

Carbon farming, co-gen and biochar
or
(forest, forest products, other sectors)

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@ 'Fire Resiliency for North Coast Homes and Forests'

May 19 2018

Timber Cove

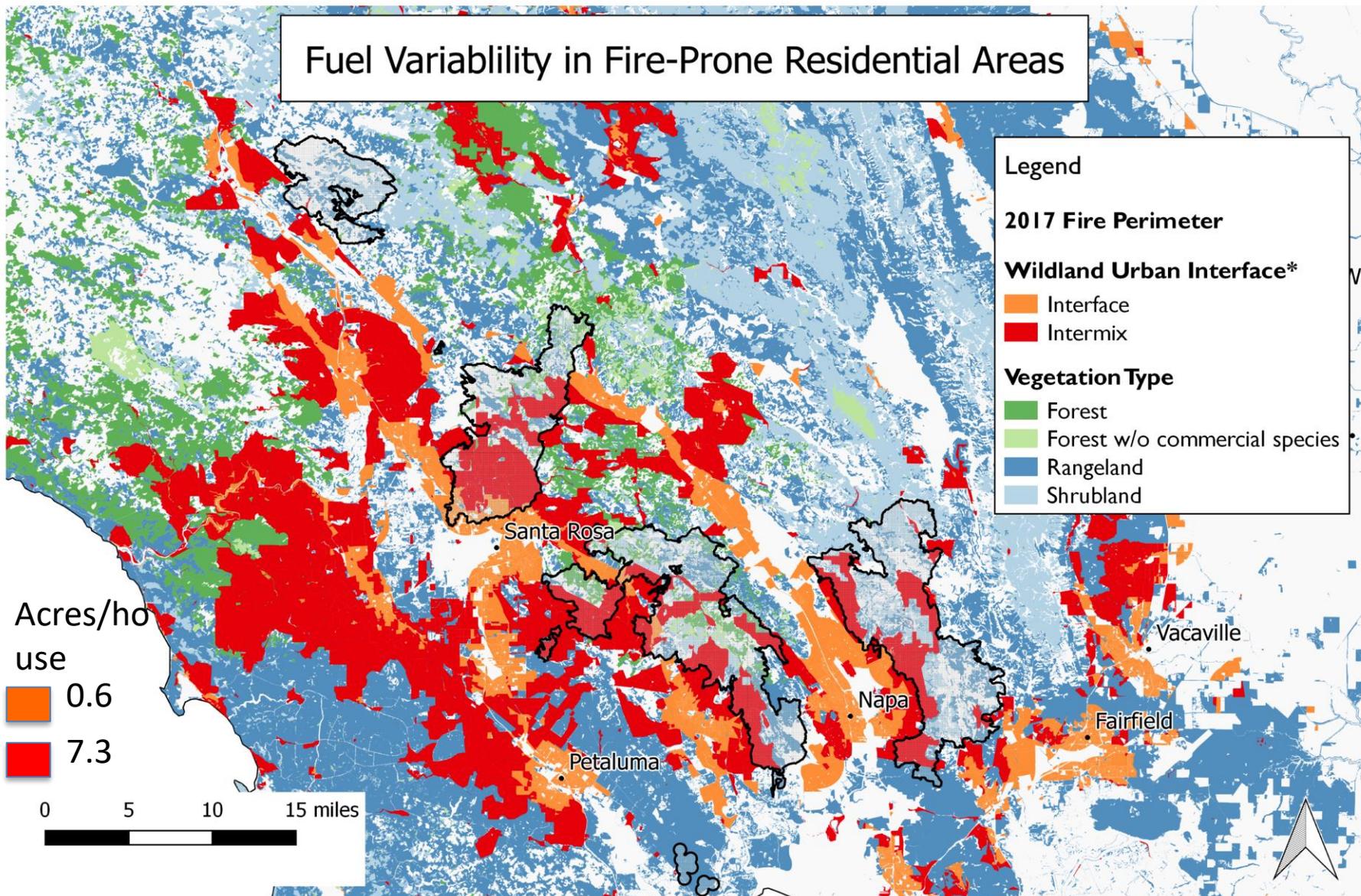
Overview

- Provide background information on acres, people, parcels and vegetation in Sonoma
- Statewide context on trends in fire and other forms of vegetation mortality in California
- What we know about forest management on family forests on the North Coast (stewardship is expensive)
- How this information relates to current forest policy goals
 - Carbon farming
 - Bioenergy
 - Forest products used elsewhere
- Addressing the bigger challenge

Sonoma County Natural Lands

Natural Vegetation Type	Total Acres	Pct of Natural Lands	Total Owners	Avg Parcel Acres	Median Parcel Acres
Temperate Forest	439,619	62%	8,583	51	8
Temperate Shrubland & Grassland	219,158	31%	8,662	25	5
Mediterranean Scrub & Grassland	32,314	5%	4,471	7	1
Introduced & Semi Natural Vegetation	11,870	2%	3,579	3	1

Fuel Variability in Fire-Prone Residential Areas



Legend

2017 Fire Perimeter

Wildland Urban Interface*

- Interface
- Intermix

Vegetation Type

- Forest
- Forest w/o commercial species
- Rangeland
- Shrubland

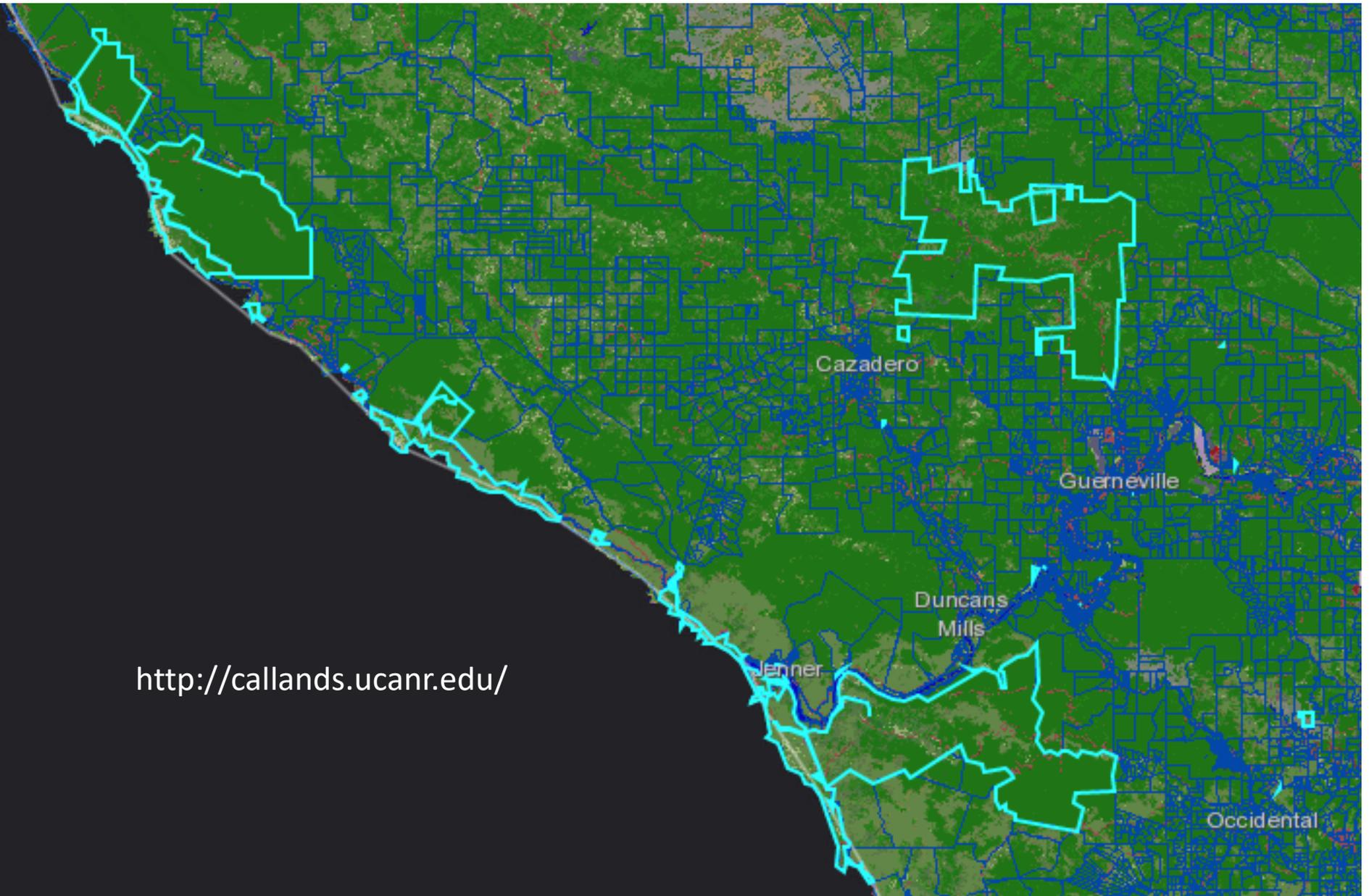
Acres/household use

- 0.6
- 7.3

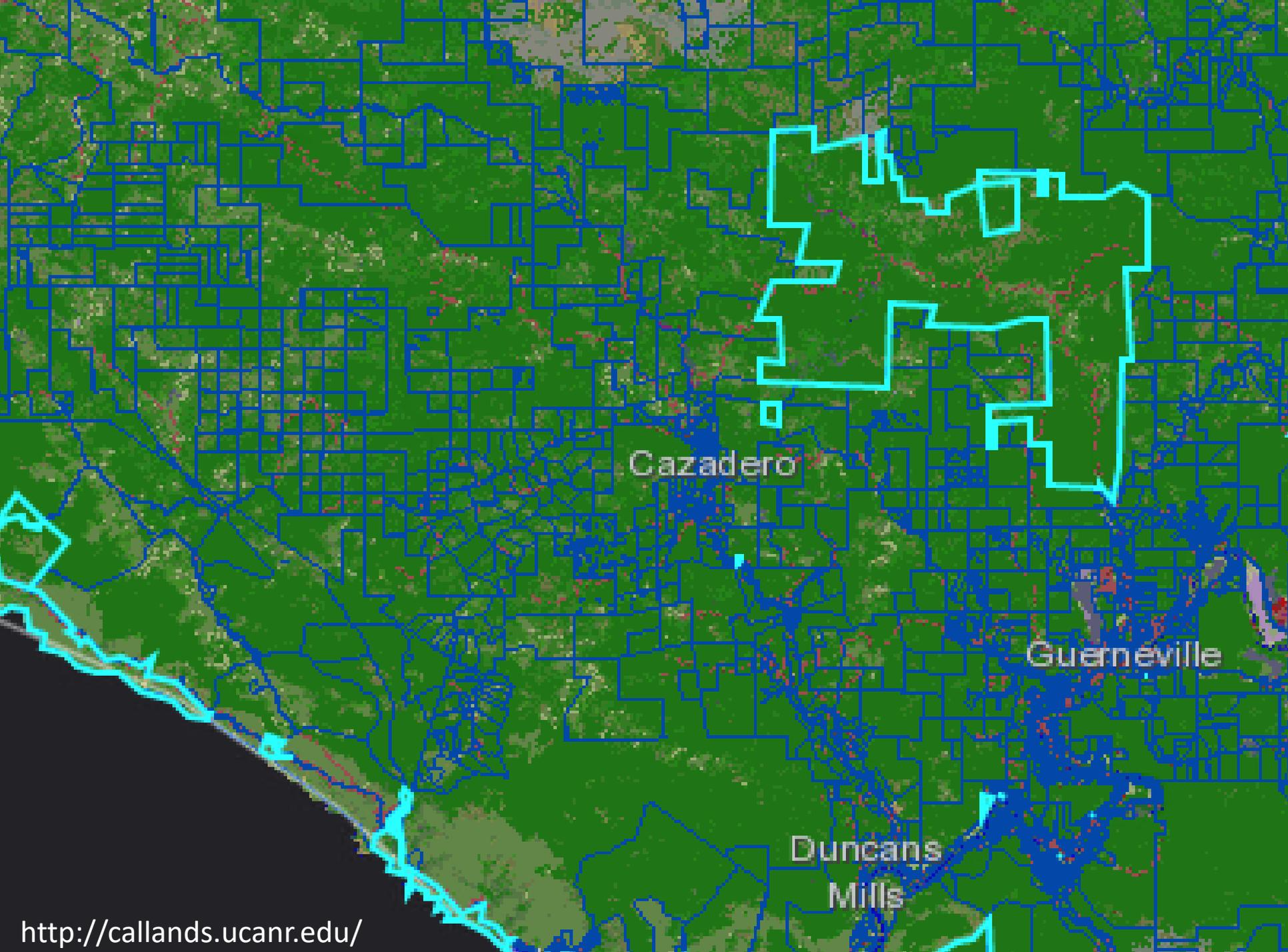
0 5 10 15 miles

* Intermix is defined as having > 50% of census block as wildland vegetation. Interface is defined as having < 50% of census block as wildland vegetation and being within 1.5 miles of a large area with > 75% wildland vegetation. See Stewart S.I., V.C. Radeloff, R.B. Hammer, and T.J. Hawbaker. 2007. Defining the Wildland Urban Interface. *Journal of Forestry* 105:201-207.

<http://callands.ucanr.edu/> (Macaulay and Butsic)



<http://callands.ucanr.edu/>



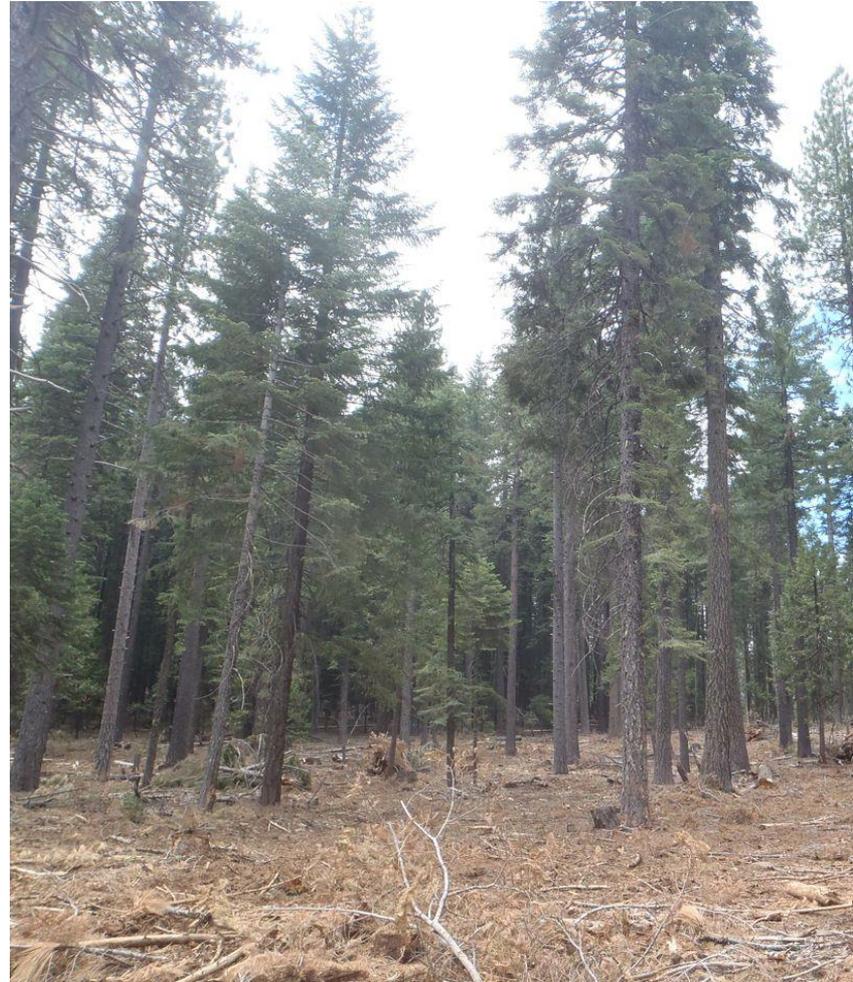
Cazadero

Guerneville

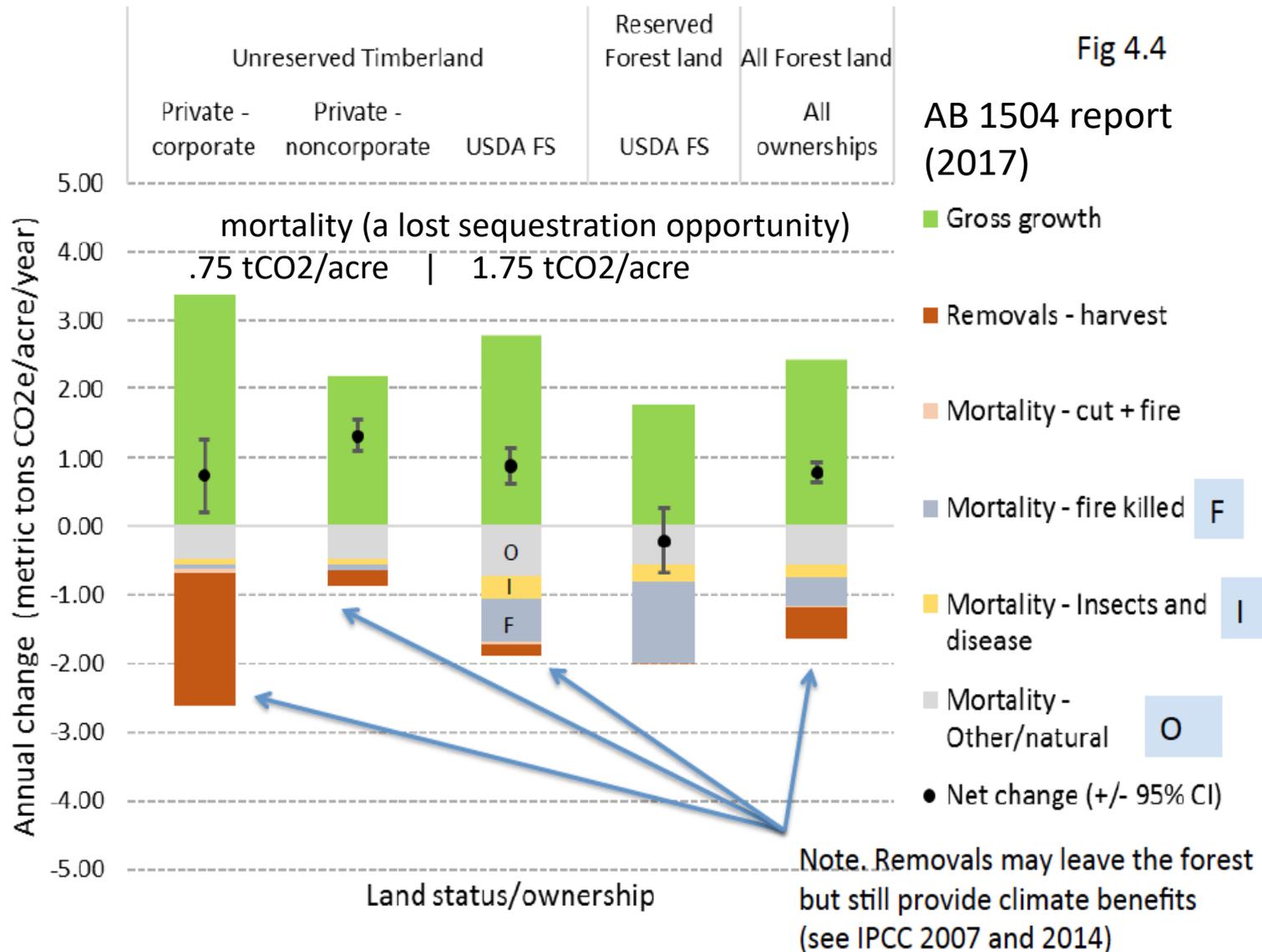
Duncans
Mills

Carbon farming (count the products too!)

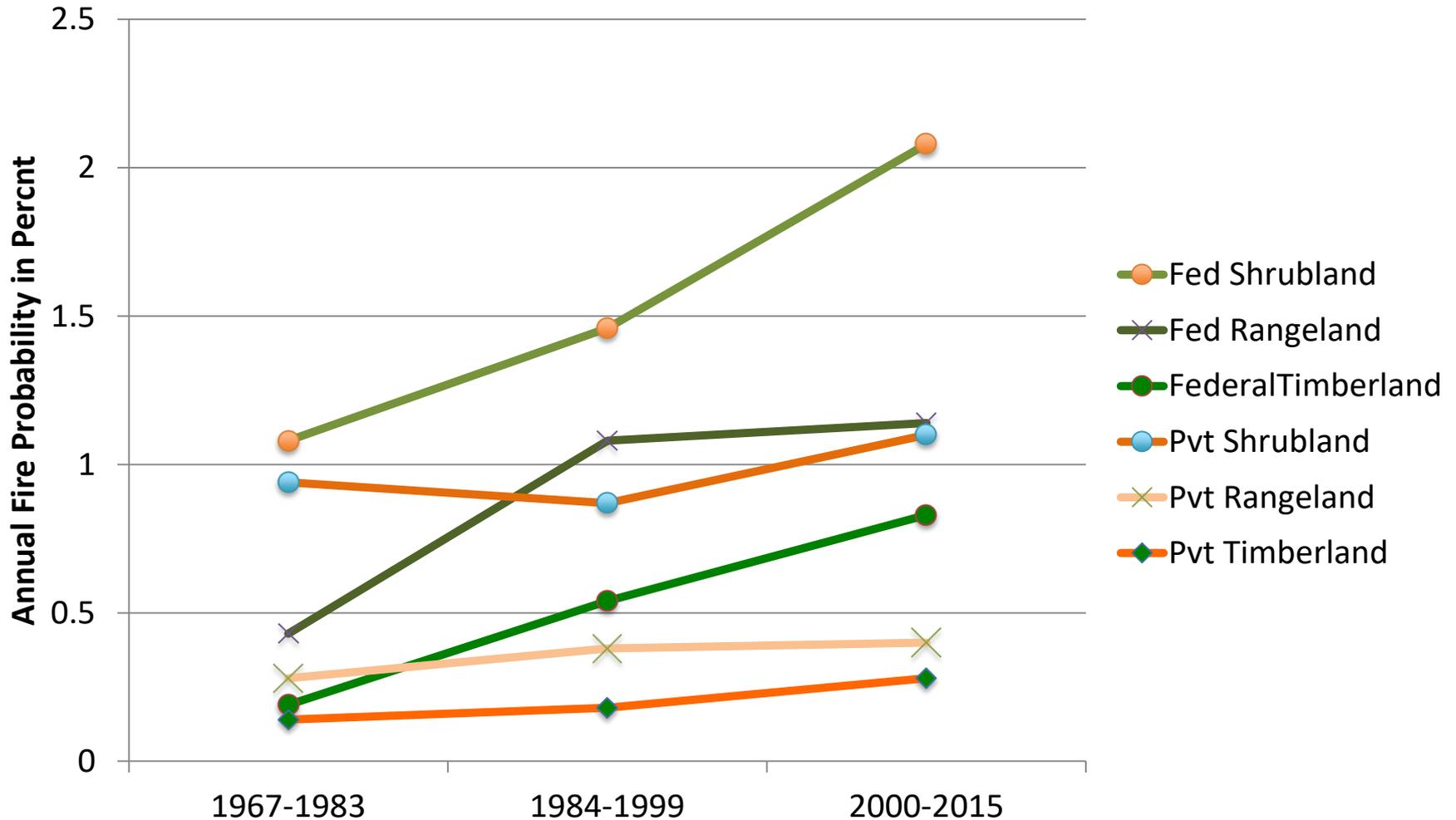
- IPCC 2014 requires developed countries to count climate benefits of wood products
- IPCC compliant forest policy analyses also address the cross-sector benefits when wood use also displaces emission intensive products (like natural gas and cement)
- The higher percentage of any cost share or carbon project that goes to land stewardship (rather than consultant's paperwork) the better
- Wildfire is only one of many sources of mortality I forests (lost sequestration opportunities)



California forest carbon (CO₂e) - Average annual growth, mortality, harvest, and net change per acre above ground live tree pool: 2001-2005 to 2011-2015



Annual Fire Probabilities for Similar Lands



Fire Probabilities are Increasing – but strongly influenced by vegetation and management (Starrs et al. 2018)

It is not just climate change driving more wildfires – management matters

Vegetation Type	Owner	1970s	2000s	Absolute Change
Forest	Federal-Reserve	0.42%/yr	1.82%/yr	1.4
Forest	Federal-Managed	0.19%/yr	0.83%/yr	0.64
Forest	Private-Managed	0.14%/yr	0.28%/yr	0.14

<http://iopscience.iop.org/article/10.1088/1748-9326/aaaad1>

Starrs et al. (2018) *Env Res Letters*

What happens to live tree volume in California fires? – by severity on USFS lands and by owner

Where to?	Low Severity	Moderate Severity	High Severity
Still Alive	97%	62%	3%
To New Snags	3%	25%	67%
Emitted in Combustion	0%	13%	30%

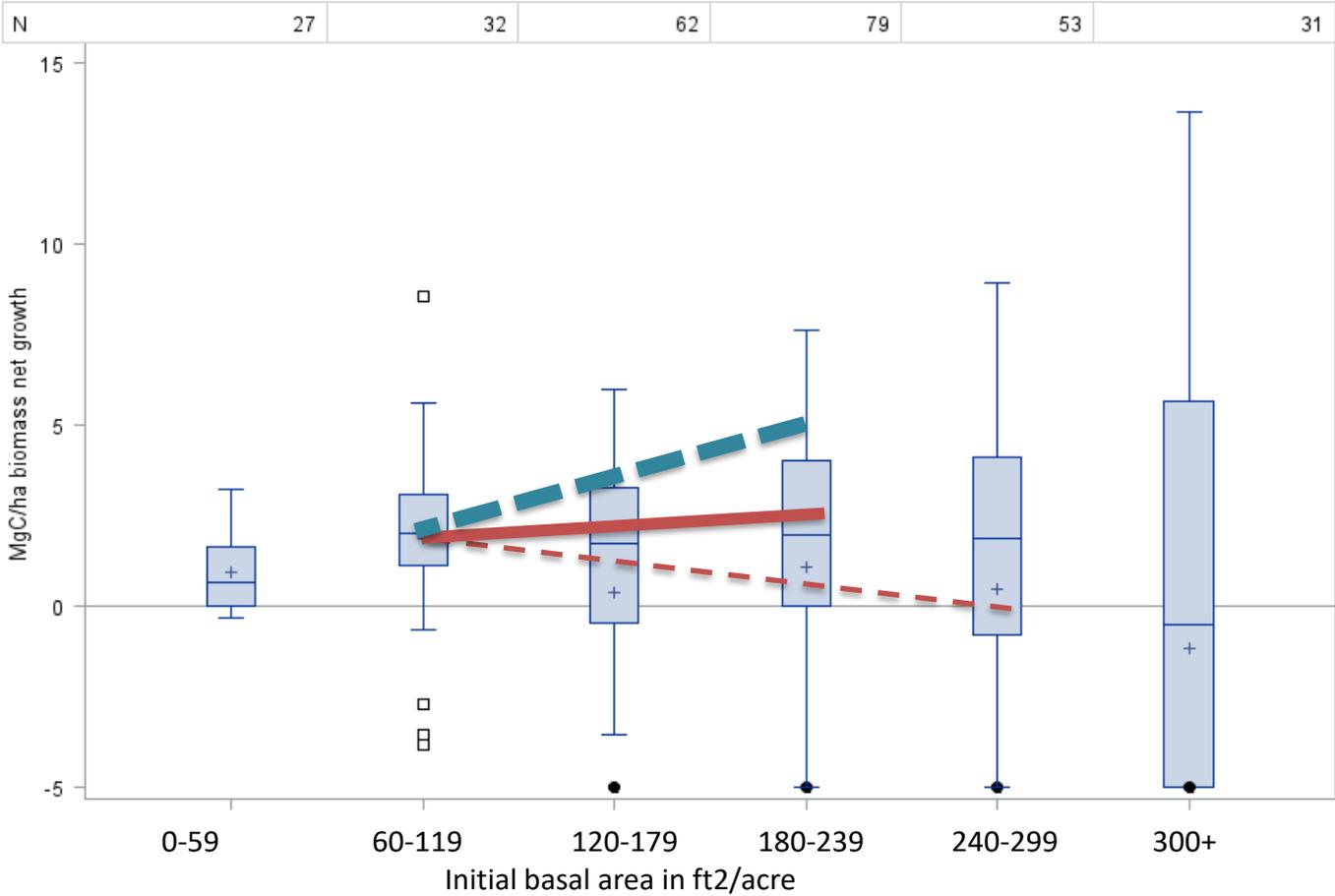
Calculated from: Eskelson, B.N.I., Monleon, V.J. and Fried, J.S. 2016 A 6 year longitudinal study of post-fire woody carbon dynamics in California's forests. *Canadian Journal of Forest Research*, **46**, 610-620

Where did burned trees go?	USFS Timberland	USFS Reserve	Corporate Timberlands	NonCorp Timberlands
To snags	94%	100%	37%	90%
To log trucks	6%	0%	63%	10%

Calculated from AB 1504 report (Christensen et al. 2017) Table 4.6

Based on remeasured FIA plots in AB1504 report

Net growth (gross growth - mortality)
NFS timberland, site class 3&4, Uneven age

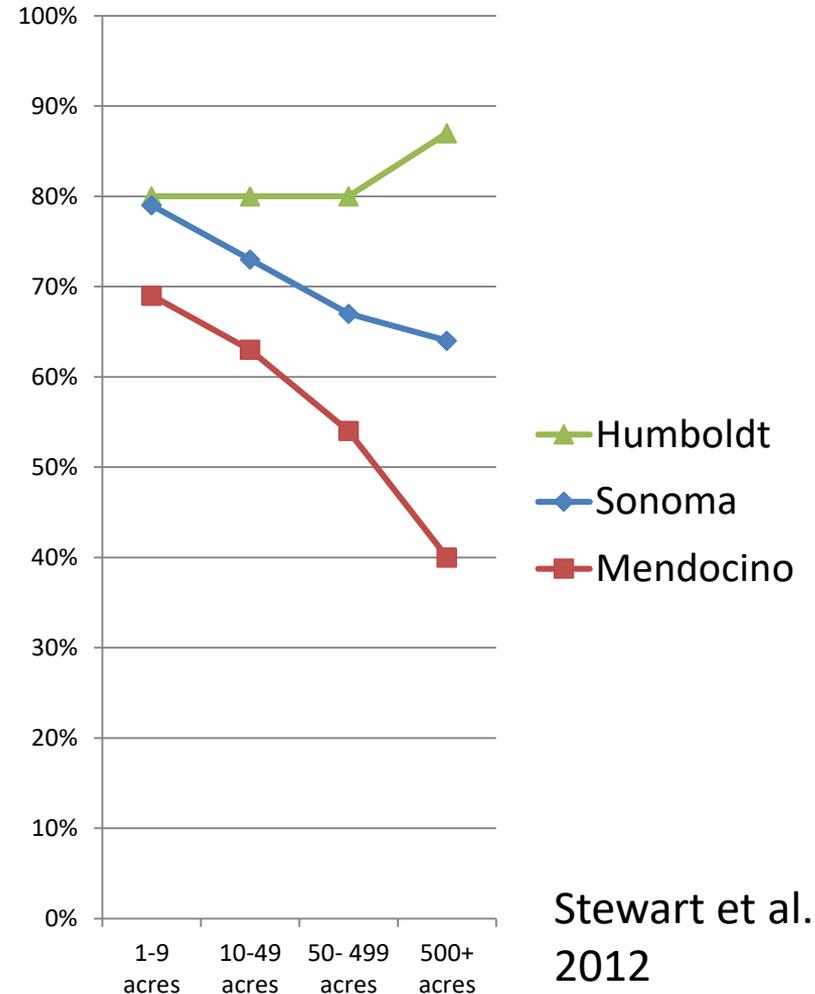
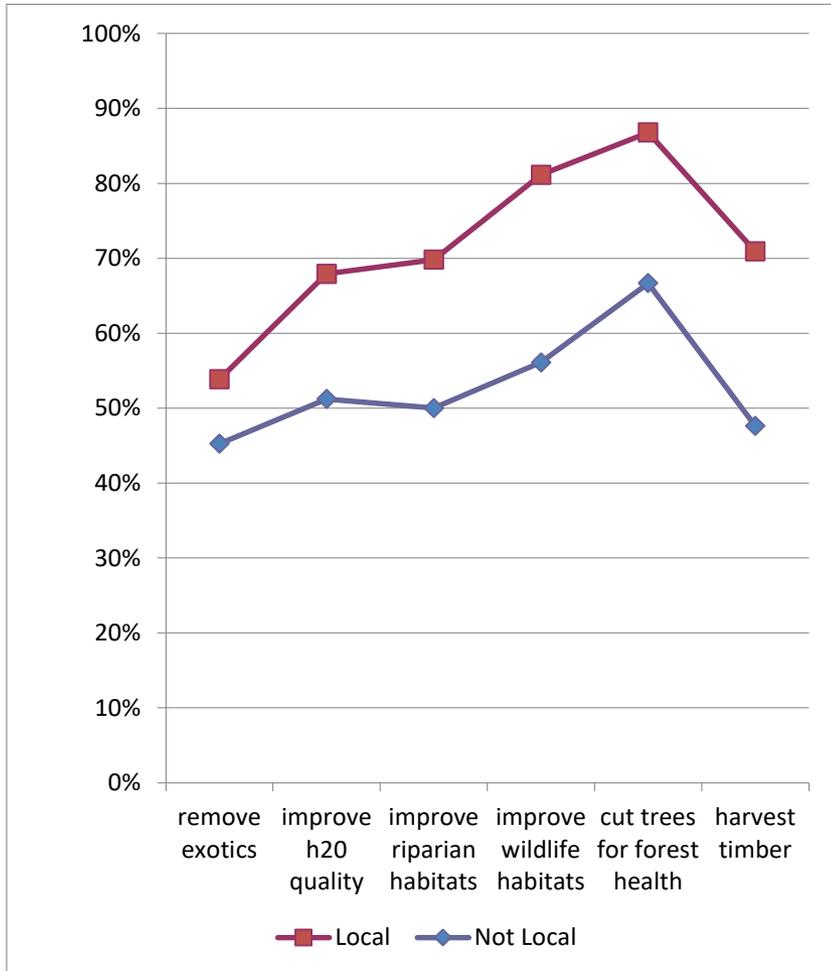


- - - - Trend line of USFS mean stand on box and whisker plots (negative returns to > inv)
- Trend line of Noncorporate mean stand (better returns to higher inventories)
- - - - Trend line of Corporate mean stand (best returns to higher inventories)

Moral: More inventory does not necessarily mean higher sequestration rates

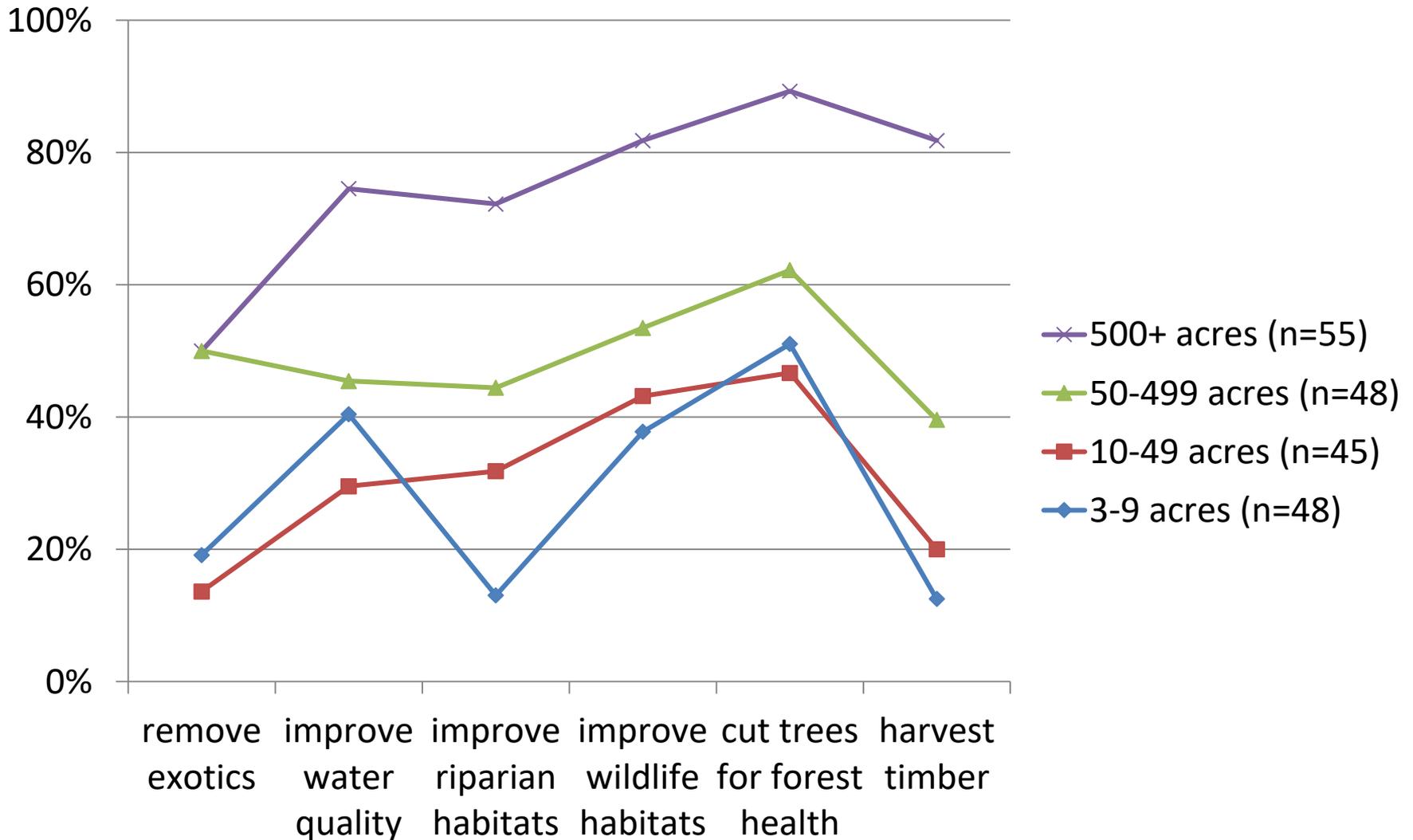
UC typology (2011)	Forest investor	Business family	Gardener family	Inheritor
Butler typology JOF (2007)	Supplemental income	Working the land	Woodland retreat	Ready to sell
Percent of sample respondents	16%	49%	22%	13%
Median size in our sample	1260 acres	50 acres	40 acres	35 acres
Approached to sell	53%	36%	39%	36%
Environmental values	51%	71%	79%	20%
Family and community values	16%	58%	56%	26%
Financial values	50%	45%	23%	27%

'Local' landowners do more resource stewardship activities



Stewart et al.
2012

Size drives management activities the 80/40/20/10 rule for harvesting



Co-gen

- Best understood uses are in wood and food processing locations that use a lot of process heat (replace natural gas) AND electricity (replace retail priced electricity)
- Smaller scale co-gen units have all the engineering challenges without the benefits of economies of scale
- Niche and local markets may pay more
- Super simple cost breakdown
 - 4 cents/kwh - operating costs
 - 4 cents/kwh – pay for fuel
 - 4 cents/kwh – ongoing capital costs
 - 4 cents/kwh – new capital costs
- Super simple revenue breakdown
 - 4 cents/kwh – long terms wholesale price of CA renewables
 - ? Cents/kwh – other public benefits (which public?)

BioChar

- Classic example of removing carbon from one sector and using it for non-carbon benefits in another sector
- But it does not fit into ARB sector by sector inventory approach (agr benefits not considered)
- BioChar has zero nutrients but can be the 'horse' to carry late season soil moisture and nitrogen fertilizer
- Topic of lots of ongoing research projects across the Western United States

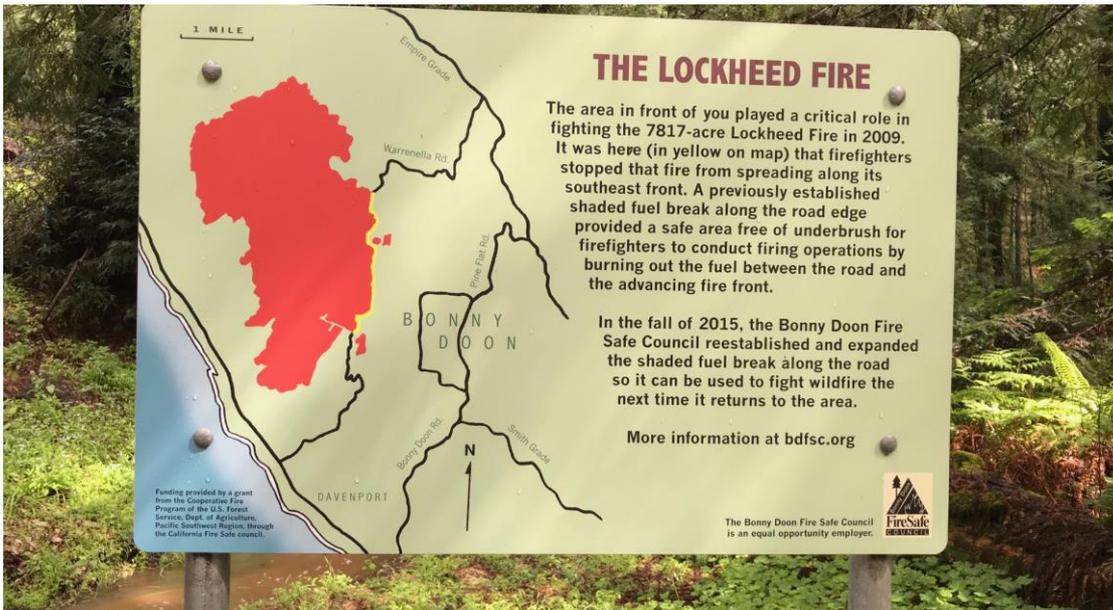


We all live in wood houses – even Governor Jerry Brown’s mansion built in 1877.

Public and private parties need to share resources and get as high a percentage of total funds to well planned and well executed resource stewardship.

Landowners want to ‘do the right thing’ but the lack of economies of scale often work against them, and therefore society overall. Why we have water districts, fire districts, irrigation districts, etc.

The challenge for Sonoma, and every other county in California, is how to combine private stewardship, markets, and public dollars for public benefits.



What is Sacramento doing with \$\$?

- ◆ January 2018 Governors Budget - \$160 million of GGRF revenues to Calfire for forest/fuels projects
- ◆ May Revise 2018

- ❖ GGRF money -
 - \$26.8 million to Calfire for 60 entry level fire fighters and 12 fire captains for prescribed fire crews
 - \$20 million for 'regional block grants to promote and expand regional forestry collaboratives led by state, local, and nonprofit entities – doled out by the Resources Agency
- ❖ Prop 68 – on the June ballot
 - \$30 million to Sierra Nevada Conservancy – then to USFS
 - \$15 million to State Parks to thin forest stands – ex Mt. San Jacinto, Cuyamaca, Nicene Marks
- ❖ Env. License Plate Fund
 - \$1.9 million for watershed coordinator grants
- ❖ Timber Tax (AB 1492)
 - \$2.25 million for 'wood products innovation' contracts, pilot projects, etc.

SB 1260 (Jackson) has whole policy package – and promise of \$\$

- “Considerable expertise exists in universities, resourceconservation districts, fire safe councils, and other entities” ... about
- “defensible space around homes, restoring prescribed fires on a regularized basis to the landscape, information about smoke monitoring from prescribed fires, hardening residences to improve resistance to wildfires, evacuation routes, land management that improves fire resiliency or carbon sequestration, and activities or programs that improve public safety, among other things.”
- SEC. 2. It is the intent of the Legislature to enact legislation that would fund the removal of dead trees that may cause a public safety concern from private homes in areas affected by tree mortality and in high fire hazard severity zones. This may be undertaken in conjunction with local governments. Governments, resource conservation districts, and fire safe councils.”
- <http://leginfo.legislature.ca.gov/> - to track legislative bills
- It looks like we will have to wait til next year for more \$\$\$\$