Northwest Forest Plan

Interagency Regional Monitoring Program

Status & Trend of Marbled Murrelet Habitat And Populations

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A Team Effort!

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… and others, including many crew members over the years

Natural History

- **Fish-eating seabird**
- **Flies inland to nest, up to 50 mi**
- **Lays single egg on limb of big conifers**
- **1992, ESA: Threatened in WA, OR, & CA**

A PRIMARY OBJECTIVE OF THE NORTHWEST FOREST PLAN:

"maintenance and/or restoration of habitat conditions for the Northern Spotted Owl and the Marbled Murrelet that will provide for viability of each species -- for the owl, well distributed along its current range on federal lands, and for the murrelet so far as nesting habitat is concerned"

--FEMAT 1993

NW Forest Plan Goal

Stabilize and increase murrelet populations by maintaining and increasing nesting habitat

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1999 Murrelet Monitoring Plan

USDA United States Department of Agriculture
Forest Service
Pacific Northwest Research Station
General Technical Report
PNW-GTR-439
February 1999

Marbled Murrelet Effectiveness Monitoring Plan for the Northwest Forest Plan

Sarah Madsen, Diane Evans, Thomas Hamer, Paul Henson, Sherri Miller, S. Kim Nelson, Daniel Roby, and Martin Stapanian

Monitor population distribution and trends

Monitor nesting habitat distribution and trends

Population Monitoring Objectives

Is the population stable or increasing?

(1994 NWFP Record of Decision)

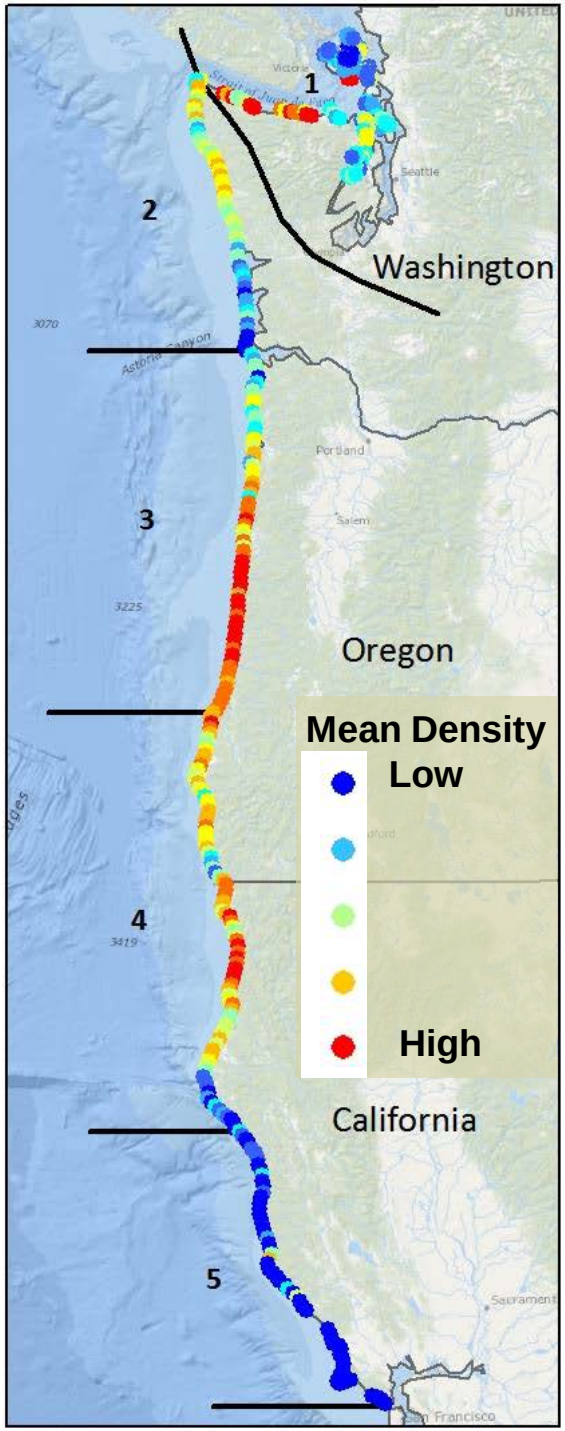
- Estimate population size
- Estimate population change over time (since 2000-2001)

Where's the marbled murrelet?

by Nick Hatch

Population Methods

- Estimate for:
  - NWFP Area
  - 5 Conservation Zones
  - 3 States
- Survey at sea during nesting season
- Standardized protocol
- Annual since 2000



Key Findings: Population

- Distributed offshore of federal lands throughout NWFP area
- 2013 estimate: ~19,700 birds
- Decline in Washington (4.6% per year, 2001-2013)
- No decline observed in OR, CA
- NWFP area: No clear trend

15-Year vs. 20-Year Findings

NWF Plan scale: Detected a downward trend (~4% per year) at 15-year point. No clear trend now (2001- 2013)

- Plan-scale trend affected by recent high population estimates in OR and CA
- Finer-scale trend results more informative
- Finer-scale finding unchanged: decline in Washington (Zones 1 & 2)

POPULATION: Annual Trend

(2000/01 to 2013, With 95% Confidence Intervals)

% Annual Change

15
10
5
0
-5
-10
-15

-4.6%

WA OR CA NWFP Area

Nest Habitat Monitoring Objectives

What is status and trend of murrelet nesting habitat in the NWFP area?

- Estimate amount and distribution of nesting habitat in WA, OR, CA
- Estimate change since start of NWFP

Nesting Habitat Methods

Habitat suitability models: Identify areas with habitat characteristics similar to those of known nest sites

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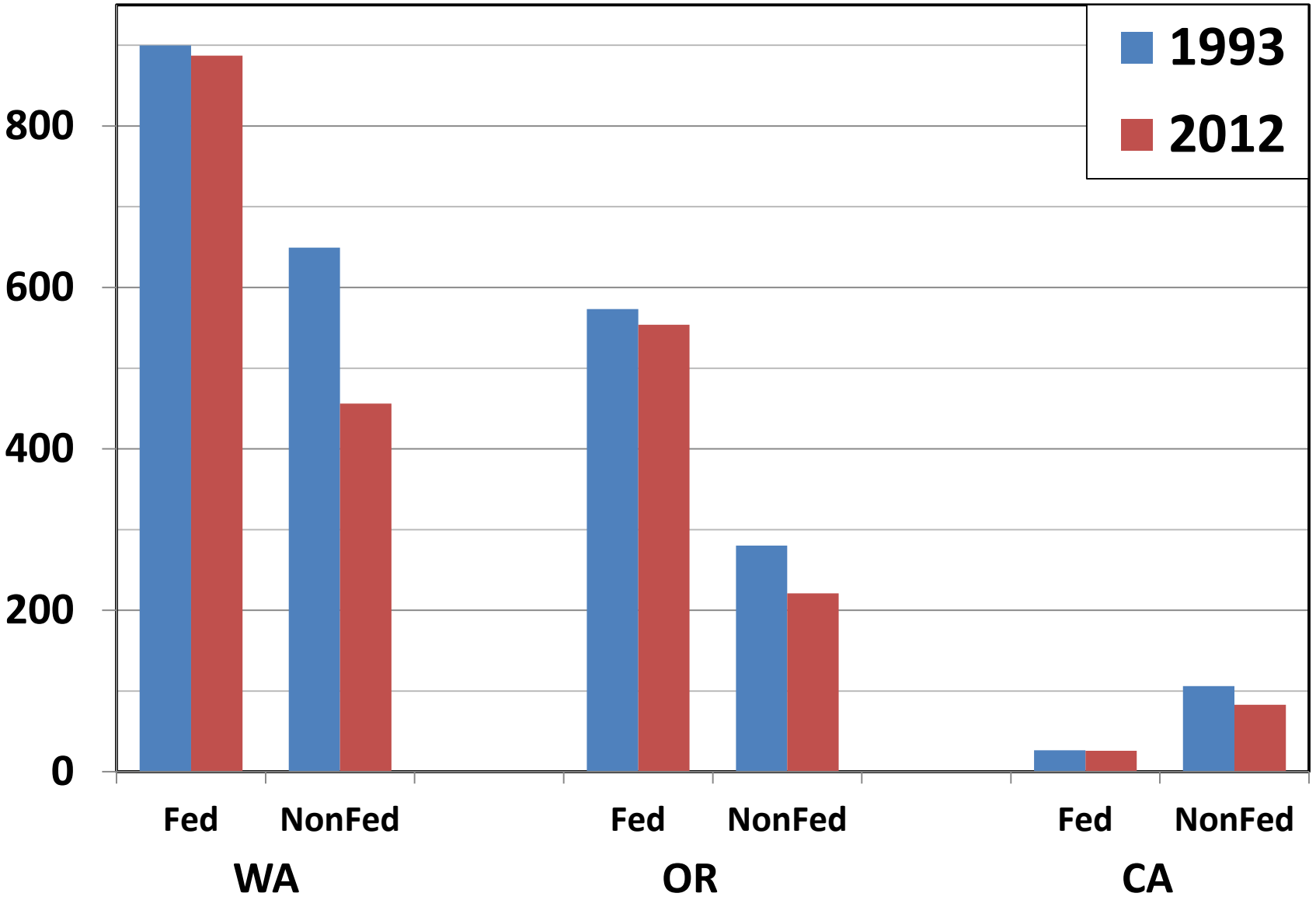
Analysis years: 1993 and 2012

Net Habitat Change, 1993 vs. 2012

(1000's of Ac)



Key Findings: Nesting Habitat

Federal (NWFP)

- 1.5 million ac of suitable habitat (1993)
- 90% in ‘reserved’ land use allocations
- 2% net loss (32,000 ac; 1993-2012)
- Most losses: fire

Nonfederal

- 1.0 million ac of suitable habitat (1993)
- 27% net loss (276,000 ac; 1993-2012)
- Most losses: timber harvest

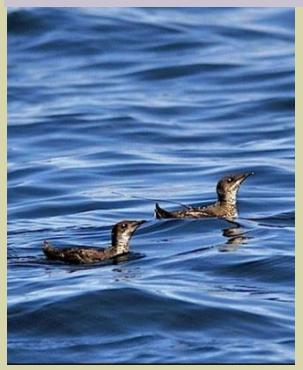
All lands combined: 12% net loss, 1993-2012

Key Findings: Nesting Habitat

- **Plan not achieving habitat gain in short-term. Habitat losses are not being offset by gains:**
  - Legacy of harvest in 1900's
  - Grows very slowly (100+ years)
  - Much potential future habitat in reserves
  - Need better tools to forecast habitat recruitment

Marbled Murrelet Effectiveness Monitoring Plan

Monitor population distribution and trends



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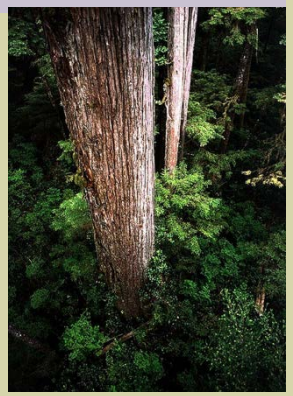

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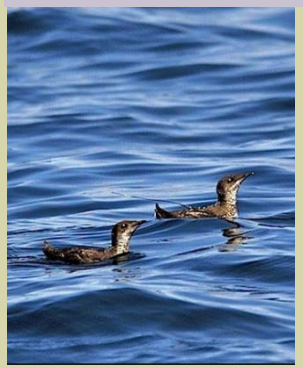

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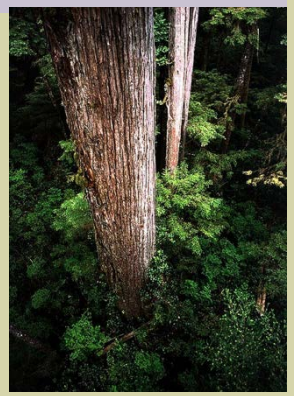

Predictive models for habitat-population relations

Marbled Murrelet Effectiveness Monitoring Plan

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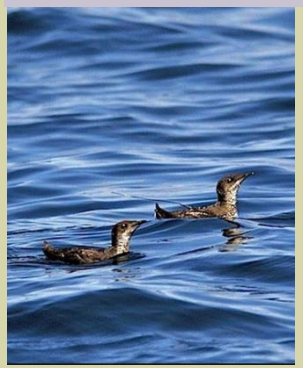

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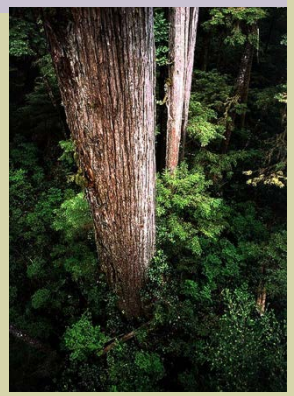

Predictive models for habitat-population relations

- Nesting habitat trends -- a surrogate for population trends?

“Land-Sea” Modeling

- Question: What factors best explain marbled murrelet distribution and trends at sea?
- Initial models: used population and habitat monitoring results, plus data on marine conditions

Key Finding: Terrestrial factors, particularly the amount and pattern of nesting habitat, best predict murrelet distribution and trends at sea

(Raphael et al. 2015, Journal Marine Systems)

Management Considerations

- Population trends appear linked to nesting habitat
  - Murrelet distribution at sea strongly correlated with amount of adjacent nesting habitat
  - Correlation between rates of bird and habitat loss

- Other than fire losses, the NWFP reserve system appears to have protected nesting habitat
  - Losses not offset by gains to date
  - Gains may take many decades

- NWFP goal to conserve murrelets by maintaining (short-term), and increasing (long term) nesting habitat remains valid

Thank you!