Alternatives to short-rotation Douglas-fir in western WA -- Bernard Bormann

UW, Olympic Natural Resources Center unfolding research agenda as driven by philanthropic funding opportunities

Presentation to the Washington Hardwoods Commission June 6, 2024; Chehalis, WA

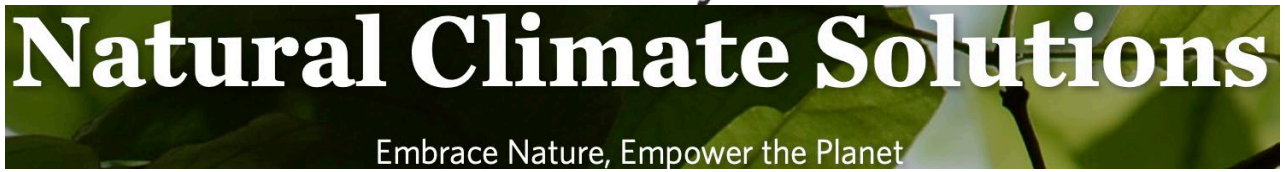
Funding opportunities are exploding around the concept of "<u>natural climate solutions</u>"

The Nature Conservancy

Support for Alder Working Group via Emerald Edge, Garrett Dalan:

- C sequestration project ($90k)
- Weyco alder drone lidar ($30k)
- Phase II funding possible

The Nature Conservancy



Combined with cutting fossil fuels and accelerating renewable energy, **natural climate solutions offer immediate and cost-effective ways to tackle the climate crisis**—while also addressing biodiversity loss and supporting human health and livelihoods.

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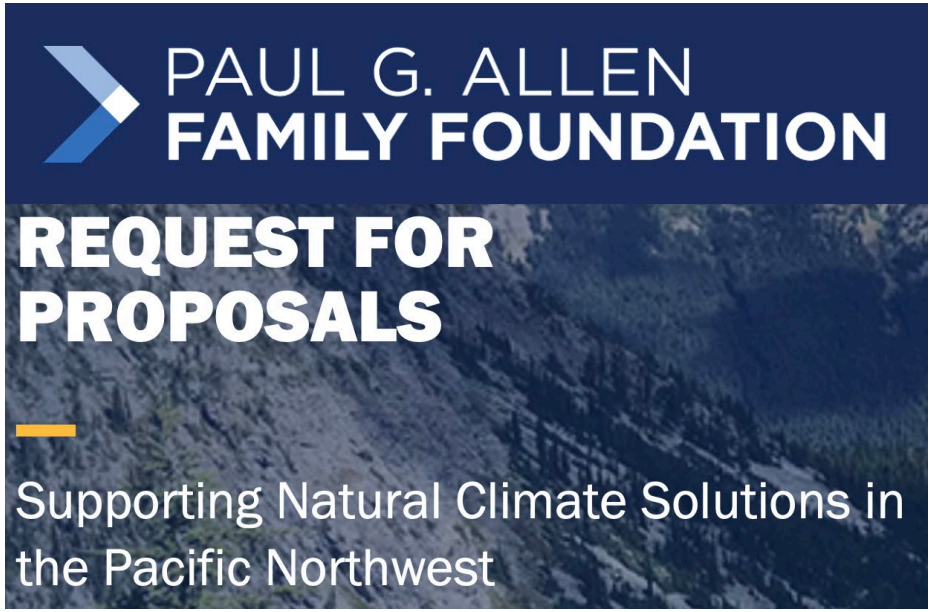
Paul Allen Foundation

Our proposal

$1M (3-year)

Thank you WHC for your letter of support



Alternatives to short-rotation Douglas-fir in western WA

PGAF Foundation Goals:

Increase C sequestration through active forest management in the PNW to meet 2050 climate goals

but also:

- Maintain (or increase) wood production;
- Provide a fuller array of "co-benefits" including:
  - Ecological (e.g., resiliency, naturalness);
  - Social (e.g., connections to tribes and local communities);
  - Economic (e.g., revenue, taxes, jobs, livelihoods)

Alternatives to short-rotation Douglas-fir in western WA

Resiliency is central. Climate and other geo-political changes underway – in plain sight – make obvious that we face high uncertainties when making decisions about managing long-lived forests

Diversification is the key to resiliency – a foundation for any NCS at scale

- **Economic**
  - Mill diversity (not only small-diameter stud mills for wall-to-wall Douglas-fir plantations)
  - Market assumptions (future markets are inherently uncertain)
- **Ecologic** in species and stand and age structure
  - Species and structures within stands and across landscapes
  - Disturbance (fire, insects, disease, wind) loves uniformity
- **Land management**
  - The content and size of the toolbox are critical for scaling up
  - People need to see their ideas applied on the ground

Our key message: Diversification works better if collaboratively developed by managers, stakeholders/tribes, and researchers (best accomplished through operational-scale experiments in what we call Learning-based collaboration – as developed with DNR on the T3 Watershed Experiment)

Our Proposal

Alternatives to short-rotation Douglas-fir in western WA

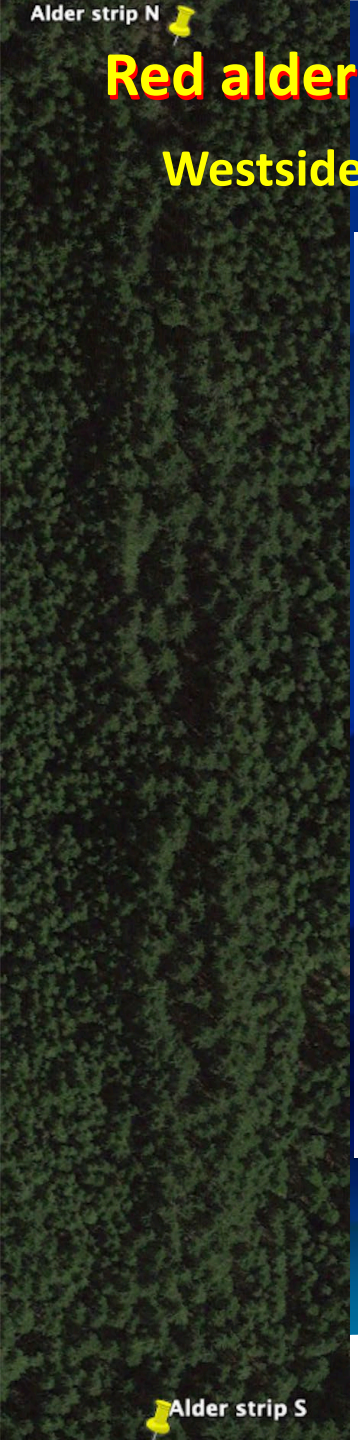
- **Define scale as western WA and OR**, limited to previously managed or burned forests;

- **Recognize and respond to low public support and seemly slow adaptability** of current PNW institutions through our LBC model;

- **Develop a new landscape-scale projects** with the Olympic National Forest and tribes using LBC (relevant to possible Northwest Forest Plan revision process);

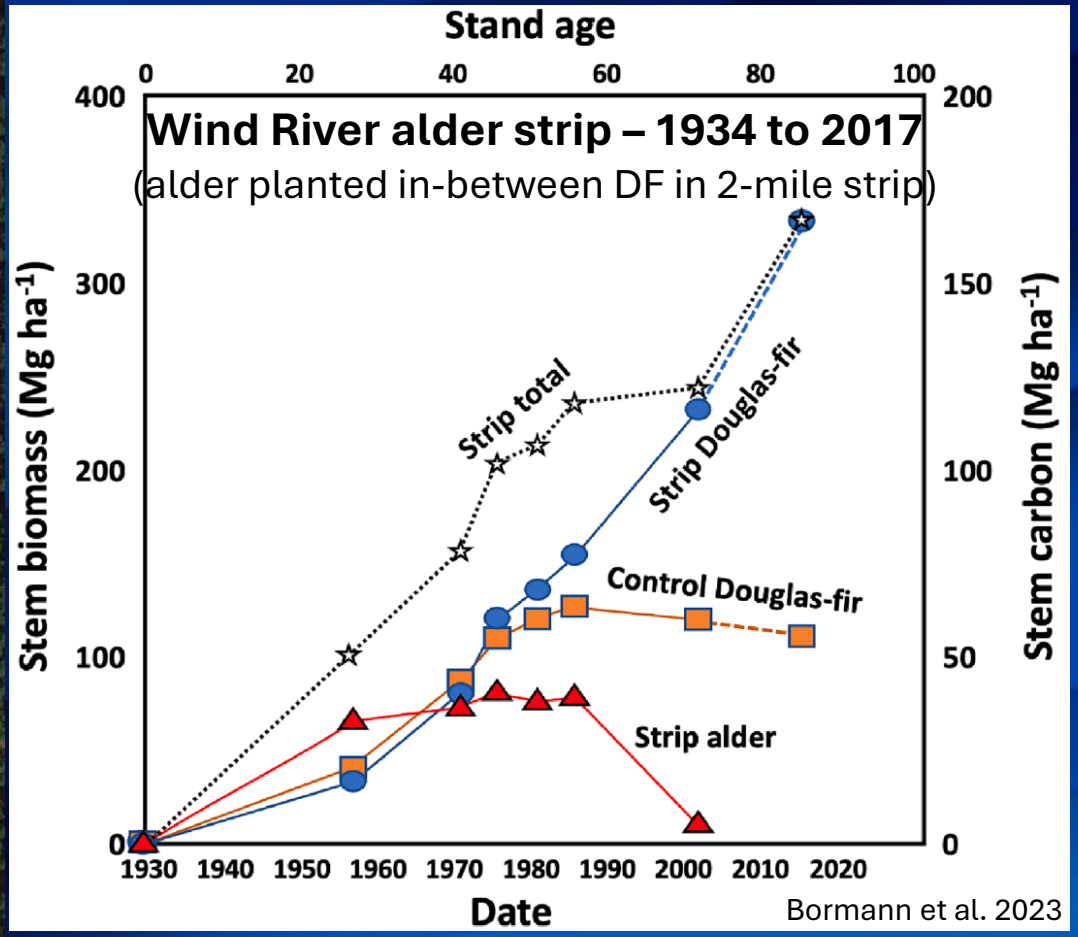
- **Analyze a wide array of alternatives to DF monoculture at operational scales** using state-of-art remote sensing:
  - T3 Watershed Experiment (UW-DNR led);
  - Willamette NF LTEP study, half burned in Labor-Day Fires;
  - Weyco alder plantings (now DNR) and others;
  - Continue focus on Swiss Needlecast effects on Douglas-fir;
  - Address some measurement deficiencies (e.g., alder biomass equations, cedar growth model)

- **Extend results to western WA and OR** (like in TNC project, through OSU CIPS/HSC and UW Ganguly)
  - Add in a community impact analysis (Indroneil Ganguly)



Red alder as an agent of change in Washington

Westside fires and changing climate – can alder save the day?



Bormann et al. 2023

Why is forest industry planting only DF on tree farms burned in the Labor Day fires? Alder mixture could:

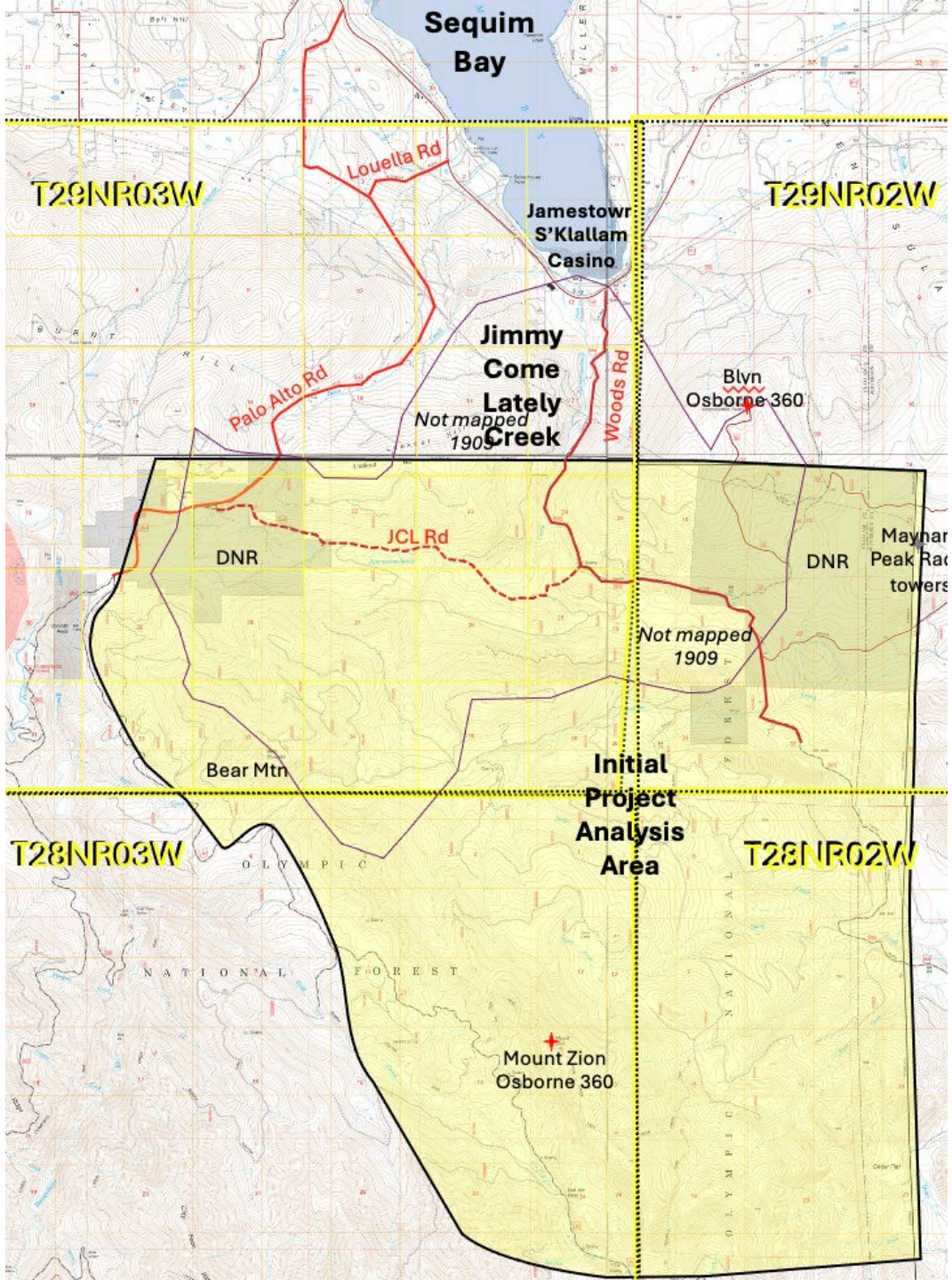
- Double biomass
- More than double C sequestration

Olympic NF Jimmy-Come-Lately Creek 7000-ac Project

Short-rotation DF not in the cards under NWFP (surrounding lands have this)

Previous and future fire and alder-based restoration/ protection are likely to be addressed

Fire History



Olympic NF Jimmy-Come-Lately Creek 7000-ac Project

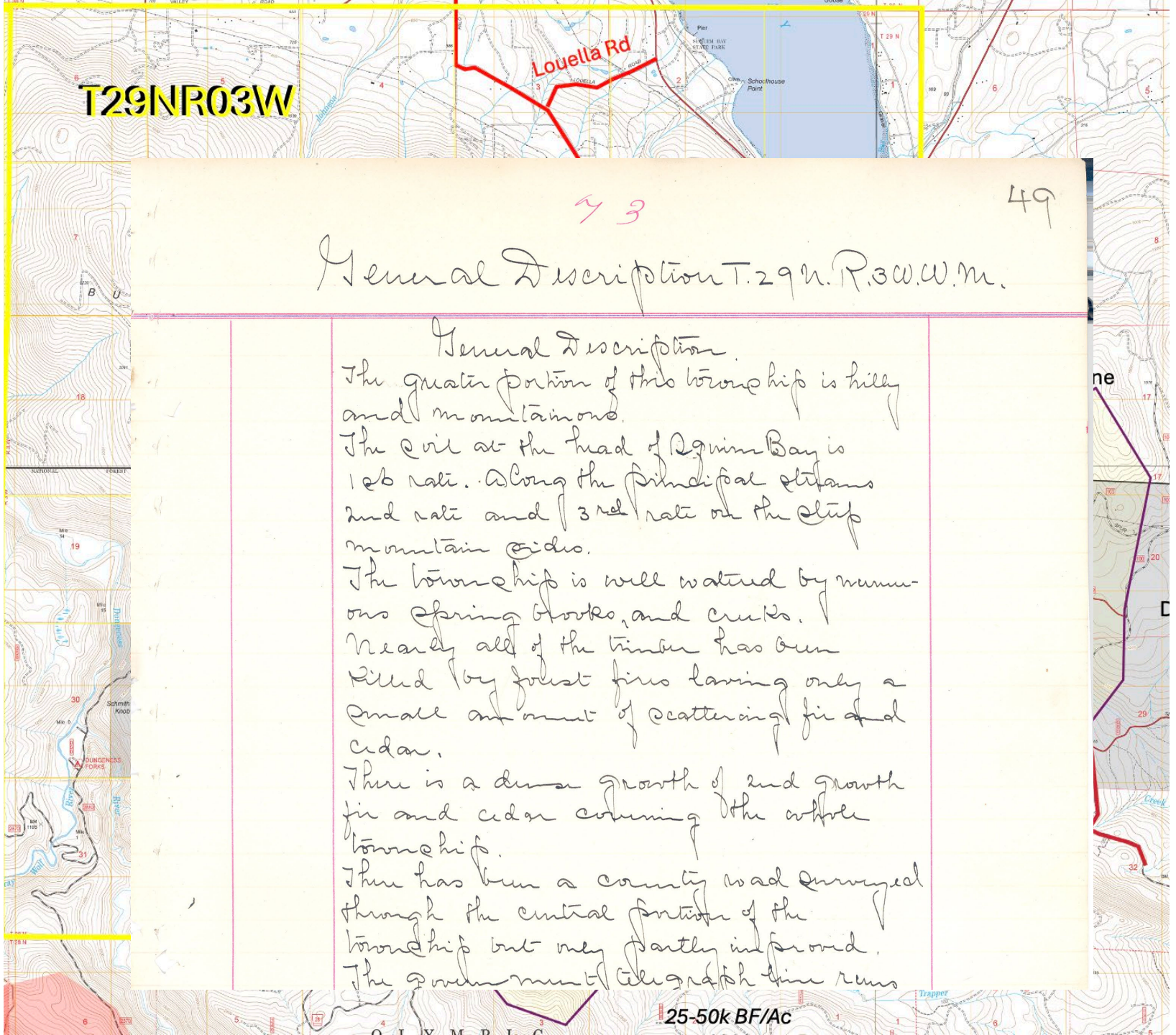
Fire History (1)

1891 Government Land Office

"Nearly all of the timber in this Township (R29NR03W) has been killed by forest fires leaving only a small amount of scattering fir and cedar (paraphrased)"

"killed by a fire about 10 years ago" (**1881**)

Extensive fire	Young conifer
1881 ➡	1891



Olympic NF Jimmy-Come-Lately Creek 7000-ac Project

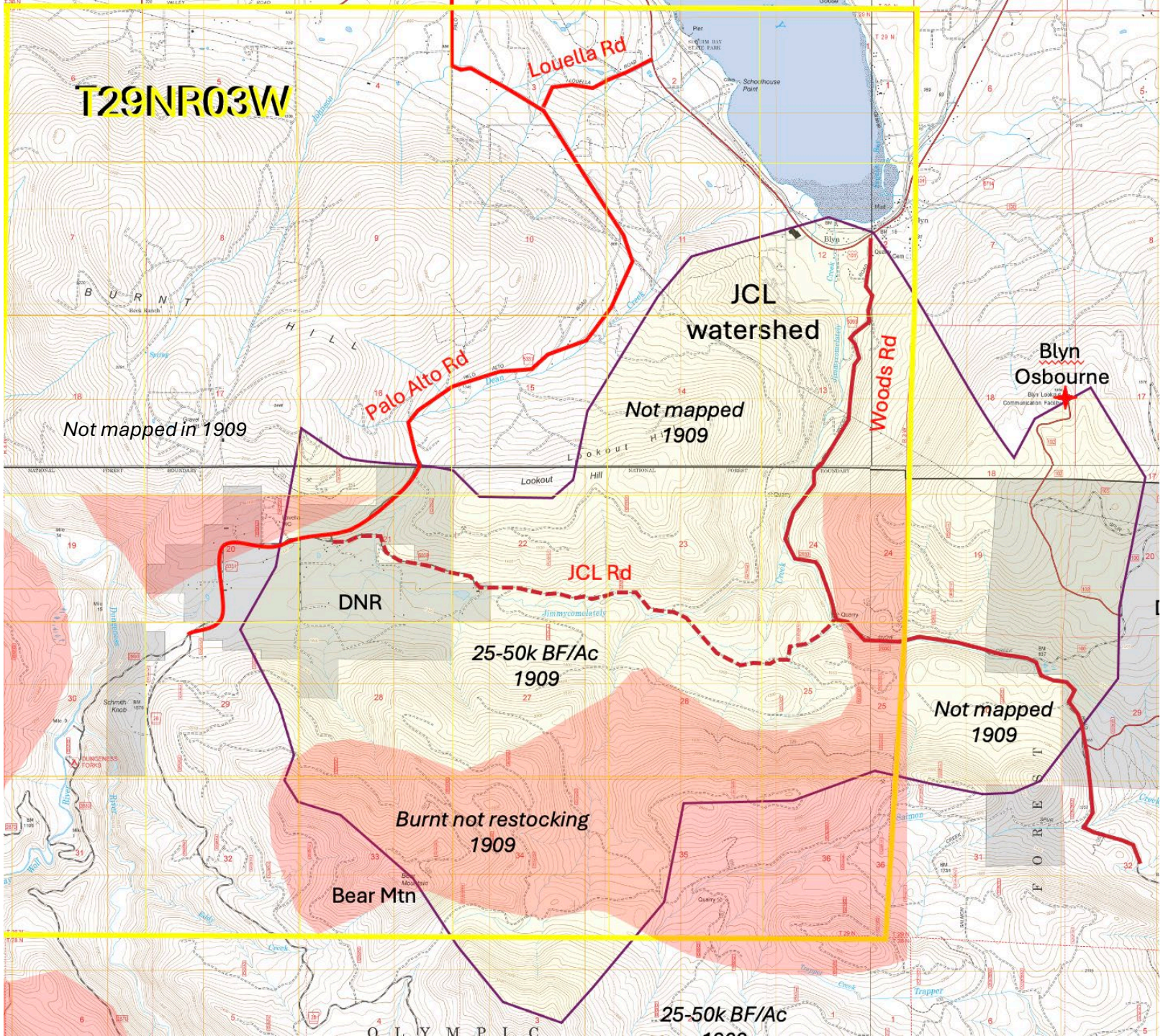
Fire History (2)

1909 FS Atlas

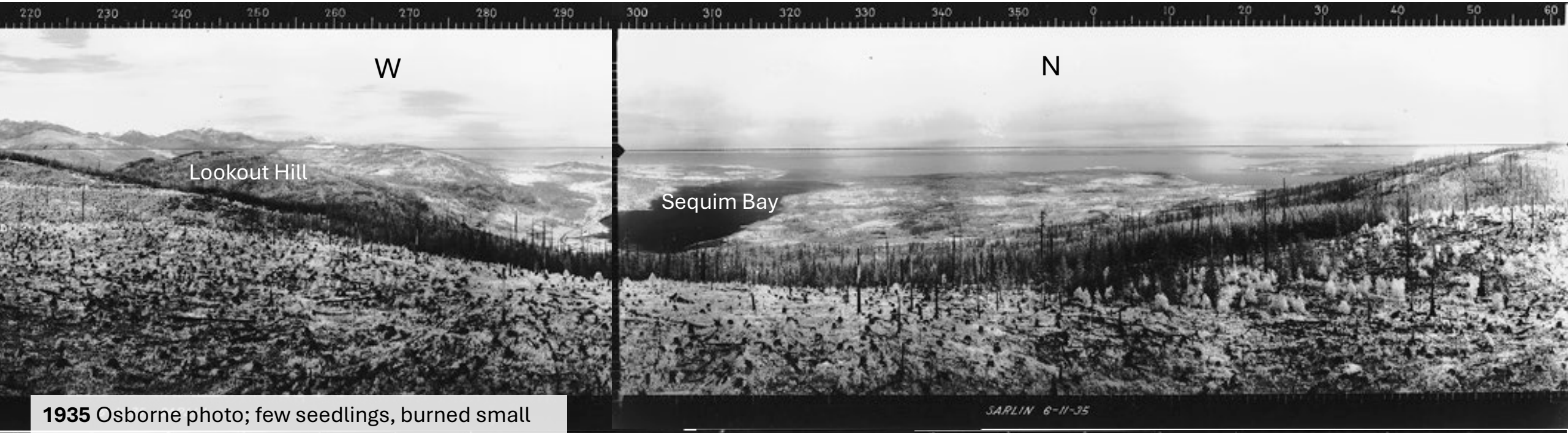
Large areas in NE Olympic NF mapped as “burnt, not restocking”

Trees about 15 years-old seemingly reburned in places

Extensive fire	Young conifer	Few seedlings
1881 ➡	1891 ➡	1907



Fire History (3) Blyn Lookout on **June 1935**; 54 years after 1881 fire—suggesting re-burn



1935 Osborne photo; few seedlings, burned small timber—reburn of trees that were 16 to 44 years old

Extensive fire	Young conifer	Re-burned before	Re-burned before
1881 ➡	1891 ➡	1909 ➡	1935

Olympic NF Jimmy-Come-Lately Creek 7000-ac Project

Fire History (4)

<u>2024</u> May 19

Overly dense forest grown back (<89 years old) of Douglas-fir, cedar, hemlock, alder

Growth rate uncertain, few but large alders; lots of Rhododendron

Plan options considered?

- <u>Hinder future fire</u> with alder strips;
- <u>Wide thin & grow alder</u> between residuals to increase C sequestration and hinder fire, and achieve late-seral condition faster

Fire History: Repeated intense fire; likely massive soil damage; will burn again

Extensive fire		Young conifer		Re-burned before		Re-burned before		Waiting to burn again?
1881	➡	1891	➡	1907	➡	1935	➡	2024

Coble *et al. Fire Ecology* (2023) 19:34
https://doi.org/10.1186/s42408-023-00192-5

Suggested reading

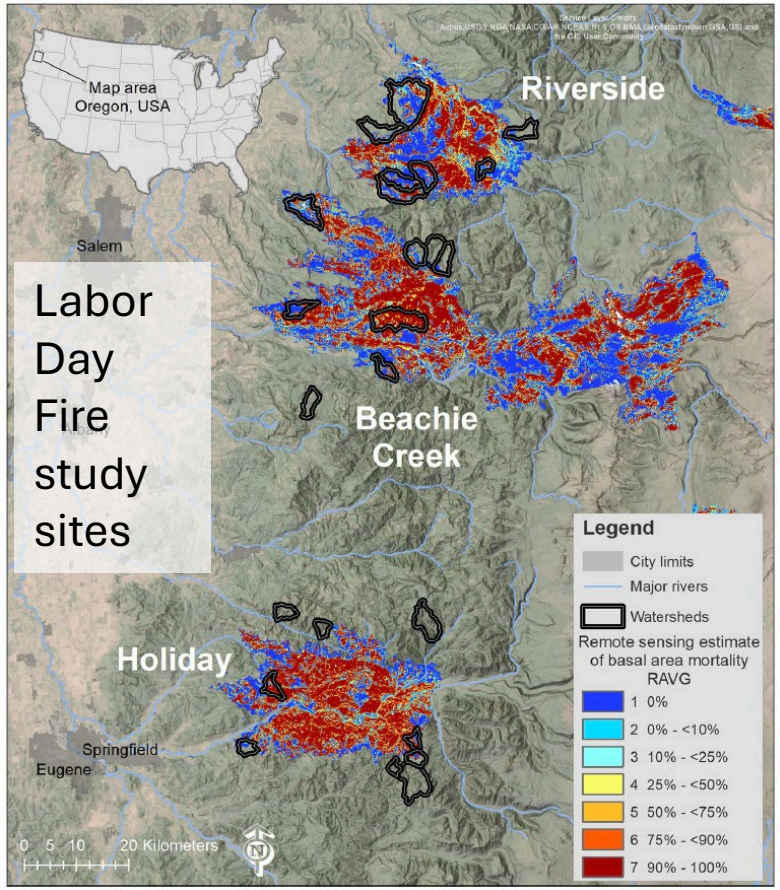
Fire Ecology

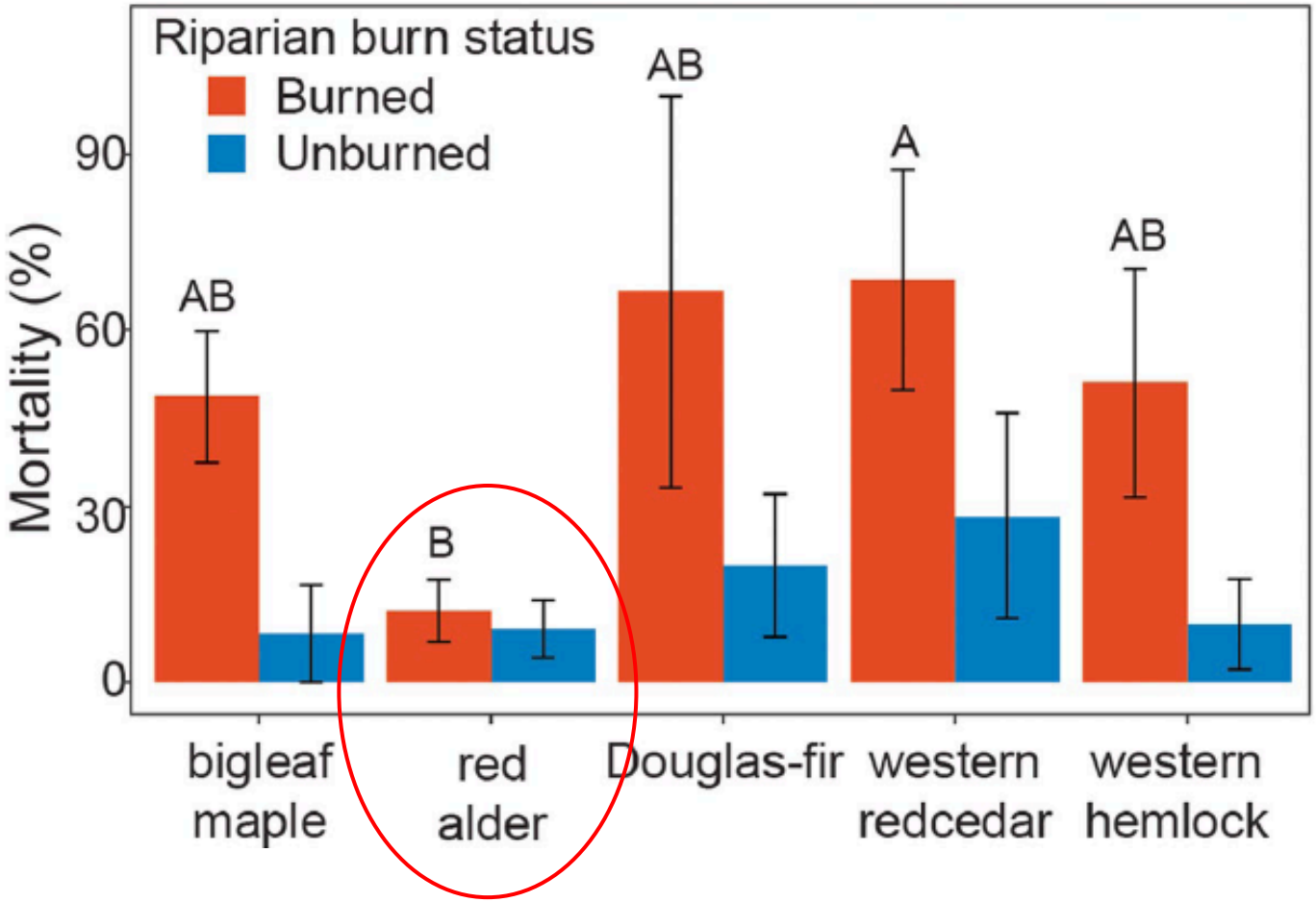
ORIGINAL RESEARCH Open Access

Fire severity influences large wood and stream ecosystem responses in western Oregon watersheds

Ashley A. Coble[1*], Brooke E. Penaluna[2], Laura J. Six[3] and Jake Verschuyl[4]

"Our results highlight an important function of red alder in riparian zones that may facilitate faster stream and riparian ecosystem recovery in increasingly fire-prone landscapes."





Alternatives to short-rotation Douglas-fir in western WA

Recommendation for WA Hardwood Commission

Write a position paper supporting specific revisions to the NWFP:

- **Economic element** (perhaps including maintaining/increasing diversity of mill infrastructure; value-added (job-rich) manufacturing (lowest in Douglas-fir oriented stud mills);
- **Support a regional array of projects** (as operational-scale studies) to evaluate the effect of active riparian management practices including:
  - Alder rotations that support industry diversity and rural communities;
  - Reduced effects of westside fire through fire dampening (Coble paper)
  - Increased food supply to riparian species
- **Consider new approaches to re-incorporating early succession** in late-successional reserves, including:
  - Loosen rules/culture to allow for thinning older plantations including gaps large enough to grow hardwoods and understory species critical to maintaining seed supply (in the event of large-scale disturbance (fire/wind)
  - Re-define LSR to include requirements for a minimal inclusion of early-seral habitat in decline similar to late-seral species
- **Post-fire management** to rejuvenate soils involving planting and managing species known to increase nutrients and soil carbon and reduce leaching losses

Alternatives to short-rotation Douglas-fir in western WA

NCS strategies to be analyzed that could contribute to greater resiliency

Stand-scale silviculture:

- Mixed species plantings (e.g., alder-DF, alder-cedar); assist OSU HSC efforts
- Mixed species through vegetation management (alder & hemlock ingrowth, PCT)
- Reduced herbicides and extended early-seral influence
- Stop planting Douglas-fir where there is a SNC potential

Landscape-scale diversification:

- Distribute patches of pure species;
- Vary plantation ages;
- Hinder fire-travel (fuel/hardwood breaks; backburn preparation)

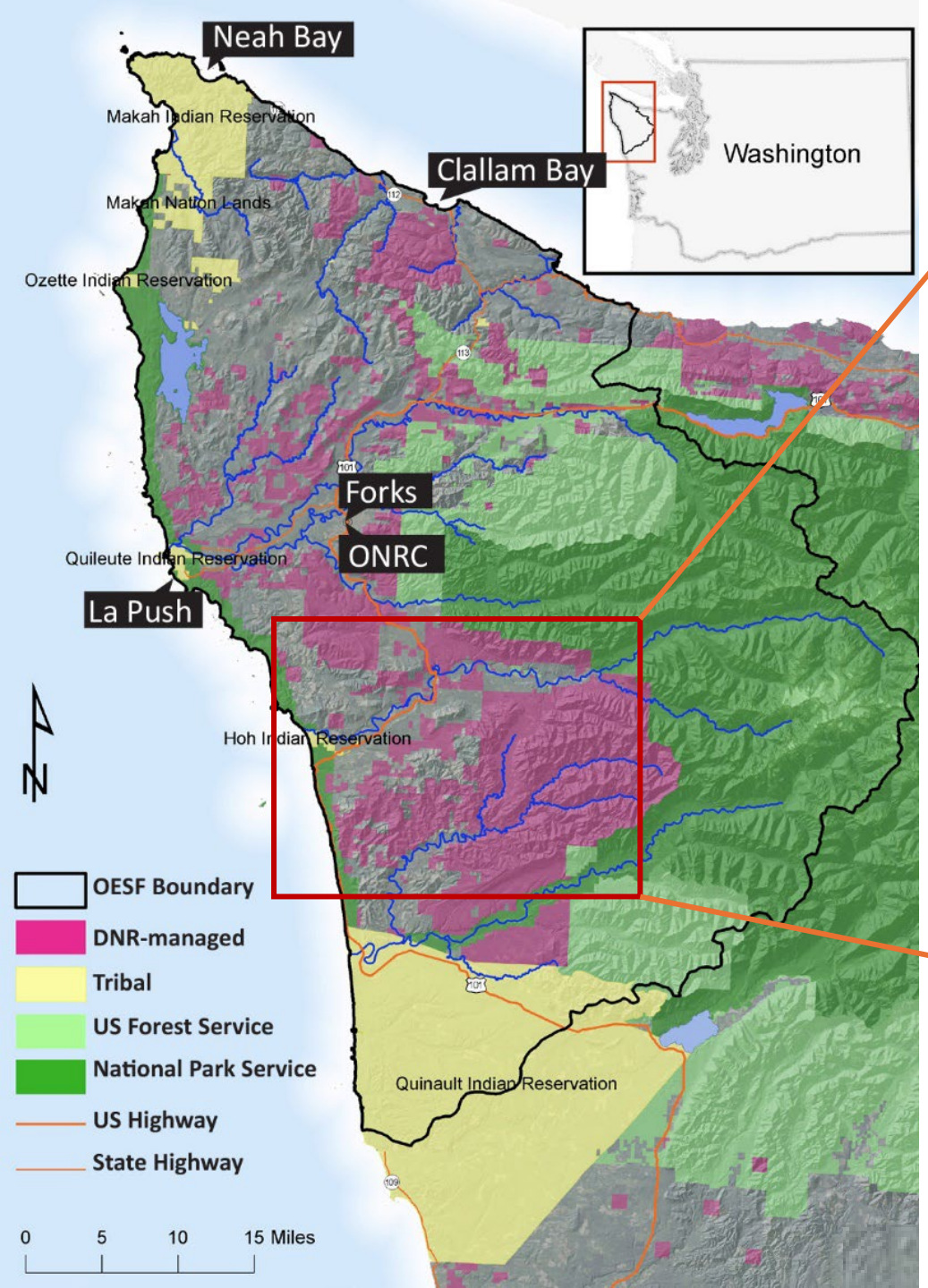
Soil rejuvenation after fire:

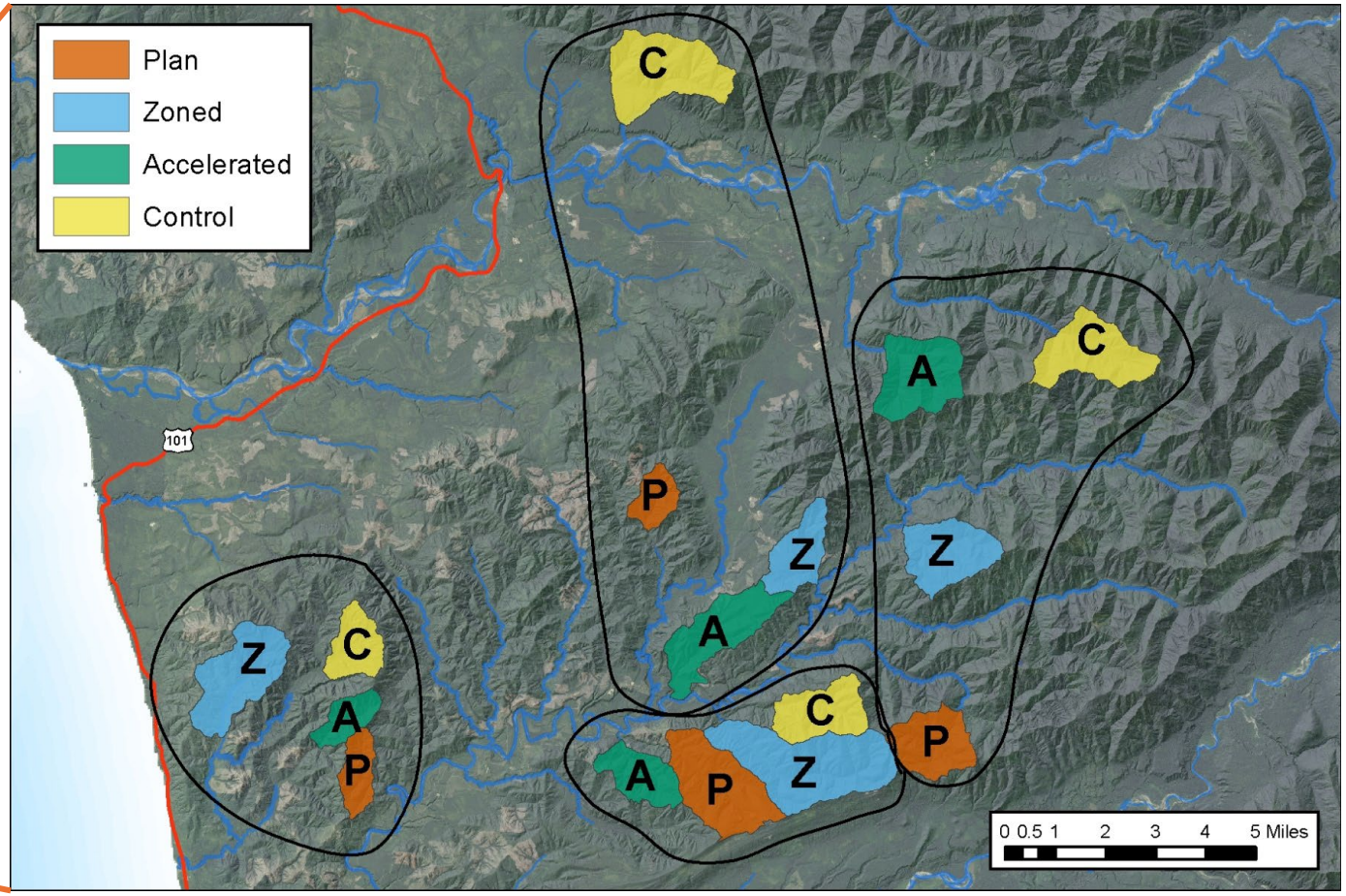
- Wind River alder effects
- Olympic NF project design: alder strips/alternate fuels management

Economic diversity:

- Alder and cedar mills
- Mill/slash waste utilization

Spatial Design





Alder prescriptions in T3:

- Natural regeneration in unplanted stands;
- Alder – cedar mixtures; and
- Riparian alder rotations between widely spaced conifer residuals