NORTHERN SPOTTED OWL EFFECTIVENESS MONITORING UNDER THE NORTHWEST FOREST PLAN

Population Trend

Predictive models

Owl Movement

Lambda$_{RJS}$

Habitat Suitability

Survival

Number of owls banded

Reproduction

Habitat Change

OVERVIEW of FINDINGS

Spotted Owl Effectiveness Monitoring Goal

- Evaluate the success of the NWFP in:
  - arresting the downward trend in spotted owl populations

and

  - maintaining and restoring habitat conditions to support viable spotted owl populations on federal lands

Spotted Owl Effectiveness Monitoring Objectives

1. Assess changes in population trend and demographic performance on federal forest lands.

2. Assess changes in the amount and distribution of nesting, roosting, foraging habitat, and dispersal habitat on federal forest lands.

THE MONITORING REPORT

- Provides estimates of:

  - **Survival, reproductive output and annual rate of population change for each demographic study area, and range-wide, through meta-analysis.**

  - **Habitat conditions on habitat-capable acres and changes in those conditions.**

The Monitoring Report

- **Also includes information on:**
  - **Owl Movement**
  - **Barred owls**
  - **Predictive modeling**

Owl Population Status and Trend

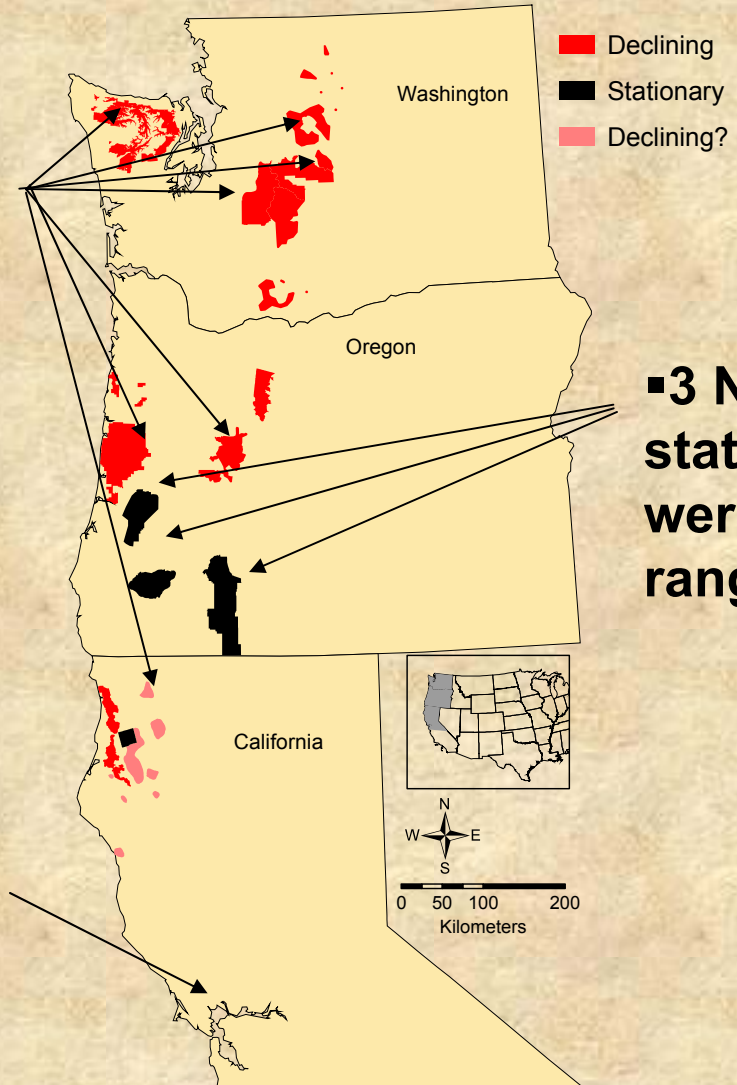
Summary chapter on the report by Anthony et al. 2004 on the status and trend in demography of northern spotted owls, 1985-2003

Population Findings

NWFP Perspective

11 of 14 study areas included NWFP-managed lands

- **7 NWFP study areas showed declines – 6 of these were in north half of range**



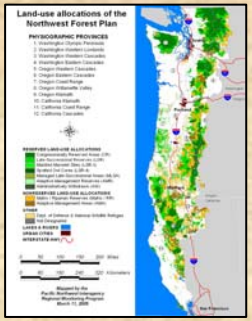
- **3 NWFP study areas had stationary populations – all were in the south half of the range**

Marin: no population change estimate due to insufficient years of data

Owl Habitat Status and Trends

- Establish a range-wide baseline of habitat conditions
- Using both spatial and non-spatial methods
- To examine changes over time on federal lands (USFS, BLM and NPS)

A Step-Down Approach



Federal acres covered by the NWFP
(federal acres)

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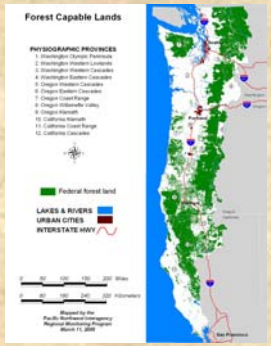

Capable of growing forests
(forest capable)

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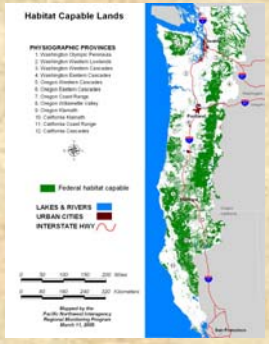


Capable of producing habitat
(habitat capable)

HABITAT CONDITIONS REPORTED FOR:

Three spatial scales

Physiographic Province ⇨ State ⇨ Range

Land-use allocations (LUAs)

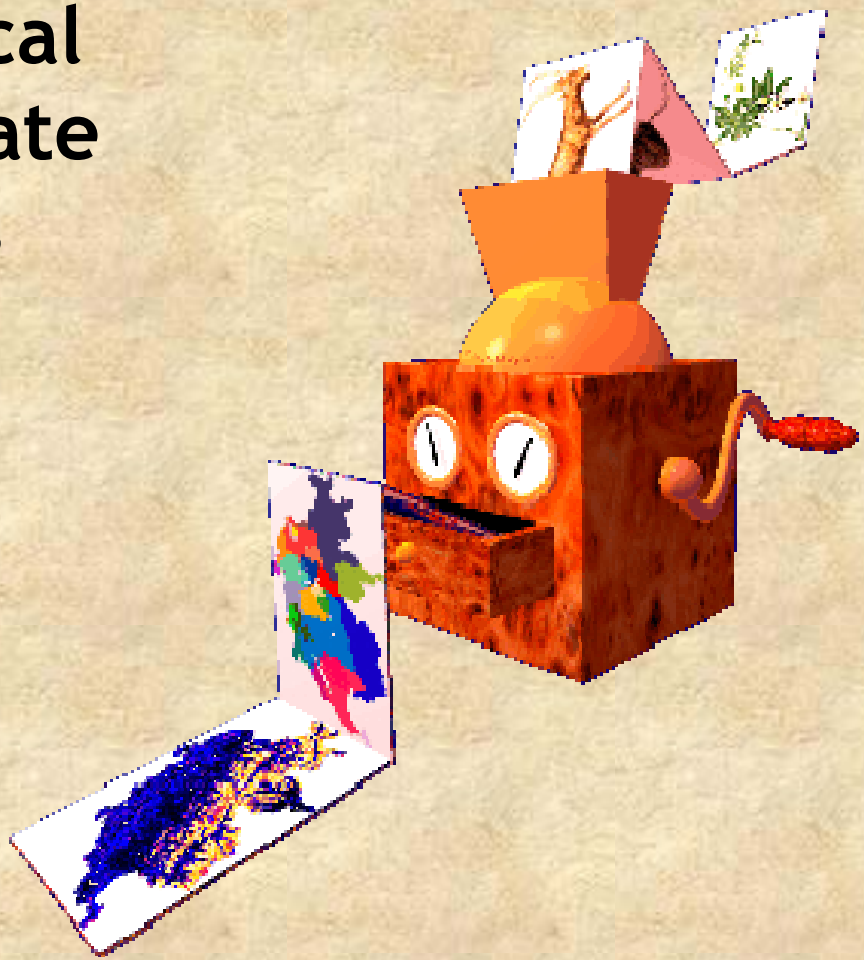
CR, LSR, Matrix, AMA, etc.

Inside and outside of large reserve blocks

BIOMAPPER SOFTWARE

Developed by Drs. Alexandre Hirzel, Jaques Hausser, and Nicolas Perrin
Department of Ecology and Evolution, University of Lausanne, Lausanne,Switzerland

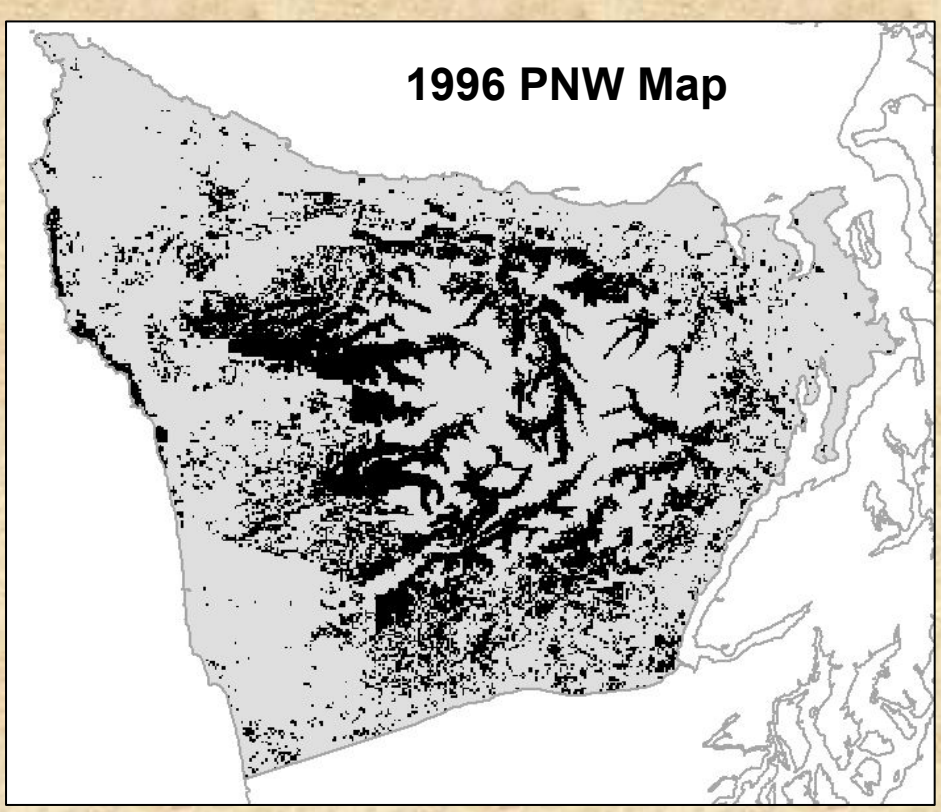
- **A kit of GIS and statistical tools to build and validate habitat suitability maps**
- **Uses species presence data to calibrate model**
- **Habitat Suitability ≈ Habitat Similarity**

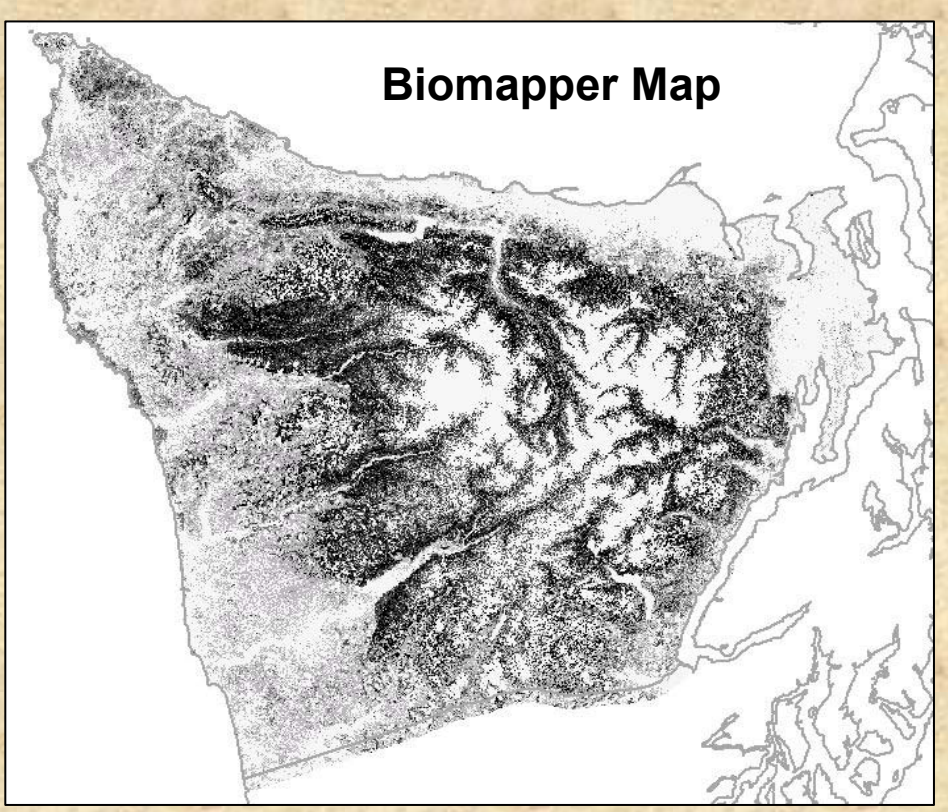


http://www.unil.ch/biomapper

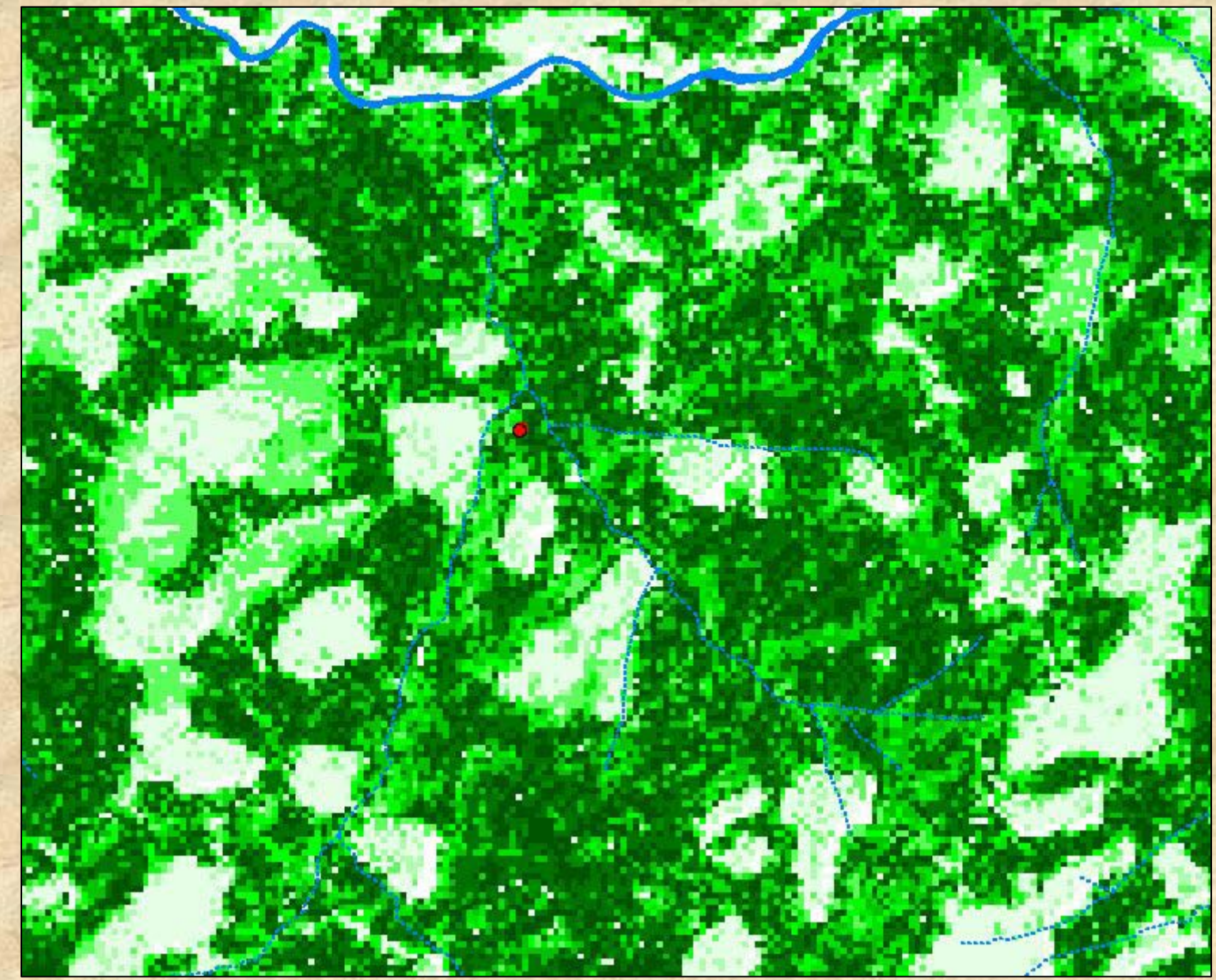
A Different View of Owl Habitat

Discrete Category Maps	Ambiguous Category Maps
Absolute thresholds, Boolean (yes or no)	Gradients of similarity, graded (0-1 scale)
Habitat = QMD ≥20” and CC ≥70%	Habitat = Range from 0-100% similarity
Only black and white	Shows entire spectrum of conditions





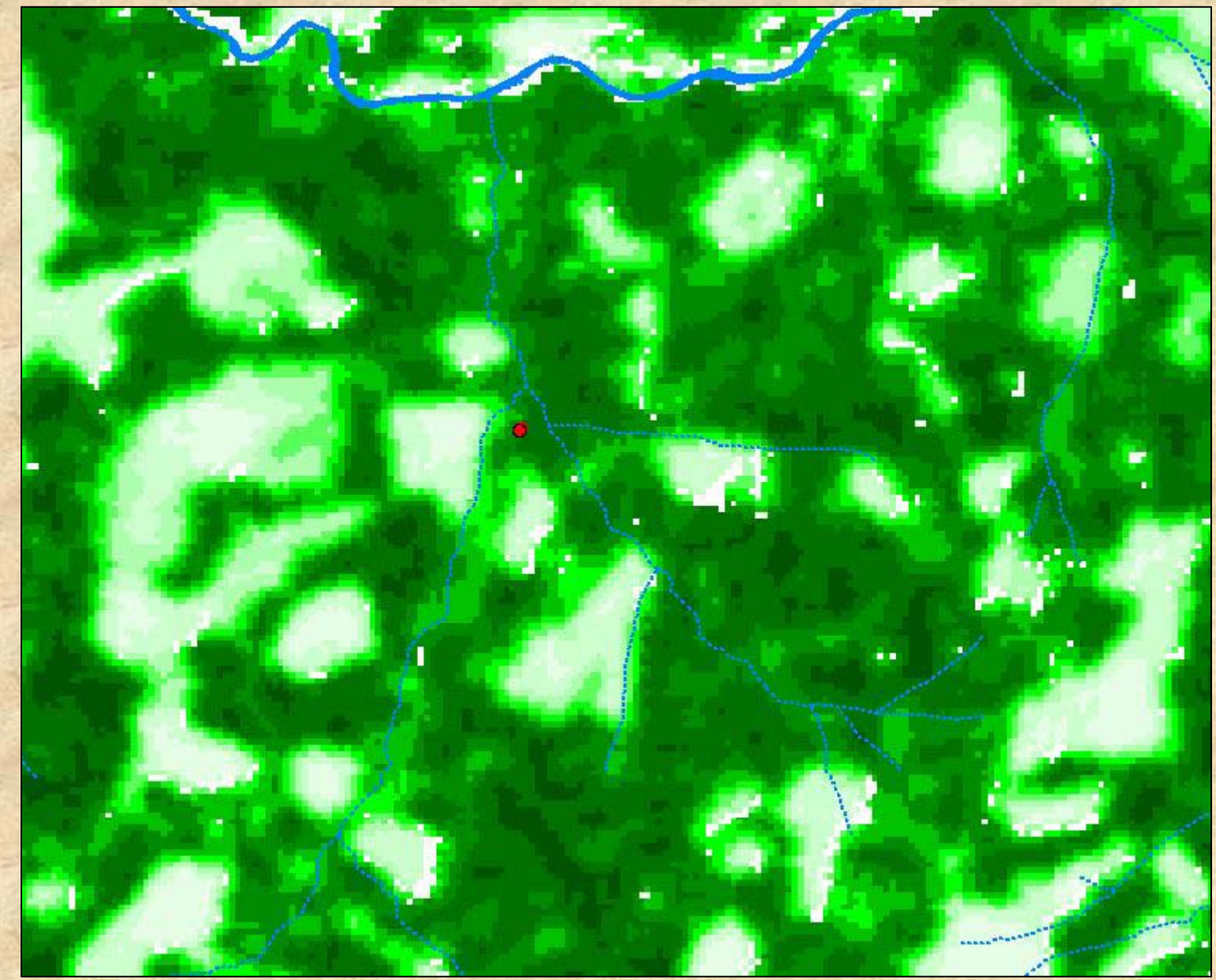
What does it look like?



0 **Habitat Suitability (HS)** 100

"Raw" model output

90% of owl pairs

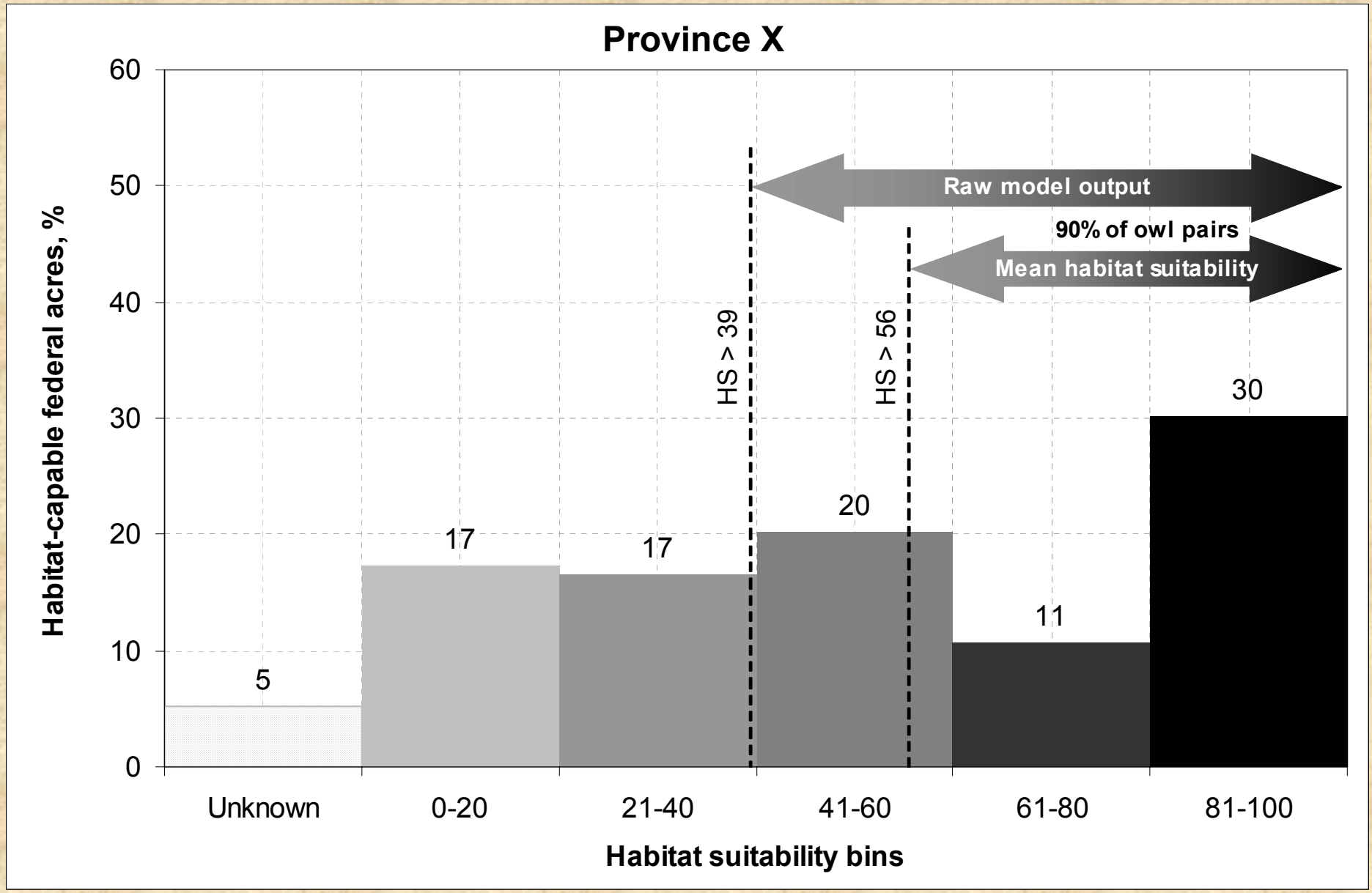


0 **Habitat Suitability (HS)** 100

Smoothed using mean HS

90% of owl pairs

HABITAT CONDITION




Habitat Findings

More Acres of Habitat

- Certain of accounting for more habitat acres in California

- Uncertain of the magnitude of the increase
  - NWFP FSEIS – 1,158,700 ac (FS only)
  - CVS Plot – 2,200,000 to 2,400,000 ac (FS only)
  - Spatial Map - about 2,800,000 ac (FS only)

- About 1.5 million+ more acres in CA

Habitat Change

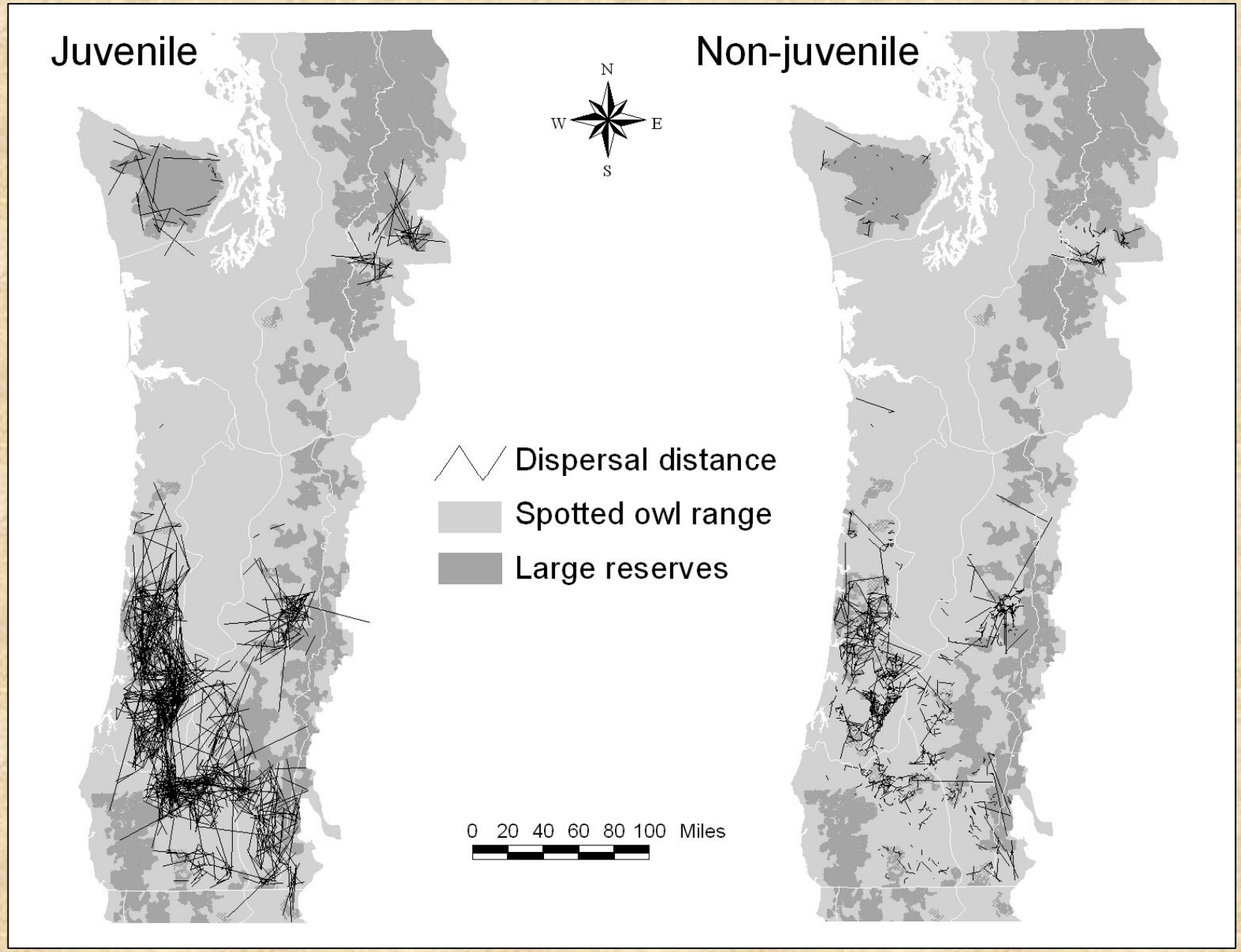
Stand-replacing timber harvest & wildfire

- Range-wide Loss
  - **Timber harvest – 0.25%**
  - **Wildfire – 1.3%**
- Province Loss
  - Oregon - Klamath Province
    - **Timber harvest – 0.44%**
    - **Wildfire –6.6%**

Owl Movement

- Forsman et al. 2003 (updated)
  - 1,210 juvenile movements
  - 1,388 non-juvenile movements
- Movement analysis – inside & outside large reserved blocks

OWL MOVEMENT: Origin and resighting data



OWL MOVEMENT PATHS ANALYZED

- reserve block to reserve block
- inside a reserve block to outside
- outside a reserve block to inside
- outside of a reserve block to another point outside
- within a reserve block

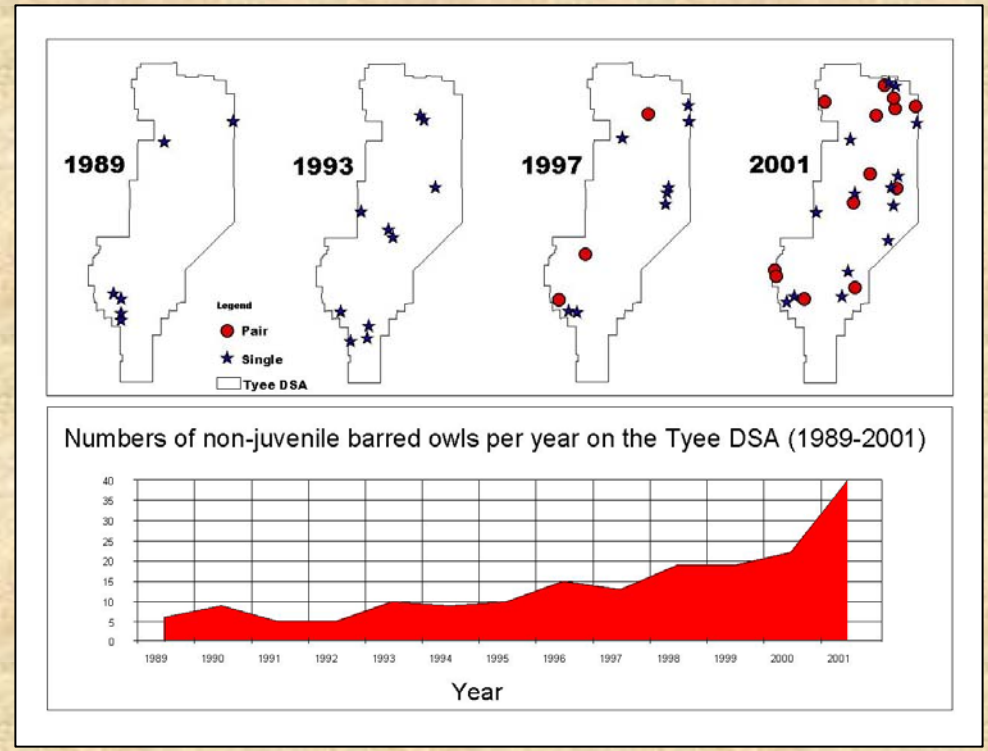
Owl Movement Results

- **Movements from reserve block to reserve block, outside a block to inside, and within a single block accounted for 51 percent of all juvenile movements.**

- **58% of juvenile owls fledged inside reserved blocks were resighted inside reserved blocks.**

Barred Owls

Review of selected papers on barred owl occurrence and distribution in the range of the northern spotted owl



Kelly et al. 2003

Pearson and Livezey 2003

Dark et al. 1998

Herter and Hicks 2000

Gutierrez et al. 2004

Barred Owl Findings

- Barred owl now overlaps most of the range of the northern spotted owl
- Spotted owls are more likely to abandon a site if barred owls take up residence close to the site
- Barred owl currently constitutes a greater threat to the spotted owl than assumed in 1990.

PREDICTIVE MODELS

- Can owl occurrence and demographic performance be reliably predicted given a set of habitat characteristics at the landscape scale?
- Shift from mark-recapture studies to increased reliance on habitat monitoring using predictive models
- A summary of Franklin et al. 2000 and Olson et al. 2004

Predictive Model Findings

- A mixture of early seral and non-forest with mid- and late seral forest seemed to provide better habitat conditions for spotted owls in some portions of the range.

- The importance of edge for spotted owls is not well understood.

- There is a plausible link between the arrangement of habitat on individual owl territories, survival, and reproductive output. BUT,

Predictive Model Findings

- We are not in a position now, or in the foreseeable future, where we can substitute predictive models for mark-recapture studies to predict owl survival and reproductive output.

Is the Plan Working?

- With only one decade of monitoring, we cannot answer with the necessary measure of certainty.

However, our monitoring does not provide any reason to depart from the Plan's objective of habitat maintenance and restoration.

In Need of Attention

- Other stressors (barred owls, West Nile virus, wildfire) may complicate spotted owl conservation and recovery

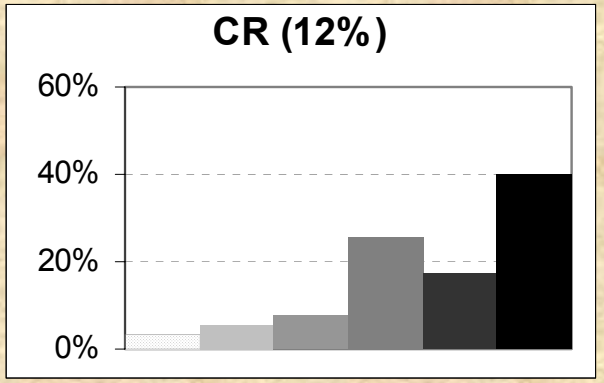
- Evolving information needs
  - Continuation of monitoring
  - Experimentation (cause and effect)

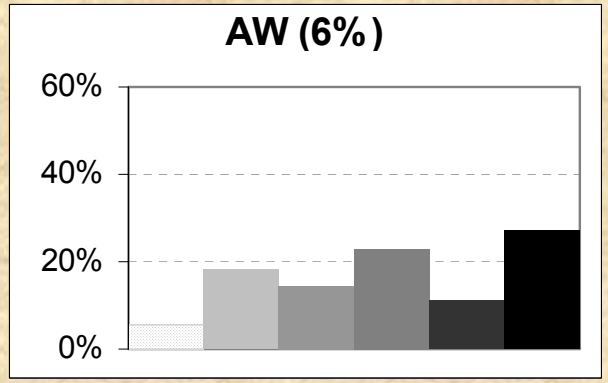
Our acknowledgement and special thanks to:

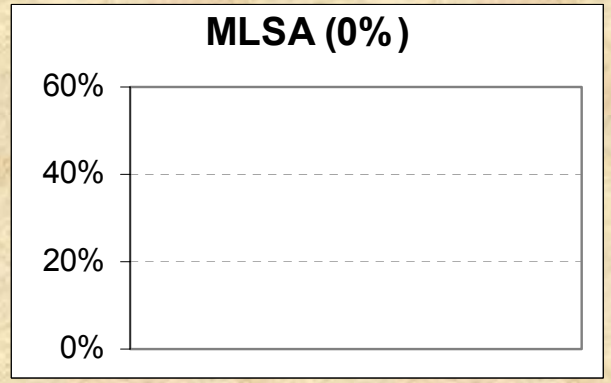
- All who have done spotted owl surveys
- Robert Anthony, Eric Forsman, Alan Franklin, Rocky Gutierrez for leadership in demographic study.
- The hardworking crews of the demographic study areas - past and present.
- David Anderson, Ken Burnham, Gary White, Jim Hines, Jim Nichols, Carl Schwarz, Katie Dugger and Gail Olson for expert analysis of the data.
- Tim Max, Jim Baldwin, Jim Alegria and David Turner for statistical review and advice.
- Ralph Warbington, Brian Schwind and their team, Jim Alegria and Melinda Moeur and the Titan team for giving us a vegetation base to work with.
- Alexandre Hirzel for Biomapper and assistance in applying it.
- William Ripple, our agency peers and anonymous reviewers for review and comment.
- Martha Brookes for editorial advice.
- Carol Apple for assistance with the plot data analysis.
- Sean Healey and Warren Cohen for showing us vegetation change.
- Bruce Bingham for getting us organized.
- Jon Martin for keeping us on the path to completion.
- Other Regional Monitoring Team members for ideas, advice, and support.
- Monitoring Program Managers and Regional Interagency Executive Team for unfailing budget and personnel support.

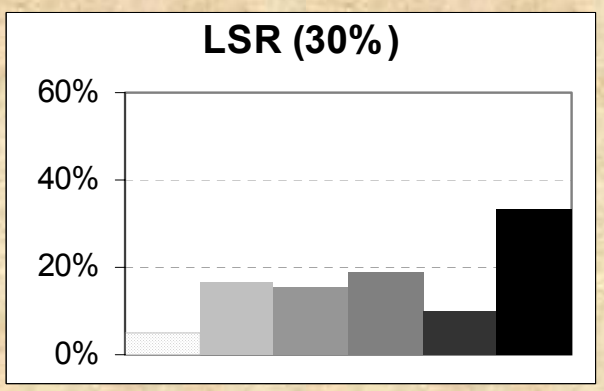

Questions??

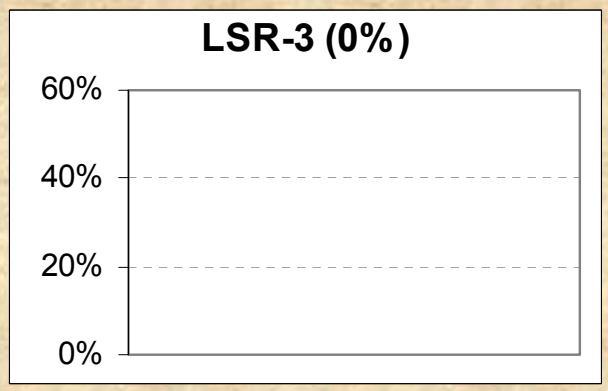
LUA Conditions

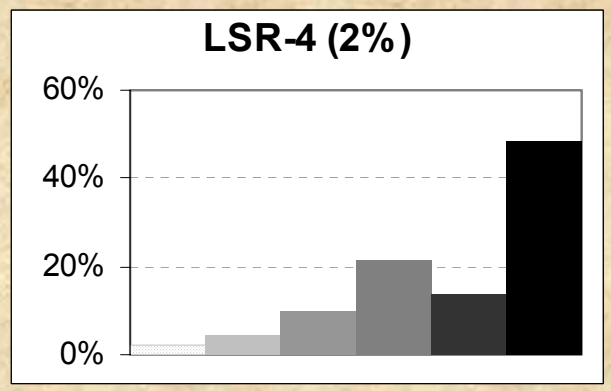


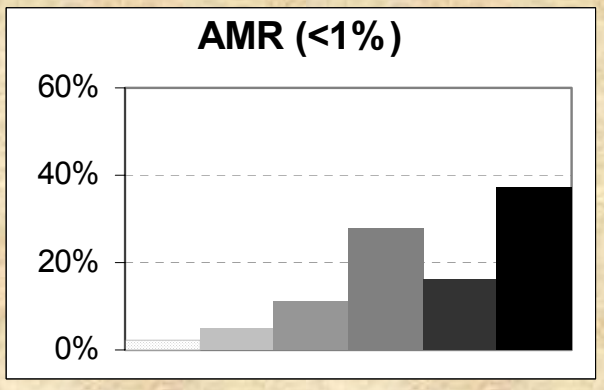


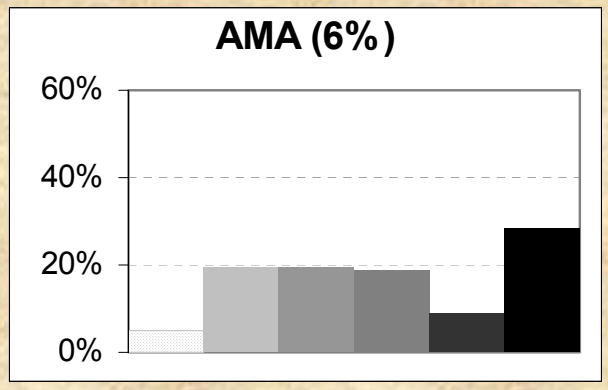


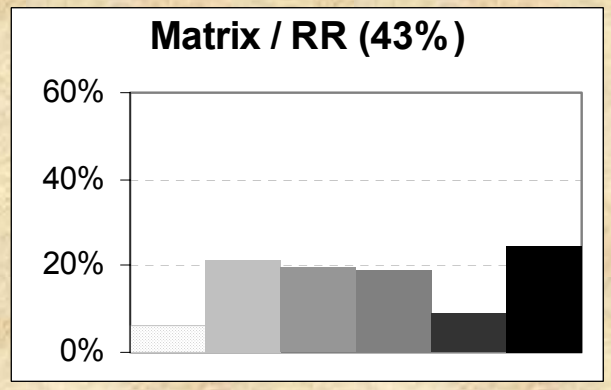




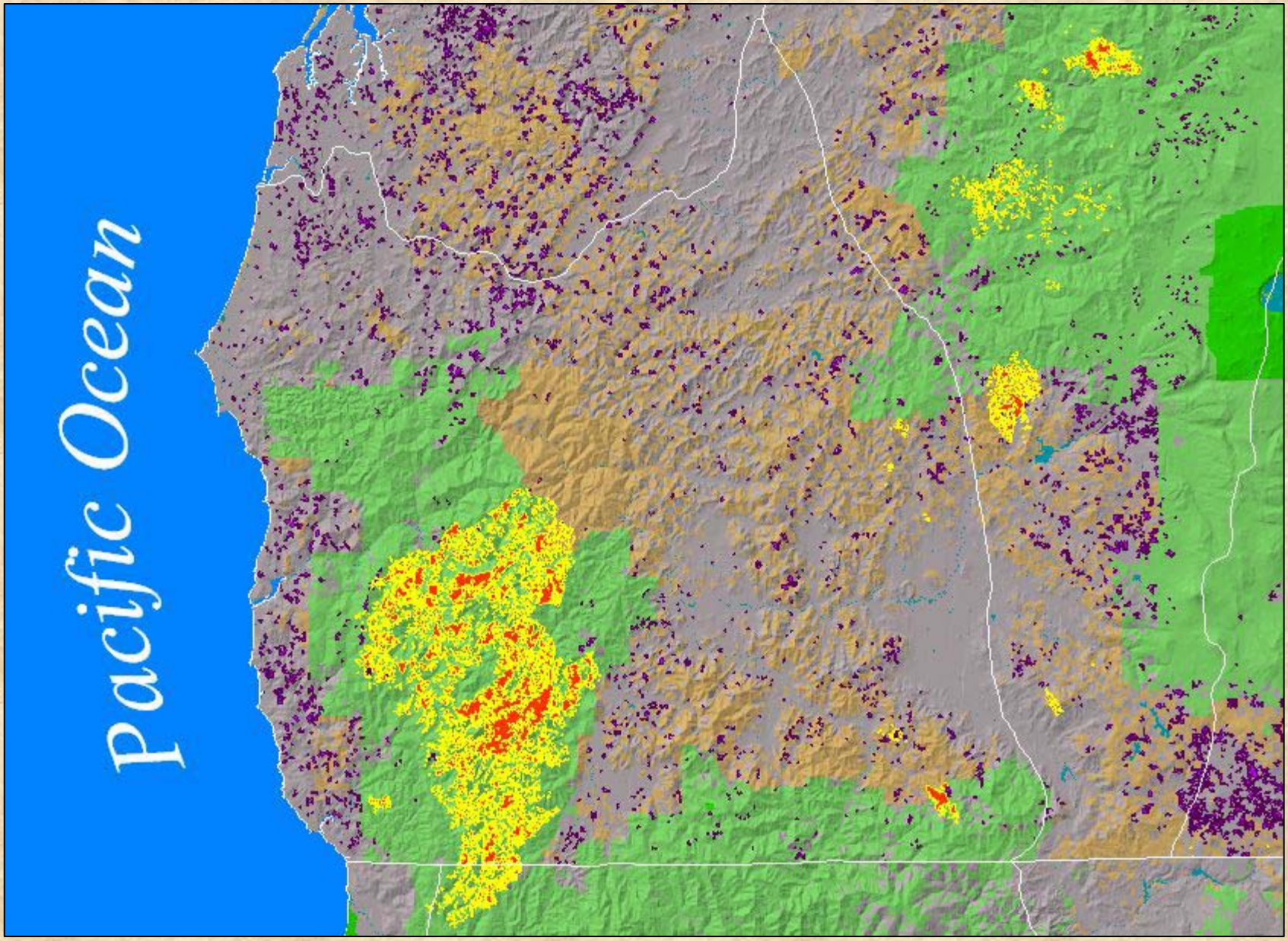








TEN YEARS OF CHANGE



WHAT ELSE TO EXPECT?

GIS Products

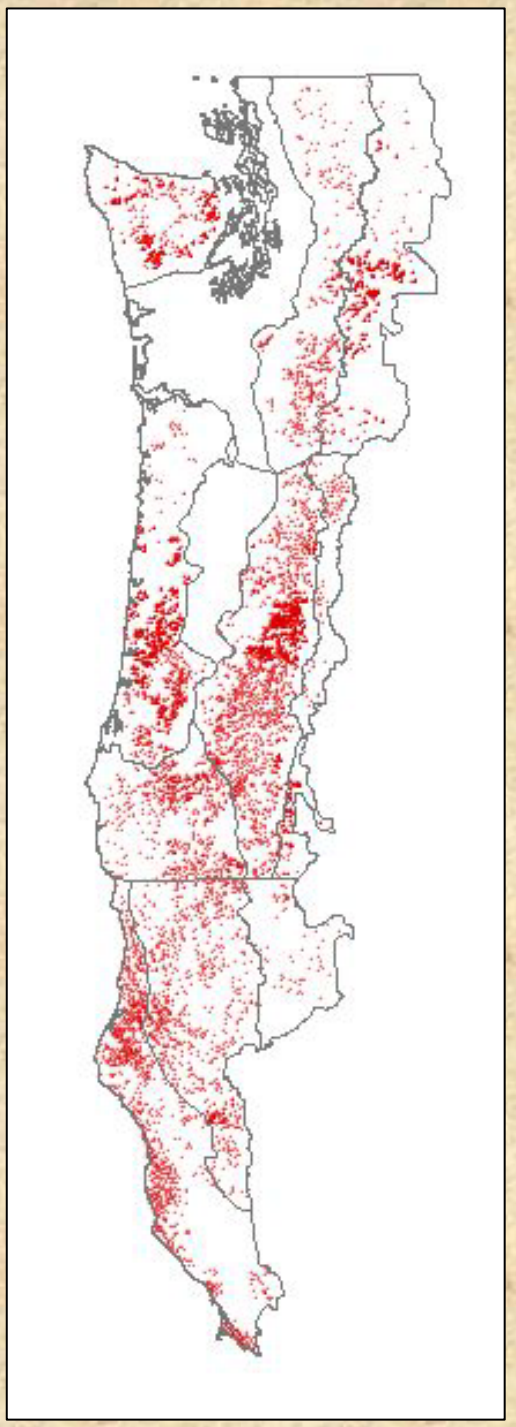
- Habitat capable land
  - Elevation isopleth
  - Serpentine soils
- Dispersal habitat maps
- Habitat suitability maps
  - "Raw" model outputs
  - "Smoothed" model outputs

The Primary Data Sources

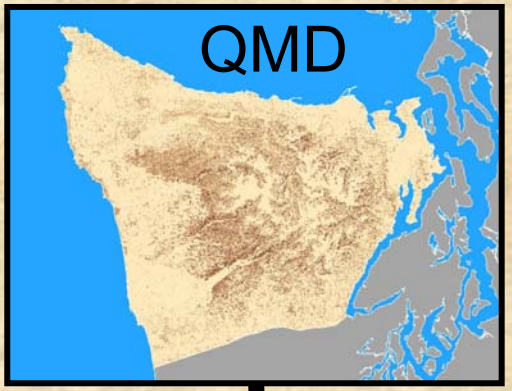
IVMP

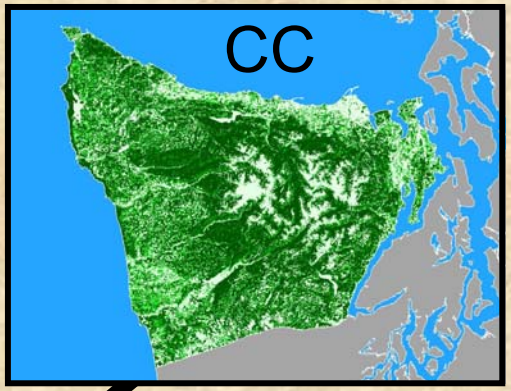
CALVEG

Owl pair activity centers and nest locations

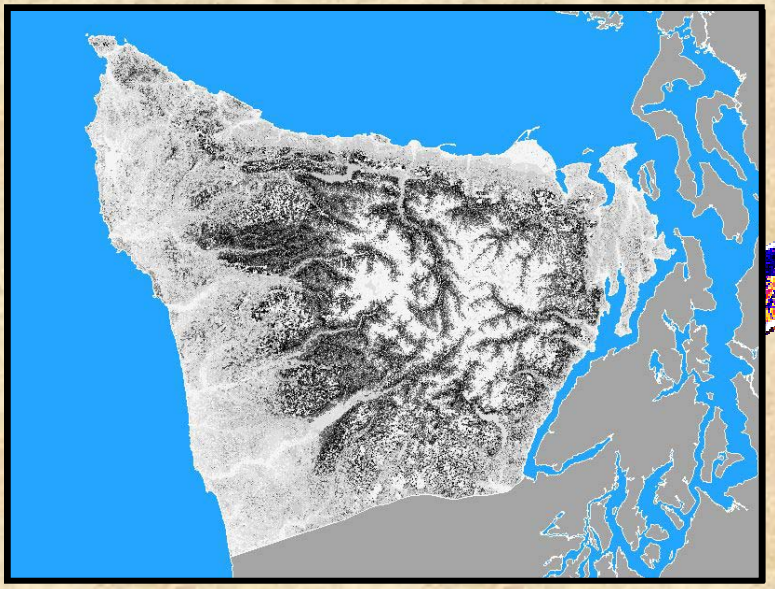


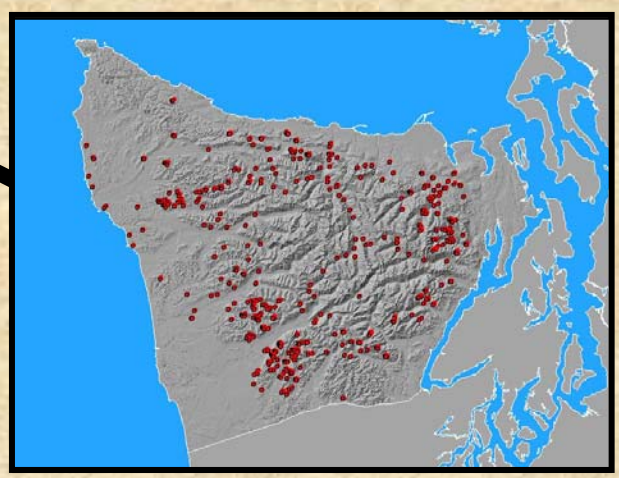
Habitat variables





HS map



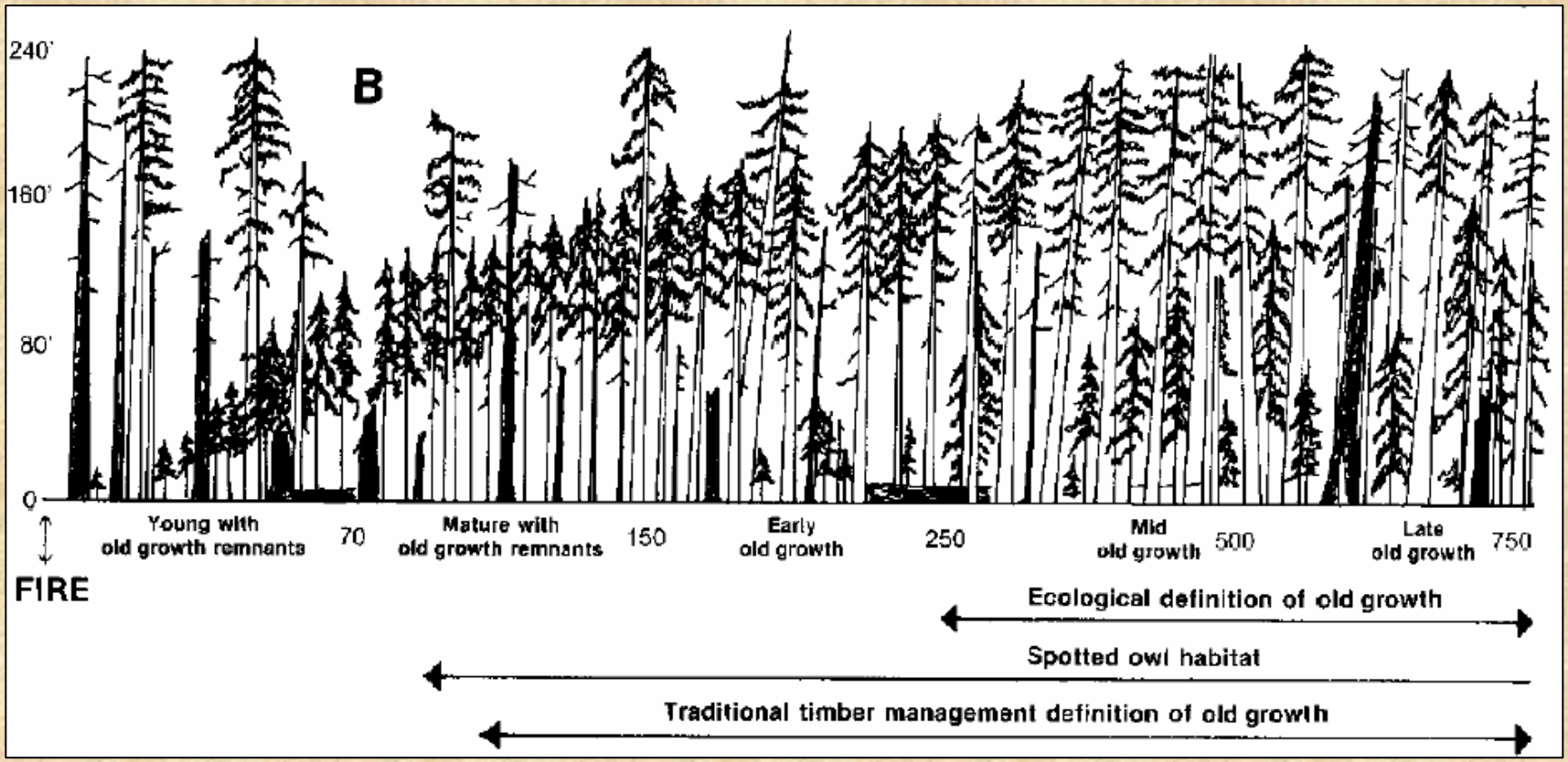


Presence Data

Wildlife and Vegetation of Unmanaged Douglas-Fir Forests

General Technical Report PNW-GTR-285

Franklin and Spies 1991

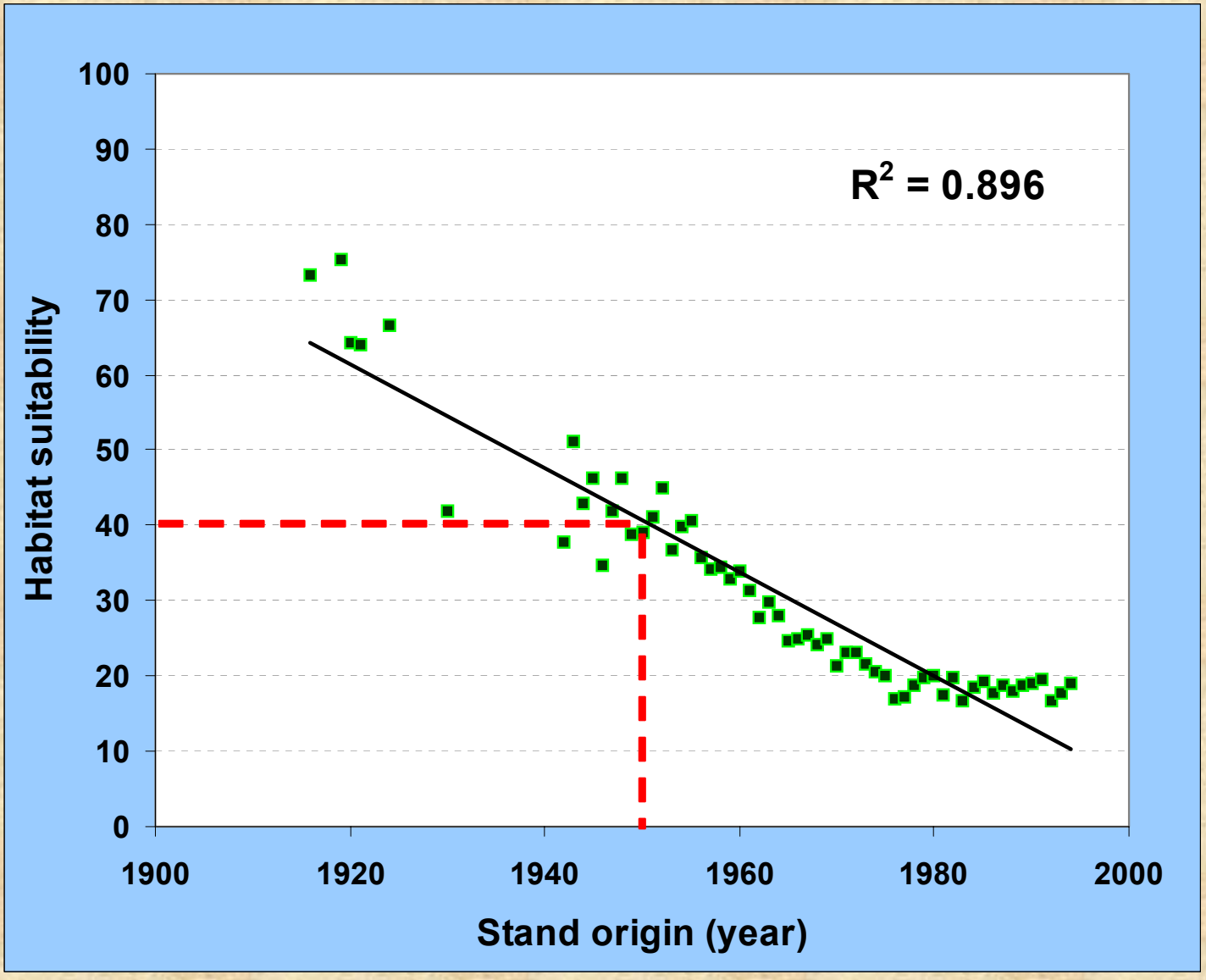


0 **Habitat Suitability (HS)** 100

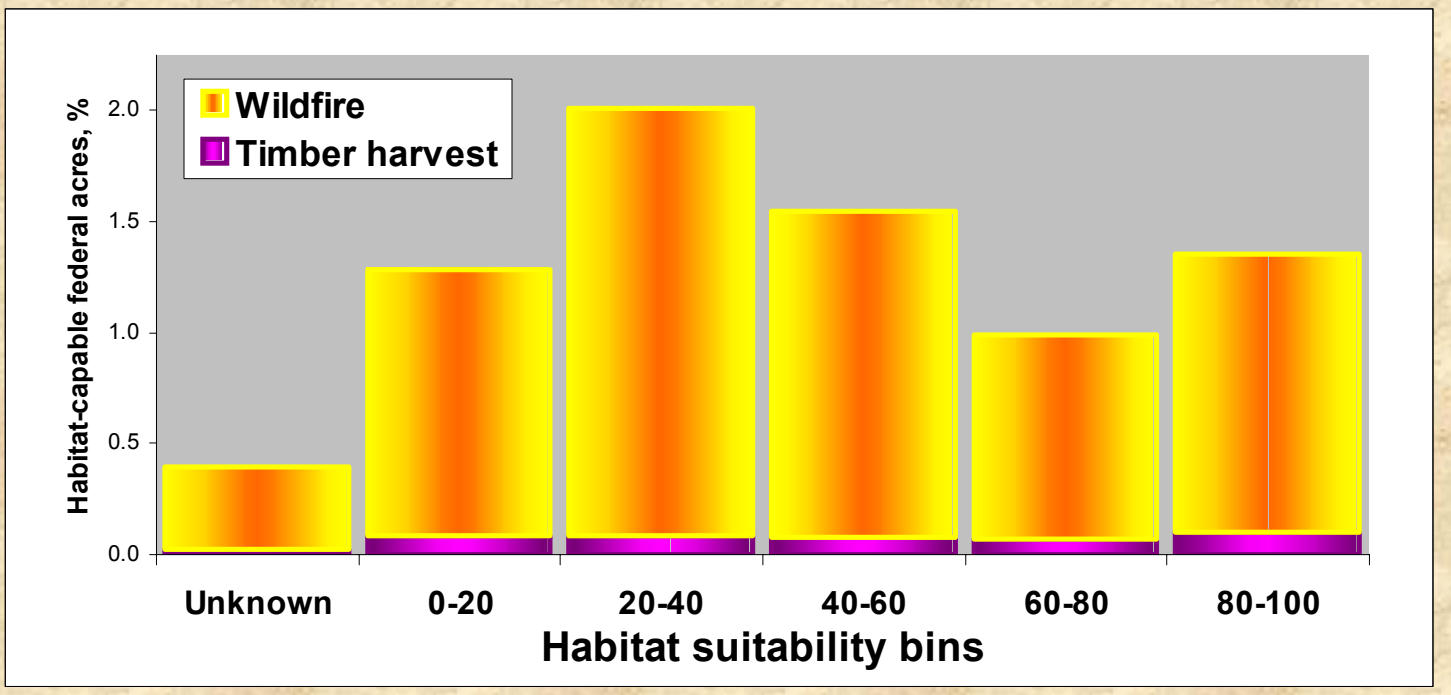
90% of owl pairs

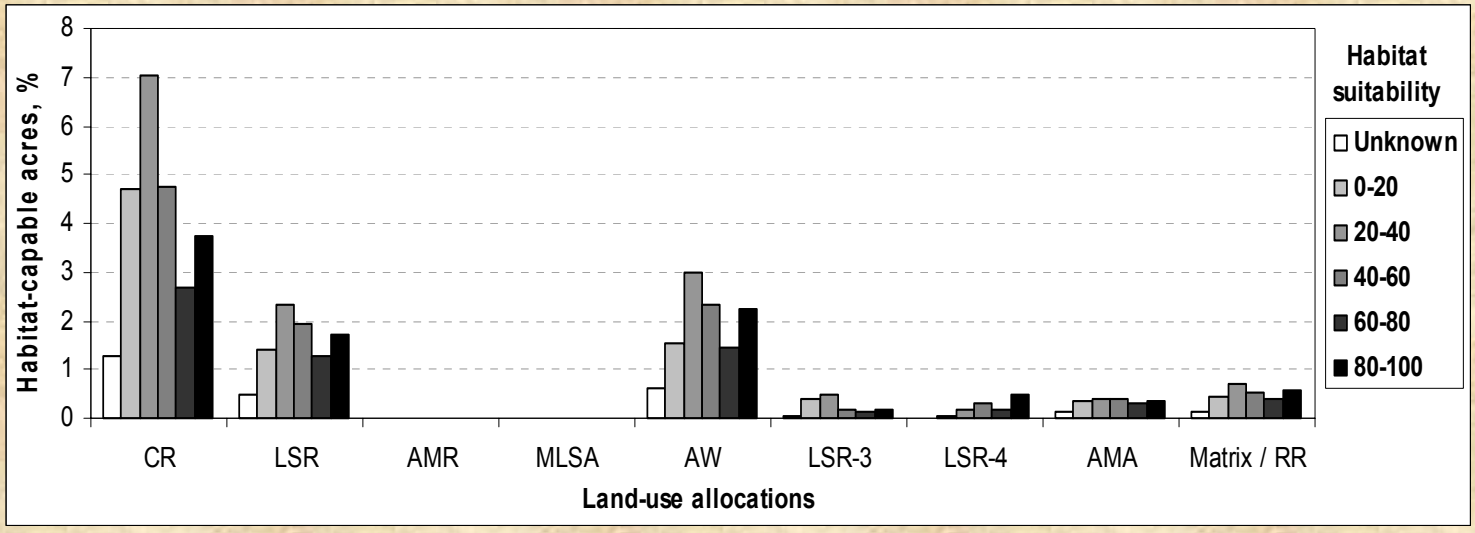
RELATIONSHIP OF HS AND STAND AGE

Western Cascades of Oregon



HABITAT CONDITION CHANGES



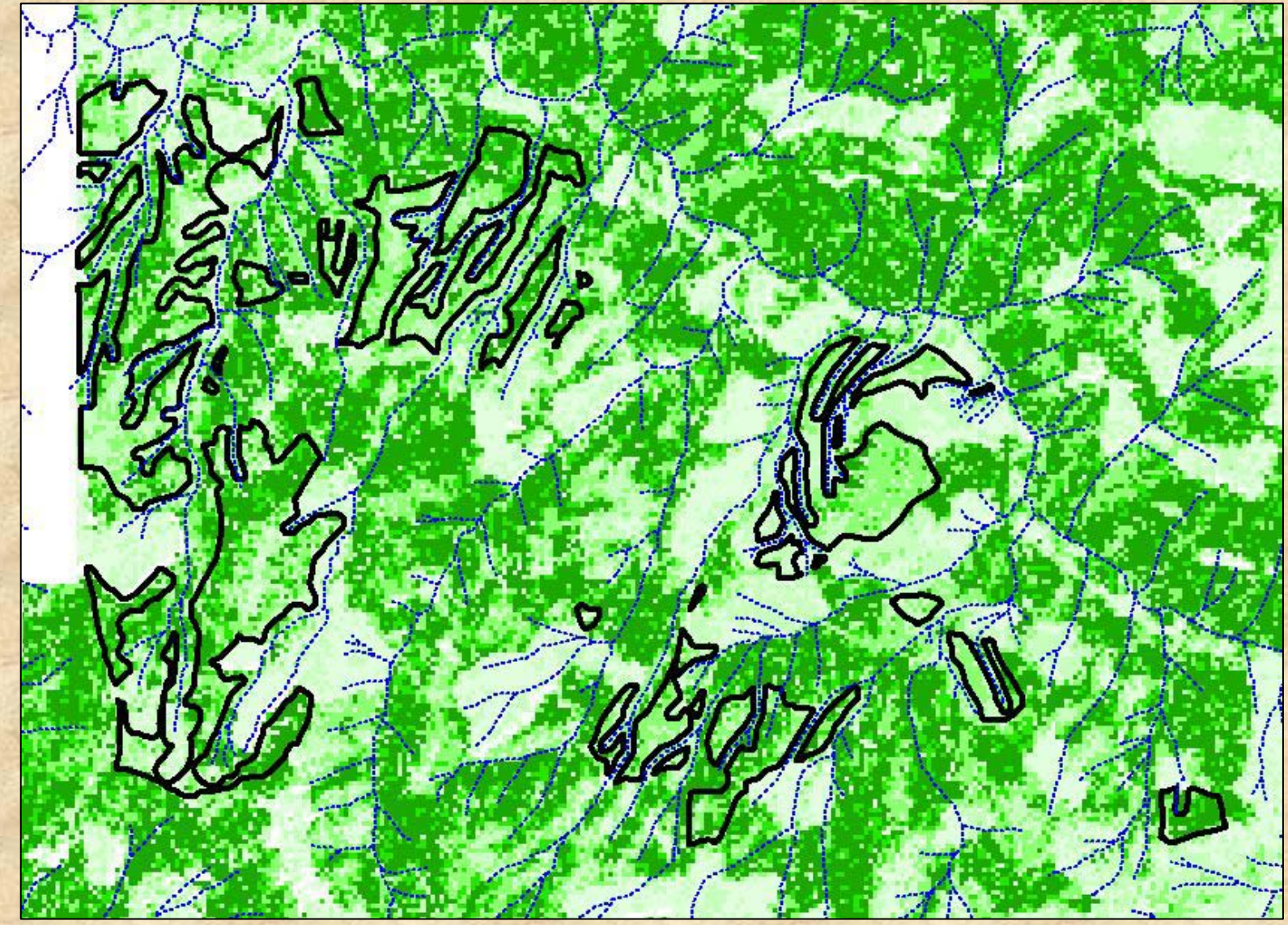


POSSIBLE APPLICATIONS?

- Land management planning
- Regulatory agency tracking
- Future monitoring
- Research

LAND MANAGEMENT AGENCIES

Timber harvest scenario



PLANNING AREA ASSESSMENT

CUMU
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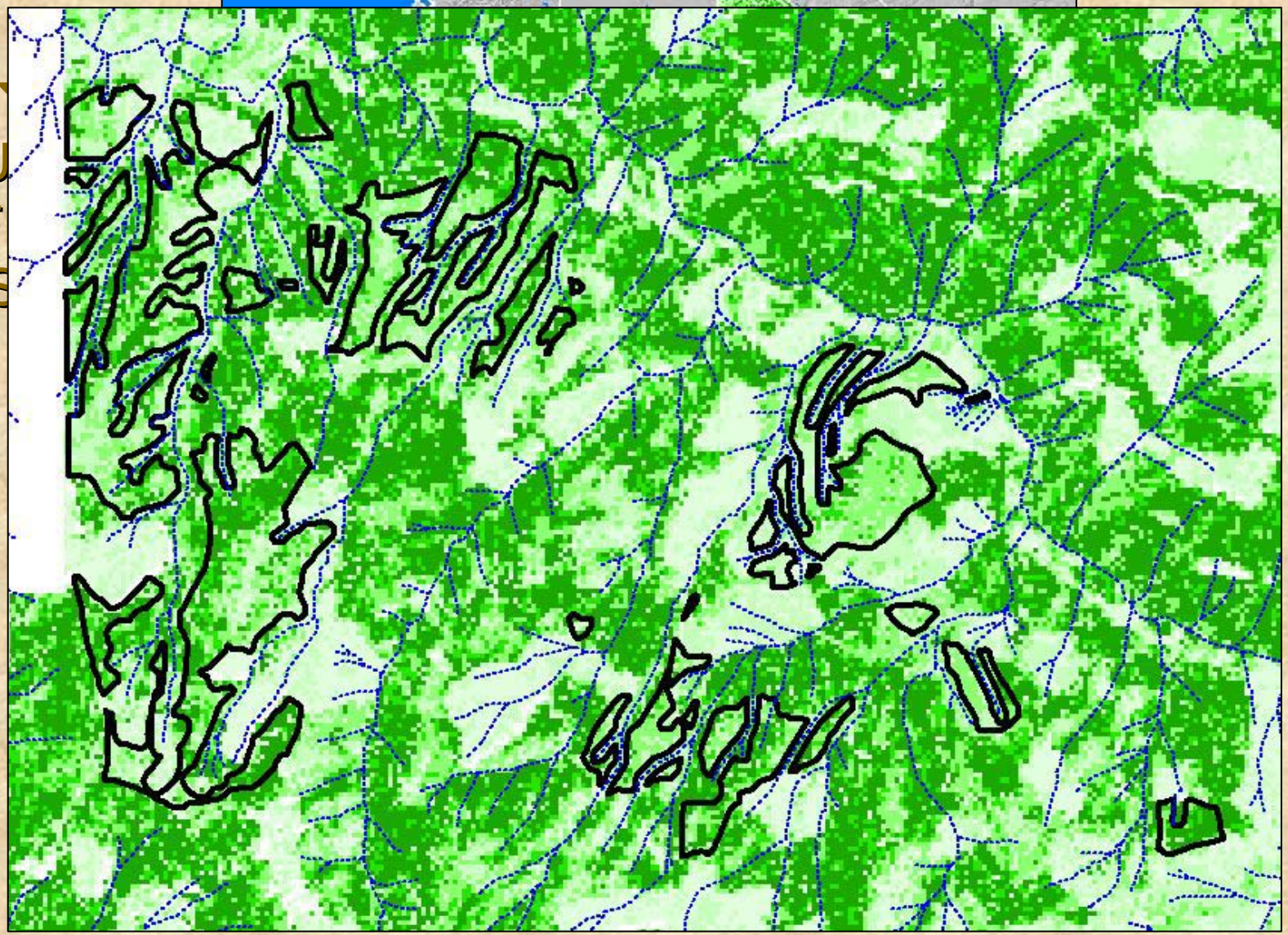

PLANNING AREA ASSESSMENT

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CUMULATIVE EFFECTS ASSESSMENT

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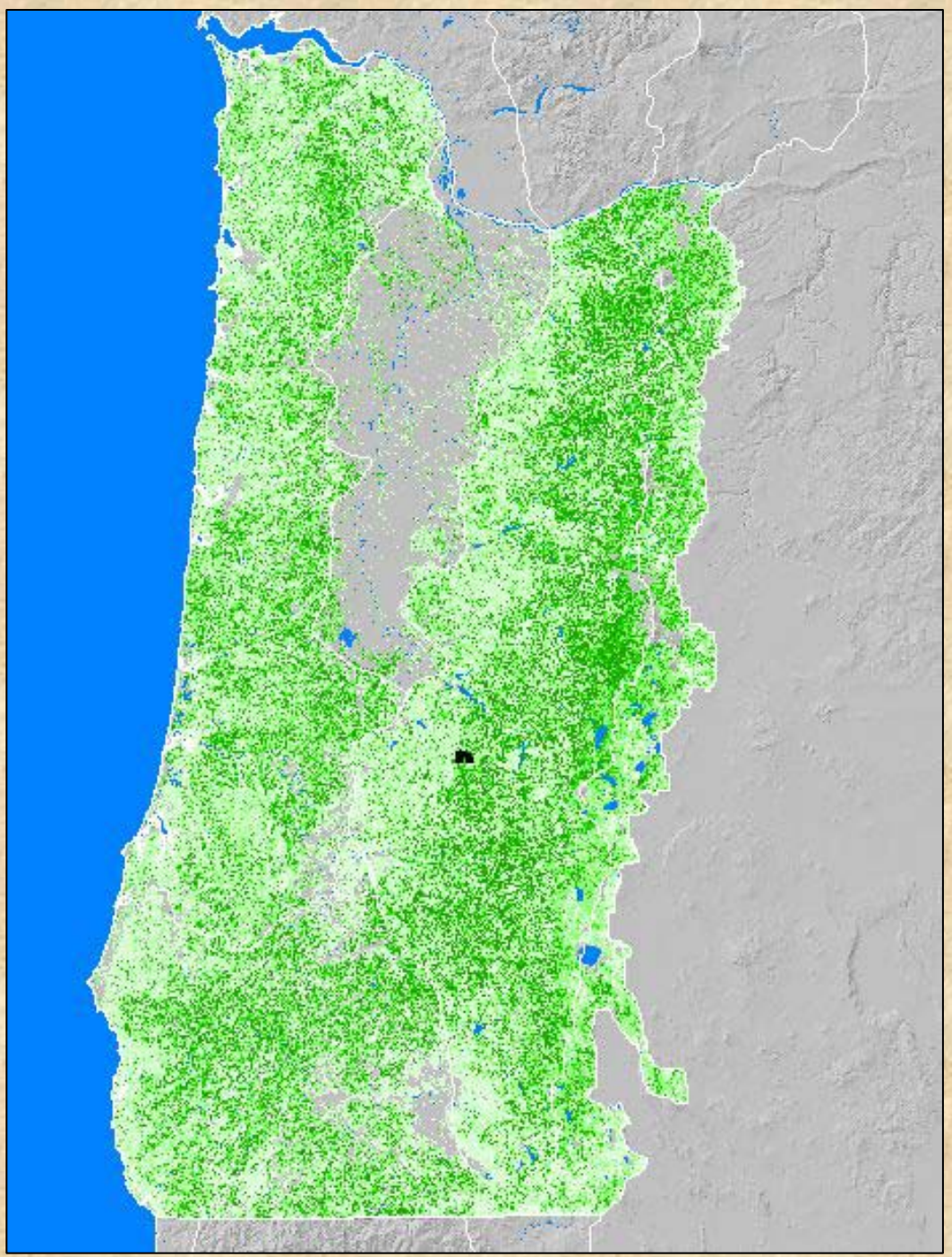
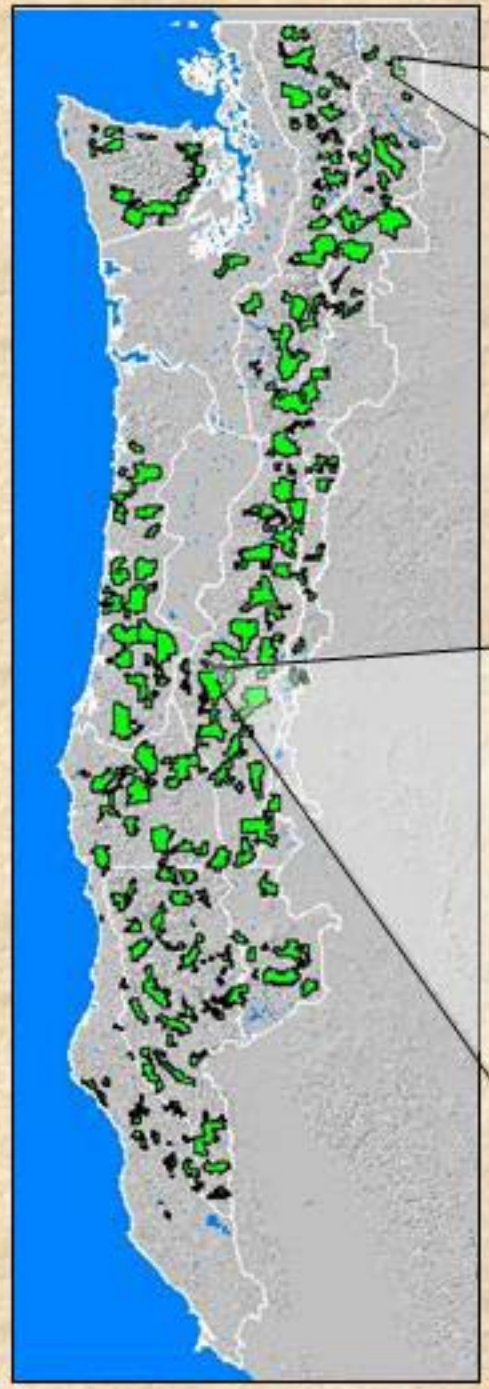
UPWARD REPORTING

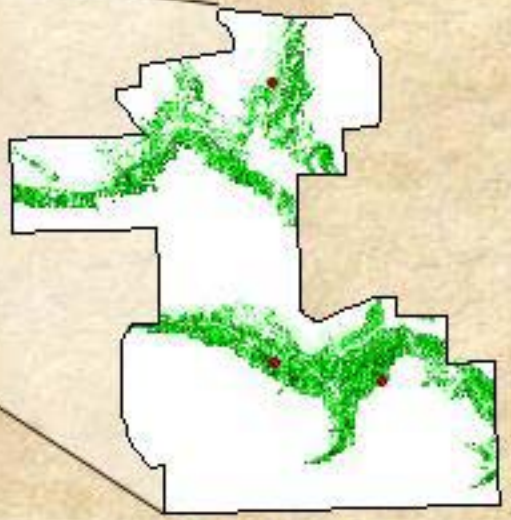


LAND MANAGEMENT AGENCY

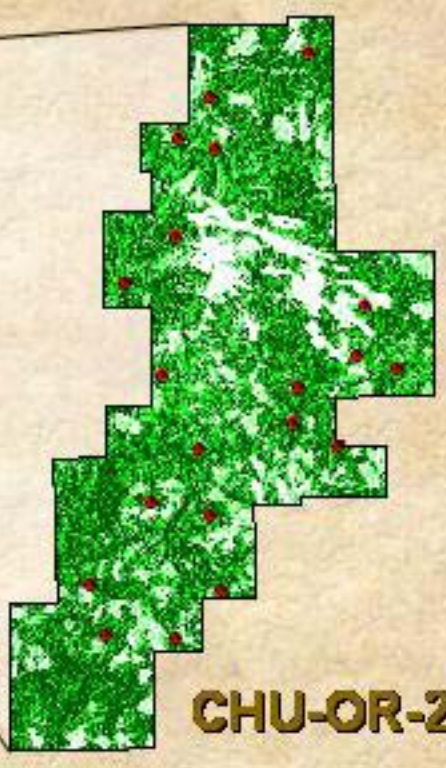
REGULATORY AGENCY

Regulatory Agencies





CHU-WA-2



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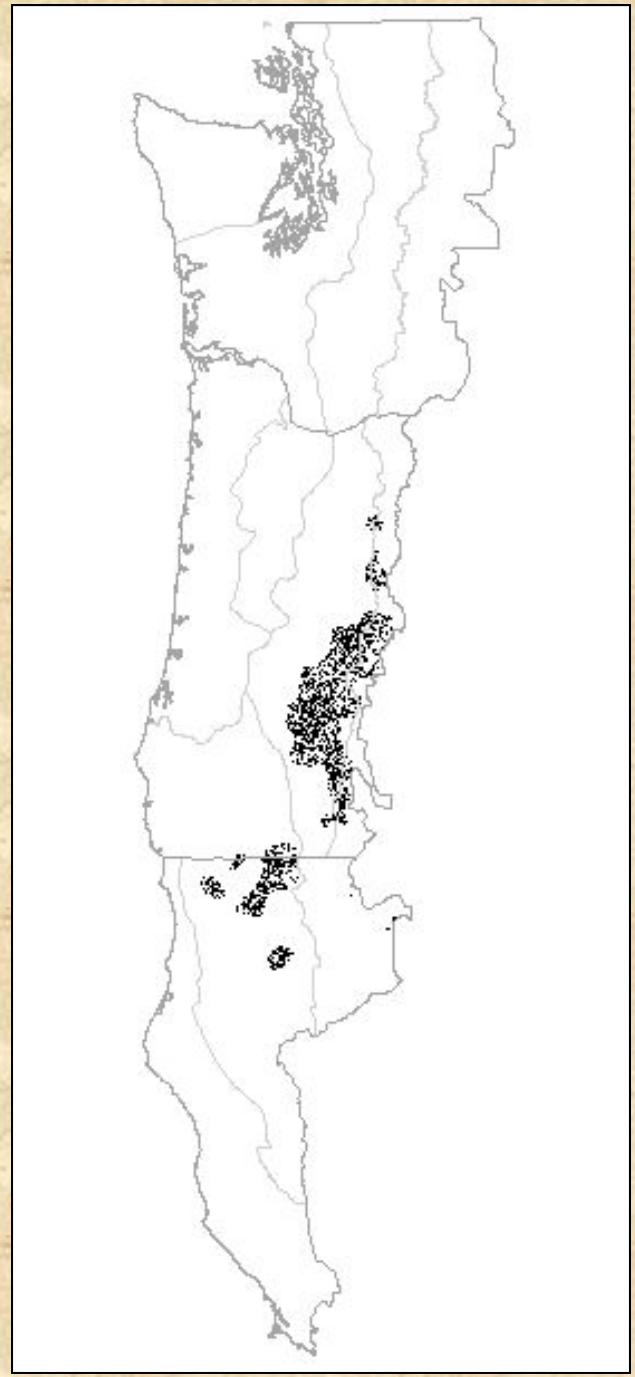
Critical Habitat Analysis



Risk Analysis and Prioritization

10 years of lighting fire

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Large wildfire probability

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Overlaid on habitat condition

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High priority treatment

Key Monitoring Questions

- Will implementation of the Northwest Forest Plan reverse the declining population trend and maintain the historic, geographic distribution of the northern spotted owl?
- What is the trend in rates of adult survival, reproduction, turnover, and the annual rate of change of owl populations?
- Do these trends support a conclusion that the Plan is working to achieve a stable or increasing population?
- Can the status and trends in spotted owl abundance and demographic performance be inferred from the distribution and abundance of habitat?