

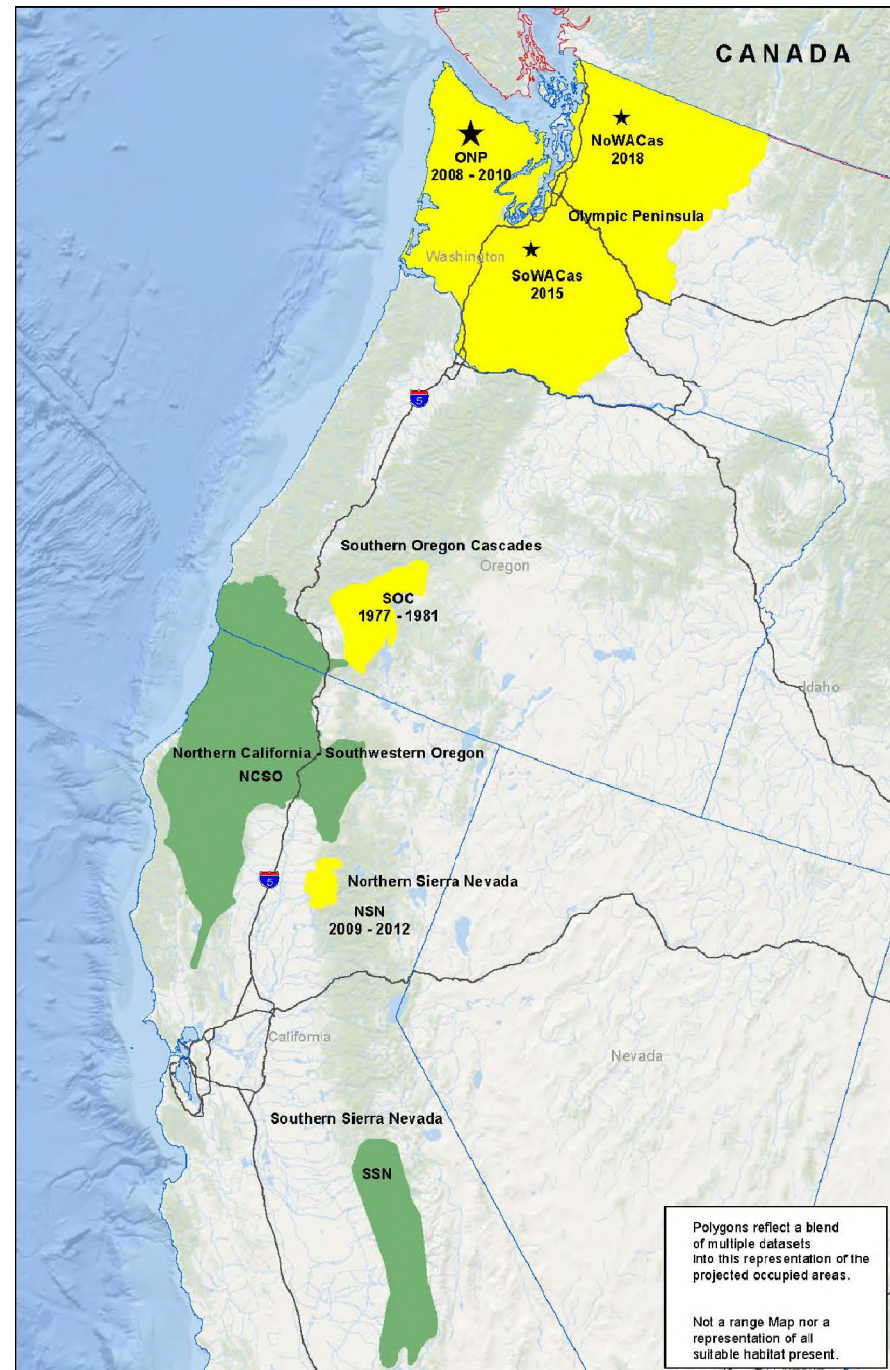
West Coast DPS of Fisher - Briefing

PACIFIC SOUTHWEST REGIONAL OFFICE

DECEMBER 18, 2018



West Coast DPS for fisher: population areas



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DATA SOURCE: USFWS
MAP SOURCE: ESRI Online Mapper
Date: 04, 2016
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Legend
Native West Coast Fisher Populations
Reintroduced West Coast Fisher Populations

Information displayed is **DELIBERATIVE** and should be considered **DRAFT** for internal discussion.

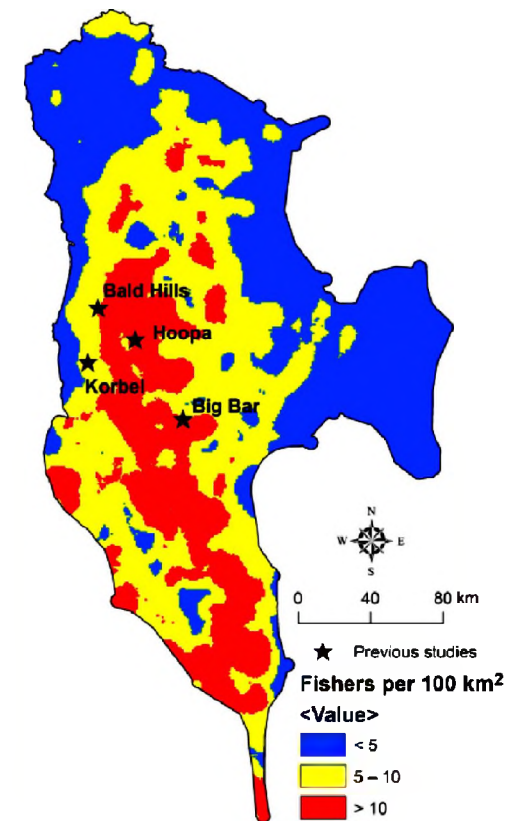
New Population Info and Trends

No Calif-So Oregon (CDFW-led study, mixed methods)

- Estimated population - 3,196 fishers (range: 2507-4184)
- Avg density = 6.6 fishers/100 km²
- Abundance (model output):
 - tree canopy cover (+) but latitude (-)
 - increased with elevation, but declined at highest elevations, where tree canopy declines (sub-alpine and alpine habitats)

Klamath-Siskiyou ecoregion (D. Green, wildfire study)

- Populations relative stable, 2006-2013 (λ generally > 1)
- Overall pop. decline due to lower # in burn area; redistribution of population
- Identified 176 unique individuals (2006-2015)

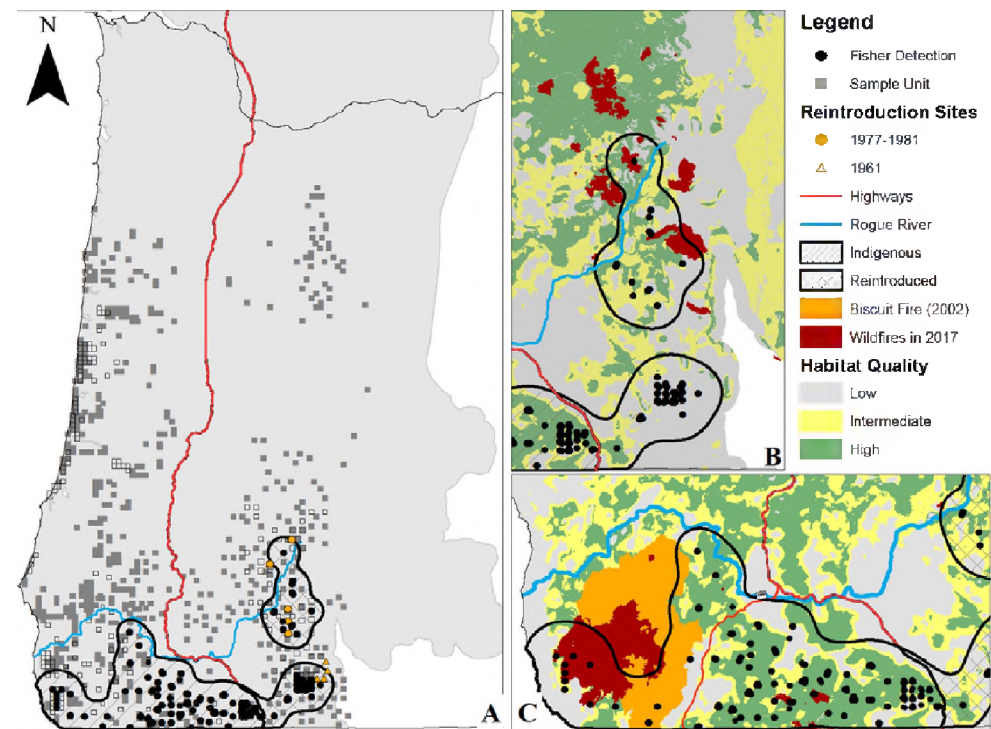


From Furnas et al. 2017

New Population Info and Trends

Southern Oregon (Brent MS Thesis; cameras & detection dogs)

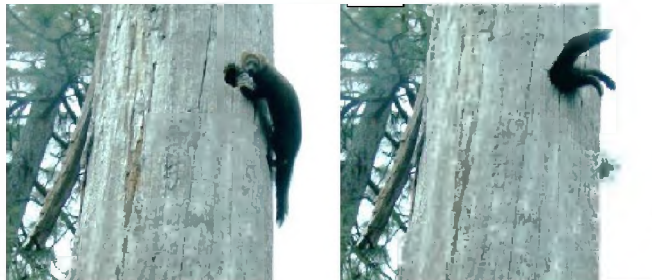
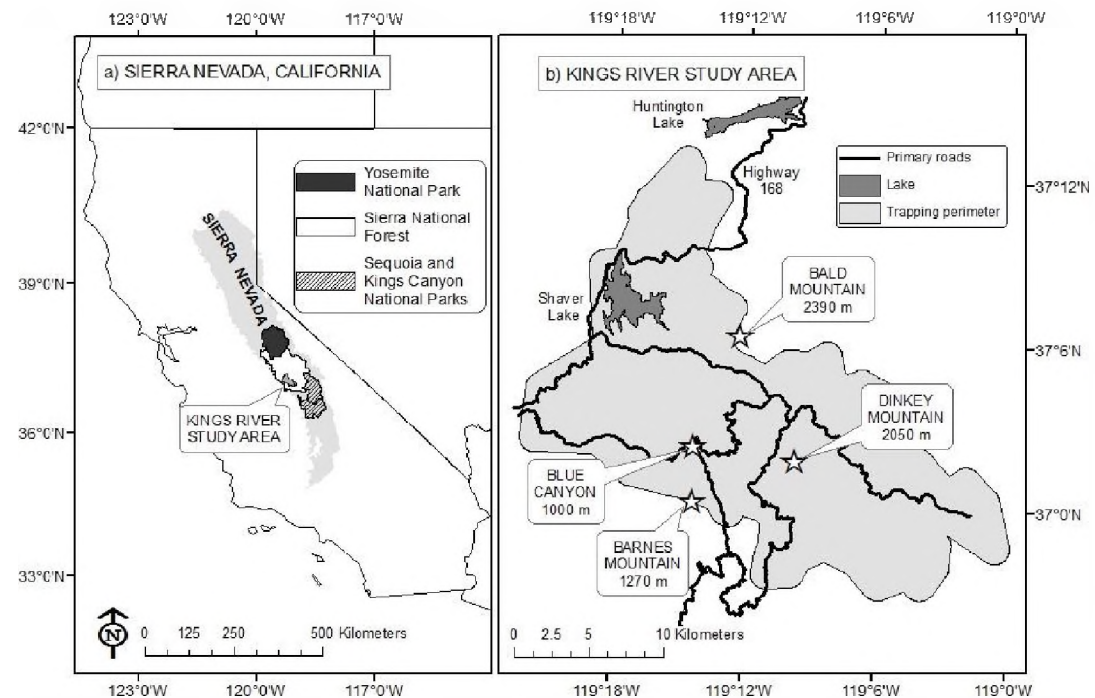
- Reintroduced fisher population in OR Cascades is persisting, but less than expected; population is small, relatively isolated
- 'Native' population – relatively common where found; but generally not in coastal area of Klamath Mtns (esp. relative to Biscuit Fire)
- Estimated range much smaller than previous estimates
- Genetic sampling (32 samples)
 - 2016: 6 individuals id (4 females, 2 males) in Cascade Mtns; all recaptures
 - 2017: 6 individuals id (4 females, 2 males) from the Klamath-Siskiyou Mountains; all new individuals to the DNA database in the region



New Population Info and Trends

Southern Sierra Nevada (R Green PhD dissert., Kings River study area)

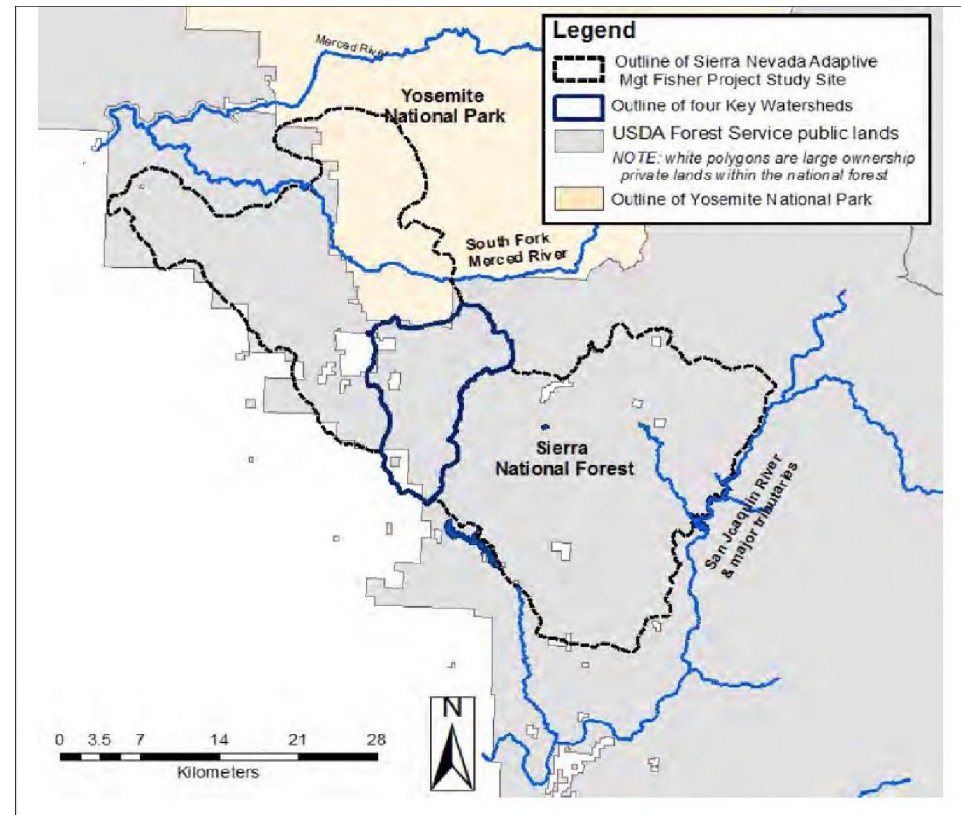
- Reproductive ecology study:
 - 71% reproduced
 - Denning animals: 75% successful
 - Documented den failures due to predation
 - Provides info re microsites and structures for resting and denning
 - For dens: California black oak and white fir were used in greater proportion to their availability (tree cavities)



New Population Info and Trends

Southern Sierra Nevada (SNAMP, collaborative study Bass Lake RD and Sierra NF study area)

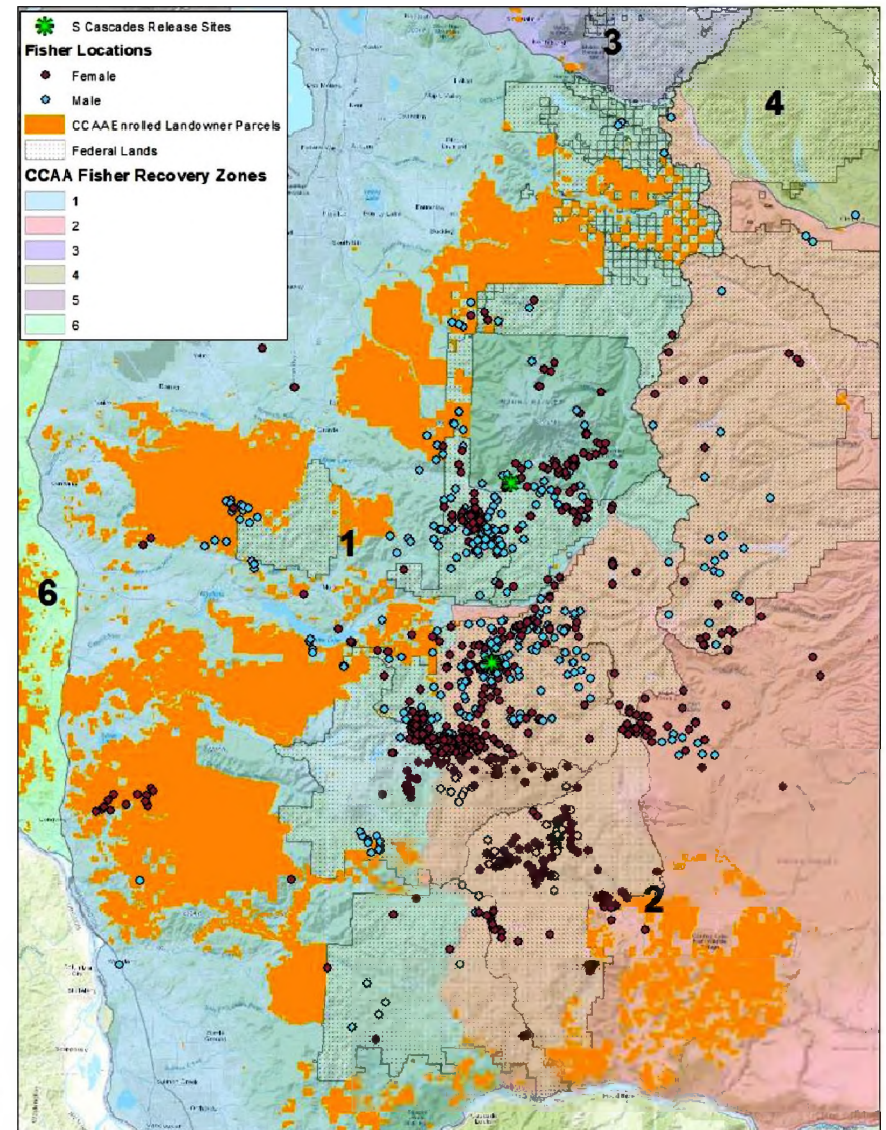
- Population growth rate – 0.99 (0.86-1.10)
- Adult survival rate – 0.71
- Predation (bobcat) is highest mortality risk



New Population Info and Trends

Washington Cascades (reintroductions)

- Total of 69 fishers released (Southern Cascades) as of Feb 2018
- 21 mortalities; 17 found; only 6 confirmed cause of death
- Oct. 2018 – 4 released at Mt Rainer NP
- Dec 2018 – 8 released into Northern Cascades
- An additional 32 releases into No Cascades expected this winter



Threat Discussion – Effects Associated with Small Populations

In general, species that occupy a narrow geographic range with specific habitat requirements ***and*** always occur in small populations have a high conservation priority

Small populations are vulnerable to a rapid decline in their numbers and localized extinction due to:

- (1) loss of genetic variability,
- (2) fluctuations in demographic parameters, and
- (3) environmental stochasticity or random fluctuations in the biological (e.g., predation, disease) and physical environment (e.g., wildfire, drought events)

Consideration of these three elements along with life history traits can provide an extinction vulnerability profile for the West Coast DPS

Threat Discussion – Effects Associated with Small Populations

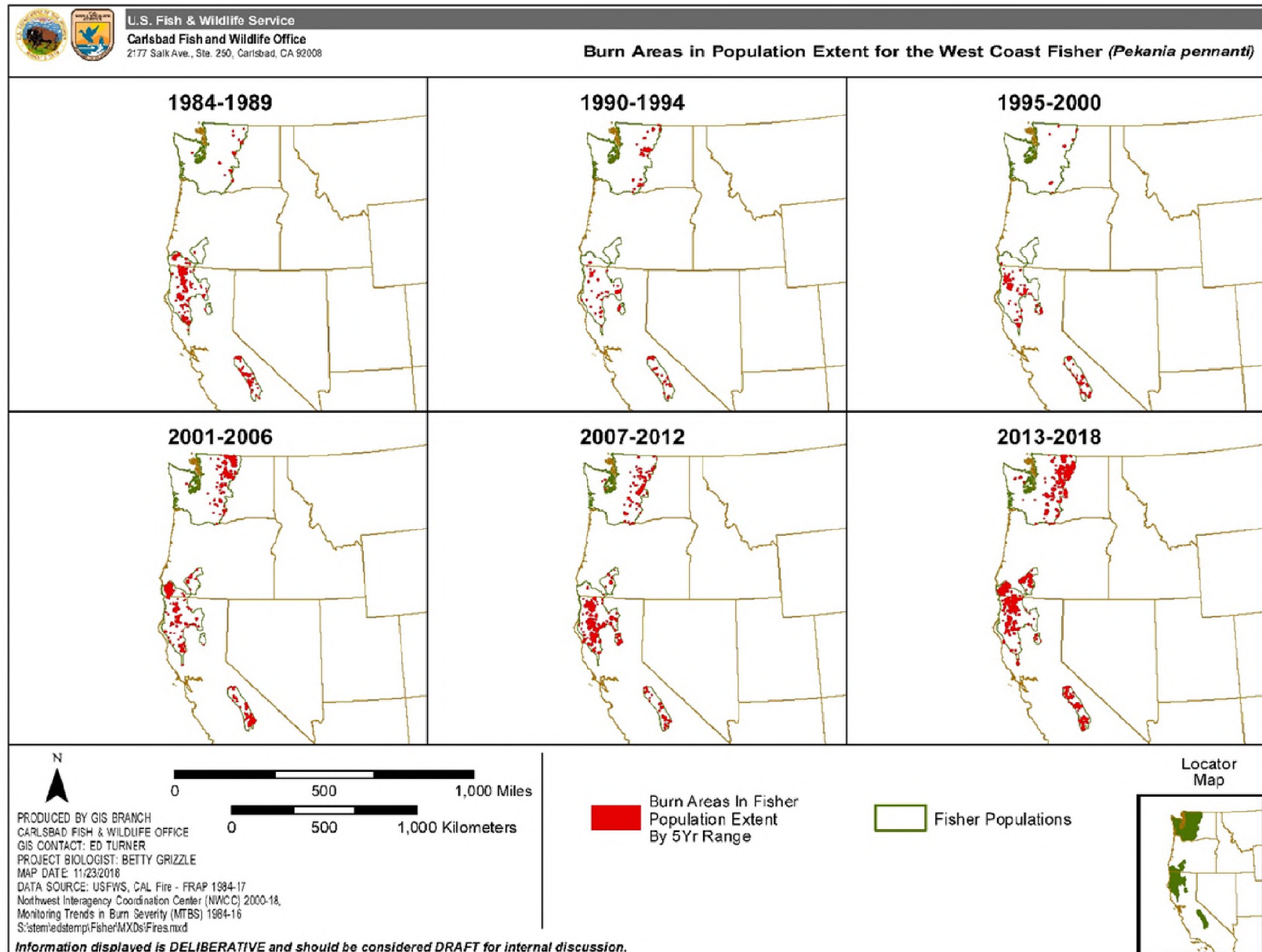
These attributes may limit the distribution and population growth of West Coast DPS:

- Loss of large contiguous areas of historical habitat in combination with restriction of the species to forested habitats
 - due to timber harvest practices, development, and large, high severity fires whose frequency and intensity are in turn influenced affected by the effects of CC
- Dependence on specific elements of forest structure, including microsites for denning and resting
- Susceptibility to injury or mortality due to predation from co-occurring larger predators
- Susceptibility to injury or mortality, and potential loss of reproductive capacity, due to exposure to toxicants introduced into the natural environment from human activities.

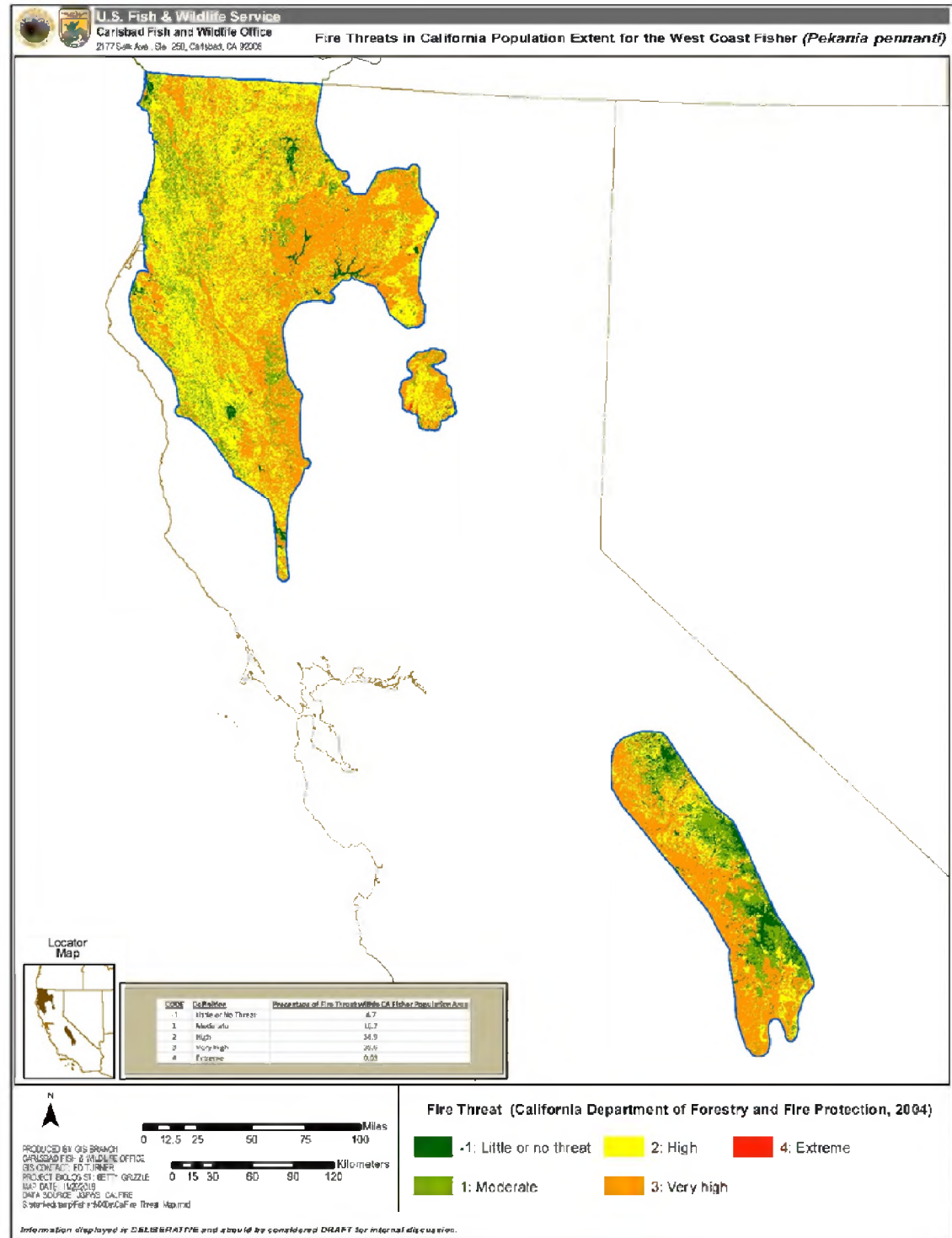
Threat Discussion – Wildland Fire: effects to fisher/fisher habitat

1. Oregon study (Barry 2018 MS thesis): Fishers not detected after Biscuit Fire in 2017 (large, severe fire)
2. Modeling study (Sierra NF and Yosemite NP) (Bomdahl 2018 MS thesis): forest structure re denning habitat are maintained for fires that burn at low severity
3. Zielinski and Gray (2018): interpreted Sweitzer et al. (2016) study to conclude that their research did not identify consistent negative effect of fire
4. Klamath-Siskiyou ecoregion (D. Green 2017): fisher populations declines after wildfires (between 2014 and 2015); density declined, esp. with loss of more than 50% canopy cover
5. Modeling study (Yosemite study area): high severity burn areas do not provide suitable den characteristics; low severity burns can be beneficial

Threat Discussion – Wildland Fire: Fire History



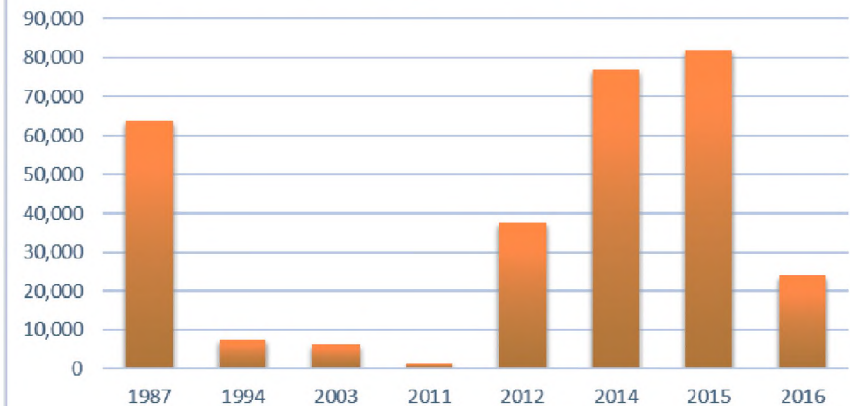
Threat Discussion – Wildland Fire: Burn Threat (Calif only)



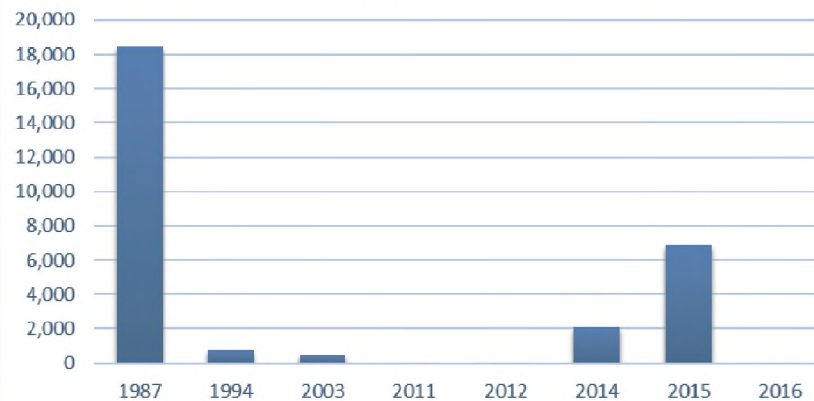
Threat Discussion – Wildland Fire: Burn Severity within fisher population areas

(not all years processed)

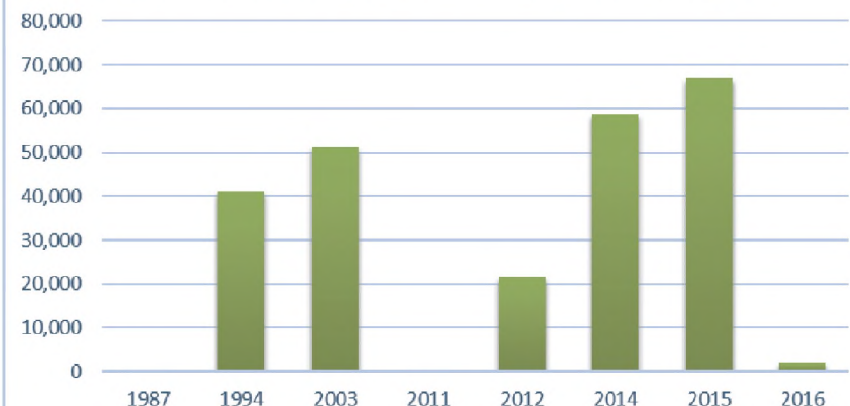
Acres burned at high severity: California



Acres burned at high severity: Oregon



Acres burned at high severity: Washington



Threat Discussion – Wildland Fire

Should evaluate vulnerability in the context of “cumulative” and/or “synergistic” effects

- Tree mortality/bark beetles
- Drought events
- Projected CC effects ($\uparrow T$ and $\downarrow P$)

Tree mortality studies re fisher

- Influences cortisol levels, which may affect reproduction, survival
- Preference for areas with lower % mortality

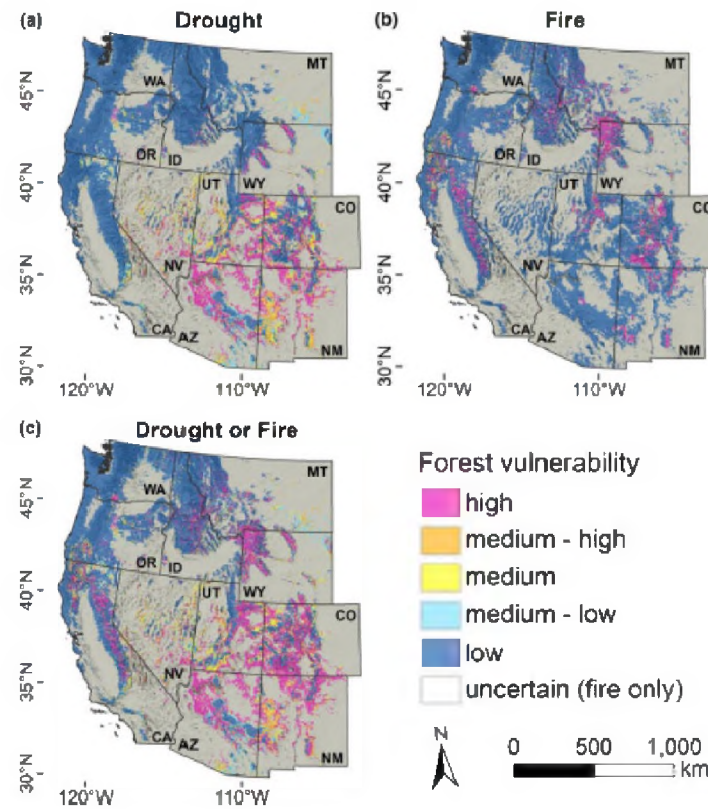


FIGURE 5 Vulnerability of forested areas during 2020–2049 to (a) drought, (b) fire, and (c) either drought or fire. Colors indicate agreement between CLM simulations with two climate projections, where one GCM low and one high (uncertain) = gray, both GCMs low = dark blue, one low one med = cyan, both medium = yellow, one medium one high = orange, and both high = magenta

	Uncertain	Low	Medium-Low	Medium	Medium-High	High
Drought	0	815,600	108,960	86,960	63,248	201,936
Fire	13,728	1,046,160	33,840	17,680	25,520	139,776
Total	0	651,616	118,544	93,952	75,184	337,408

Note. Categories reflect agreement between CLM simulations run with two climate projections, as described in the main text.

TABLE 1 Forested area (km²) in each drought, fire, and total (maximum of drought or fire) vulnerability category during 2020–2049

Threat Discussion – Wildland Fire

What is being implemented to address this risk?

- *California, feds, green groups partner on more logging to stop deadly wildfires* (news article 12/11/2018)

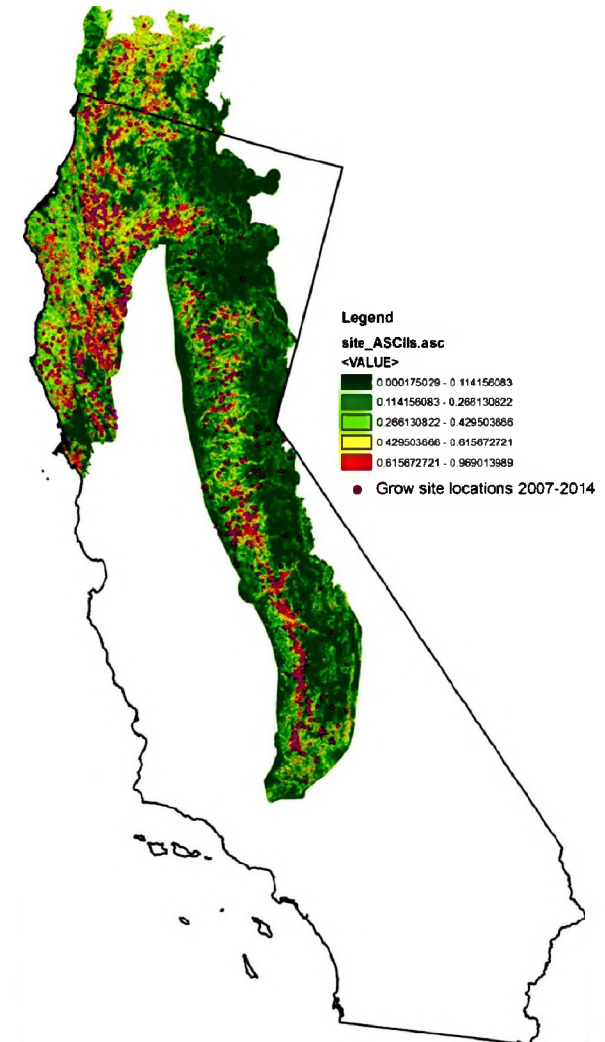
Threat Discussion – Anticoagulant Rodenticides (ARs) and Other Toxicants

Key on-going studies, Gabriel et al.

- 44% of high quality fisher habitat within areas predicted as moderate-high likelihood for illegal grow sites (red areas = highest likelihood, green = lowest)
- For 77 sites, 23% with 1st gen ARs, 31% with 2nd gen ARs, but also 40% with carbamates and 34% with organophosphates
- For 34 sites – fisher mortality due to poisoning confirmed at one site; AR residue in livers found for animals with other causes of death

With legalization/policy changes: fewer sites, but footprint getting larger; more intensive use of 1st gen ARs

Need to also evaluate exposures in prey base, sublethal effects, other exposure routes



Proposed DPS And Alternatives

DPS Policy Standards

(Rationale for west coast DPS of fisher)

DISCRETENESS:

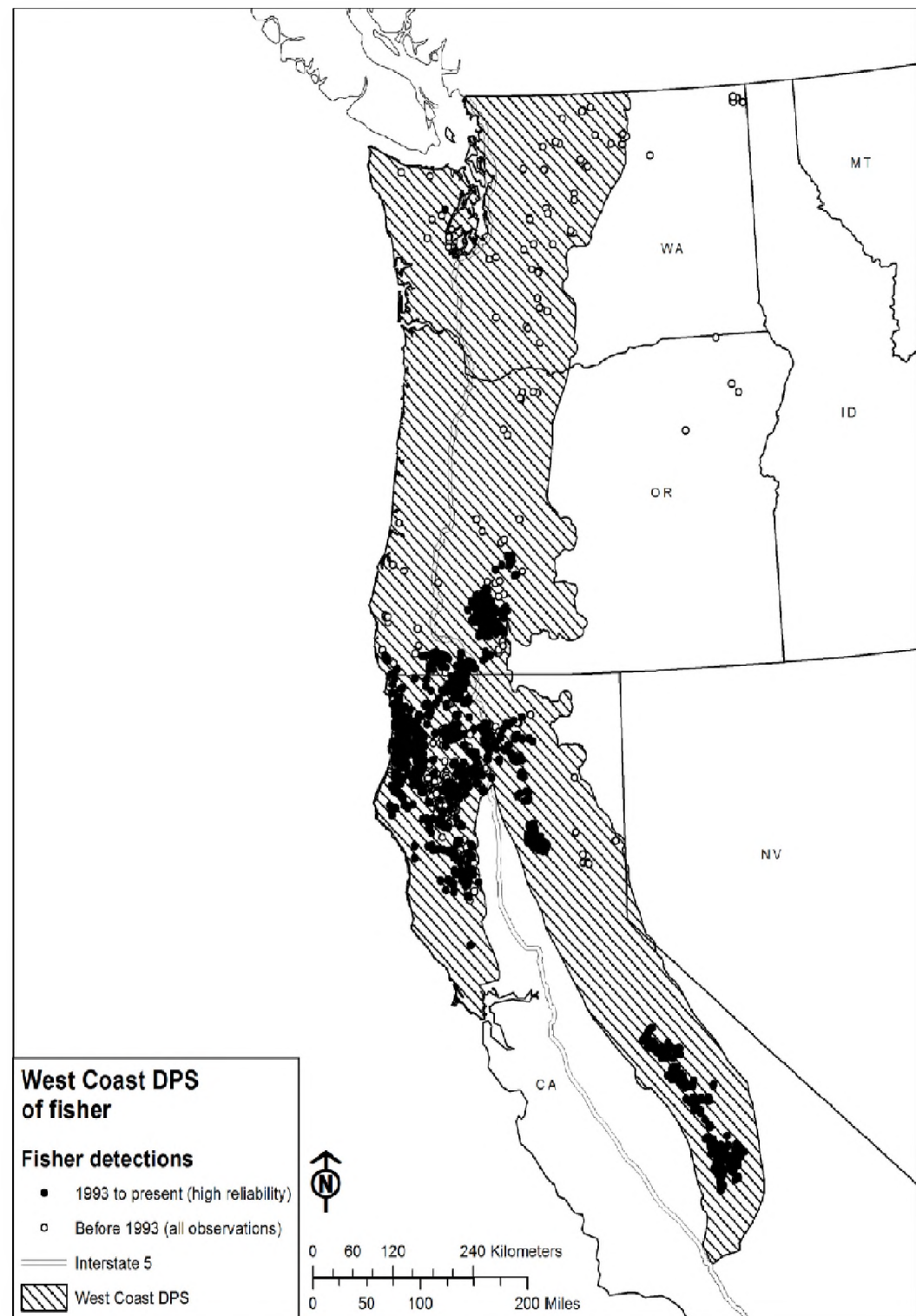
- Native & reintroduced pops are markedly separate from pops to the east by geographical barriers, unsuitable habitat, & urban development
- Native pops are markedly separate to pops to the north by ~560 mi; extremely unlikely that transient individuals could disperse far enough to provide a functional pop connection between the native NCSO pop & Canadian pops.

SIGNIFICANCE:

- Significant loss of the species from a unique ecological setting b/c fishers in the West Coast inhabit landscapes dominated by different forest types, climate, & predator–prey relationships compared to fishers in the rest of the range of the taxon.
- Significant gap in the range; significantly impact representation of the species by shifting the southern boundary of the taxon > 994 mi to the north & would create a significant gap in the range of the taxon because of its situation at the southern periphery of the species' range.
- Reduction in the species' genetic diversity.
 - Differ markedly from other pops in their genetic characteristics b/c these native fisher pops on the West Coast are genetically distinct from fishers in the remainder of North America (e.g., Canada, Rocky Mtns, & Great Lakes) and from each other.

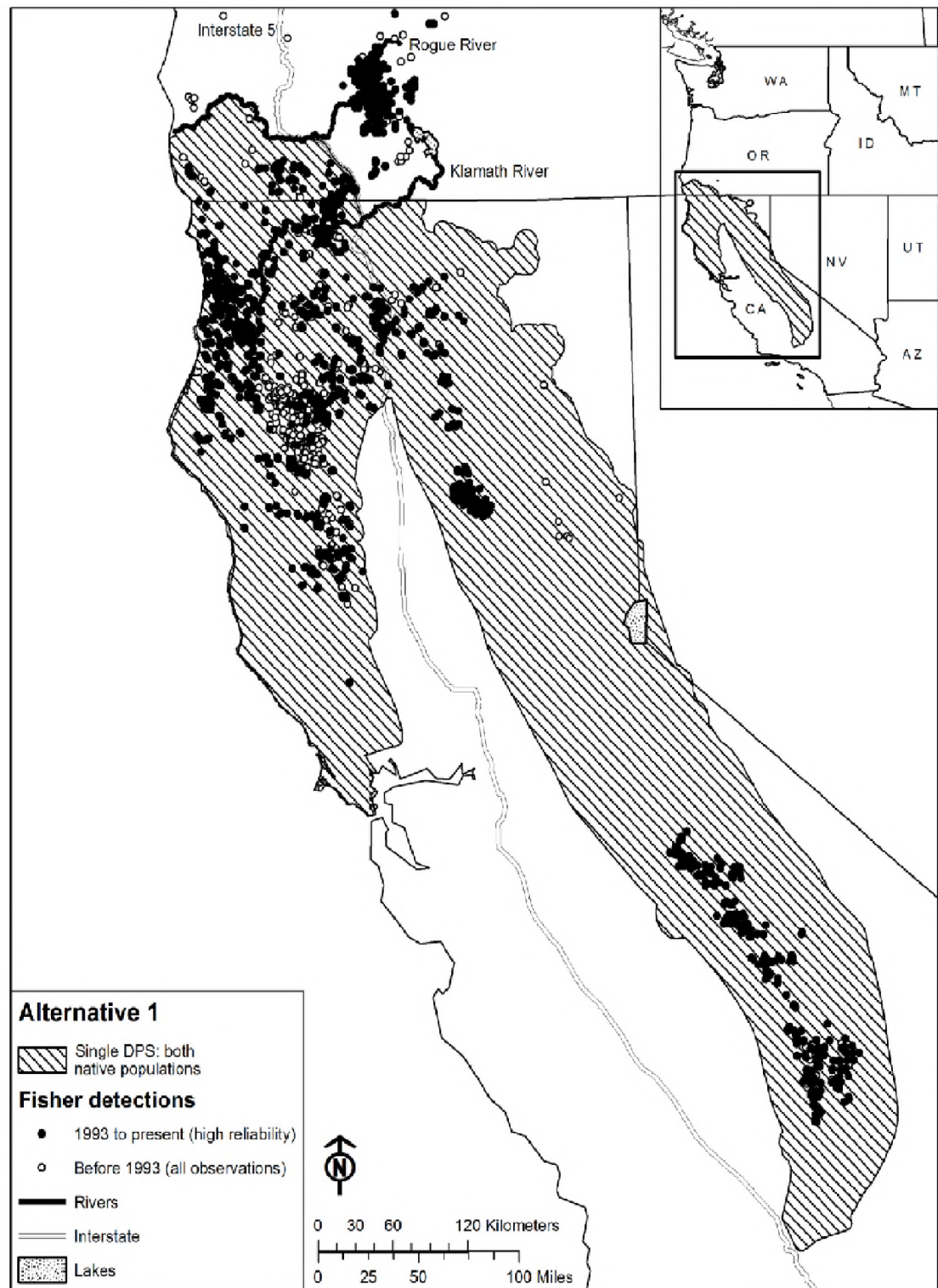
2014 Proposed DPS

--covers the range
of the 2004 Finding
--international
border and south
to include [then] 3
reintroduced pops,
2 native pops, &
suitable habitat



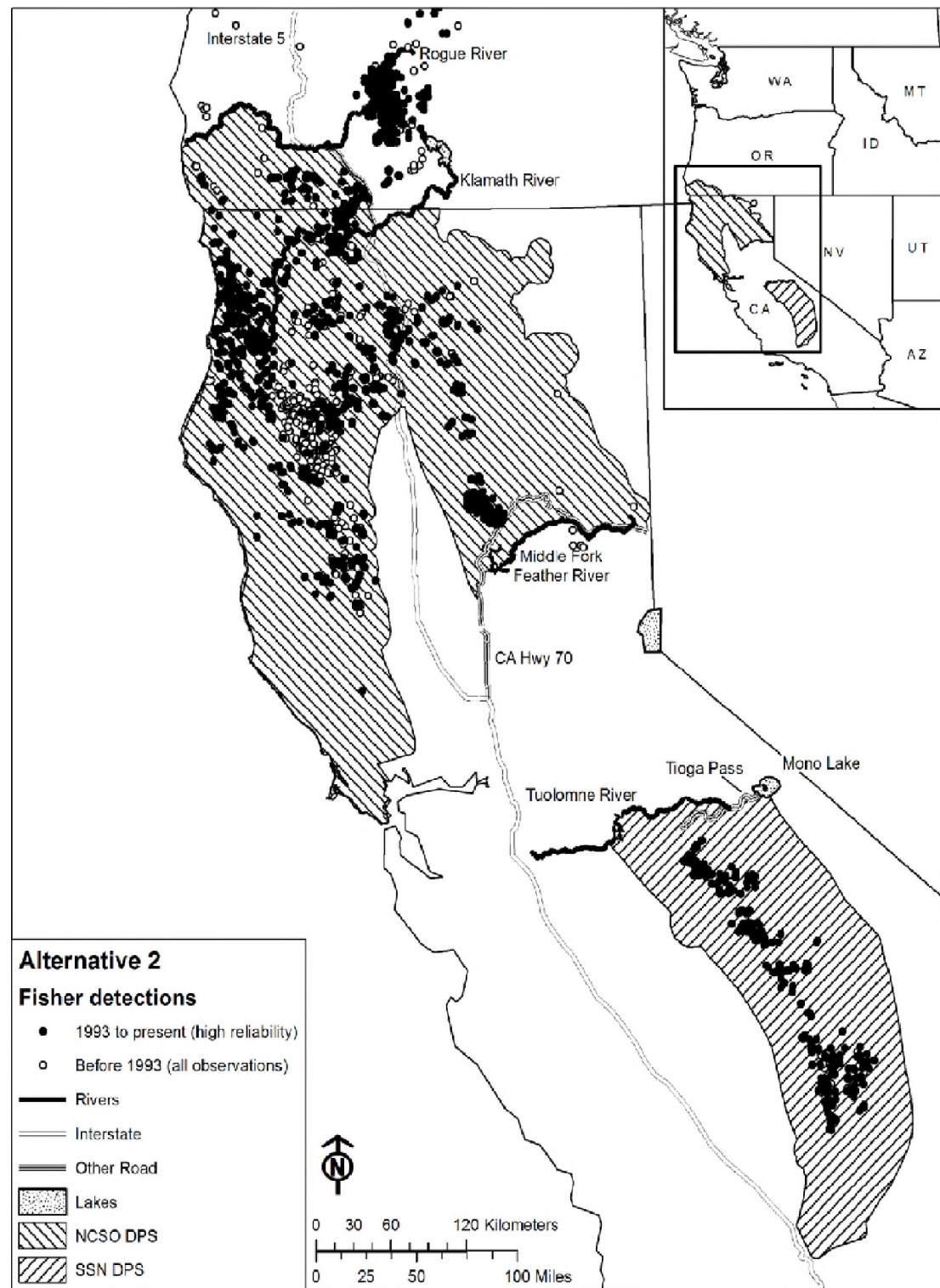
DPS Alternative 1

--a single DPS encompassing the extant native populations (one DPS that includes NCSO (which includes the reintroduced native NSN) & SSN



DPS Alternative 2

--two separate narrowly drawn DPSs around each of the extant native populations (one DPS around NCSO (which includes the reintroduced native NSN) and one DPS around SSN)



Why the 3-state analysis area/boundary?

- 2000 petition targeted CA, OR, & WA.
 - FWS began analysis with this area constituting the DPS boundary
→ valid DPS

OTHER IMPORTANT NOTES WE SAID IN 2014 PROPOSED LISTING RULE:

- *“The range of a species may theoretically be divided into any of several potential configurations that may all meet the discreteness and significance criteria of our DPS policy. In the case of the fisher, we have identified smaller areas within the larger DPS boundary that would also potentially constitute a valid DPS, and that may warrant listing under the Act.”*
- *“The Service is also interested in comments regarding other potential DPS configurations not outlined in the Other DPS Alternatives section.”*

Four Peer Reviewers Suggested Changing the DPS Boundary to Alt 1 or 2 for 1+ reasons:

- (1) Genetic evidence (Tucker *et al.* 2012) suggests a break in the distribution along the length of the Sierra Nevada, including that the fisher pop was isolated prior to European settlement.
- (2) The SSN pop harbors distinctly different habitat, fire regimes, geography, & ownership patterns, suggesting that fishers in this area behave differently, have different needs, and will require a different conservation strategy than the rest of the West Coast fishers.
- (3) The SOC & NCSO pops show no genetic exchange despite their relatively close proximity, & thus should not be part of a single DPS.
- (4) The introduced fisher pops should not be included in the proposed DPS b/c they are more closely associated with their source pop as opposed to native pops.
- (5) Alternative 2 is the most appropriate configuration based on the small number of animals present [note: we presume the commenter was referring to the SSN pop] throughout the identified potentially suitable habitat, & the [then] current risks identified for the small pop as compared to the NCSO pop.
- (6) Alternative 2 is the most appropriate configuration b/c both nuclear & mtDNA research support a clear division between the Sierra Nevada & the remainder of the fishers in North America. Comprehensive research suggests that the SSN pop is a well-supported DPS, with a separate/second DPS along the West Coast being everything north of the SSN pop.
- (7) The NCSO pop should be managed as a separate mgt unit (although not necessarily a DPS) from the reintroduced pops with British Columbia origins.

Eight Peer Reviewers Suggested *NOT* Changing the DPS Boundary for 1+ reasons:

- (1) Alternative 1 is not reasonable because it would exclude the ONP population based on genetic distinctiveness, yet includes the NCSO and SSN populations despite the fact that they are genetically distinct.
- (2) Alternative 1 would result in the exclusion of suitable habitat in Oregon and Washington that may be important to fishers given future climate change predictions.
- (3) Alternative 2 is inappropriate because genetic evidence (statistical differences in neutral markers) is not strong enough to split the two Sierra Nevada populations and fails to protect the northern Sierra Nevada population when\if it expands from the reintroduction area. Additionally, there is an absence of samples from the currently unoccupied area to justify splitting the proposed DPS in California.
- (4) Alternative 2 is inadequate to improve the fisher's status throughout the west coast.
- (5) Neither alternative engenders recovery, although Alternative 1 is better than Alternative 2 because it promotes connectivity.

...more

Continued...

- (6) Excluding much of Oregon and Washington (as in Alternative #1) or the currently unoccupied area in the Sierra Nevada (as in Alternative #2) is contrary to the goal of restoring the species to its historical range.
- (7) Neither alternative provides for future CC concerns that may result in a northward shift of fishers, as well as their habitat & prey. One PR asserted that this specific area north of the Alternative 1 and 2 boundaries is germane to the proposed DPS's recovery given the species past distribution from British Columbia to CA, & the habitat modeling results that indicate future suitable habitat focused north of both the Alt 1/2 boundaries.
- (8) Neither alternative is supported by strong evidence for the historical distribution of fishers in significant portions of WA & OR; thus, an effort to conserve the taxon should not exclude areas where their return via mgt actions is scientifically justified.
- (9) Neither alternative includes the SOC pop.
- (10) Both alternatives prevent what should be a long-term conservation goal of reconnecting all fisher pops to Canada.
- (11) Neither alternative provides the combined conservation of preserving the native genetics & expanding the range of the proposed DPS to reoccupy suitable habitat in WA & OR.

Other Peer Reviewer DPS Configuration Comments:

- (1) If listed as proposed in 2004, the cumulative pop size & effective pop size are so large that the threats leading to the DPS's extinction would be diminished, which comes into play regarding FWS's concerns about small pop dynamics. The PR expressed a much graver concern if the DPS configuration was revised into multiple DPSs, especially for a SSN DPS and its likely ability to persist into the future.
- (2) Given the NCSO pop is expanding beyond the boundary described in the proposed listing rule & the 40-year time horizon for our evaluation, one PR suggested we combine the SOC & NCSO pops as one unit for conservation purposes since they will likely become indistinguishable over this time period.
- (3) If the configuration changes to Alt2, FWS should account for a recovery area large enough in the SSN pop area to support a pop size that would not suffer the stochastic genetic & demographic effects of small pops. This may require expanding the current SSN boundary outlined in Alt2 further north.