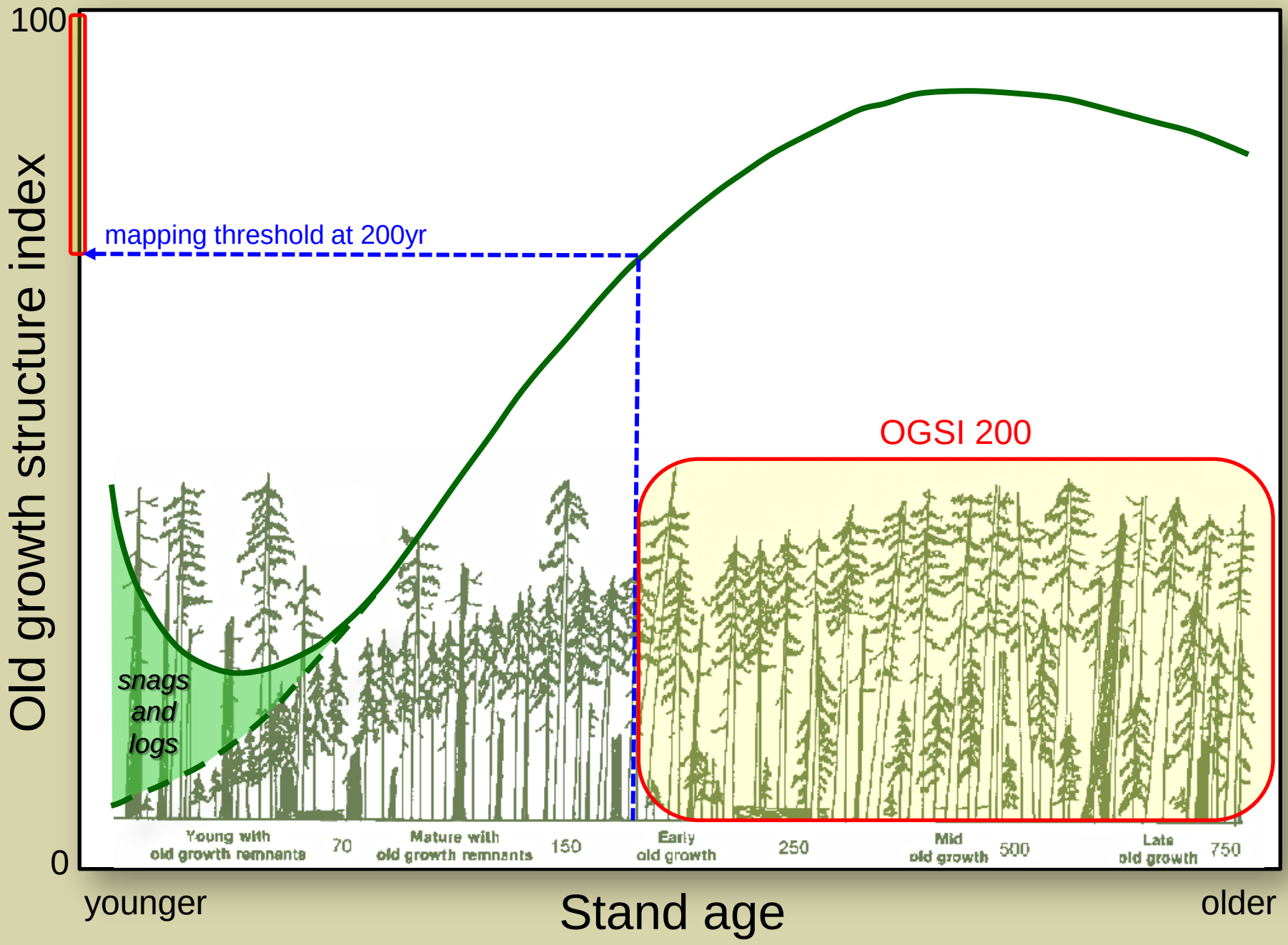



100
0
Old growth structure index
younger
Stand age
older
AKA: Mature and old growth or
Late successional and old growth
OGSI 80
mapping threshold at 80yr
snags
and
logs
Young with
old growth remnants
70
Mature with
old growth remnants
150
Early
old growth
250
Mid
old growth
500
Late
old growth
750


100
0
Old growth structure index
mapping threshold at 200yr
OGSI 200
snags
and
logs
Young with
old growth remnants
70
Mature with
old growth remnants
150
Early
old growth
250
Mid
old growth
500
Late
old growth
750
younger
Stand age
older

Major Questions

- **How much old growth?**
- **What are recent trends in amounts over 20 years?**
- **What explains the trends? (e.g. fire, logging, succession)**
- **Do trends match expectations?**

Answers to Major Questions

- **How much late-successional and old growth in 2012?**
  - **$OGSI_{80}$: 12.2 million acres (52% of federal forest land)**
  - **$OGSI_{200}$: 6.3 million acres (27%)**

- **What are trends in amounts over 20 years?**
  - **$OGSI_{80}$: -2.9% net change; -6.0% losses only**
  - **$OGSI_{200}$: -2.8% net change; -7.6% losses only**

Answers to Major Questions

- **What explains the trends? (e.g. fire, harvest, succession)**
  - **$OGSI_{80}$ Loss: 19.5% from harvest; 69.5% from fire**
  - **$OGSI_{200}$ Loss: 16.8% from harvest; 71.0% from fire**
  - **Losses from insects and disease—minor overall**

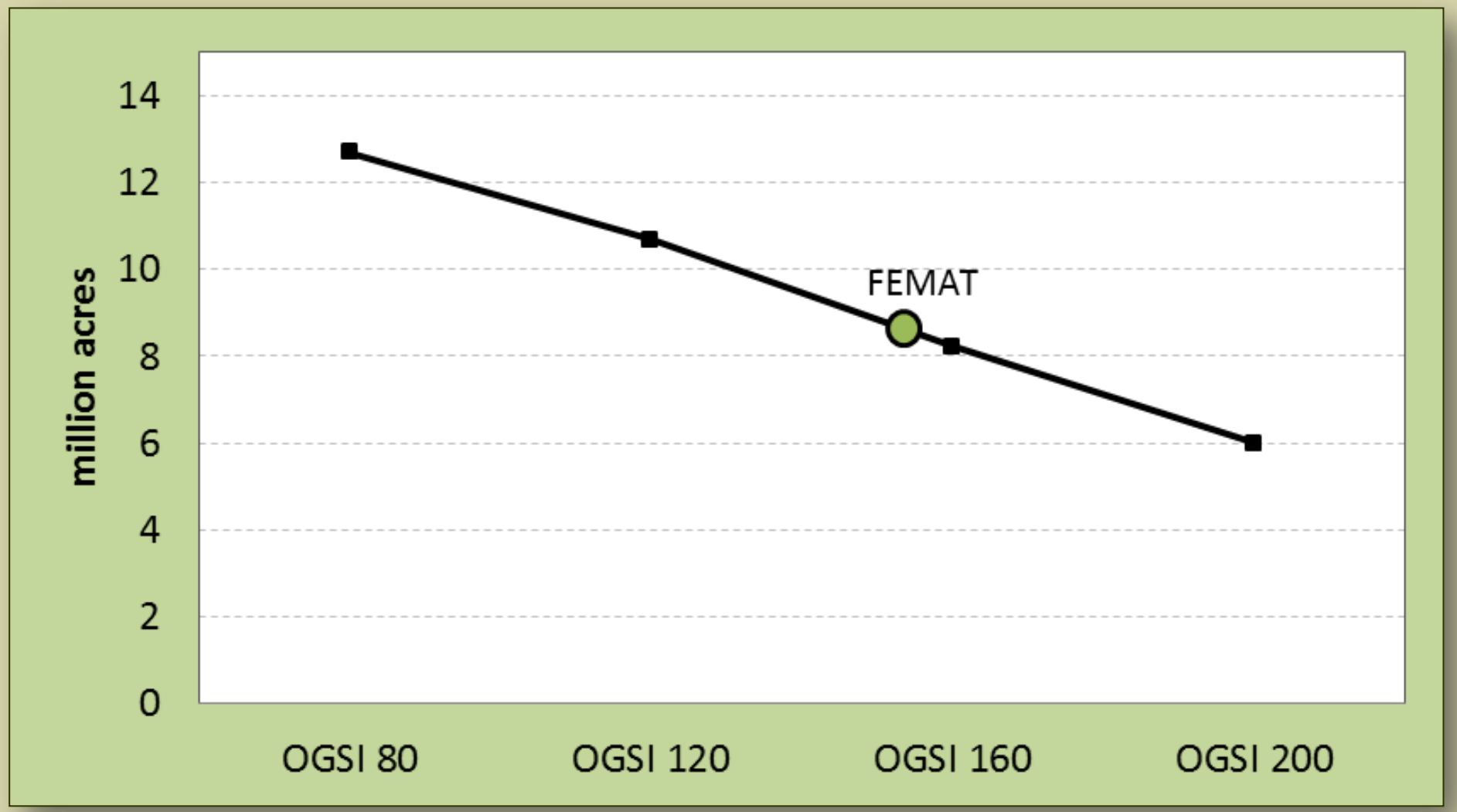
- **Losses from wildfire exceeded 5% in some provinces**
  - **WA Eastern Cascades = 5.5 − 7.1% ($OGSI_{80}$, $OGSI_{200}$)**
  - **OR Klamath = 12.2 − 14.3%**
  - **CA Klamath = 8.1 − 13.1%**

Answers to Major Questions

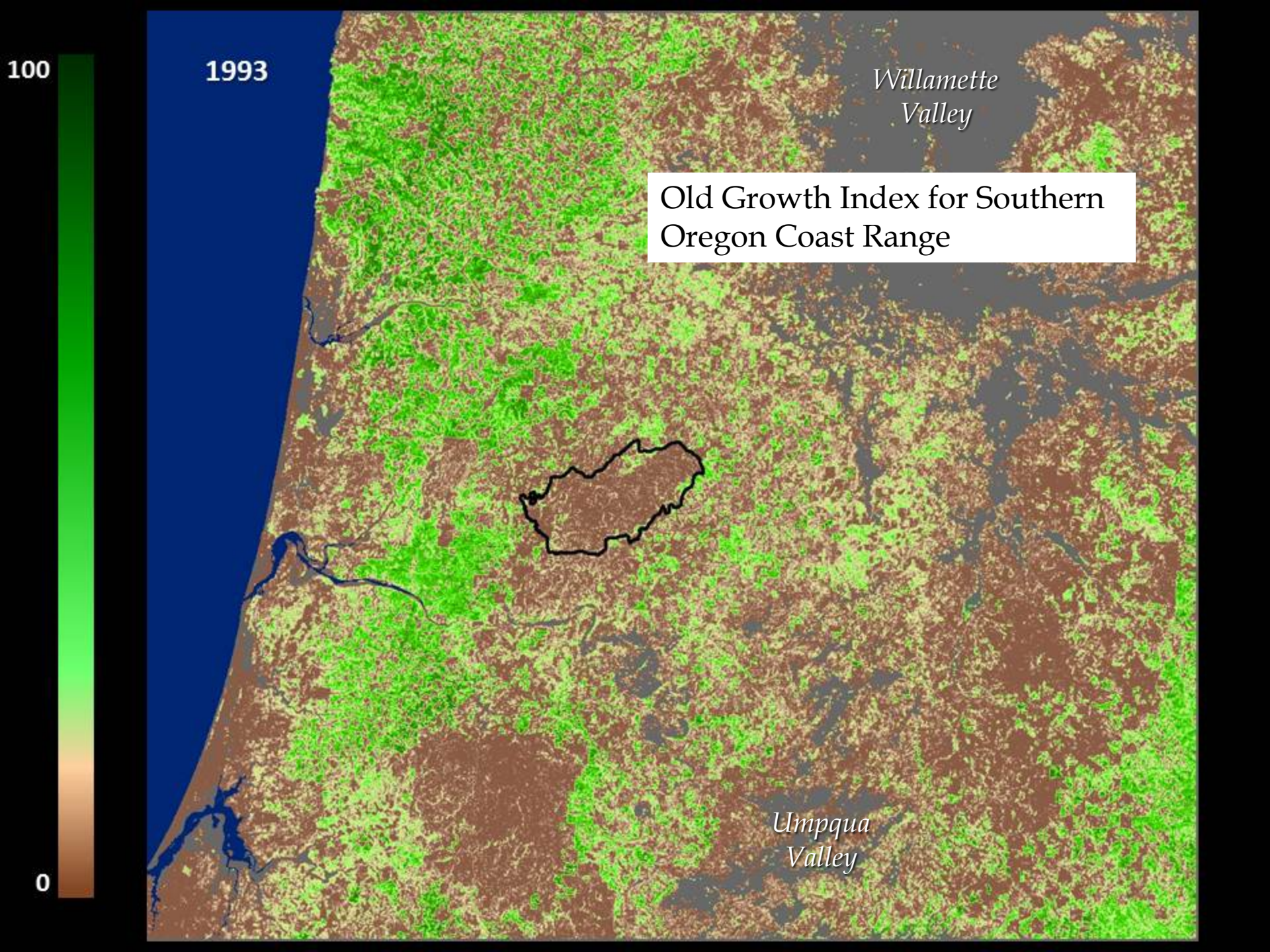
- **Achievment of Plan's outcomes has not yet been realized**
  - **Abundance and diversity decreased by 1 − 4 %**
  - **Connectivity decreased by 1 − 2%**

- **Do trends match expectations from 1993?**
  - **Losses from fire about what was expected at *regional scale***
  - **Losses from harvest *much less* than expected**

Amount of “old growth” depends on definition



Old forest on federally managed lands in 1993


100
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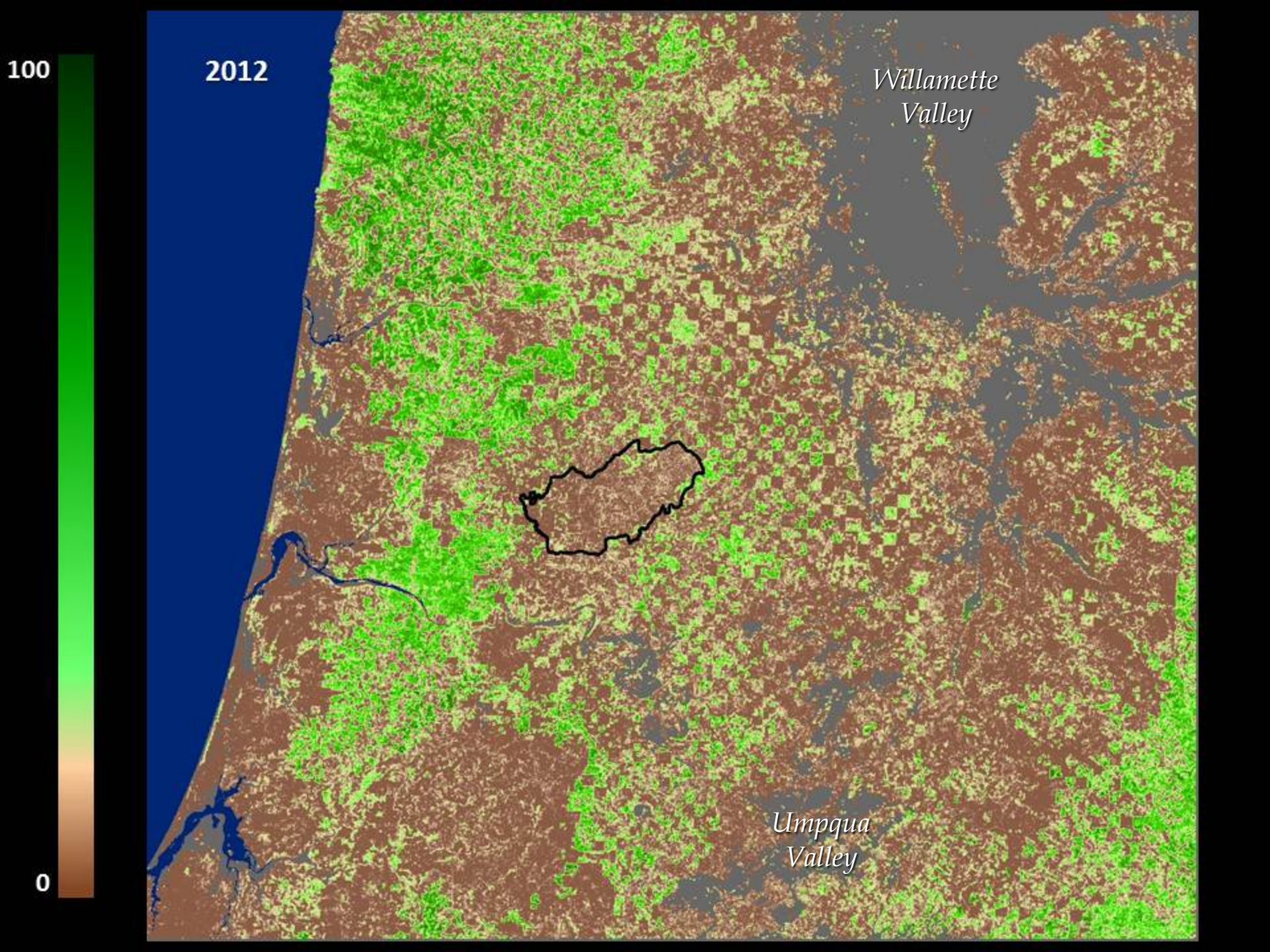
1993
Willamette Valley
Old Growth Index for Southern Oregon Coast Range
Umpqua Valley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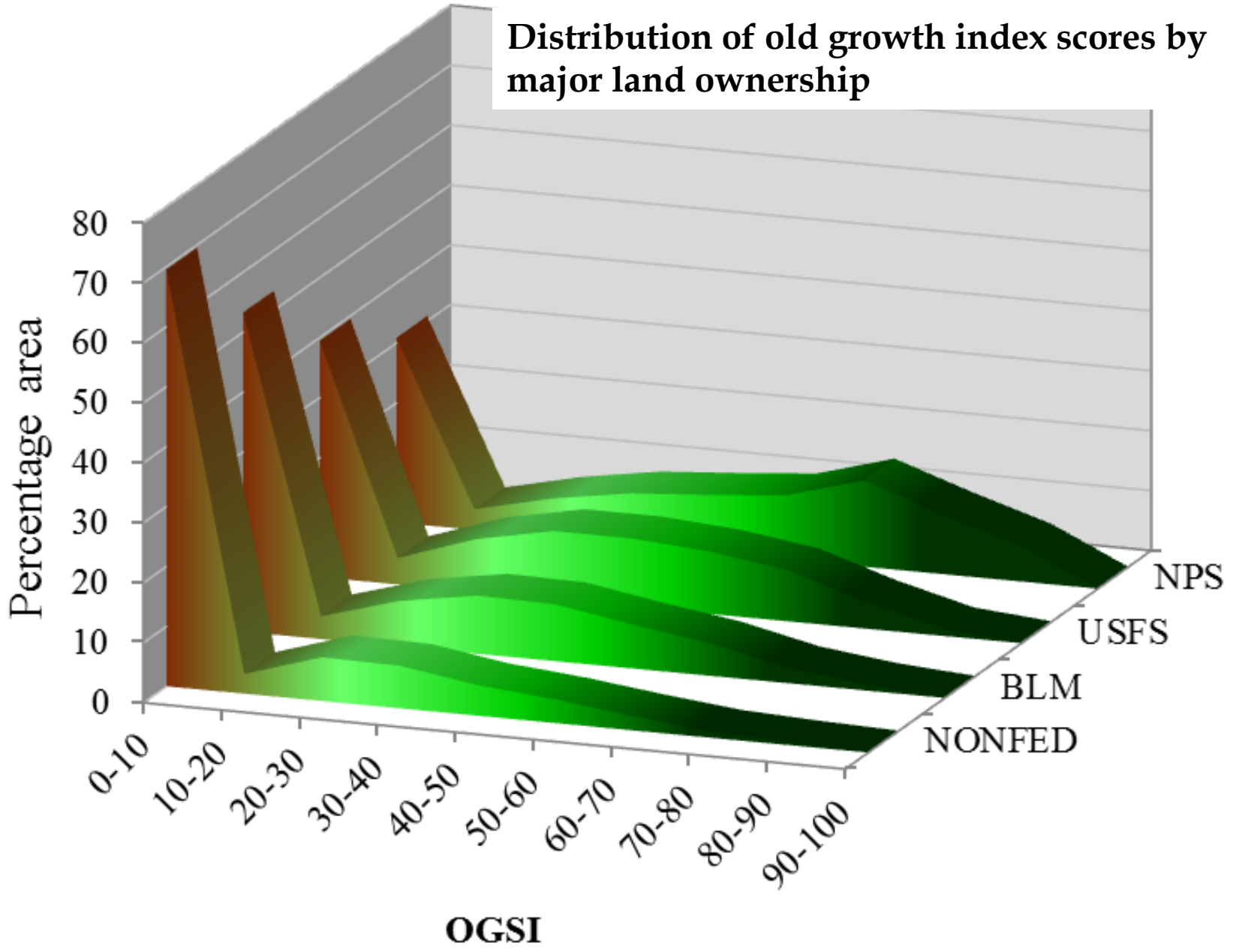
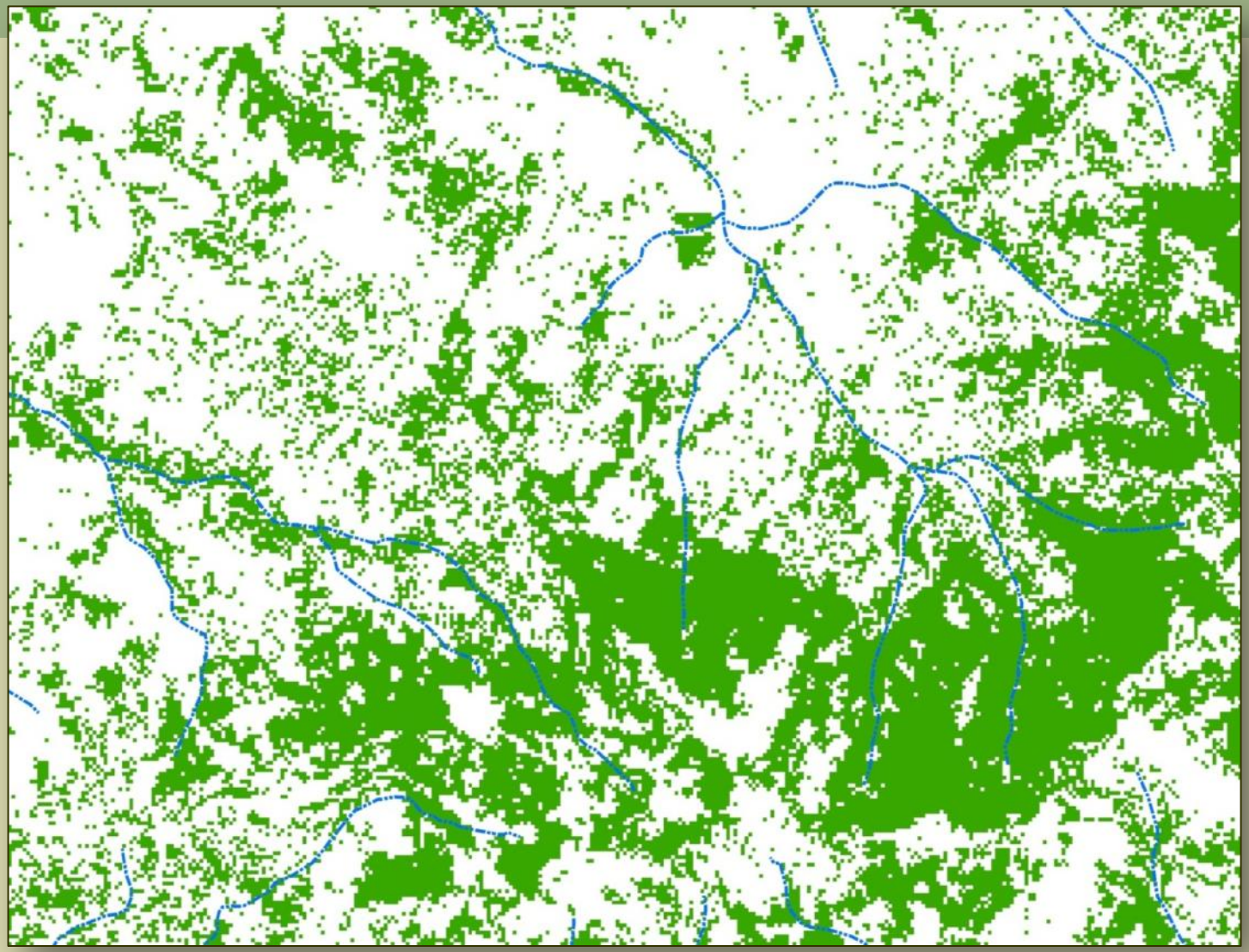
2012
Willamette Valley
Umpqua Valley

Distribution of old growth index scores by major land ownership



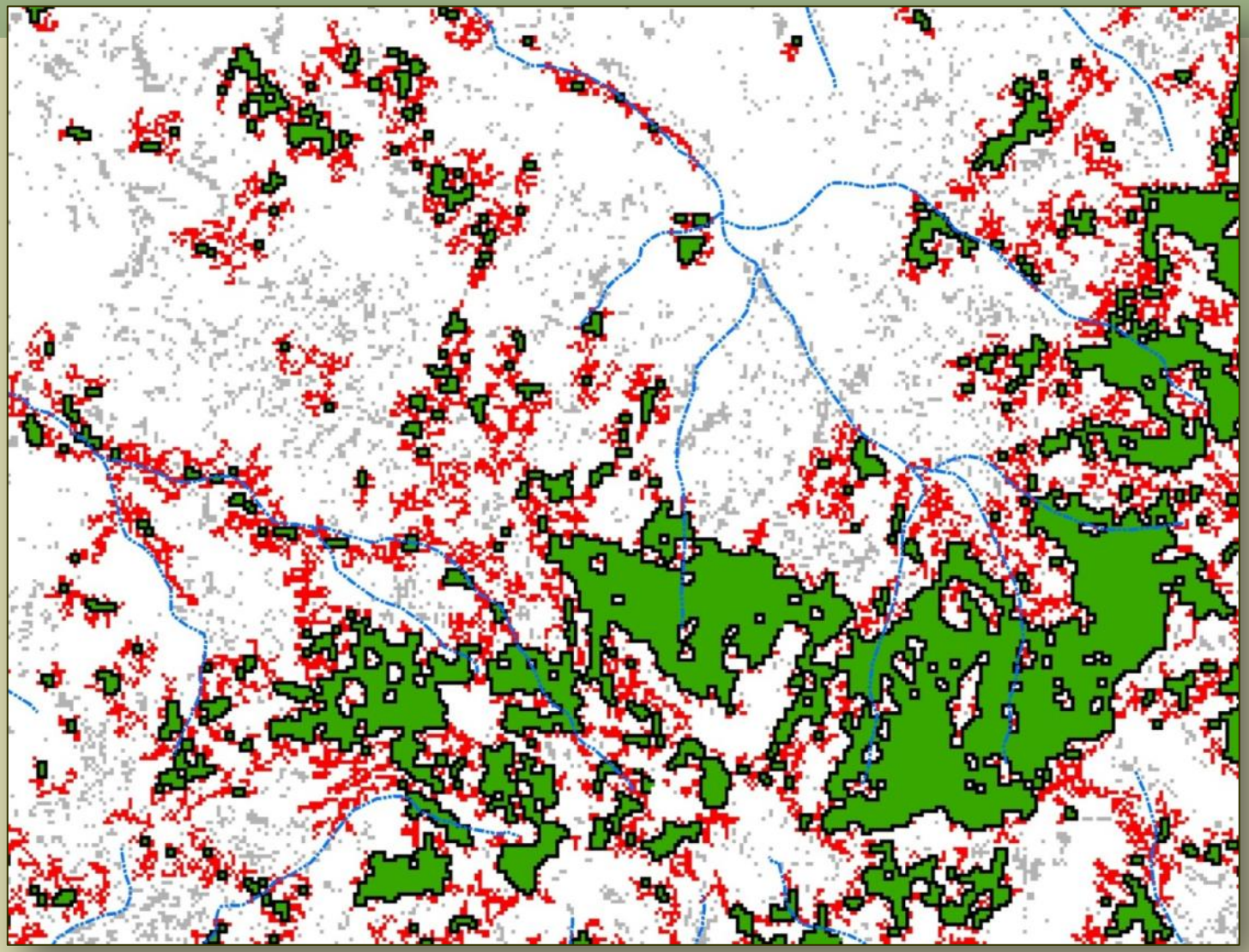
Spatial Patterns

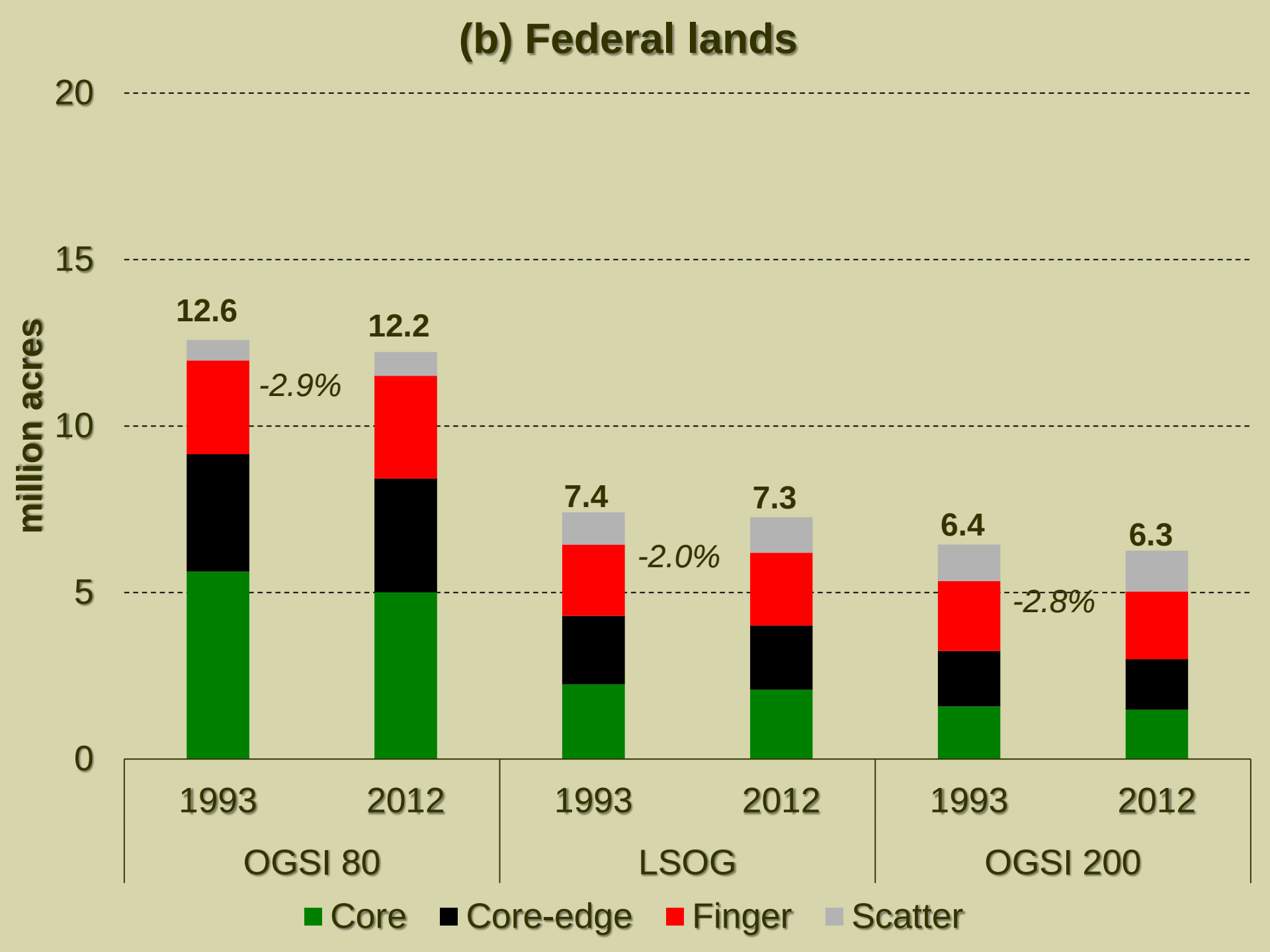


Old Forest

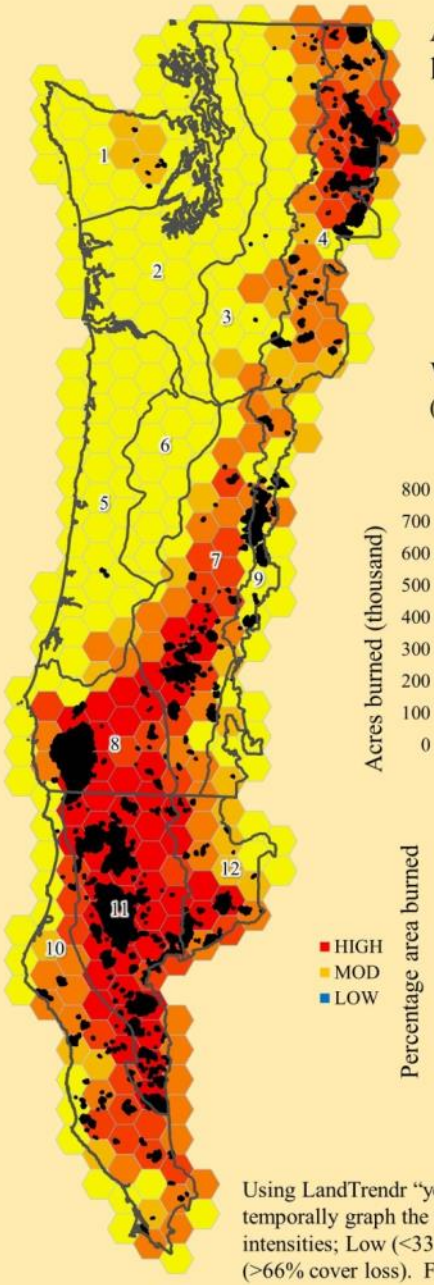
Streams

Spatial Patterns




(b) Federal lands
20
15
10
5
0
million acres
12.6
12.2
-2.9%
7.4
7.3
-2.0%
6.4
6.3
-2.8%
1993
2012
1993
2012
1993
2012
OGSI 80
LSOG
OGSI 200
Core
Core-edge
Finger
Scatter

Wildfires within the Northwest Forest Plan Area

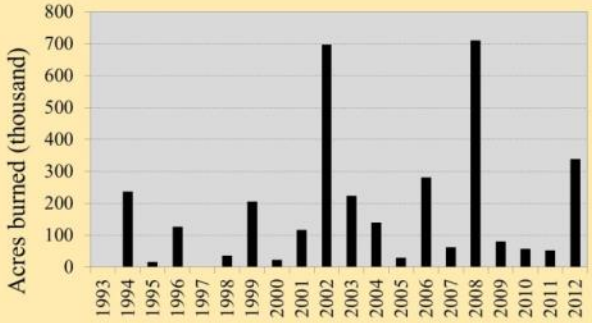


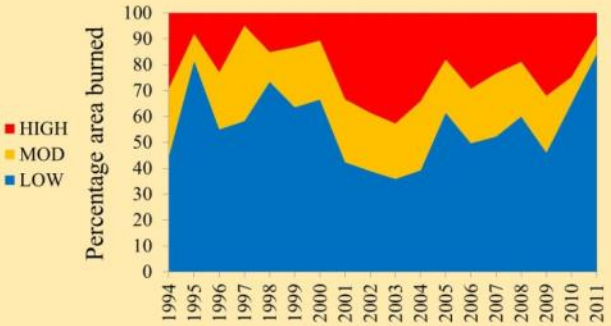
Area prone to large wildfires
Percent area
<1%
1-5%
5-25%
25-50%
>50%

Wildfires ≥100ac
(1993-2012)
Wildfire

Physiographic Provinces

1 - Olympic Peninsula (WA)
2 - Western Lowlands (WA)
3 - Western Cascades (WA)
4 - Eastern Cascades (WA)
5 - Coast Range (OR)
6 - Willamette Valley (OR)
7 - Western Cascades (OR)
8 - Klamath (OR)
9 - Eastern Cascades (OR)
10 - Coast Range (CA)
11 - Klamath (CA)
12 - Cascades (CA)

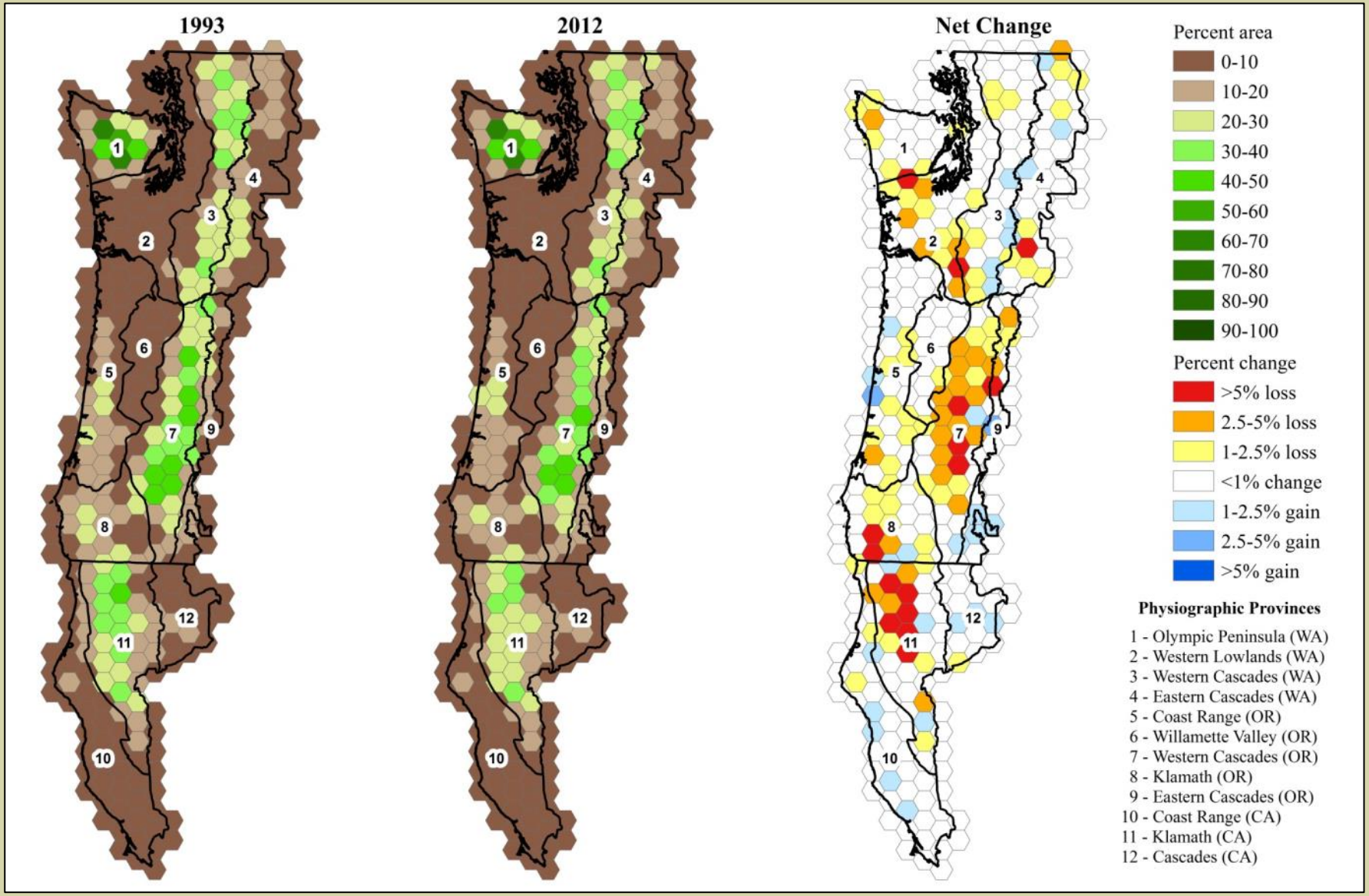




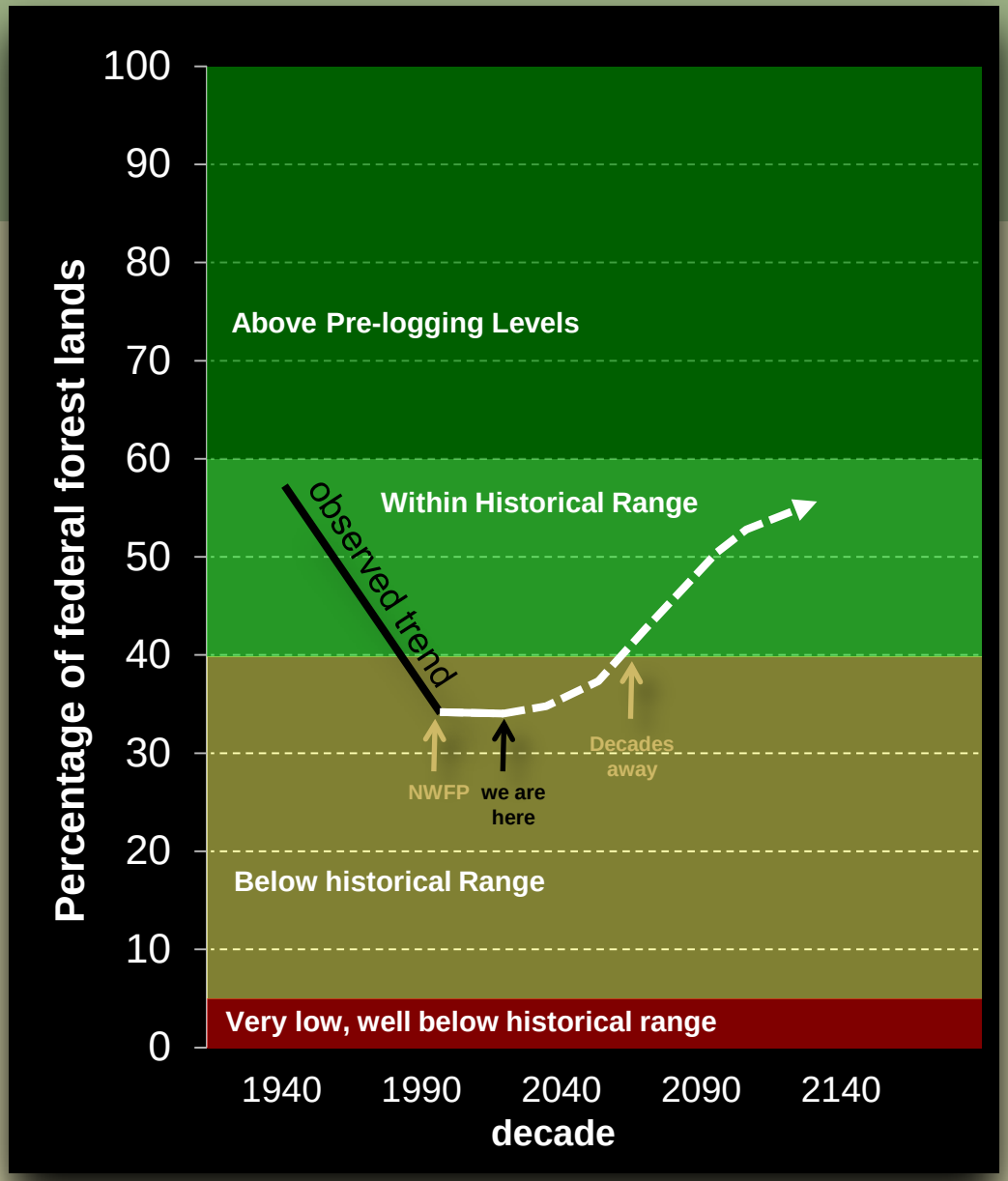
Using LandTrendr "year of disturbance" and "magnitude" we were able to temporally graph the proportion of forested areas that burned at three different intensities; Low (<33% cover loss), Moderate (33-66% cover loss), and High (>66% cover loss). Fires of 2012 were not included as they were not yet detected.

Pattern of Old Growth Change 1993-2012

(OGSI 200)



Historical and Expected (FEMAT) Amount of Old Forests on Federal Land



Summary
Monitoring Methods

- **New, flexible approach to defining and mapping old forests**
- **Area of old growth depends on definition—can use different definitions**
- ***More than old growth--all* stages of forest development**
- **New approaches to change detection—trends mapping**

Summary
What Have We Learned?

- **Old forests on federal lands are still declining, but at a much lower rate than before the NWFP.**
- **Wildfire the major cause for losses on federal lands; loss from harvest less than expected**
- **Overall wildfire losses about what was expected but losses are a concern in some physiographic provinces**
- **Evidence of recruitment of old forest in some areas**
- **Reaching original Plan outcomes will require decades**

Acknowledgements

- Justin Braaten (OSU)
- Daniel Donato (WA DNR)
- Andrew Merschel (OSU)
- Vicente Monleon (USFS PNW)
- Rob Pabst (OSU)
- Matt Reilly (OSU)
- Mike Simpson (USFS)
- Andrew Yost (ODF)
- Harold Zald (OSU)
- Miles Hemstrom (INR)
- Ashley Steele (USFS PNW)
- Becky Gravenmier (USFS PNW)

Questions?