

Joined At The Hip: Spotted Owl Viability and Habitat Protection



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Population Viability 101



- Viability is influenced by many factors - environmental variation, catastrophic events, demographic stochasticity, genetic deterioration, metapopulation dynamics, predation, competition, disease, **habitat (quantity/quality), and management practices.**

Influence of Management on NSO Viability

- Small populations are more vulnerable to extinction than large ones (Olympics, Washington Lowlands, Northern Oregon Coast Range, CA Cascades, British Columbia).
- Isolated populations more vulnerable than connected ones (Olympics – Holthausen 1995).
- Populations facing multiple threats (particularly synergistic ones), more vulnerable than those with fewer threats .
- Populations facing extensive loss and modification of habitat (historic echo?) are more vulnerable than those with sufficient habitat.



Why Habitat In Population Viability?

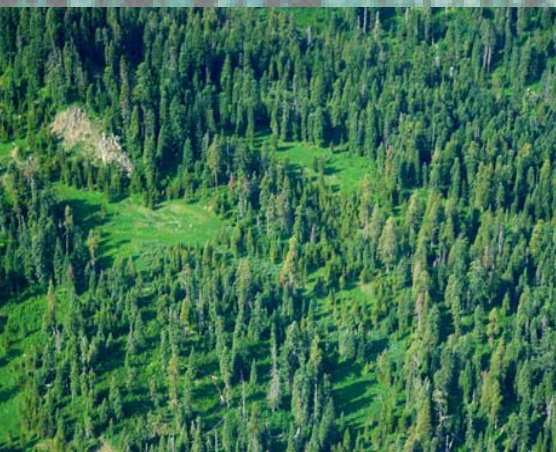


- “*The northern spotted owl is threatened throughout its range by the **loss and adverse modification of suitable habitat** as the result of **timber harvesting** and exacerbated by catastrophic events such as fire, volcanic eruption, and wind storms.*” Fed Register 1990

Delisting Factor A: The Present or Threatened Destruction, Modification, or Curtailment of Its Habitat or Range.

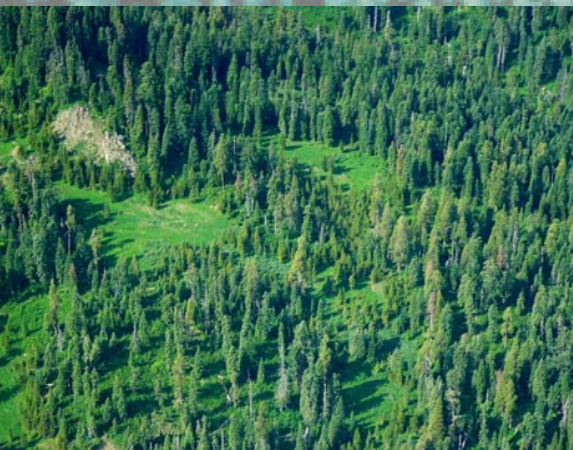
“*The **dependence of northern spotted owls on older forest**, the low probability that significant amounts of suitable habitat will persist outside of preserved areas, and the inability of the protected areas to support a viable population of northern spotted owls, all indicate that the northern spotted owl is likely to become endangered within the foreseeable future throughout all or a significant portion of its range.*”

Owls and Late-Seral Forests



- “With some exceptions (e.g. structurally complex young redwoods), **there is still a strong association of owls with late-successional forests**. Hence there is no reason to call into question this basic tenet of the plan.” (Courtney et al. 2004).
 - In SW Oregon, apparent survival and repro assoc. with older forests (no edge effect, no mid seral, and survival decreased when non-habitat declined to ~50%; Dugger et al. 2005 -- **under emphasized in the RP**).
 - In N. California, annual survival assoc. with interior old growth and edge, repro w/edge (Franklin et al. 2000).
 - In Oregon Coast Range, survival had quadratic relationship with late-mid seral and repro was related to edge (Olson et al. 2004).
 - In Southern Range, quadratic relationship between owl abundance and LSOG, and pseudo-threshold between owl abundance and LSOG in North (Carroll and Johnson, in press)*.
- * Inflection in owl abundance vs. LSOG is much higher (>80%) than used in the recovery plan.**

Lag Effects May Impair Viability



- “Owls are **long-lived** and **individuals may persist in disturbed habitats even if that habitat is unsuitable** for future colonization by other Spotted Owls; or habitat could have been reduced in quality and may only marginally support owls (Courtney et al. 2004)
- “If past harvest has **reduced habitat quality** it may lose its ability to **buffer** the owls against poor climatic conditions” (Courtney et al. 2004) – does this pertain to BDOW and climate change effects too?
- Other factors may play a role – delayed maturation/ recruitment; predator-prey dynamics; competition, **changes in habitat quality** (K. Halupka, 8/17/06)
- Conservation consequences – extinction thresholds can be crossed without adequate warning (populations begin “winking out” with little warning), constrains “adaptive management.”

Ecoregions of the Pacific Northwest



NCF – Northern Cascades Forests

CMLF – Cascade Mountain Leeward Forests

PLF – Puget Lowland Forests

CPCF – Central Pacific Coastal Forests

WVF – Willamette Valley Forests

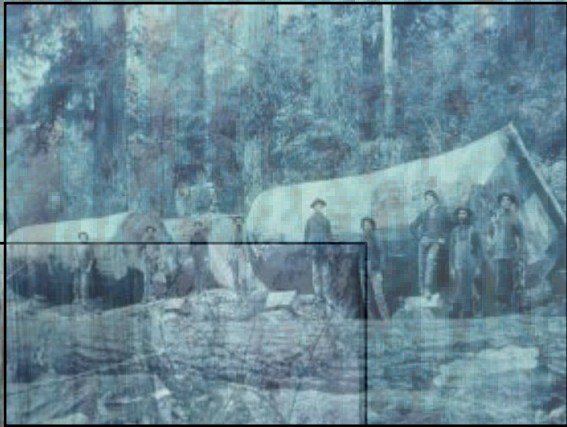
CSCF – Central and Southern Cascades Forests

ECF – Eastern Cascades Forests

KSF – Klamath-Siskiyou Forests

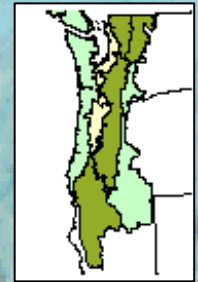


Historic and Current Landscape Change



| | Current Old Conifer Area (ac) | Historic Old Conifer Area (ac) | Percent Loss |
|---------------|-------------------------------|--------------------------------|--------------|
| NCF | 1,263,650 | 1,894,846 | - 33 |
| CMLF | 1,038,794 | 2,372,818 | - 56 |
| PLF | 262,294 | 3,399,554 | - 92 |
| CPCF | 1,651,322 | 7,909,648 | - 82 |
| WVF | 86,468 | 735,255 | - 88 |
| CSCF | 3,283,455 | 8,304,930 | - 60 |
| ECF | 1,699,643 | 4,001,640 | - 58 |
| KSF | 2,338,540 | 7,462,194 | - 69 |
| Totals | 11,624,177 | 36,080,885 | - 68 |

Old/Mature Forest Public vs. Private



| | O/M Forest Area (ac) | Public O/M (ac) | Percent | Private O/M (ac) | Percent |
|---------------|----------------------|-------------------|-----------|------------------|-----------|
| NCF | 1,767,719 | 1,478,845 | 84 | 288,886 | 16 |
| CMLF | 1,744,119 | 1,617,072 | 93 | 127,046 | 7 |
| PLF | 876,827 | 190,598 | 22 | 686,229 | 78 |
| CPCF | 3,339,257 | 2,076,772 | 62 | 1,262,485 | 38 |
| WVF | 754,532 | 81,913 | 11 | 672,619 | 89 |
| ECF | 5,505,544 | 1,729,226 | 43 | 2,310,985 | 57 |
| CSCF | 4,040,211 | 4,131,898 | 75 | 1,373,646 | 25 |
| KSF | 5,401,557 | 3,593,332 | 66 | 1,808,225 | 34 |
| Totals | 23,429,775 | 14,899,656 | 64 | 8,530,110 | 36 |

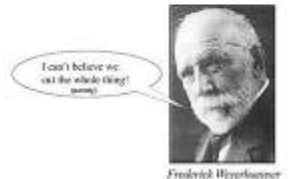
Rates of Landscape Change



A LEGACY OF FOREST DESTRUCTION THROUGHOUT AMERICA

Part of "The Big Cut" - 50 square miles (30,000 acres) of clearcuts through ancient forests and steep mountains in the Oregon Cascades

Courtesy: Native Forest Council



Annual Rate of Forest Change (%)

| | Periods | Public Land | Private Land | Total Land | Reference |
|----------------------|-----------|-------------|--------------|------------|---------------------------|
| Klamath-Siskiyou | 1972-1992 | - 0.25 | - 0.42 | - 0.53 | Staus et al. 2002 |
| Rogue Basin | 1972-1992 | - 0.36 | - 0.46 | | Staus et al. 2002 |
| Klamath Basin | 1972-1992 | - 0.48 | - 0.96 | | Staus et al. 2002 |
| Central Cascades, OR | 1972-1988 | - 1.20 | - 3.90 | | Spies et al. 1994 |
| Tillamook Basin, OR | 1972-1992 | | | - 1.00 | Strittholt and Frost 1995 |
| Hoh River Basin, WA | 1975-1991 | - 1.47 | - 3.45 | | Turner et al. 1996 |

Clearcutting in Southern Oregon

1970 through 2002



Map Info

Map Layers

Loading Animation

Clearcutting on the Olympic Peninsula, Washington

1970 through 2002



Map Info

Map Layers

Loading Animation



Factor D. The Inadequacy of Existing Regulatory Mechanisms

“The cumulative impact of timber-cutting practices by land managing agencies increases and exacerbates the fragmentation of existing owl habitat. **The proposed spotted owl management plans of the Forest Service and Bureau of Land Management are untested. Recent legal actions aside, there is no indication from the land management agencies that the current rate of change from old growth to young, even-aged forest management will diminish. Further, as agencies concentrate their clear cutting activities outside designated spotted owl habitat management areas, **future habitat management options will be lost if currently planned habitat networks prove later to be deficient.**”**

Existing regulatory mechanisms are insufficient to protect either the northern spotted owl or its habitat.”

*** Both the ISC and USFS SOHA/SOMA strategies deemed legally/scientifically inadequate – not enough habitat = low NSO viability estimates**







Northwest Forest Plan Backbone And Major Federal Contribution to Owl Recovery

- ... conservation strategies for the NSO are based on **sound scientific principles and findings, which have not substantially altered** since the time of listing (1990), the Final Draft RP (1992) and adoption of the NWFP (1994) (Courtney et al. 2004).
- ...**the NWFP has had considerable benefits to NSO**, by halting the removal by logging of occupied and future potential recovery habitat on federal lands, which would not have otherwise occurred (Courtney et al. 2004).
- **The Reserve and Matrix strategy of the NWFP has been successful** in that NSO populations are persisting, and (largely) performing as predicted (Courtney et al. 2004)
-the NWFP has made important conservation contributions, and **without the plan the situation of NSO would be far bleaker.** (Courtney et al. 2004)
- “...**owl populations on federal lands had higher demographic rates** than elsewhere; thus, the NWFP appeared to have had a positive effect on demography of NSO” (Anthony et al. 2006).
- Washington Oversight Committee – “**decouple the RP from the NWFP**” and make the plan “**less focused on habitat...**”

“Recovery” Via Decoupling

Northern Spotted Owl

-  Option 1 blocks
-  Option 2 blocks
-  LSRs
-  BLM district boundaries

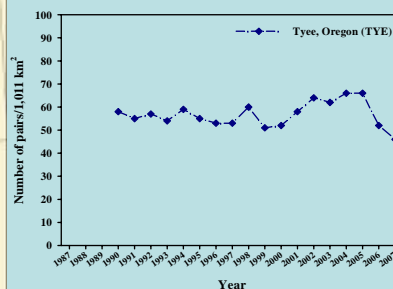


Acres

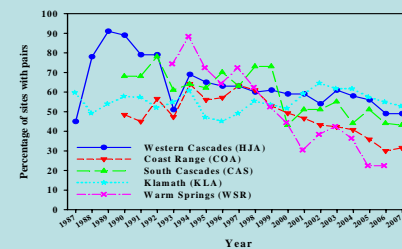
Difference (%)

| | | |
|-----------------|------------------|------------------------|
| LSRs | 7,712,012 | - |
| Option 1 | 6,685,495 | -1,026,517 (13) |
| Option 2 | 5,096,463 | -2,615,549 (34) |
| * TWS | Option 1 | -2,675,745 (35) |

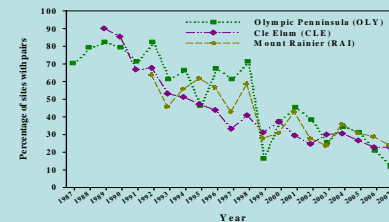
Tyee Density Study Area



Oregon Study Areas



Washington Study Areas



Northern Spotted Owl

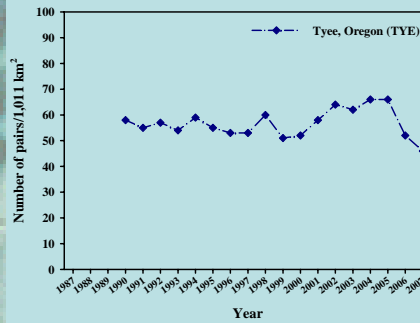
- Proposed critical habitat
- Current critical habitat
- LSRs
- BLM district boundaries



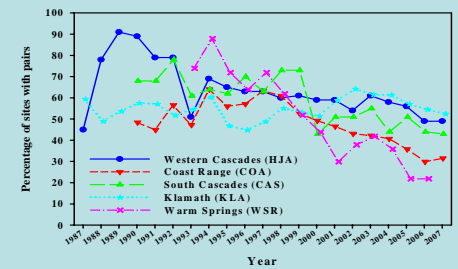
Proposed Critical Habitat **Via Decoupling**

| | Acres | Difference (%) |
|-----------------|------------------|------------------------|
| Existing | 7,884,271 | - |
| Proposed | 5,337,792 | -2,546,479 (24) |

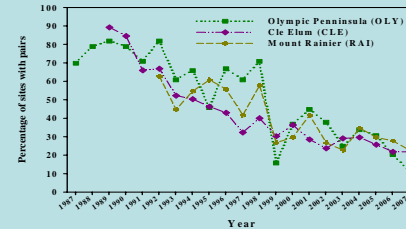
Tyee Density Study Area



Oregon Study Areas

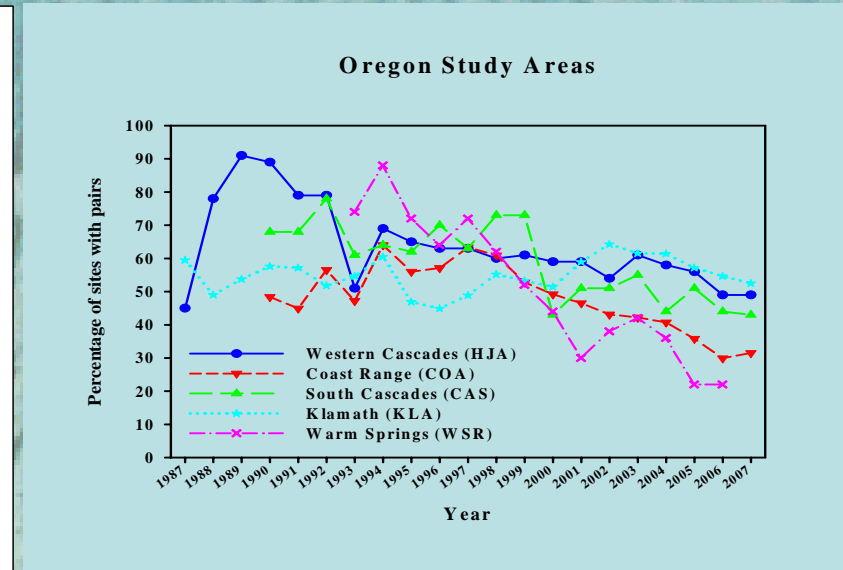
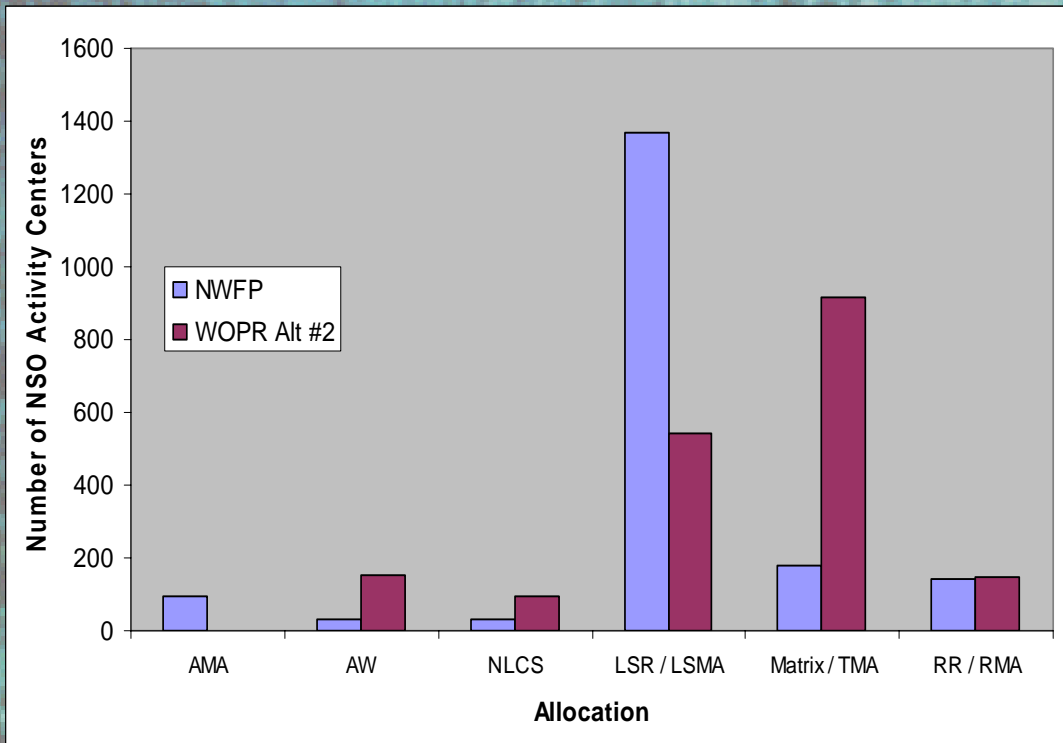


Washington Study Areas



Relationship Between NSO Recovery and BLM WOPR (“....revise existing plans to replace the Northwest Forest Plan allocations and management direction.” 2.4 million acres of O&C lands in w. Oregon)

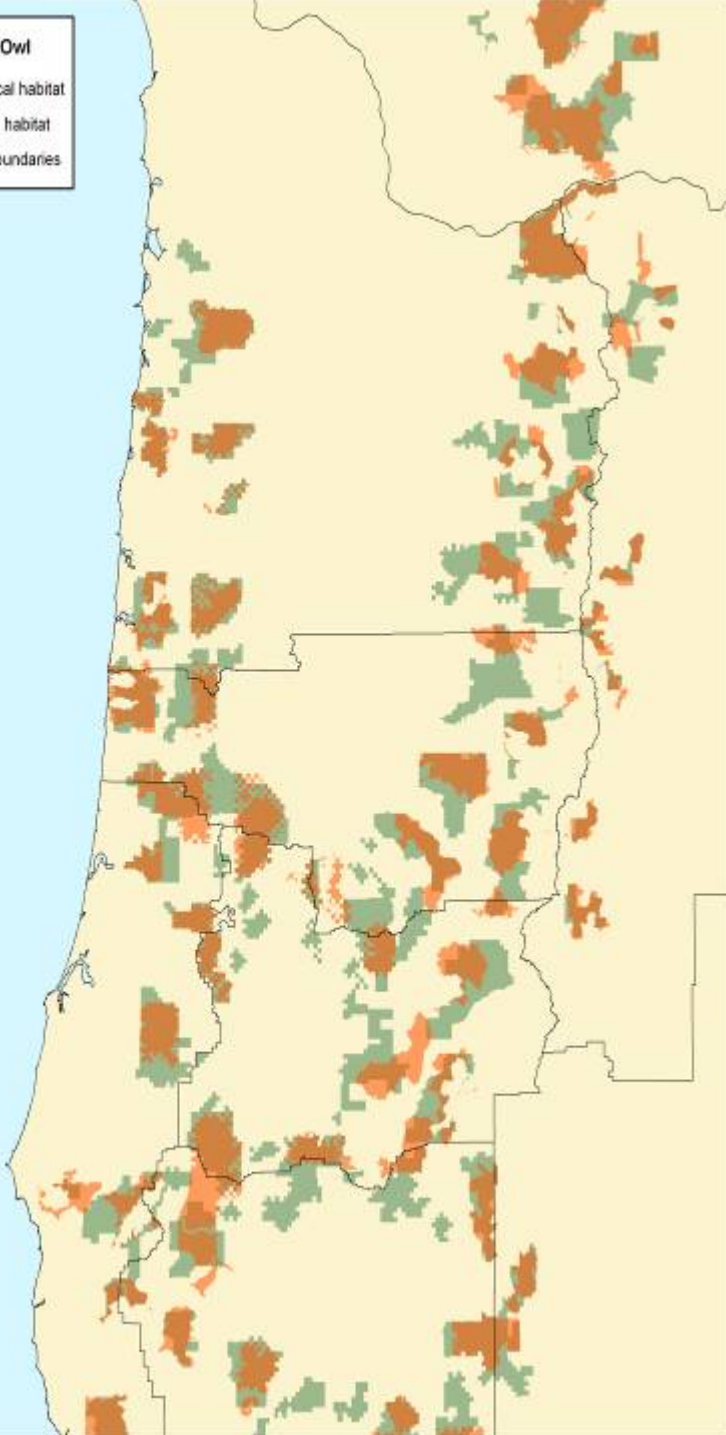
Forest Plan Revisions Via Decoupling



- Reduction in LSRs constitute a potential “take” of 830 NSO activity centers
- In 1994, OR had 2,893 owl sites – therefore, BLMs “take” would potentially represent ~29% of owl sites in OR?

Northern Spotted Owl

- Proposed critical habitat
- Current critical habitat
- BLM district boundaries



BLM WOPR and Critical Habitat Management **Via Decoupling**

| | Critical Habitat (acres) | LSOG (acres) |
|------------|-------------------------------------|-------------------------|
| Existing | 1,047,860 | 682,669 |
| Proposed | 616,297 | 357,519 |
| Difference | -431,563 | -325,150 |
| Percent | -41% | -48% |
| CH/LSOG | 65% | 58% |

- 50% reduction in Riparian Reserves
- Managed owl pairs in TMAs – no retentions/100 ac owl cores
- Clearcut LSMA after natural disturbance
- ACS, ACES become TMAs

Bruce Marcot Threat Workshops (6/30/06)

| Habitat Conditions | | | | | | | | | | | | | |
|---|---|---|-----------------------|---|--------------------|----|---|---|---|----|----|----|--|
| Loss of habitat amount & distribution from past activities & disturbances | 8 | 5 | rangewide | lower K; neg effects on survival & reprod & occupancy energy expenditures | A | 10 | 8 | 5 | 6 | 10 | 10 | 8 | |
| Habitat fragmentation (adverse change in pattern, distribution, patchiness, at any scale) | 6 | 3 | rangewide | incr, decr in prey; incr predation; energetic considerations; decr occupancy; changes in dispersal rates | A | 8 | 7 | 5 | 5 | 7 | 7 | 6 | |
| Loss of habitat heterogeneity | 6 | 5 | 1/ | reduce foraging, reprod, occupancy | A (some causes); B | 9 | 5 | 4 | 7 | 5 | 6 | 6 | |
| Ongoing habitat loss to timber harvest (conversion of habitat) | 8 | 5 | rangewide (ownership) | lower K; neg effects on survival & reprod & occupancy, energy costs | A | 5 | 8 | 7 | 6 | 10 | 10 | 10 | |
| Ongoing habitat loss to wildfire | 6 | 2 | rangewide | reduced occupancy, survival (poss); changes in fecundity | A | 7 | 8 | 4 | 8 | 5 | 6 | 6 | |
| Habitat loss to other causes (conversion of habitat to other) | 5 | 5 | rangewide | reduced occupancy, survival (poss); changes in fecundity | B,C | 6 | 8 | 3 | 4 | 4 | 4 | 3 | |
| Decline in habitat quality | 6 | 5 | rangewide | reduced foraging opportunities; reduced occupancy, survival, reprod | A | 4 | 4 | 3 | 5 | 9 | 6 | 9 | |
| Effects (change of ecosystem function) of fire exclusion on vegetation change | 5 | 4 | rangewide | + = replacement of pine forest by fir-dominated stands (created habitat); - = reduced foraging opportunity, but risk of loss of habitat is high; site abandonment | C (A) | 7 | 5 | 3 | 7 | 3 | 6 | 5 | |

* Rankings were done prior to Option 1 & 2/critical habitat proposed reductions

Bruce Marcot Threat Workshops (6/30/06)



Barred Owls

| | | | | | | | | |
|--|---|---|-----------|---|-------|---|----|----|
| Competition (interference compet., competitive exclusion, resource comp) | 9 | 2 | rangewide | reduced occupancy; reduced foraging opportunities; energetic constraints | A | 8 | 10 | 10 |
| Direct mortality / killing | 4 | 7 | rangewide | direct mortality | C (A) | 1 | 2 | 8 |
| Hybridization | 2 | 2 | rangewide | potential reduced fitness, survival; genetic swamping; lower recruitment | A (?) | 3 | 2 | 1 |
| Human disturbance | 1 | 2 | rangewide | increased stress; birds flush | A 2/ | 1 | 2 | 1 |
| Monitoring and research activities | 2 | 2 | rangewide | poss. reduc. survival, productivity, occupancy; change in behavior; energetic costs | C (A) | 2 | 2 | 1 |
| Shooting, trapping, direct mortality from humans | 1 | 2 | rangewide | direct mortality | C | 1 | 2 | 1 |
| Climate change (longer-term) | 1 | 4 | rangewide | decreased occupancy; loss of owls; lower K; could be positive effects | C | 0 | 1 | 2 |
| Stochastic weather events (period cycles) | 4 | 8 | rangewide | reduc in survival, reproduc | A | 3 | 6 | 1 |

- The September 2006 considered both habitat loss and BDOW as primary threats to NSO recovery.
- In October, the recovery team was directed by the WOC to make the BDOW the only level 1 threat and to make the plan “less focused on habitat preservation.”
- Draft NSO Recovery Plan failed peer review largely on habitat.

Devolution of Spotted Owl Conservation Strategy



2007 Proposed Cumulative Reductions

- NSO Option 1 (13-35%) (**decouple**)
- NSO Option 2 (34%) (**decouple**)
- NSO Critical Habitat (24%) (**decouple**)
- BLM WOPR (41% CH, 48% LSOG) (**decouple**)
- S&M reductions (?)
- Non-fed logging - 2-3 x higher than fed logging

- What would the Marcot and Courtney threat rankings be if panelists were given these 2007 projections instead of the assumption that the NWFP would remain intact?
 - Habitat should be given a priority 1 threat level
- What happens to “regulatory certainty” (listing factor D) under the decoupling scenario?
- How can you recover a declining species when habitat is being decoupled (in 30 yrs!)?



Recovery By Addition

Purpose/Intent of the Recovery Plan:

- Endangered Species Act (Congressional Findings)

*“The purposes of this chapter are to provide a means whereby the **ecosystems** upon which endangered species and threatened species depend may be **conserved**, to provide a program for the **conservation** of such endangered and threatened species....”*

Recovery **By Addition***



NWFP w/o BDOW

- **NWFP 15-20 pairs/LSR**
- **Matrix retentions (15% retentions)**
- **Dispersal (Riparian Reserves/HCPs)**

Recovery With BDOW

- Bigger reserves needed to reach 15-20 pair occupancy**
- More retentions needed to enhance dispersal (RP was weak – see TWS review)**
- Higher quality dispersal habitat w/increased non-fed contributions**
RP was weak on non-fed contributions, particularly in OR

***Assumption – NWFP is the floor below which habitat must not decline on federal lands.**

**** Re-couple the RP to the NWFP!**

Recommendations/Conclusions

- Decoupling NSO RP from NWFP is a recipe for future endangerment (RP will be used in Sec. 7 consultations on forest plan revisions – also see TWS peer review).
- Option 2 is a return to the old SOHA/SOMA days where the action agencies get to pick large blocks (regulatory uncertainty).
- Both options 1 and 2 are a departure from the NWFP, which should be a floor for criterion 3.
- Consider potential cumulative impacts in threat rankings— Option 1/2, NSO Critical Habitat, BLM WOPR, S&M, HCPs, non-fed logging – habitat protection should be given equivalent priority as BDOW in conservation actions.
- If BLM reduces protections, does this increase the amount/ type of contributions needed from non-fed lands and NF?
- Designate all remaining NSO suitable habitat on fed lands as critical habitat or manage it under LSR guidelines (also see Pearson and Livezey 2007).



*“ We also do not want to suggest that development of **additional habitat and protection** of existing habitat are not important conservation objectives.” Courtney et al. 2004*