Responding to Sudden Oak Death on Mt Tamalpais

Janet Klein, OneTam
Richard Cobb, CalPoly
Peter Hartsough, UC Davis
Jessica Wright, USDA Forest Service
Susan Frankel, USDA Forest Servie

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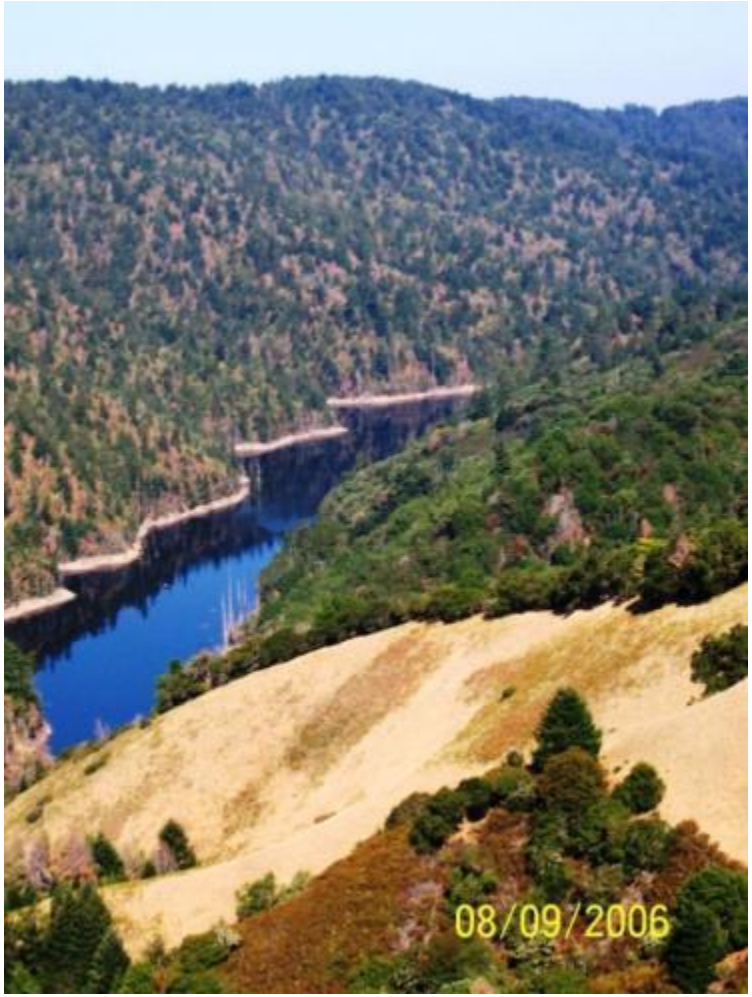
Background

Sudden Oak Death Outbreak
Bolinas Ridge, Mt Tamalpais
2006



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Typical Redwood Forest On Bolinas Ridge, 2018

Virtually No Forestry Infrastructure In Marin County

And No Public Support for Large Scale Work.

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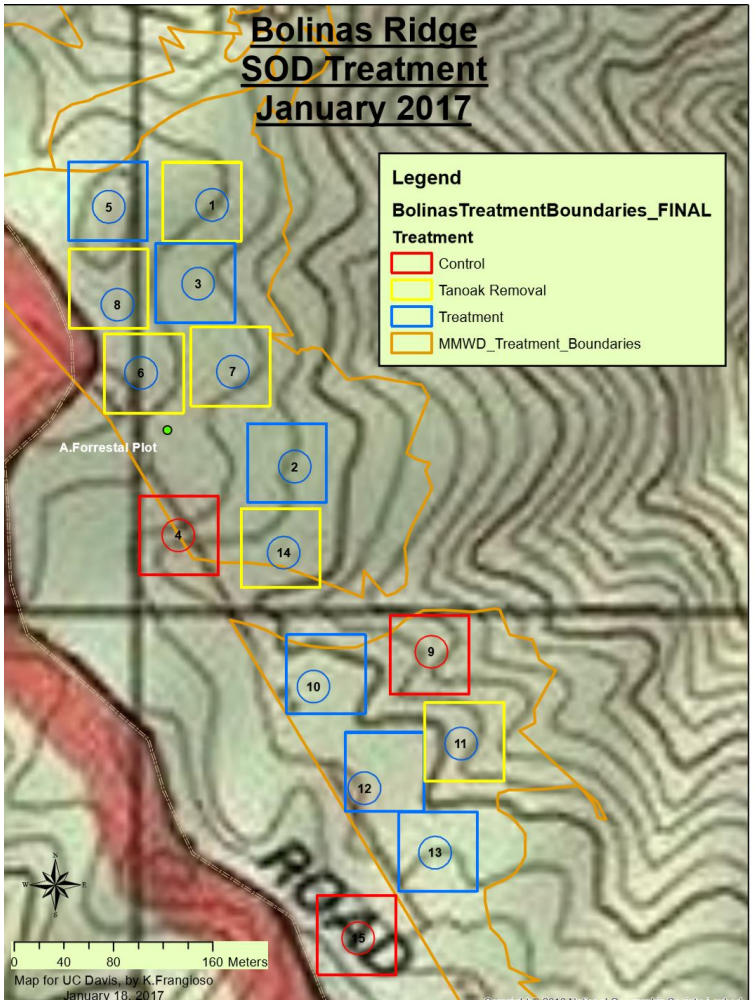
Marin County Resilient Forest Study
Investigations into Multiple Benefits Options

GOAL: Improved Forest Functions

- Reduce brush
- Reduce fuel
- Increase tree diameter
- Improve fire resiliency
- Optimize carbon storage
- Optimize water yield
- Improve habitat value

And can we fund the work at a meaningful scale?



CAT
DANGER
314C LCR
CAT

CAT
RG6J99
299C

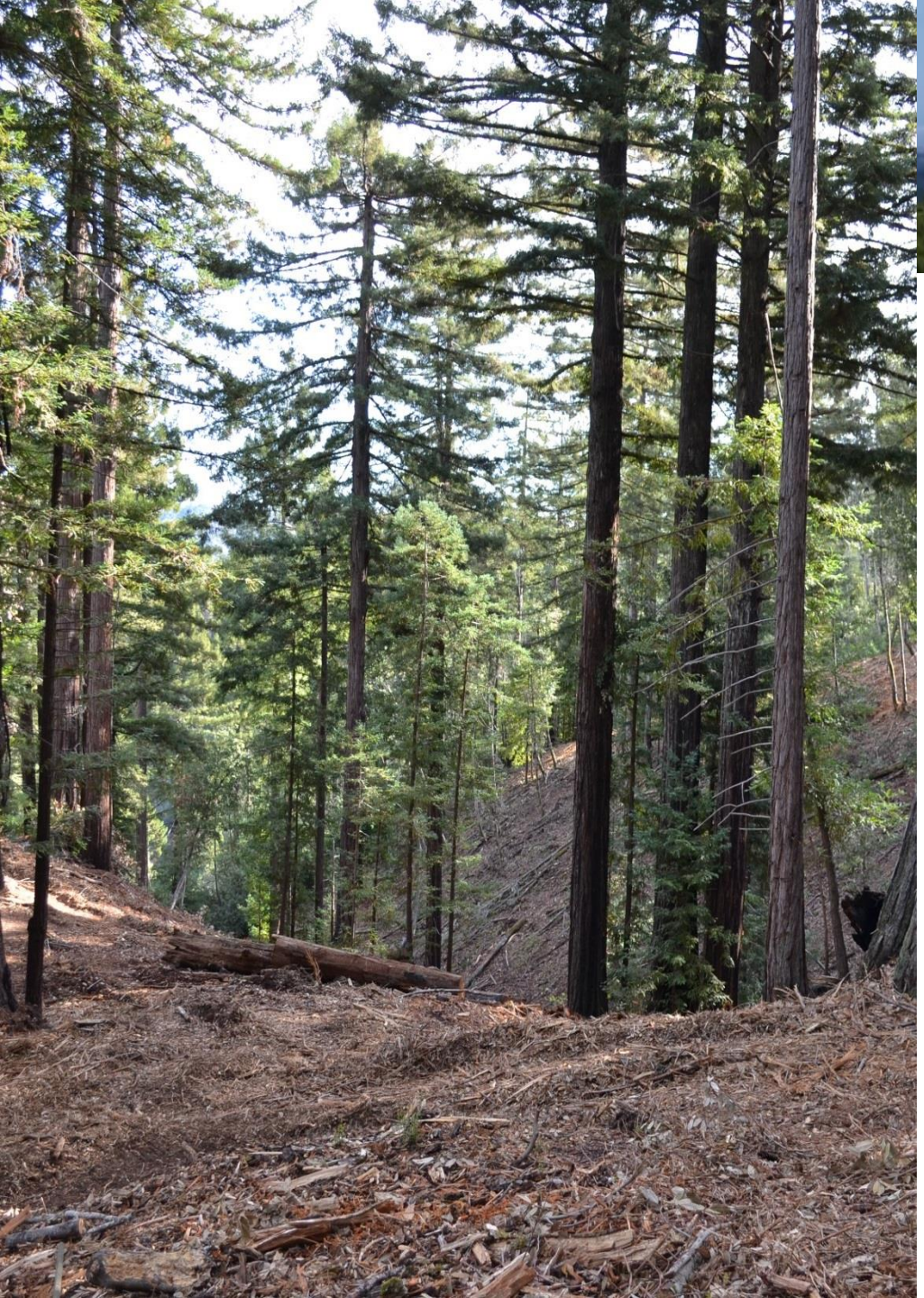
Treatments Started in 2015

25 treatment plots installed.

We used a combination of machine and hand crews; MMWD staff & contractors

Material was masticated on site where machines could reach. Chainsaw crews cut and piled elsewhere

Plots placed in both redwood/tanoak forest and Douglas fir/mixed hardwood forest.



Secondary Treatments

We brush cut tan oak resprouts in 50% of plots.

We piled burned material in plots inaccessible to heavy equipment with masticating heads.

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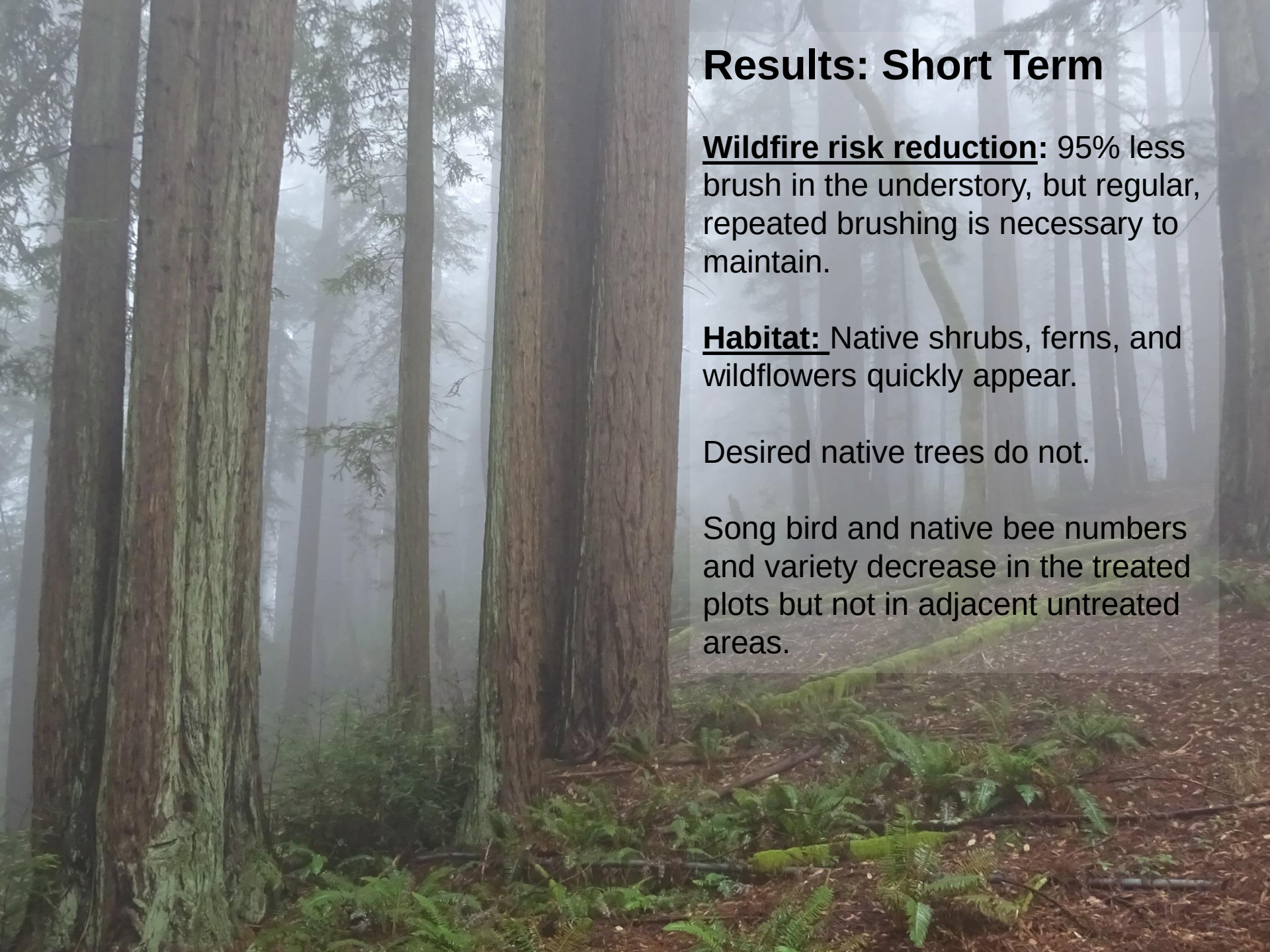
Costs

Initial Treatment: $12,300 per acre.
Follow up Treatments: $360 per acre.

Lower Intensity Treatments: $5000 per acre.

Treatment Target by Year 5 of BFFIP:
60 acres of new treatment each year.
100 acres of follow up each year.

Estimated Extent of *Reachable* Diseased Forest:
2000-3000 acres. ($10,720,00 to $16,080,000)



Results: Short Term

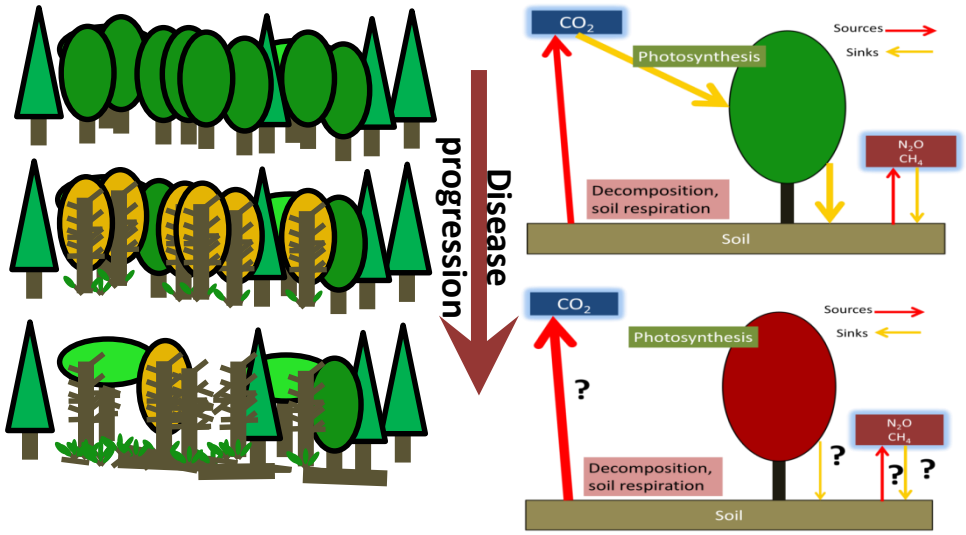
Wildfire risk reduction: 95% less brush in the understory, but regular, repeated brushing is necessary to maintain.

Habitat: Native shrubs, ferns, and wildflowers quickly appear.

Desired native trees do not.

Song bird and native bee numbers and variety decrease in the treated plots but not in adjacent untreated areas.

Short Term Results: Green House Gases



Green House Gas Balance:
Not yet calculated but pieces of puzzle are falling in place.

Cobb, R.C., Hartsough, P., Ross, N., Klein, J., LaFever, D.H., Frankel, S.J., Rizzo, D.M. 2017. Resiliency or restoration: management of sudden oak death before and after outbreak. Forest Phytophthoras. 7:1-14.

Standing Carbon: Basal area reduced by 3 to 14% depending on plot. More than 85% of stored carbon was retained.

Carbon transport: Carbon released by treatments not fully calculated. 20-40% of carbon released bydecomposition goes into the atmosphere while 60 to 80% goes into the soil.

Methane transport: Redwood soils absorb methane and off-set about 5% of the carbon released.

Rate of carbon uptake by trees: Not yet known—tree re-measurement scheduled for 2019. Likely to be beneficial

Long term outcome will be improved with establishment of new trees.

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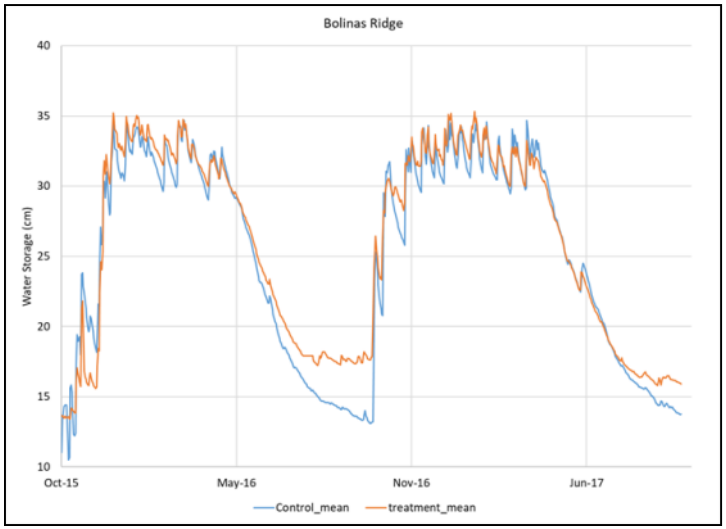
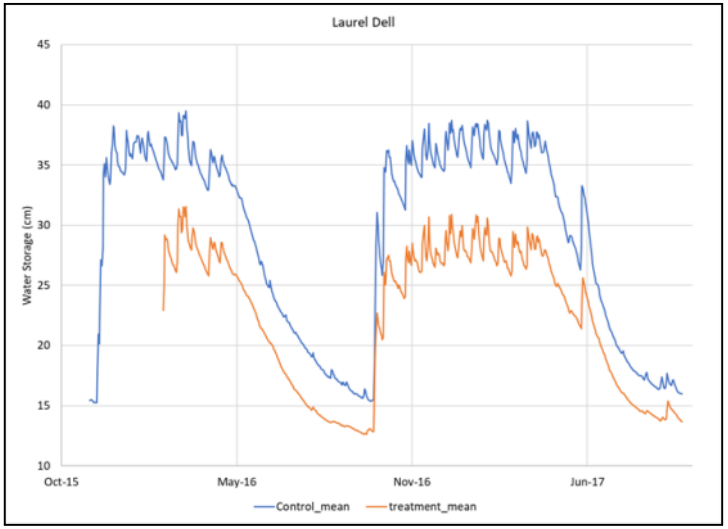
Short Term Results: Water Yield.



Water penetration and retention improved in redwood stands.



Water penetration and retention worsened in Douglas fir / mixed hardwood stands.

<u>Possible factors:</u> Pre-treatment brush quantities, depth of mulch, pile burning, size of canopy gaps. ***Additional data collection and treatment plots are needed.***

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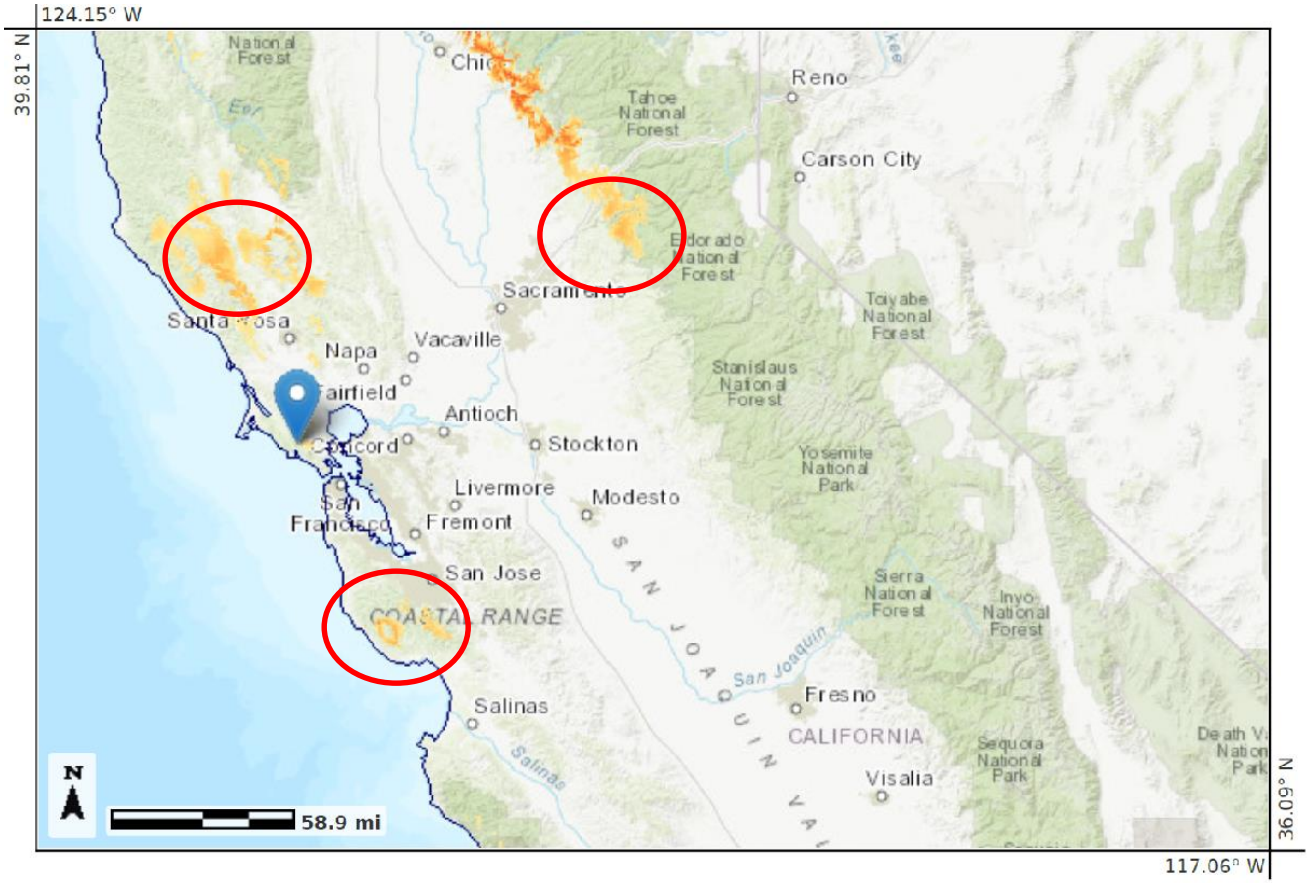
The Next Question:
What is the best source of seed for reforstation?

Field Testing from seed stock from 3 projected climatic futures:

- Coast Redwood
- Douglas fir
- Canyon Live oak
- Big Leaf Maple
- California Nutmeg



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Next Step: Scaling Up

The One Tam Partnership

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