Implications of Lower Recent Fire Risk for Stand-Level Restoration

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2008 Recovery Plan (withdrawn) Identified High Risk

Based on estimates of rates of high-severity wildfire:

1. Oregon Eastern Cascades Province: 69-yr high-severity fire rotation, based on preliminary data on the 2003 B&B fire
2. Oregon Klamath Province: 105-year high-severity fire rotation

Extrapolated from these Province estimates to Cascades/Klamath scale

"…the rate of loss of older forests to stand-replacement wildfire has been relatively high…there is evidence that wildfire activity will continue or increase…thus, it is unlikely that designating Spotted Owl habitat reserves within fire-prone landscapes will be effective"

(Recovery Plan, p. 20)

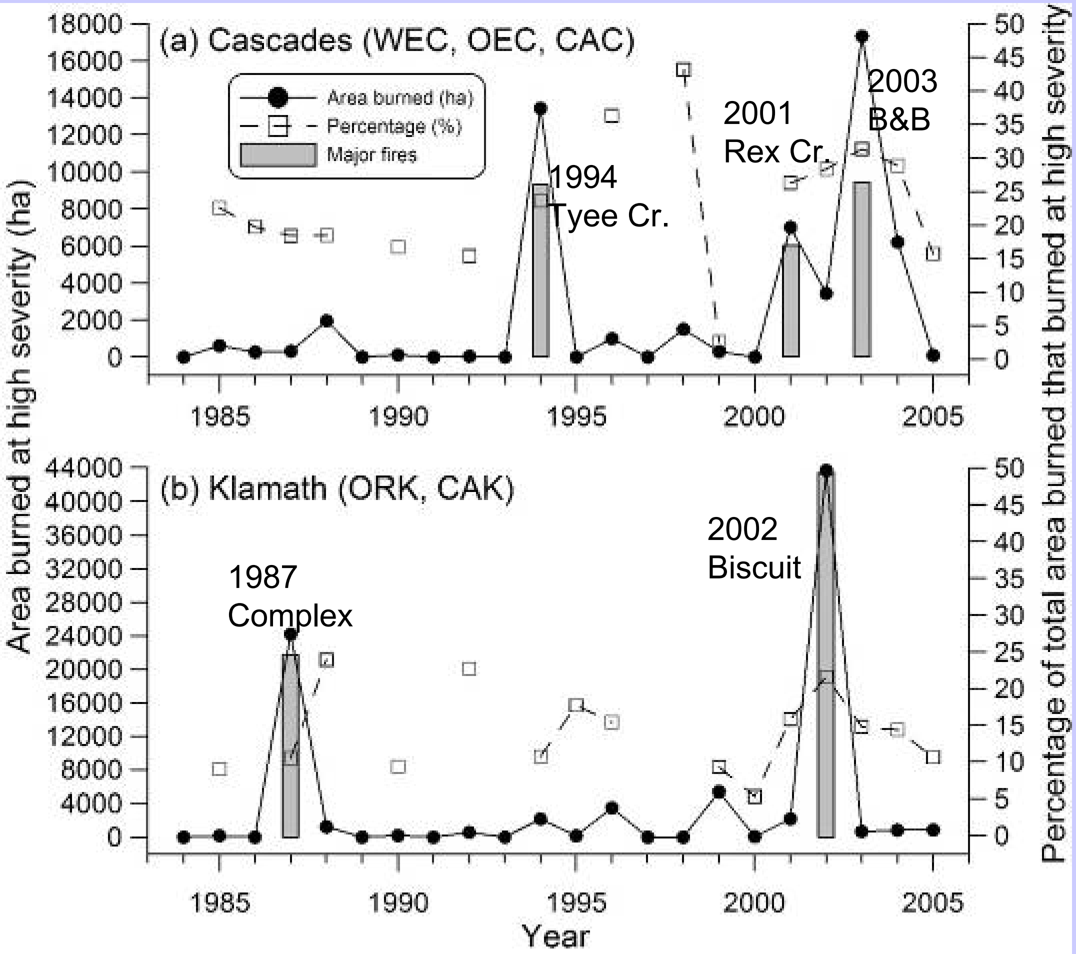
Proposed in three E. Cascades Provinces:

1. No reserves in dry forests
2. Fuel treatments on up to 65-70% of dry forests

Test: Is Fire Risk High in Dry Forests?

- GIS analysis using more complete data:
  - High-severity fire (1984-2005): Monitoring Trends in Burn-Severity (www.mtbs.gov) data
    - Our RdNBR threshold represents about 60% mean % basal area mortality of trees ≥ 50 cm dbh
  - Old forests: 1996 (Moeur et al. 2005)
  - Northwest Forest Plan federal lands
  - Dry forest provinces (www.reo.gov)
- High-severity fire rotation
  - period/fraction of area burned
  - 5, 10, 20-year periods to study effect of period
- Old-forest recruitment (Moeur et al. 2005)

Area burned at high severity on federal land in dry forests



PROVINCES:

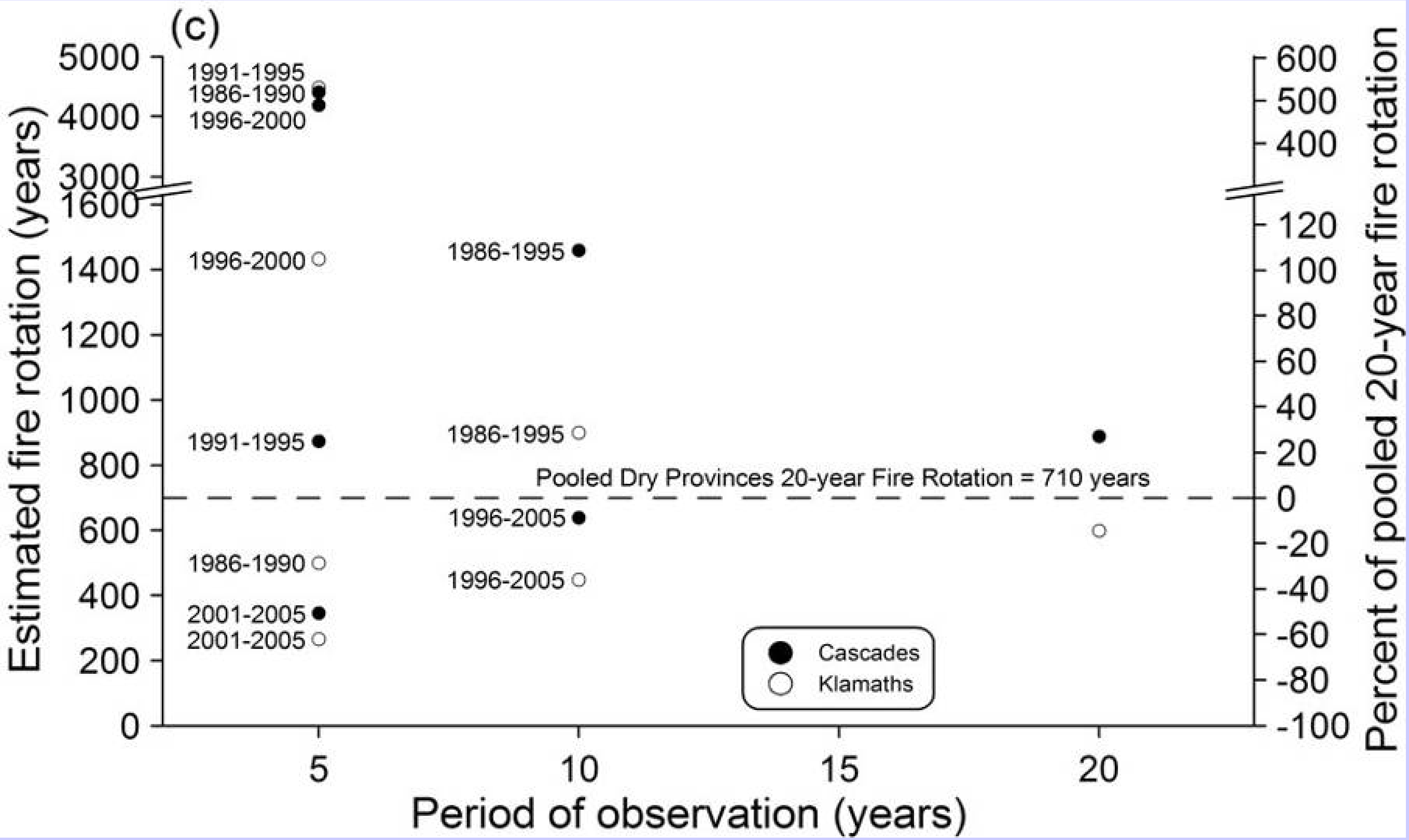
WEC = Washington Eastern Cascades ORK = Oregon Klamath
OEC = Oregon Eastern Cascades CAK = California Klamath
CAC = California Cascades

No significant trend (p = 0.346) in percent high severity in Cascades/Klamath
- Percent high severity of 20-25% similar to HRV (Hessburg et al. 2007)

Significant (p = 0.045) trend in rank-order area burned at high severity in Klamath
- Not much can be made of trend analysis or future predictions—only 5 fires

Looks like lots of fire but fire rotations long; what is effect of period of observation?

High-Severity Fire Rotation Versus Period of Observation



Note: Based on total area burned on federal lands, not area burned in old forest

Old-Forest Recruitment Versus High-Severity Fire Rotation in Old Forests (1996-2005) in Dry-Forest Provinces

Province	High-severity fire rotation (years)	Ratio of old-forest recruitment area to high-severity burned area: Using average recruitment estimate[a]	Using low recruitment estimate[a]
Washington Eastern Cascades	372	7.06	3.53
Oregon Eastern Cascades	469	8.92	4.46
California Cascades	4,545	86.36	43.18
CASCADES	746	14.18	7.09
Oregon Klamath	233	4.42	2.21
California Klamath	1,351	25.68	12.84
KLAMATH	575	10.92	5.46

[a] Old-forest recruitment data from Moeur et al. (2005)

High-Severity Fire Occurred Historically and Spotted Owls May Use High-Severity Burns

- E. Cascades dry forests historically shaped by mixed-severity fires (Hessburg et al. 2007)
- Spotted owls use old forest, but may benefit from successional diversity created by fire (Franklin et al. 2000)
- Spotted owls may preferentially forage in high-severity fire areas (unless logged) likely due to greater prey abundance (Clark 2007, Bond et al. 2009)
- Inappropriate to assume that high-severity fire at current rates is a risk to NSO or represents habitat "loss"

Dennis Odion photograph

Dominick DellaSala photograph

Summary—Main Findings About Fire Risk & NSO

- Fire-risk assessment unreliable over short periods (e.g., 10, 20 yrs) and small areas (province scale). Need large areas, long periods:
  - Most burned area from a few fires that are large and spotty
  - Fire rotations are several centuries--10-year data far too short
    - Climatic teleconnections (ENSO, PDO) influential in short periods
- Reported decadal high-severity fire rotations in RP revised:
  - Cascades not 69 years, but 746 years
  - Klamath not 105 years, but 575 years
- Old-forest recruitment *omitted* in RP fire-risk assessment. Ratios of old-forest recruitment to high-severity burned area are high:
  - Cascades: 7.1 times (low est.) to 14.2 times (avg. est.)
  - Klamath: 5.5 times (low est.) to 10.9 times (avg. est.)
- Dramatic increase in high-severity fire (e.g., 5-10 times as many huge fires per decade) would need to occur for net declines in old forest to begin; high-severity rate not currently a risk to NSO
- Spotted owls *do* use high-severity burned areas, so *not* habitat loss

Implications for Stand-Level NSO Habitat Restoration

- *Abandoning reserves/extensive fuel treatments not needed:*
  - *If anything is shown by decadal data, current fire risk is low*
    - *Allows us to focus on owl habitat needs, not risk of fire*
  - *Extensive action inconsistent with adaptive-management framework*
- *Using a precautionary approach: small-scale research & adaptive management to understand NSO response to:*
  - Natural processes (wildfire, insect outbreaks)
  - Science-based actions aiming to enhance/restore NSO habitat
    - e.g., There are no empirical studies of NSO response to thinning in dry forests
- *After findings at small-scale are available, can scale up:*
  - Manage natural processes in ways found to benefit NSO
  - Implement enhancement/restoration actions found to benefit NSO
- *In the meantime, take "No regrets" active/passive steps that benefit owls first and foremost*

“No Regrets”--Maintain/Restore Known Stand-Level Habitat Features for NSO in Dry Forests

- High number/density of large (> 60 cm dbh) Douglas-firs or grand/white firs (King 1993, Buchanan et al. 1995, Everett et al. 1997)
- Large basal area, especially Douglas-fir (Buchanan et al. 1995, Pidgeon 1995)
- Large quadratic mean diameter of dominant trees (Lint 2005)
- High canopy cover (King 1993, Pidgeon 1995, Lint 2005)
- Multiple tree layers, including abundant medium & small grand/white fir or Douglas-fir (King 1993, Pidgeon 1995, Everett et al. 1997)
- High density of large pine snags in lowest decay class (Pidgeon 1995)
- Large volume of mature-sized down logs (Pidgeon 1995)
- High understory litter, ferns, and tall shrubs (King 1993, Pidgeon 1995)


U.S. Fish & Wildlife Service photo

More “No Regrets” Stand-Level Management for NSO in Dry Forests

ACTIVE STAND-LEVEL MANAGEMENT

- Actively manage wildfires for resource benefit
    - To maintain fire process essential to NSO in the longterm
- Reduce excessive human-caused fires in and near NSO habitat
    - Use temporary road closures during severe droughts
    - Reduce/redesign infrastructure to limit ignitions and fire spread
- Reduce human-caused high-contrast edges that favor ignition/spread
    - Edges from logging, roads, exurban development, powerlines
    - Redesign edges to lower ignition/spread probability
    - Limit or reduce edge-creating land uses in and near NSO habitat
- Limit invasion/expansion of fire-cycle invasive species (cheatgrass)
    - Restrict human access, livestock, heavy machinery near reserves
    - Directly control fire-cycle invasives/do not burn where they occur
- Carefully manage slash from restoration treatments/other activities
    - Rapid treatment of large quantities can damage soils/favor invasives
    - Failure to promptly treat slash undermines the purpose of treatments

More "No Regrets" Stand-Level Management for NSO in Dry Forests

PASSIVE STAND-LEVEL MANAGEMENT

- Designate NSO habitat-restoration areas
  - Management focused on restoring NSO habitat components
- Expand late-successional reserves
  - Add protection from post-fire logging to additional area
  - More fully encompass remaining nesting, foraging, roosting habitat
  - Include areas of dense, old firs among younger forests
- End post-fire logging in NSO habitat
  - So owls do not avoid logged areas they could use (Clark 2007)
- Protect and maintain natural heterogeneity from mixed-severity fires
  - To provide future habitat for NSO
  - Potential insurance against unexpected or severe climatic change

Dominick DellaSala photograph

Summary

- Fire-risk assessments based on short periods and small areas are generally unreliable
  - If anything, these data indicate current fire risk is low and ample time is available for careful adaptive-management steps
    - Treatments can focus on NSO habitat improvement, not fire risk
- We suggest 3 approaches to NSO recovery in dry forests:
  1. First, conduct essential research, using small-scale adaptive management, to better understand NSO response to natural processes and potential active/passive restoration actions
  2. Afterwards, scale up, but continue adaptive management:
     - Appropriate management of natural processes that benefit owls
     - Active/passive restoration actions that benefit owls
  3. Meanwhile, undertake “No Regrets” active/passive management actions that address owl habitat needs first and foremost

Baker Handouts

- New spatial reconstruction of dry forests and fire, Pringle Falls area, AD 1880-1882
  - Dry forests commonly had understory pines, at times dense understory pines
  - Shrubs were abundant, usually dense
  - Tree density in many areas was high
  - Large trees common, but small trees numerically dominant
- Fire rotation and mean fire interval longer than previously thought
- Email BAKERWL@UWYO.EDU for copies

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