North Coast Oak Woodland Restoration: Oregon White Oak and Black Oak Tree Response to Release from Douglas-fir Encroachment

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Board of Forestry and Fire Protection

Age and stand structure of oak woodlands along a gradient of conifer encroachment in northwestern California
Madelinn Schriver et al (2018)
https://doi.org/10.1002/ecs2.2446

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Acknowledgements

Several projects 2015 to present

- ✓ Characterizing conifer encroachment (age, structure, and biodiversity)
- ✓ Evaluation of NRCS and USFWS restoration effectiveness (tree response, oak health, forage, wildlife, etc.)
- ✓ Oak regeneration: effects of cattle and deer on oak seedling success
- ✓ Water demands of conifer encroachment
- ✓ Wildfire impacts on oak stands with and without conifer removal
- ✓ Economic analysis of managing for oaks or conifers in transitioning sites

Researchers, Partners, and Funders:

Univ of CA: Lenya Quinn Davidson, Jeff Stackhouse, Brendan Twieg, Ricky Satomi, Will Cox, Dave McLean, Wallis Robinson

UC Berkeley: Maggi Kelly, Rick Standiford, Matthew Potts, Ellen Bruno, Nicolas Polask, 2 students

Humboldt State: Rosemary Sherriff, Madeline Schriver, Moran Varner

NRCS: Matt Cocking, Jon Shultz, Chris Zimny, Todd Golder

CAL FIRE: Chris Lee, Jim Robbins

USFWS: Greg Gray

Landowners: 24 research sites

Policy: Mike Miles, NC Land Trust, Buckeye, Matt Diaz, Ass. Jim Wood

Funding: University of California, NRCS

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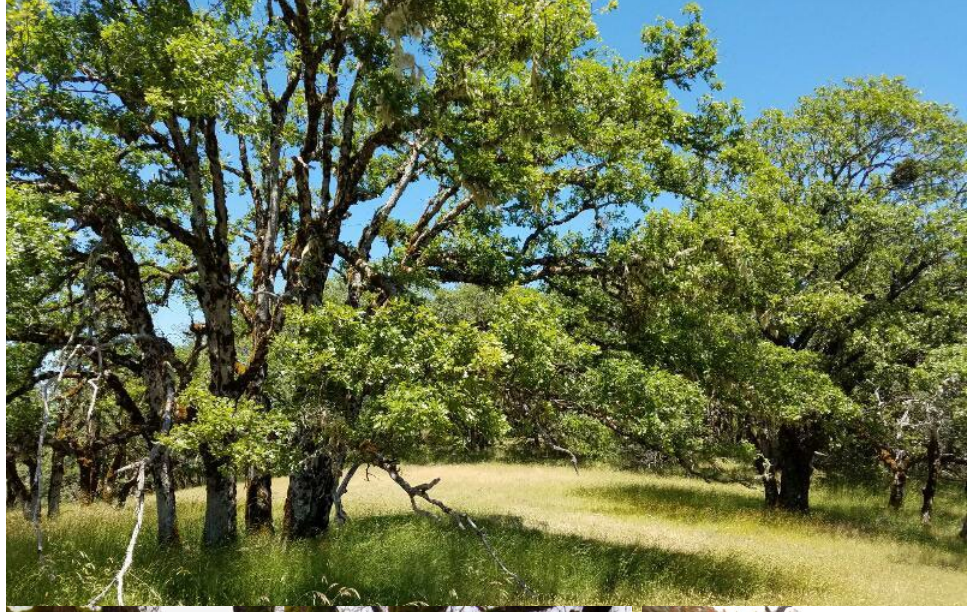
Today's talk- *Quercus kelloggii and Quercus garryana*

- Deciduous oak challenge to encroachment
- Effects of conifer removal or restoration
- How do oaks fair in the face of wildfire
- California's oak management policies and regulations



Photos by L. Quinn Davidson

Oak woodlands have high biodiversity





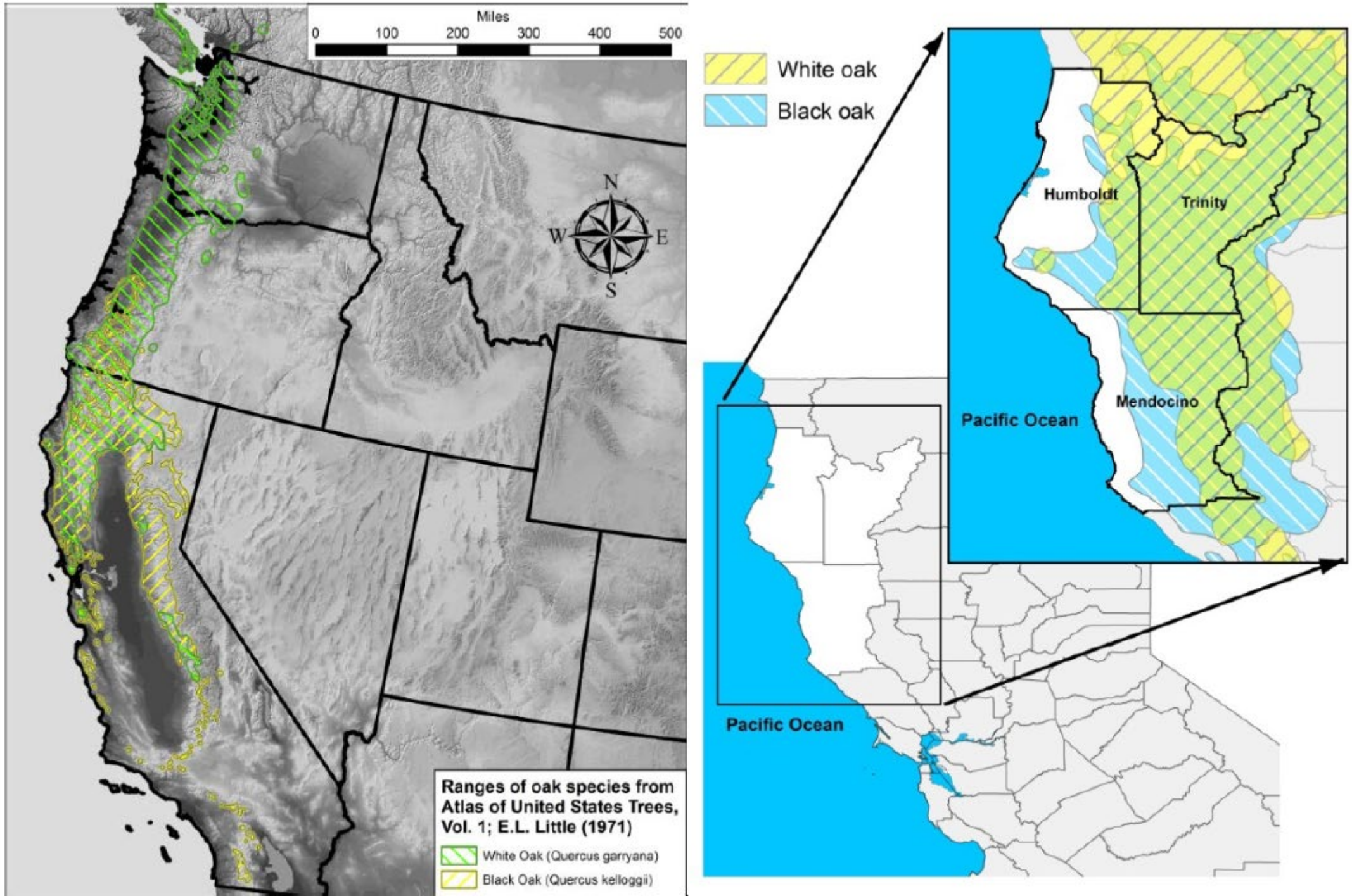








Douglas-fir (*Pseudotsuga menziesii*) encroachment

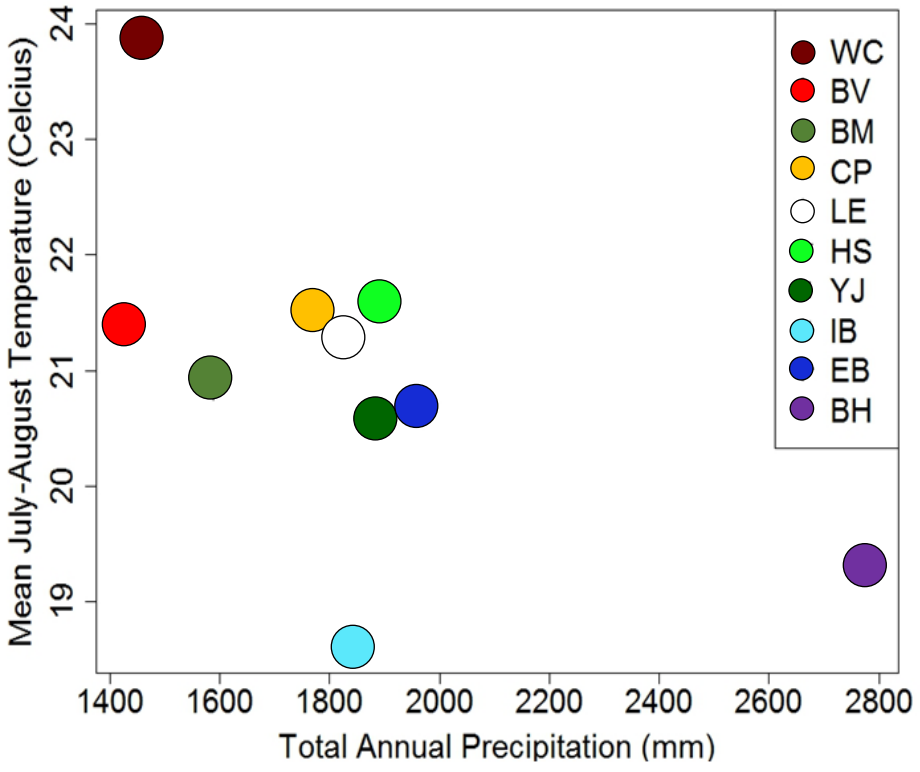

Miles
0
100
200
300
400
500
N
W
E
S
Ranges of oak species from Atlas of United States Trees, Vol. 1; E.L. Little (1971)
White Oak (Quercus garryana)
Black Oak (Quercus kelloggii)
White oak
Black oak
Humboldt
Trinity
Mendocino
Pacific Ocean
Pacific Ocean

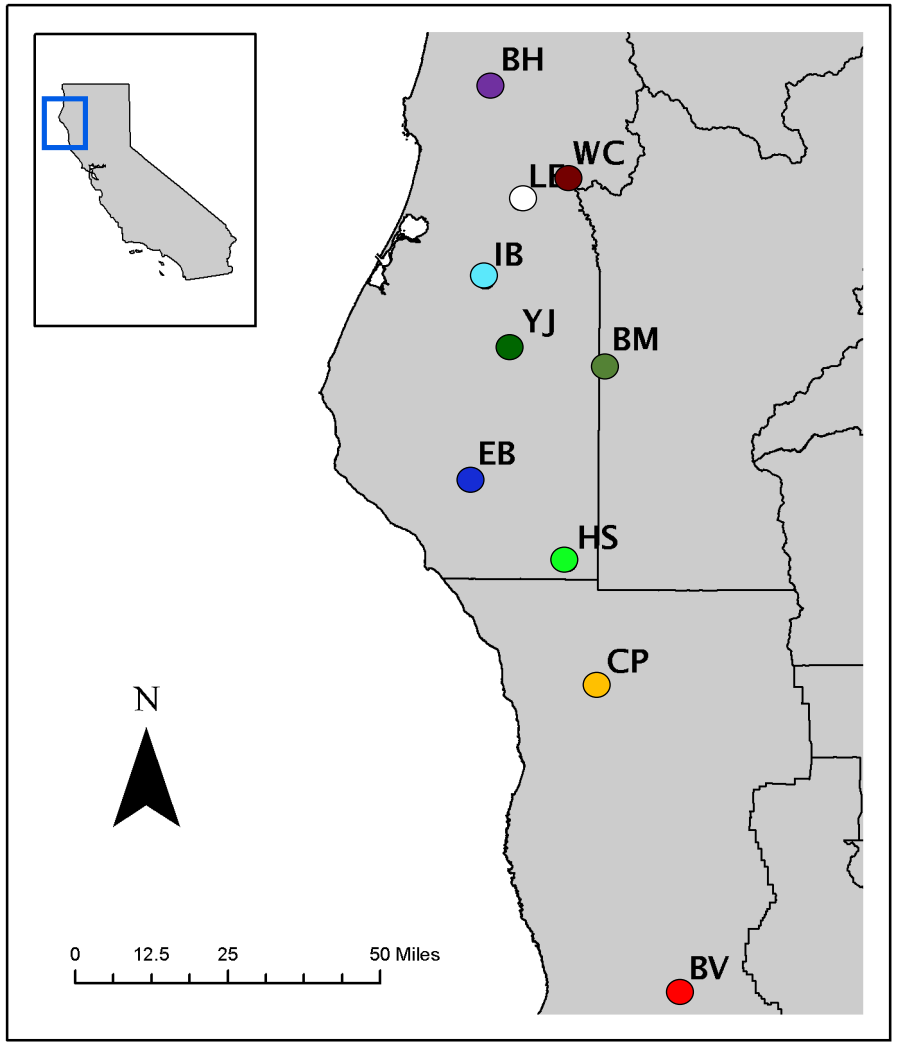
Study area

Study locations rated by climatic conditions

Xeric (warm, dry)

Mesic (cool, wet)





Research efforts

How old are the trees? Are oaks really older than conifers?

Tree species composition

Early Stage

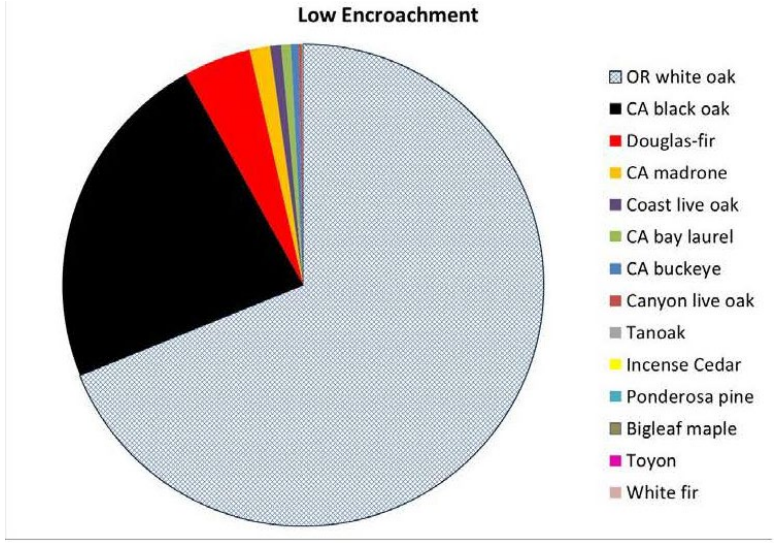
- 65% White oak
- 20% Black oak
- 10% Douglas-fir
- 5% Evergreen hardwood

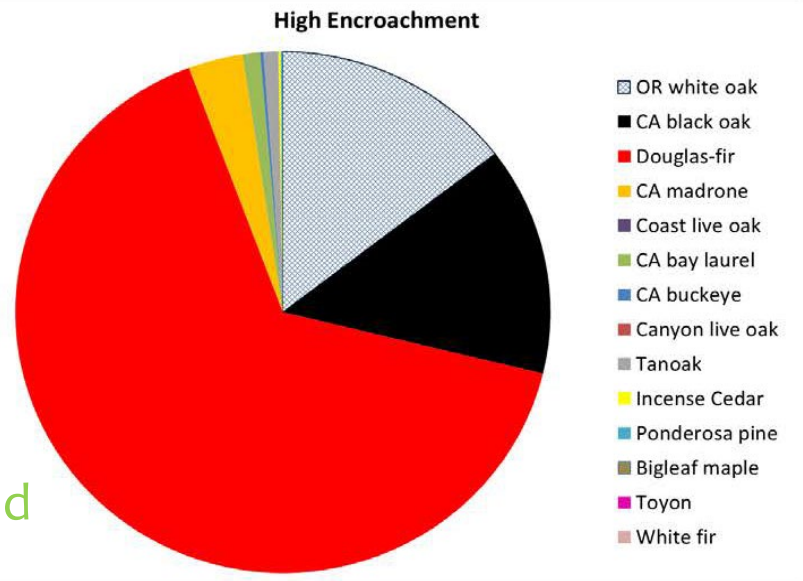
Mid Stage

- 32% White oak
- 10% Black oak
- 48% Douglas-fir
- 10% Evergreen hardwood

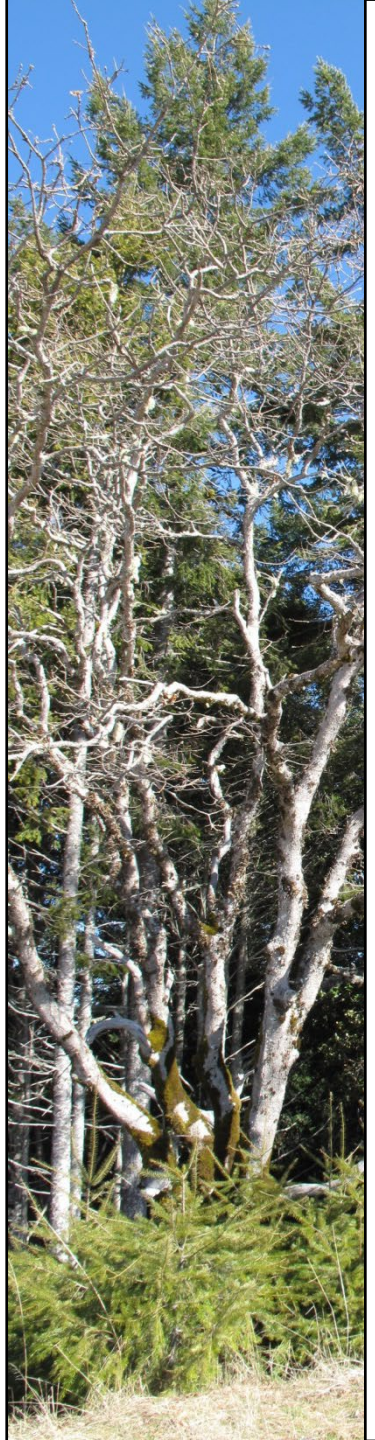
Late Stage

- 15% White oak
- 9% Black oak
- 68% Douglas-fir
- 8% Evergreen hardwood





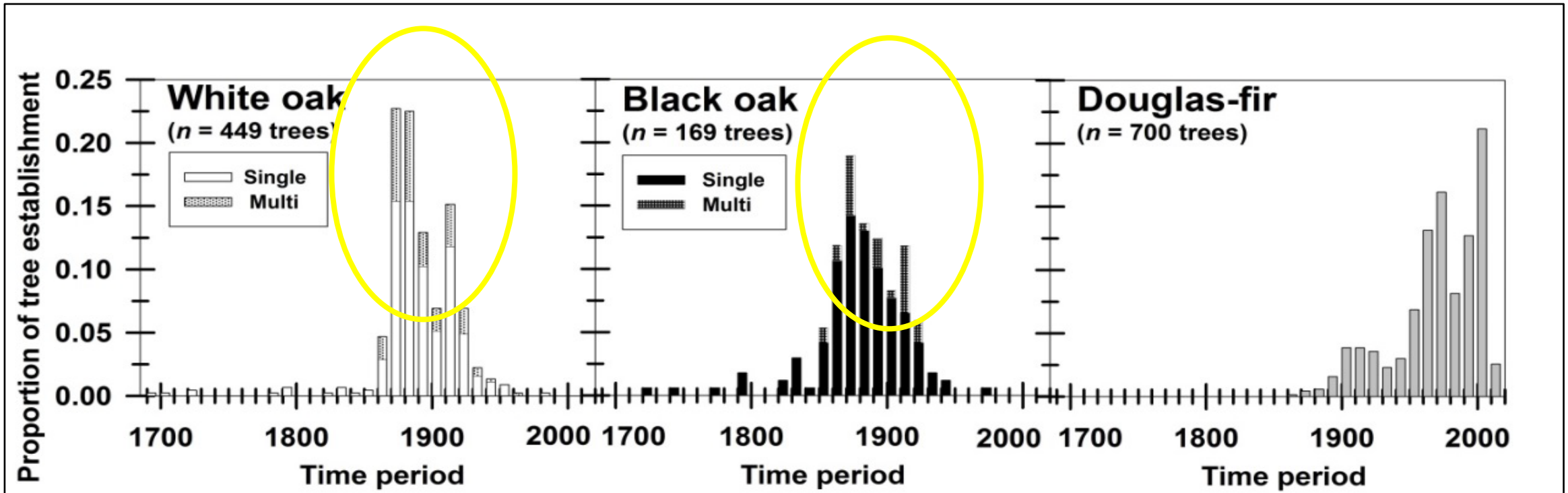

Douglas-fir encroachment of an oak stand



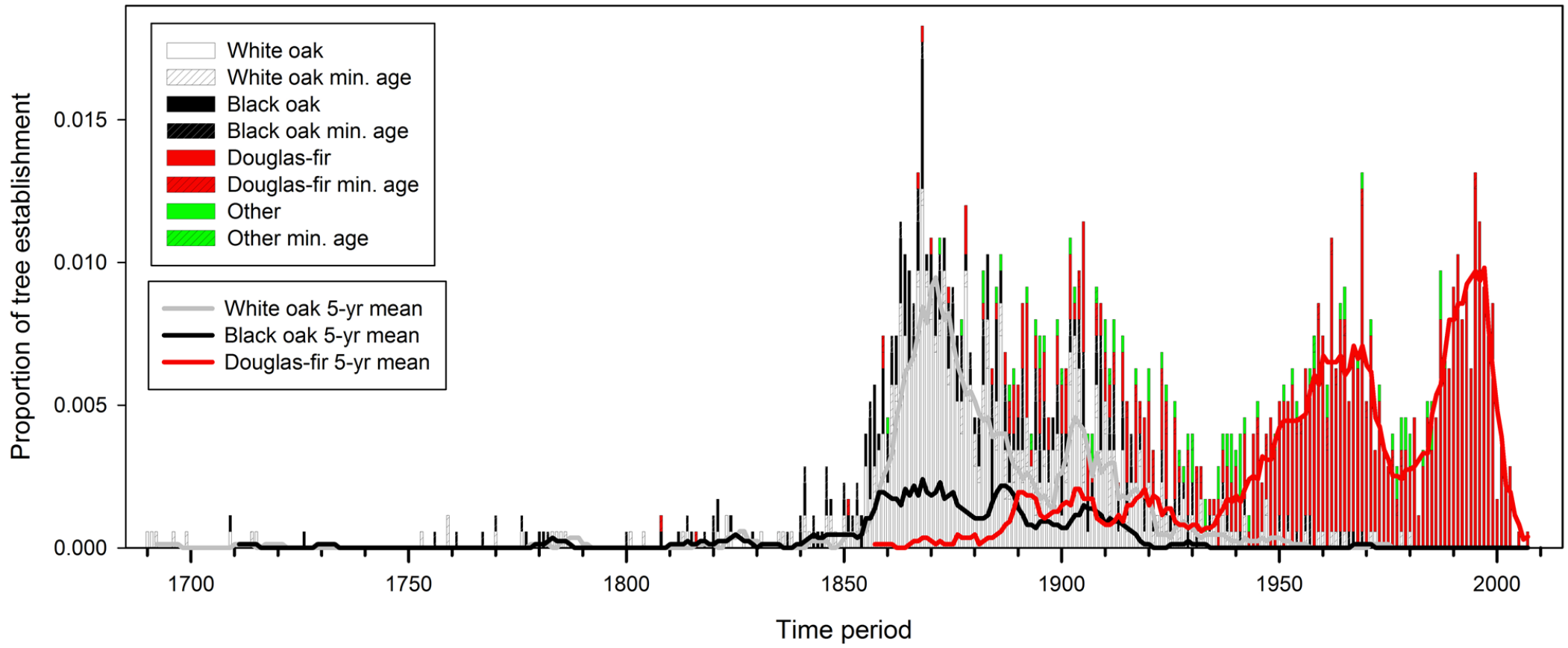
Regeneration Across Sites

	Seedlings	Saplings
Early Stage		
• White oak	78%	< 1%
• Black oak	14%	< 1%
• Douglas-fir	5%	95%
• Bay Laurel	2%	2%
Mid Stage		
• White oak	36%	< 1%
• Black oak	20%	0%
• Douglas-fir	21%	55%
• Canyon live oak	4%	17%
• Bay Laurel	10%	14%
• Tanoak	3%	2%
Late Stage		
• White oak	9%	< 1%
• Black oak	39%	0%
• Douglas-fir	15%	45%
• Canyon live oak	6%	31%
• Bay laurel	13%	9%
• Tanoak	16%	9%

Multi-stemmed oaks are common

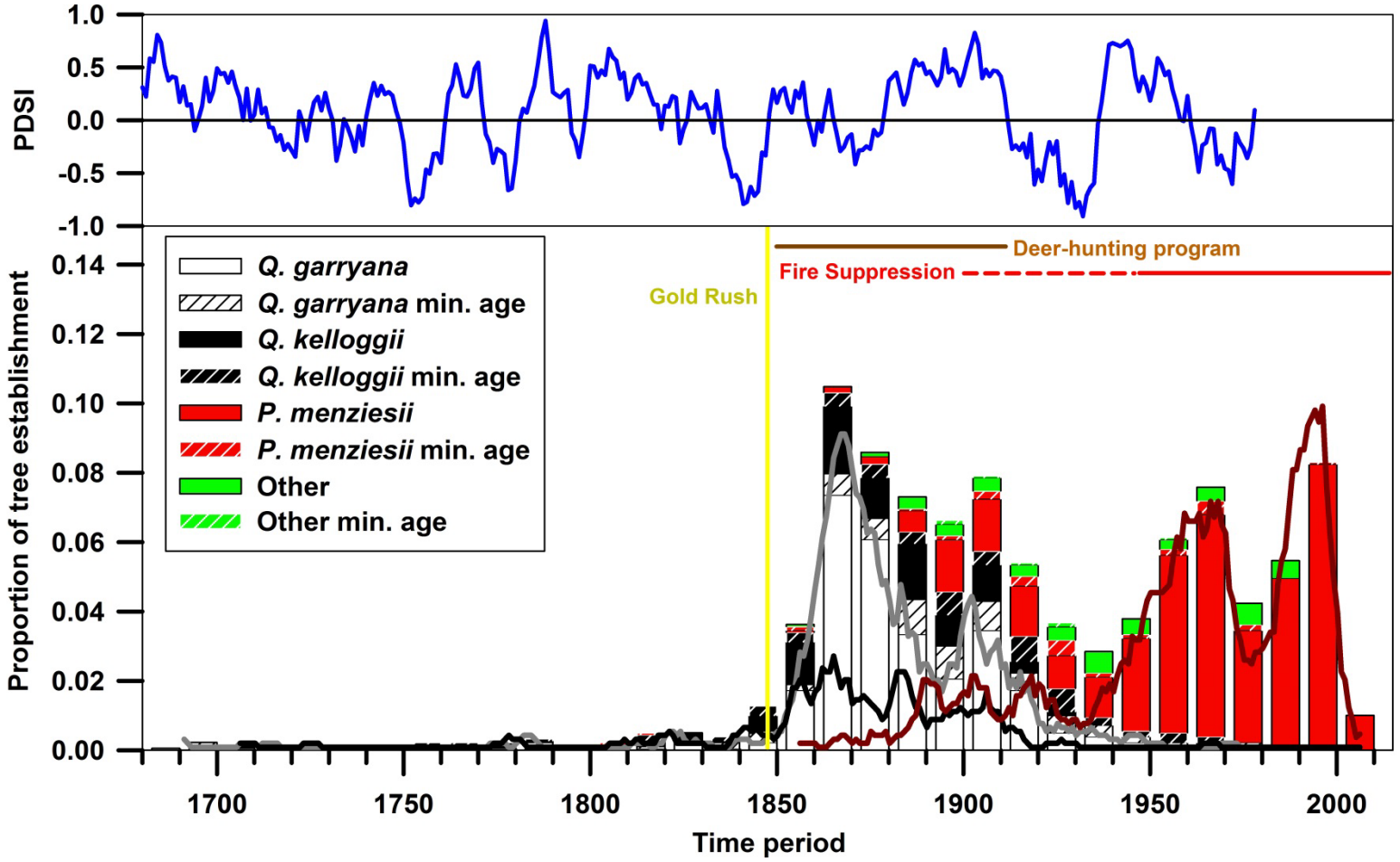


Age distributions

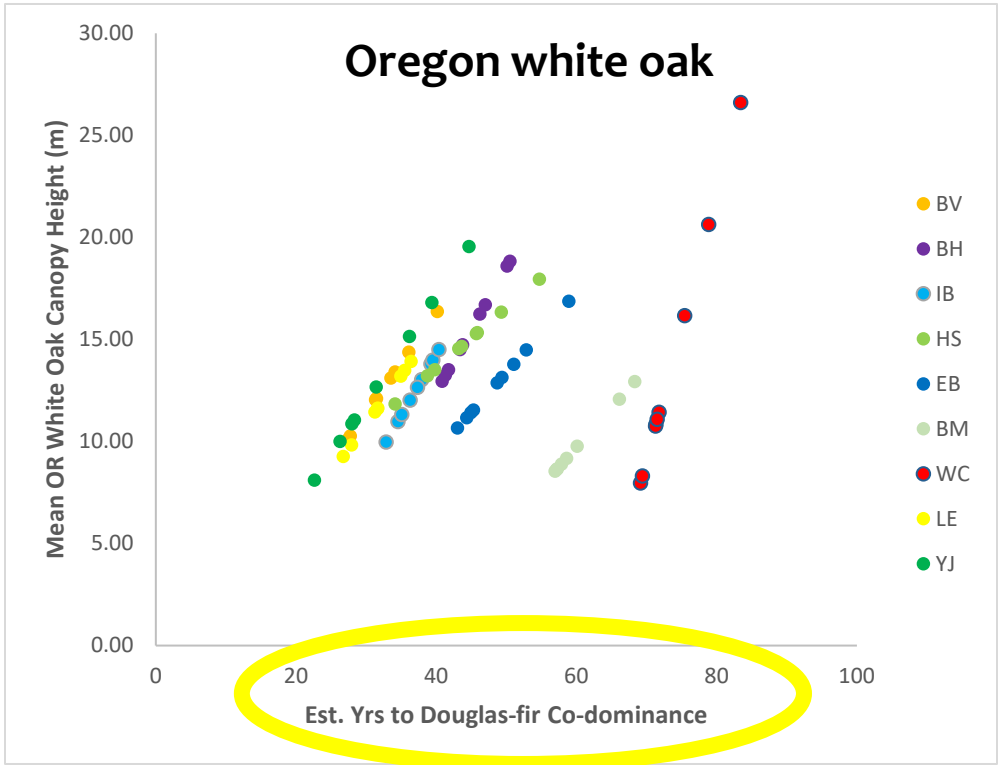


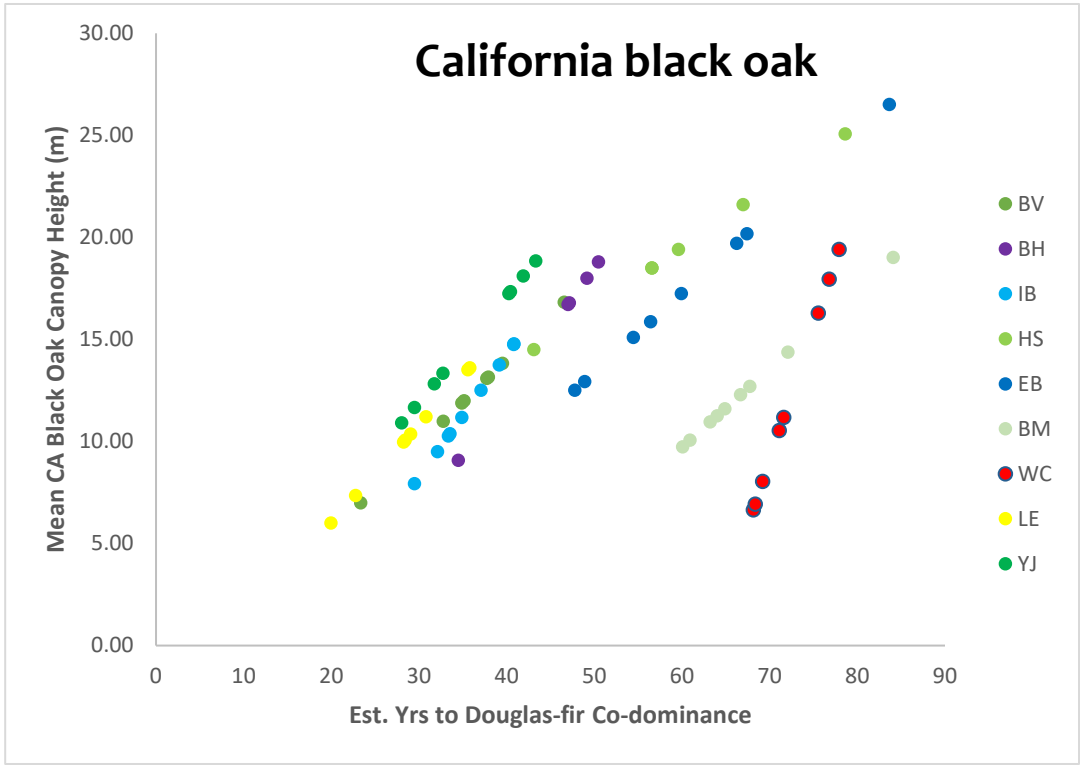
The proportion of tree ages of Q. garryana, Q. kelloggii, P. menziesii, and other tree species sampled from 10 mixed oak-conifer woodland sites (n = 90 plots) in northwestern California. The 5-year smoothing averages (solid horizontal lines) of tree establishment trends for each species is overlaid .

Historical variables



Time to conifer co-dominance Range 20-80 years





Xeric

red

green

purple

Mesic

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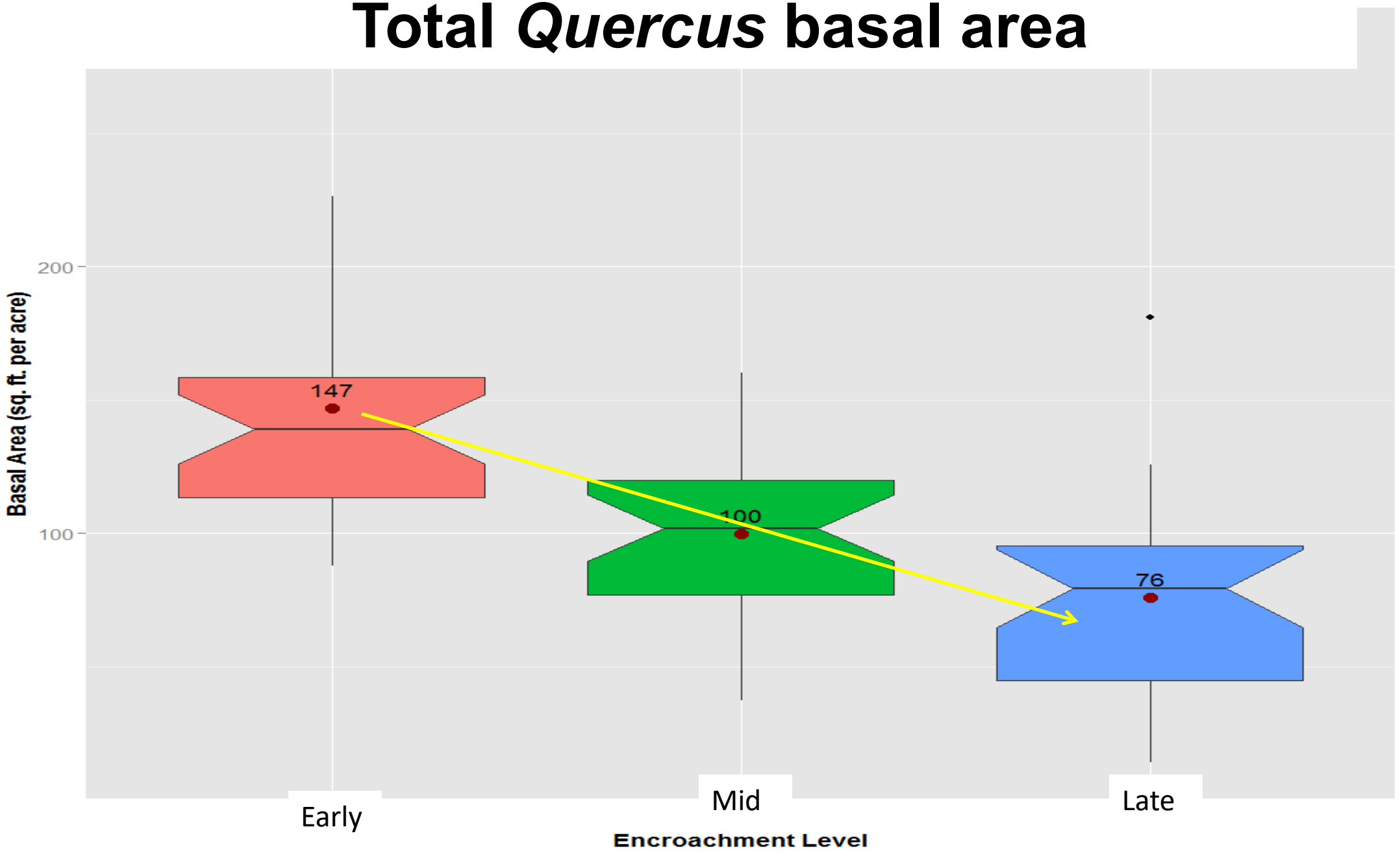
Total *Quercus* basal area



Where are oak saplings surviving?

White oak saplings in poison oak

White oak sapling in CA fescue

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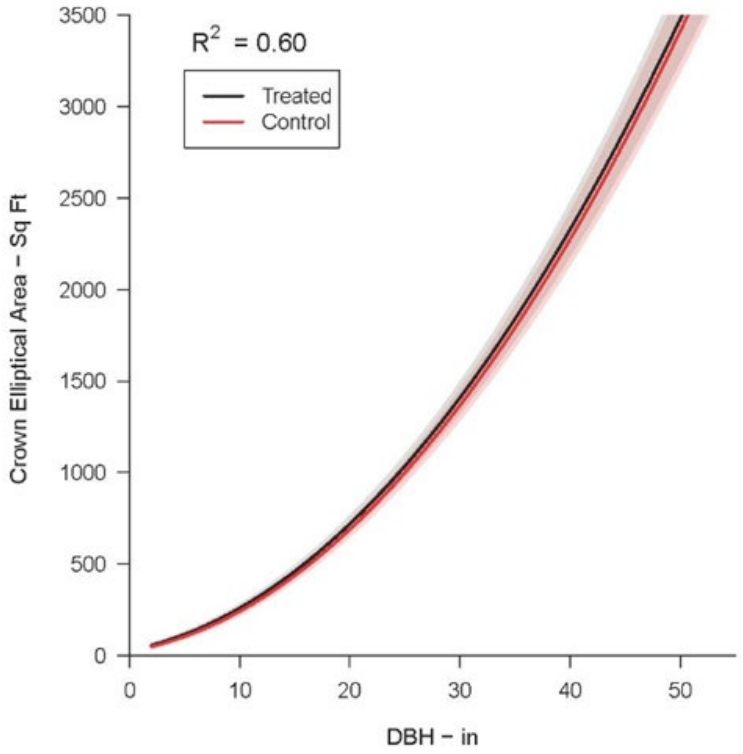
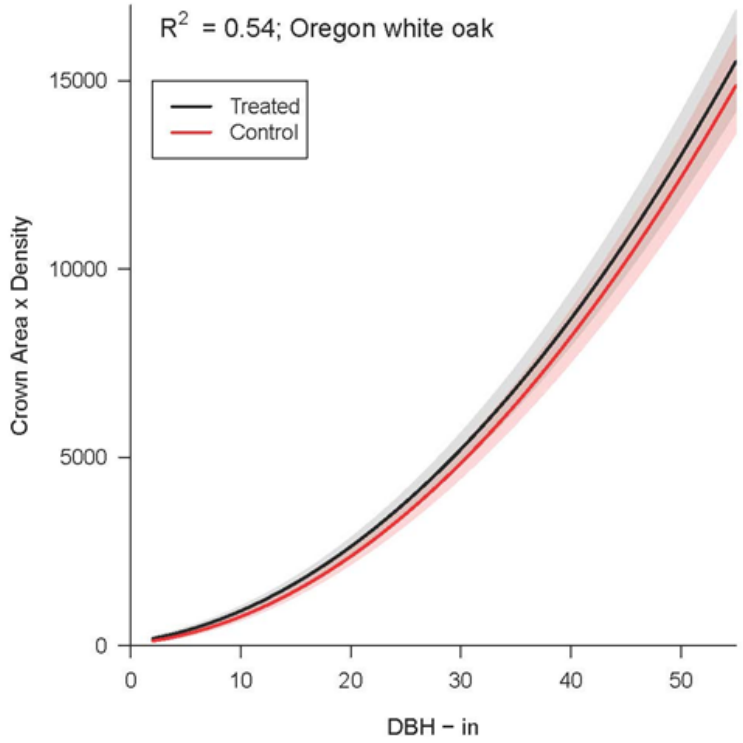
- California's oak management policies and regulations

Results: oak crown release? (yes)

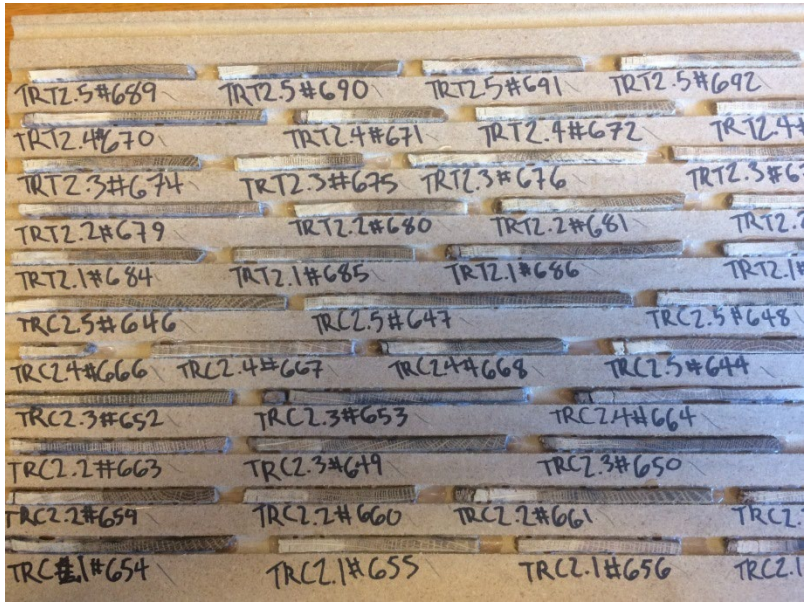


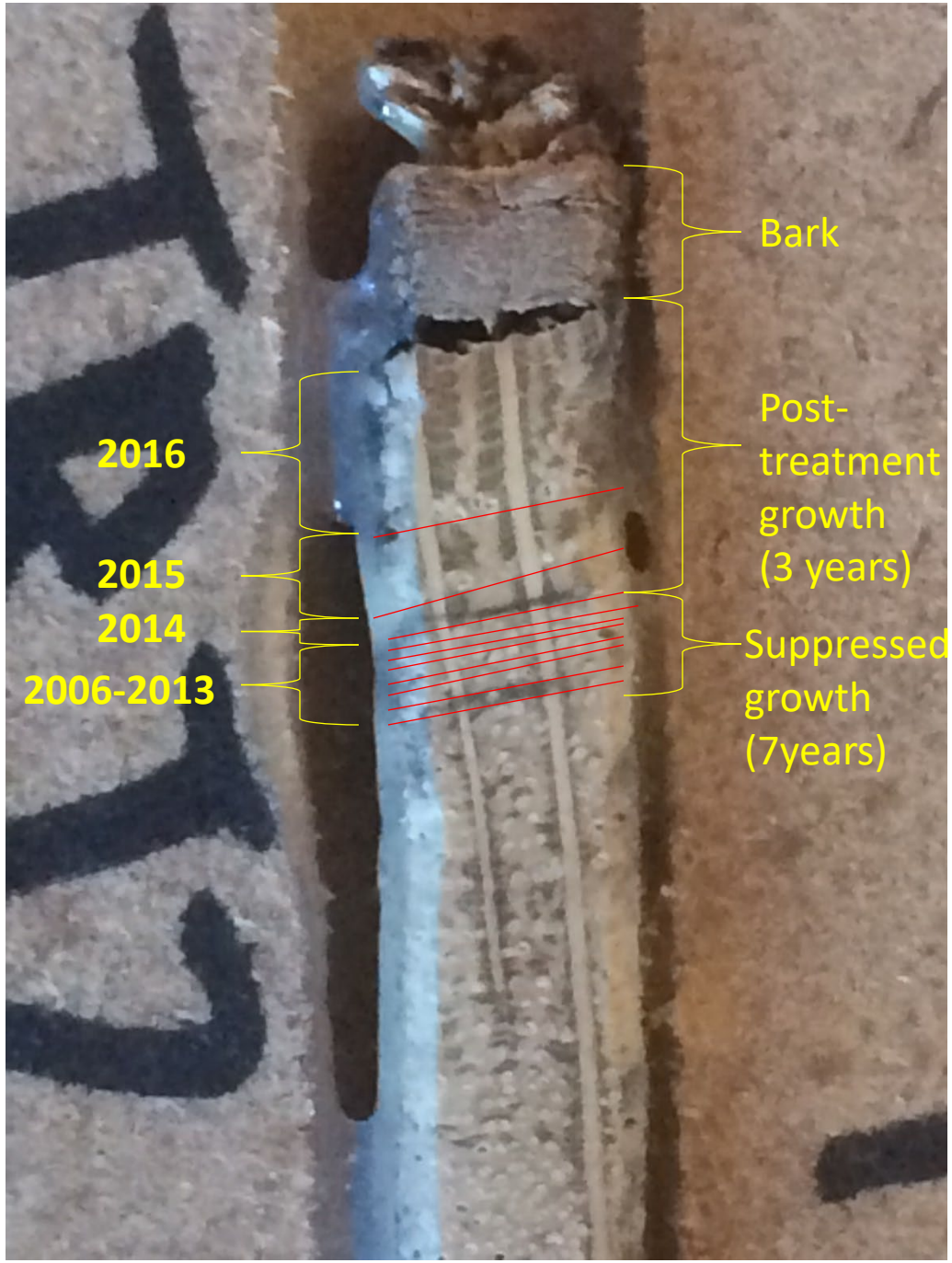
20 ft² larger in the treatment area than the controls. Short-term results.



Crown x density shows the same relationship. Note: white oak responded more than black oak

Oak core from a **control** site showing signs of slowed growth (41 Cattle Control 3).





An oak core from a treated site showing an exceptionally robust release response to the removal of encroaching conifers (41 Cattle Treatment 2).

Drought period 2015-2016

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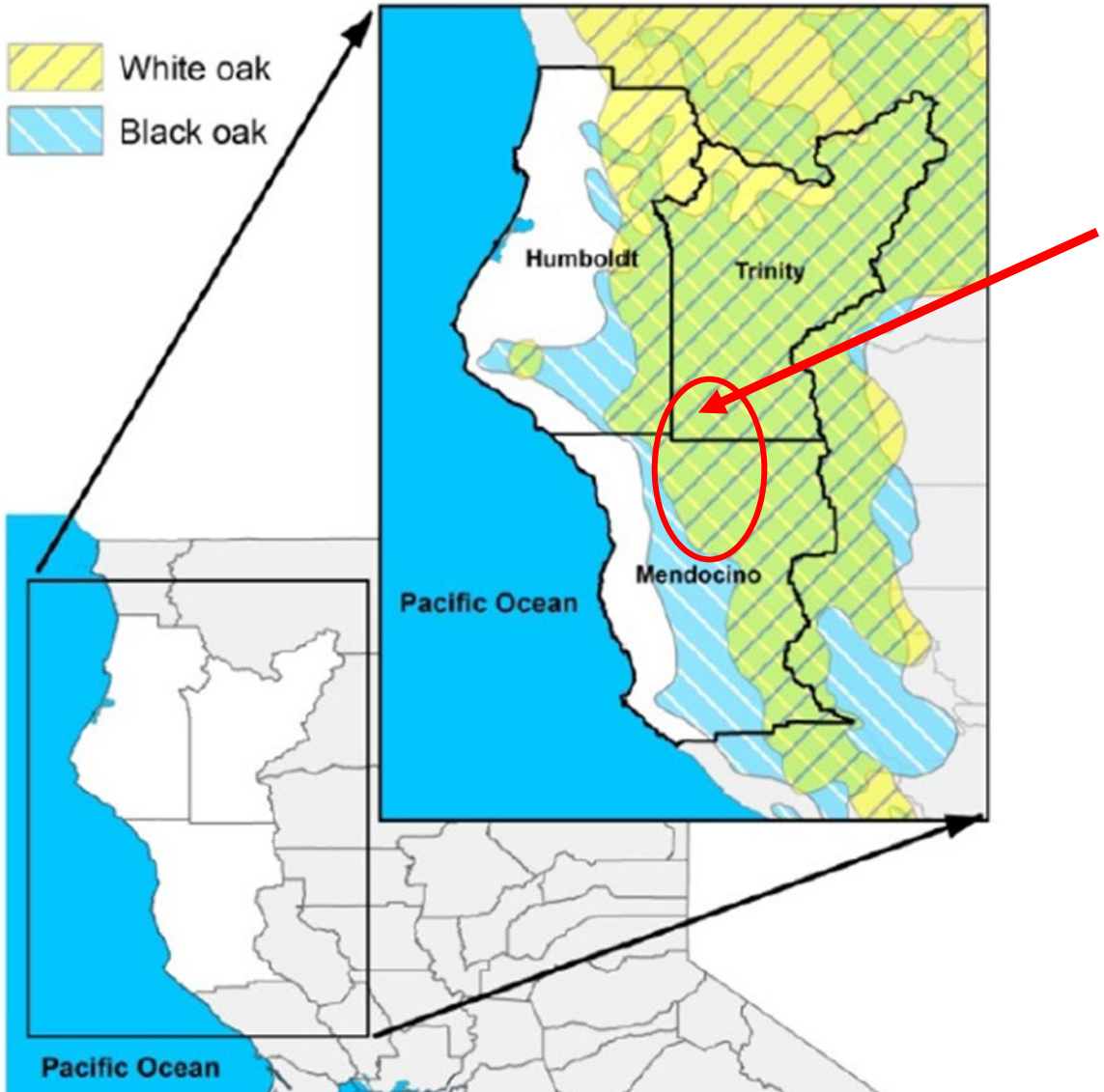
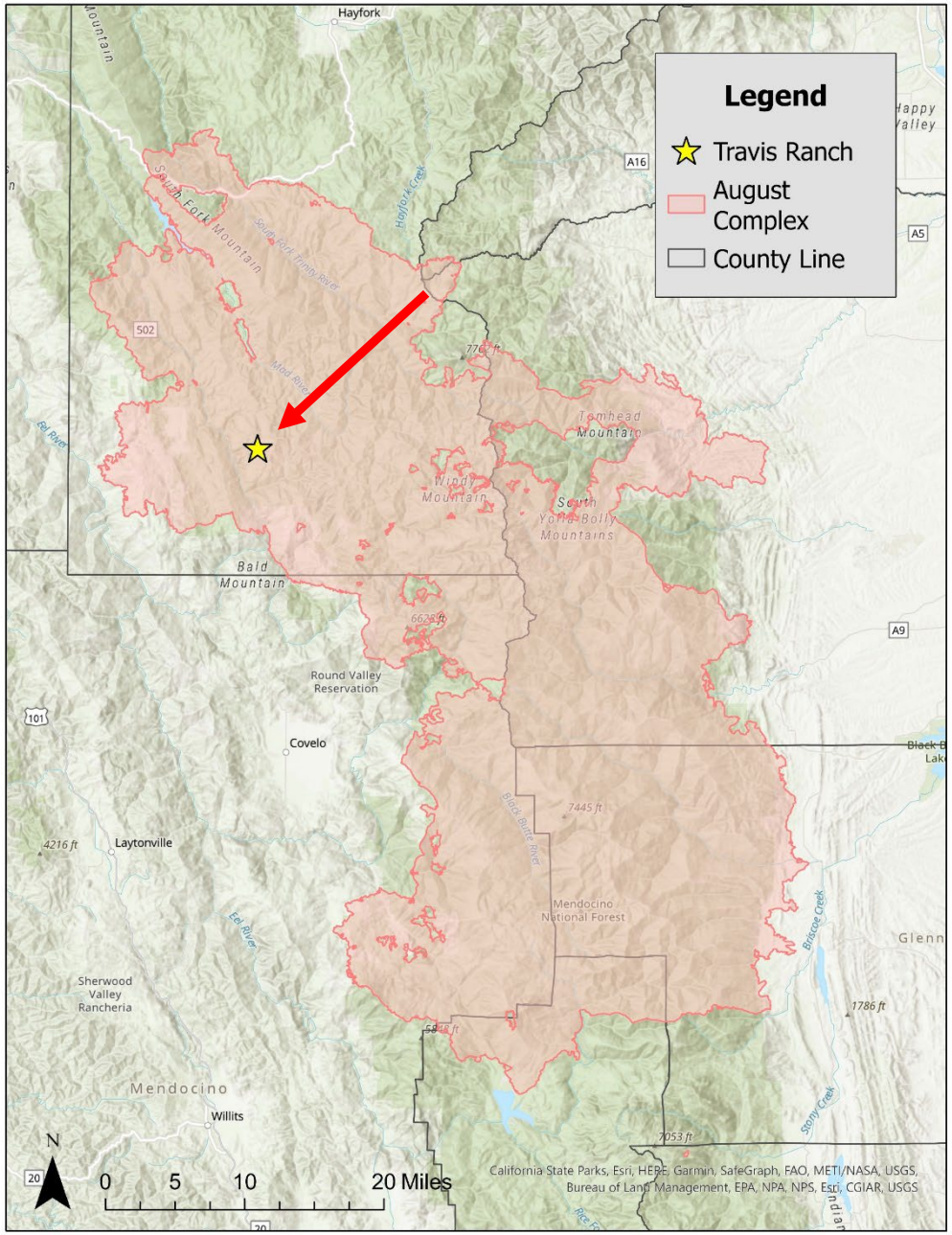
2020 August Complex

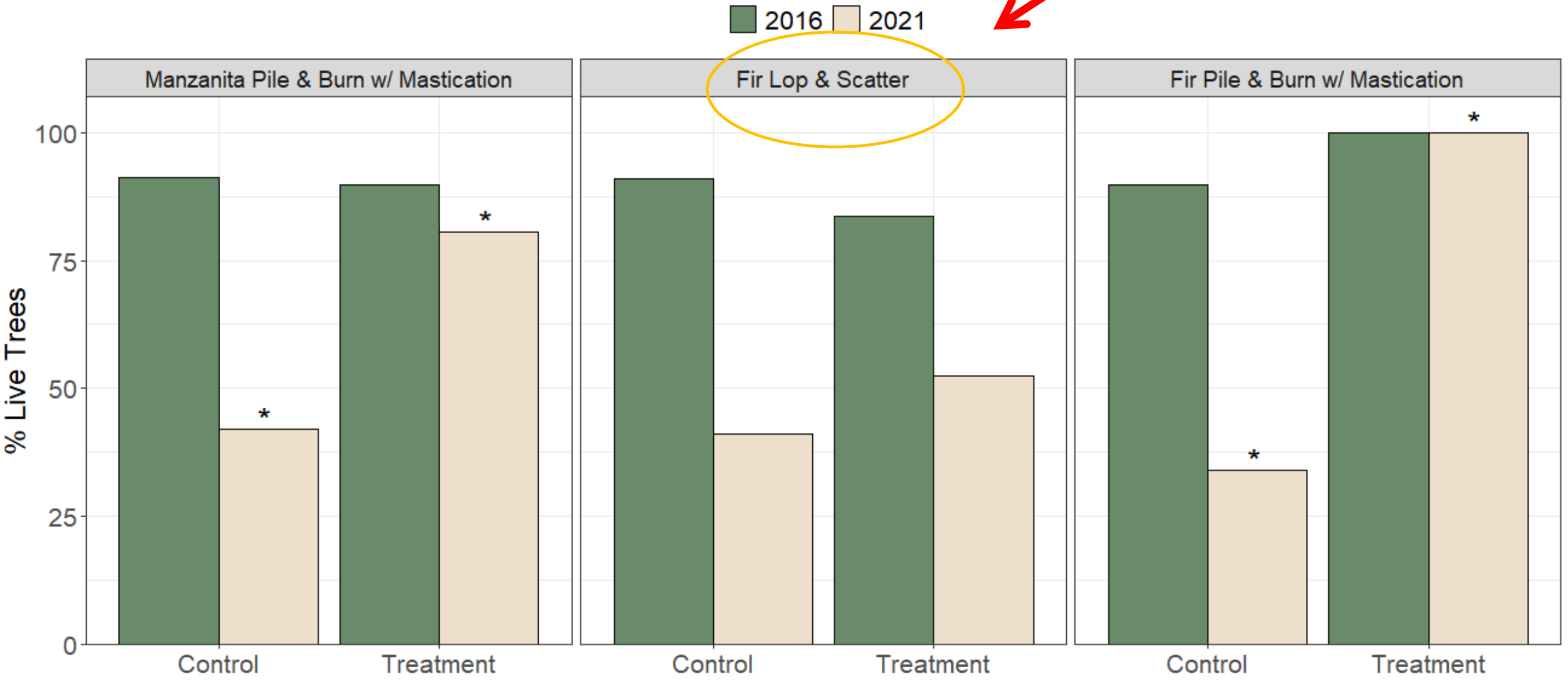




Post- 2020 August Fire

Live Trees (%) Before and After Fire

Fire severity was affected by surface fuels.



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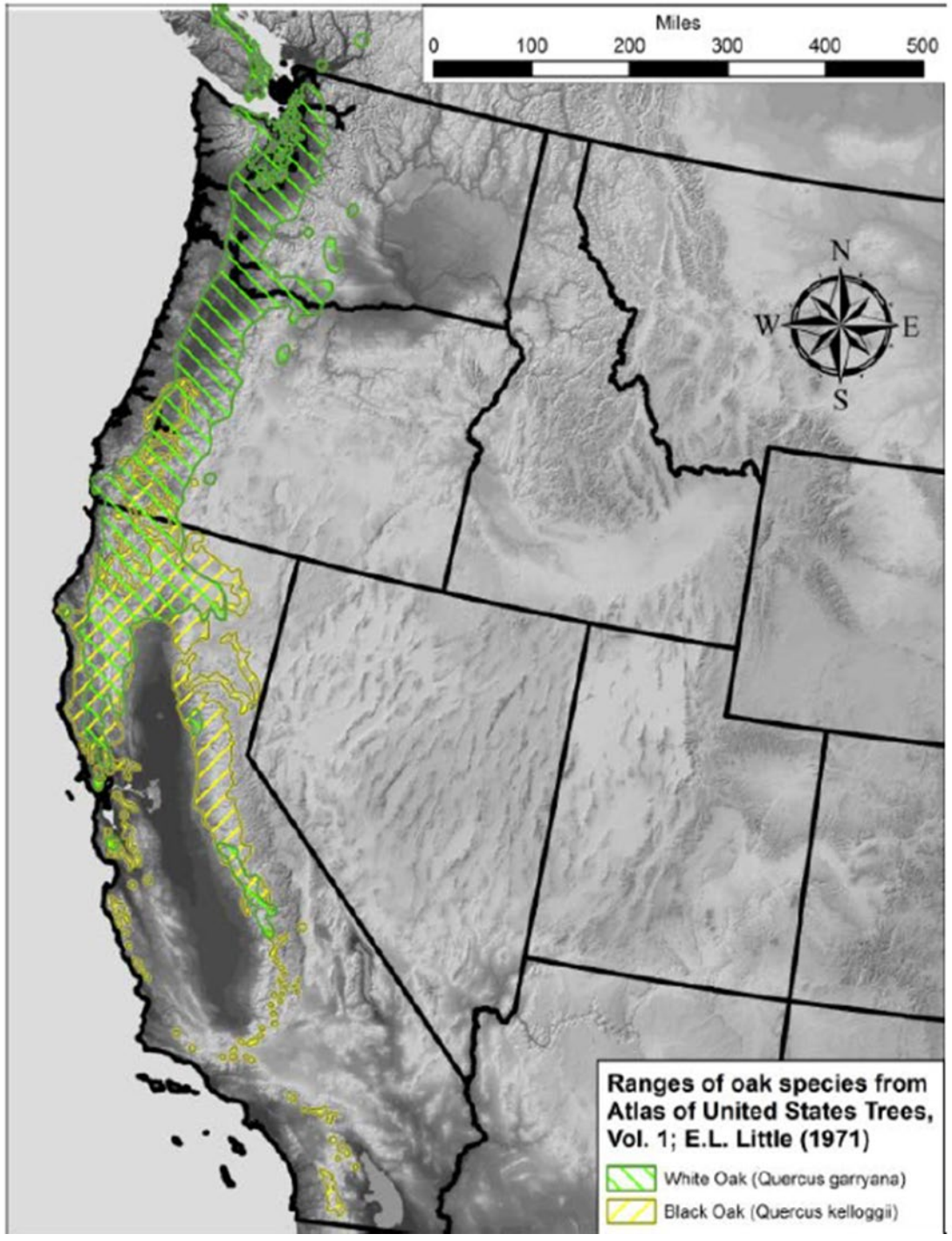
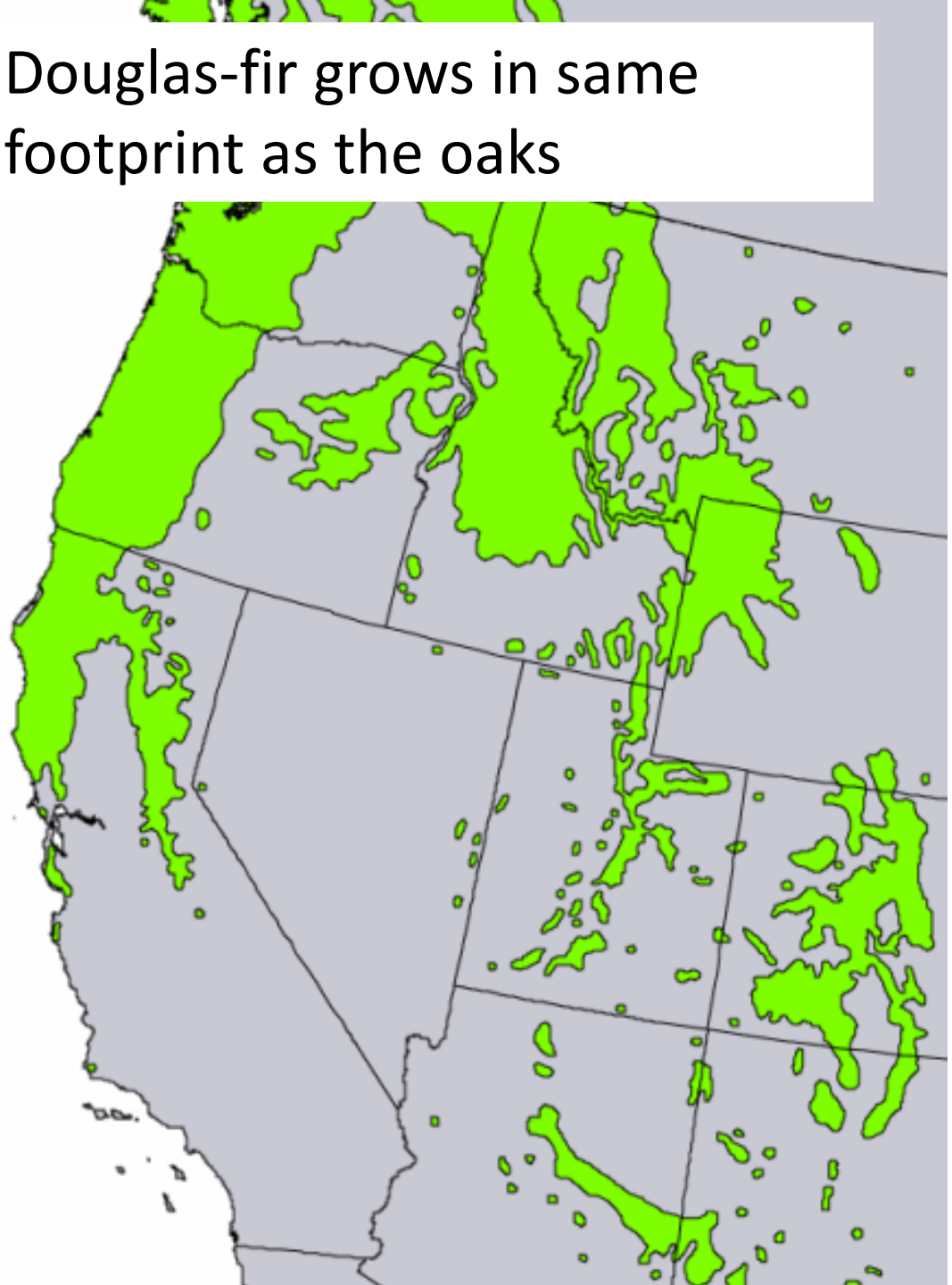
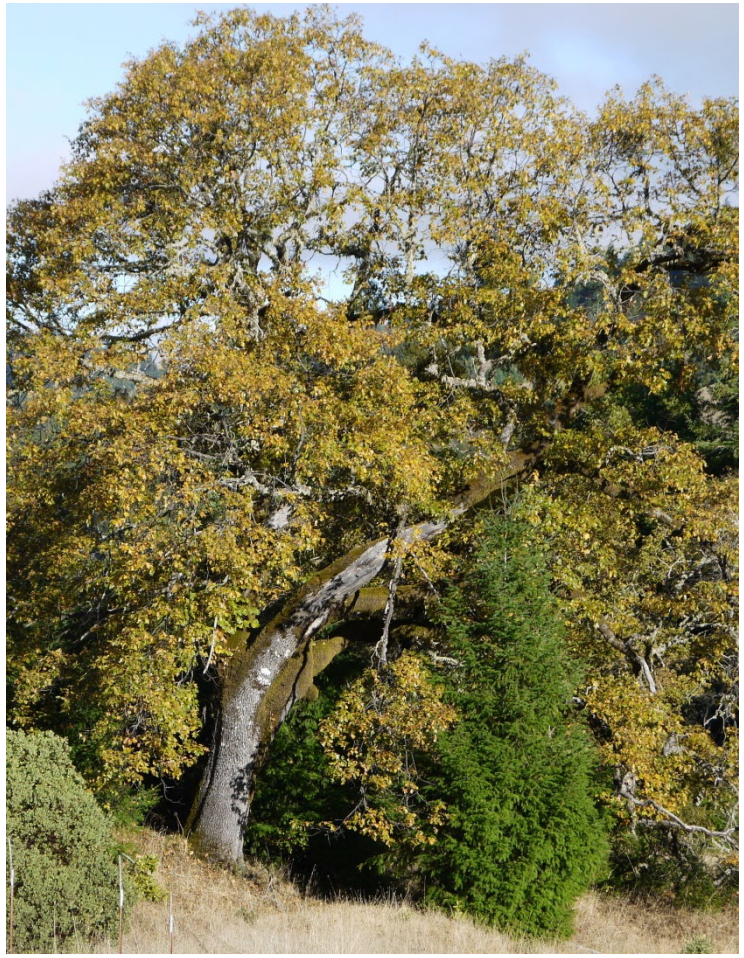


Douglas-fir grows in same footprint as the oaks




Management goals-approaches?

Group A versus Group B (Coast District)



Group A

- Coast redwood
- Douglas-fir
- Grand fir
- Western hemlock
- Western red cedar
- Bishop pine
- Sitka spruce
- Western white pine
- Incense cedar
- Port Orford cedar
- California red fir
- Jeffrey pine
- Ponderosa pine
- Sugar pine

Group B

- Tanoak
- Red alder
- White alder
- California black oak
- Monterey pine
- Golden chinquapin
- Pepperwood
- Oregon white oak
- Pacific madrone

Barriers in the rules

- PCR § 4561 defines a **post-harvest stocking standard**
- 14 CCR 912.7 (d) states that "the site occupancy of Group A species shall not be reduced relative to Group B".
- Gives preference to the conifers and encourage use of planting stock to meet the stocking standards
- Thinning a stand, post-harvest conditions must meet these same stocking or **proportionality** standards , it may be necessary to thin across the species in the stand to meet the pre-harvest to post-harvest proportionality standards
- "**Conversion**" maybe an issue if a stand is not stocked in 5 years – an issue for non-commercial as well as commercial activities .

Solutions- Special Rx

- White and Black Oak Woodland Management Special Prescription, 2016 - Amended 14 § 913.4 [933.4] to enable landowners to manage stands for Oregon white oak and/or California black oak in which Group A species are encroaching.
  - Stocking Standards for the prescription were based of residual oak basal area and adopted pursuant to PRC § 4561.2
  - Prescription applicable in the Coast and Northern Districts
  - Minimum 35 ft^2 of living oak basal area

Solutions- Exemption (2016)

- AB 1958, Wood. Forestry: timberlands: restoration and conservation forest management activities. (Approved and Filed 9/24/16). Amended § 4584 and 4621
  - Authorized the board to exempt the restoration and conservation of California black or Oregon white oak woodlands (and associated grasslands) from portions of the Forest Practices Act
  - Required the Board to implement a California black and Oregon white oak management Exemption by January 1, 2018
  - Defined “growing of timber,” to include restoration and conservation forest management activities, including the removal of commercial species, if necessary to achieve specific forest health and ecological goals.
  - Allowed oak management to occur without risk of “conversion” pursuant to 14 CCR § 1100 et al.
  - Repealed PRC § 4556 which required the Board to “revise or repeal regulations that impeded the restoration of Oak Woodlands”


Photo by L. Quinn Davidson


Photo by Kat Anderson


Photo by Frank Lake


Photo by L. Quinn Davidson


Photo by L. Quinn Davidson

Permit comparison

Green= previous rules
Orange= anticipated changes based on legislation

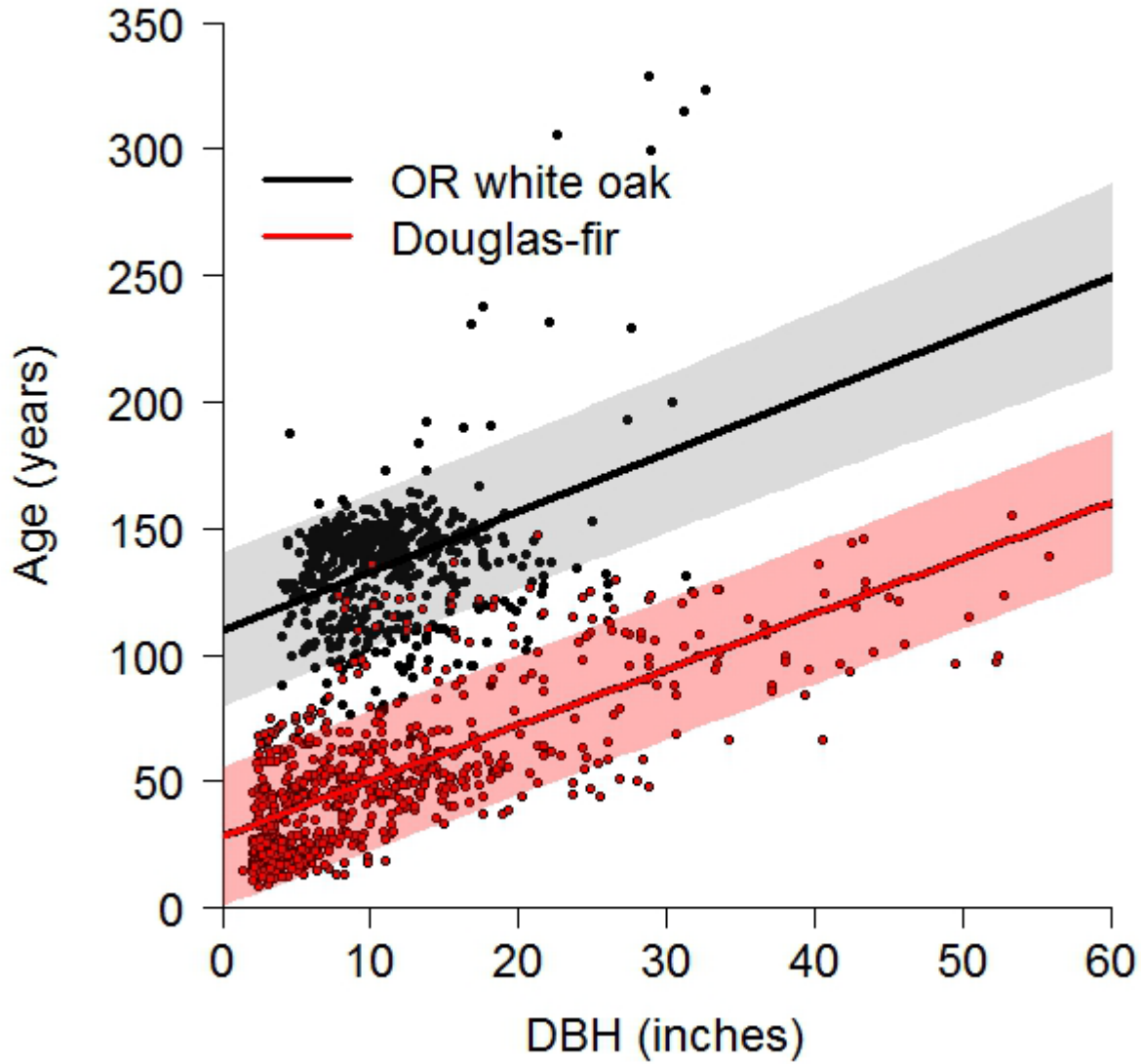
Special Prescription

- ✓Removed conifers must be within 300' of living oak
- ✓No size constraints on removed conifers
- ✓Requires an RPF to prepare
- ✓Can amend into NTMP
- ✓No limit on project size
- ✓Allowed on steeper ground and where in lieu practices are needed
- ✓All THP requirements apply (wildlife, botany, archeological, etc.)
- ✓Requires post-harvest conifer stocking be <50% of total onsite stocking
- ✓Oak used to meet post-project stocking requirements

Exemption

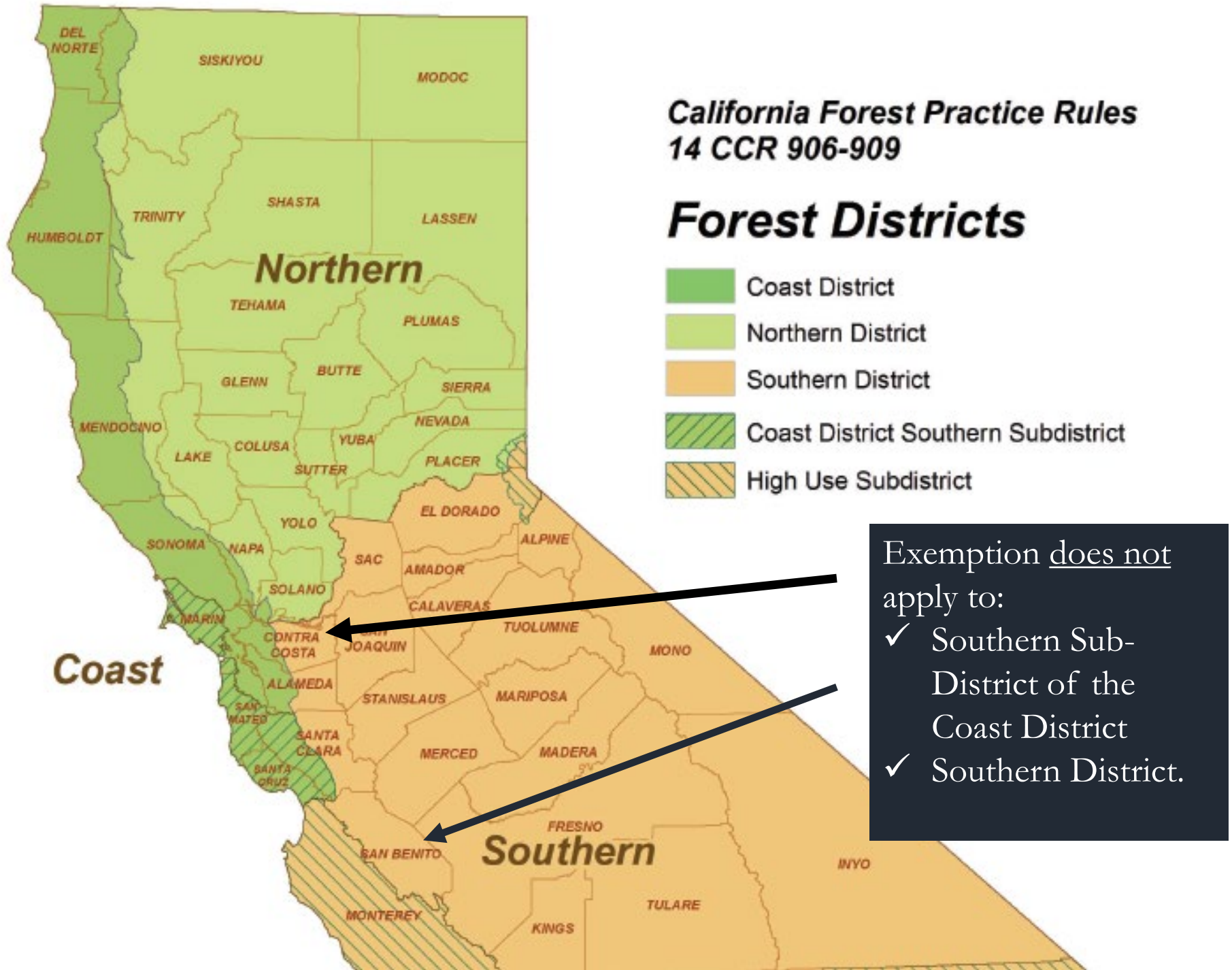
- ✓Removed conifers must be within 300' of living oak
- ✓Removed conifers must ≤26" diameter at 8" stump height. Going to <30" DBH
- ✓Requires an RPF to prepare
- ✓Allowed within existing NTMP
- ✓Limited to 300 acres/5 years/ planning watershed/ ownership
- ✗Not allowed in a WLPZ
- ✓Requires slash treatment
- ✓Requires confidential archeological letter
- ✓Requires post-harvest conifer stocking be <25% of total onsite stocking
- ~~✗Not allowed in So. Sub-Dist. of the Coast Dist. or the So. Dist.~~

Oregon white oak and Douglas-fir diameter to age relationships



Potential Decisions

- 35 square feet basal area per acre restriction
- 4” dbh requirement
- Special prescription application across all forest districts



Exemption <u>does not</u> apply to:

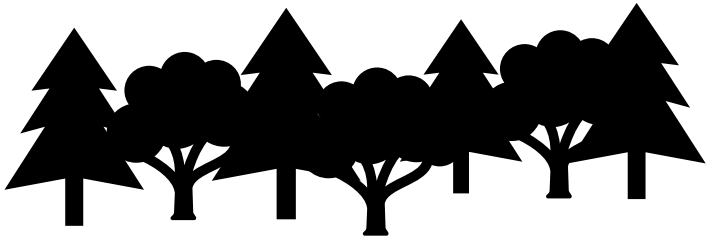
- ✓ Southern Sub-District of the Coast District
- ✓ Southern District.

Usage of the permits

- The exemption and special prescription usage are on the rise as foresters and landowners gain familiarity and experience with the permitting pathways
- **2000 acres** have been completed using the exemption, and **1000 acres** have been completed using the Special Rx option.
- 13 foresters have used the exemption. There are two foresters who have written the most permits based on the geographic area in which they focus their work.
- Word of mouth and visibility are increasing neighborhood interest.
- The landowners have a tremendous amount of pride in the post-treatment condition.
- Landowners are increasing their restoration of oak woodlands using the PLM program and covering many **hundreds of acres** each year.

Mitigation Pathways for Conifer Encroachment in California woodlands

This is prior to AB 2276



Encroachment with merchantable conifers (>12" dbh)

Oak basal area
>35 ft^2 per acre

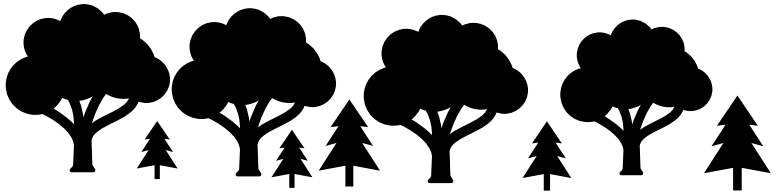
Oak basal area
<35 ft^2 per acre

Special Prescription
- ✓ Removed conifers must be within 300' of living oak
- ✓ No size constraints on removed conifers
- ✓ Requires an RPF to prepare
- ✓ Can amend into NTMP
- ✓ No limit on project size
- ✓ Allowed on steeper ground and where in lieu practices are needed
- ✓ All THP requirements apply (wildlife, botany, archeological, etc.)
- ✓ Requires post-harvest conifer stocking be <50% of total onsite stocking
- ✓ Oak may be included in post-project stocking requirements

Exemption (THP)
- ✓ Removed conifers must be within 300' of living oak
- ✓ Removed conifers must ≤26" diameter at 8" stump height
- ✓ Requires an RPF to prepare
- ✓ Allowed within existing NTMP
- ✓ Limited to 300 acres/5 years/ planning watershed/ ownership
- ✗ Not allowed in a WLPZ
- ✓ Requires slash treatment
- ✓ Requires confidential archeological letter
- ✓ Requires post-harvest conifer stocking be <25% of total onsite stocking
- ✗ Not allowed in So. Sub-Dist. of the Coast Dist. or the So. Dist.

No Permit
- ✓ Personal use only
- ✓ Landowner responsible for conifer removal
- ✓ Funding assistance available

Forest conversion
- ✓ Re-establish dominant conifer forest
- ✓ Requires an RPF
- ✓ Requires THP or NTMP



Encroachment without merchantable conifers

Government sponsored funding assistance
- ✓ NRCS-EQIP or RCPP
- ✓ CAL FIRE- CFIP
- ✓ USFWS- Partners Program
- ✓ See insert for program details

Prescribed fire
- ✓ Effective at reducing conifer seedling competition
- ✓ CAL FIRE- VMP
- ✓ Humboldt County Prescribed Burn Association
- ✓ NRCS- EQIP

Project maintenance

Acronym key:
CFIP= California Forest Improvement Program
DBH= diameter at breast height
EQIP= Environmental Quality Incentives Program
NRCS= Natural Resources Conservation Service
NTMP= Non-industrial Timber Management Plan
RCPP= Regional Conservation Partnership Program
RPF= Registered Professional Forester
THP= Timber Harvest Plan
USFSW= US Fish and Wildlife Service
VMP= Vegetation Management Program
WLPZ= Watercourse Lake Protection Zone