calforests
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May 26, 2016

Air Resources Board
1001 I Street
Sacramento, CA 95814
Re: Comments on the final draft of the Short Lived Climate Pollutant Reduction Strategy (SLCP) and the Draft Environmental Assessment (EA)

Dear Air Board Members:

The following comments are from **the California Forestry Association (CFA).** CFA has a membership consisting of most of California's large industrial forest land owners, many non-industrial forest landowners, most of the 27 remaining medium and large sawmills and veneer mills, and several biomass powerplants and one shavings mill. Our mission is to create a favorable operating environment for the forest products industry, ensure a reliable wood supply from public and private lands, and promote sustainable management of forest lands.

Comments on the Proposed Strategy

Wildfire Produces 2/3 of the Black Carbon Emissions Annually

CFA concurs with the Strategy that there are continuing opportunities to reduce emissions of short-lived climate pollutants (SCLPs) including black carbon and methane. CFA believes the Strategy understates the importance of forest emissions and the opportunity to reduce those emissions.

As the Strategy (page 6) points out, wildfire contributes an average of two-thirds of the black carbon emissions annually in the State.

From 2001-2015, the national forests in California averaged 320,000 acres/year burned (Attachment #1). In addition, the insect and disease epidemic has already killed 60% of the pine vegetative type in the southern Sierras. Additional plots will be taken this spring and are anticipated to show that 85% of the pine type is now dead. The epidemic has moved up through the mixed conifer and into the red fir vegetative types and is proceeding northward. 84,000 acres of the Sierra National Forest are deforested already from the insect and disease epidemic and 1 billion board feet of timber is dead (Attachment #2). With 85 tons of dead material on the landscape in these deforested conditions, the additional risk of future wildfires is substantial. Thus, leaving the dead material on the landscape is a very poor option.

An ARB-funded study at the California National Primate Research Center linked wildfire smoke exposure to reduced immune system function. The study was done during 10 days in June 2008 when there were about 2,000 wildfires burning in Northern California. During the time period of the study, 2.5 micron particulate matter was recorded at 50 to 80 micrograms per cubic meter; dramatically higher than the 35 microgram per cubic meter federal standard (2013. Miller. "Persistent immune effects of wildfire PM exposure during childhood development").

Investing in forest health and fuels reduction projects that lead to resilient forest conditions, that can combat the natural disturbance agents and thereby reduce GHG emissions, is an extremely important objective. The April 16, 2016 Legislative Analyst's Office "Estimated Average GHG Reduction Cost is High With Wide Variation Across Programs" report shows that Forest Health is the lowest cost program at $4/ton of GHG emission reduction (Attachment #3). In contrast, single-family solar photovoltaics cost $209/ton of GHG emission reduction.

CFA believes it should be obvious that to get the best "bang for the buck", investing in forest health provides the best return in GHG emission

reduction and black carbon reduction in the State. Private non-industrial landowners would be an excellent target for assistance as the CA regulatory environment makes it impossible for them to manage their forest lands. Investing in National Forest lands through the "Good Neighbor Authority" would allow CalFire (or subcontractors that they hire) to perform forest health and fuels reduction on National Forests.

Reducing Black Carbon and Methane Emissions by Consuming Wood Waste in a Biomass Boiler versus Open Field Pile Burning; There is an 11 cent/kW-hr Environmental Benefit

The Strategy also points out, and CFA concurs, that there are opportunities to reduce methane "by putting organic waste streams to beneficial uses" (Strategy, page 7) including the goal of eliminating organic disposal in landfills by 2025 (Strategy, p. 8).

There are only 3 viable options for agriculture, urban, and forest wood waste disposal. They are: 1) disposal in landfills, 2) consumption in a biomass boiler, or 3) open field pile burning.

In a study published September 2015 by Springsteen etal ("Forest biomass diversion in the Sierra Nevada: Energy, economics and emissions"), it was shown that consuming forest wood waste in a biomass boiler rather than open pile burning provided "air emissions reductions of 98%–99% for PM2.5, Carbon Monoxide, Non-Methane Organic Compounds,, Methane, and Black Carbon, and 20% for NOx and CO2-equivalent greenhouse gases." This study verifies a January 2011 study by Springsteen etal that also showed a 98% reduction in Black Carbon when burning wood waste in a biomass boiler versus open field pile burning and a U.C. Riverside study in 1979 that also showed a 98% reduction (Attachment #4). All 3 studies show that burning forest wood waste in a biomass boiler rather than open pile burning provides a 98% or more reduction in Black Carbon, Methane,

and other pollutants. Disposal in landfills is not an option since California wants a rule to effectively eliminate organic disposal in landfills by 2025 (Strategy, page 8). Therefore the only viable options are open field pile burning or consumption in a biomass boiler.

Dr. Gregg Morris (1999. Morris. "The Value of Biomass Power") (2006. Western Governors Association, Biomass Taskforce Report) has demonstrated there is an 11.4 cent/kW-hr environmental benefit by consuming wood waste in a biomass boiler compared to open field pile burning. In California's Renewable Portfolio Standard, today, subsidized Wind and Solar Power sell in the range of about 8 cents/kW-hr. Currently, Biomass Power is not incentivized. Biomass power needs about 12 cents/kW-hr. So there's clearly more than sufficient monetary uncompensated environmental benefit (11.4 cents/kW-hr) for biomass power to be competitive with other forms of renewable energy and even competitive with natural gas at 4 cents/kW-hr. The State needs to incentivize biomass power by recognizing the 11.4 cent/kW-hr uncompensated environmental benefit.

The annual usable wood waste stream for biomass heat and power in California was estimated in 2006 (California Biomass Collaborative, Roadmap, p. 12) at about 10 million bone dry tons.

Governor Schwarzenegger's 2007 Bioenergy Action Plan recognized the wood waste disposal issue and the value of burning it in a biomass boiler by calling for doubling the biomass power capacity in the State to about 1,200 megawatts, which would consume about 10 million bone dry tons of agriculture, urban demolition wood, and forest mill residuals, timber harvest slash, and thinnings.

Governor Brown updated the Schwarzenegger Bioenergy Action Plan in August, 2012 calling for biomass power operating capacity to increase to about 900 megawatts. Today, the remaining operating biomass

powerplants produce about 545 megawatts but 7 of those plants have expiring energy price contracts over the next 5 months, which could lead to total capacity dropping to about 350 megawatts.

A 900 megawatt biomass powerplant industry in CA would consume 7.2 million bone dry tons of green wood waste. A 1,200 megawatt industry would consume about 10 million bone dry tons. With an 11.4 cent/kW-hr environmental benefit, the State should be incentivizing the biomass powerplant industry to expand to at least an operating capacity of 1,200 megawatts (consume about 10 million bone dry tons of wood waste annually).

Today, there are 13 biomass powerplants idle due to expired energy price contracts (Attachment #5); they are:

Biomass Powerplant	Operating Capacity (Megawatts)(MW)
Blue Lake	12 MW
Brawley	15 MW
Burney Mountain Power	12 MW
Delano	50 MW
DG Fairhaven (Arcata)	17.5 MW
Dinuba	11.5 MW
Loyalton	20 MW
Madera	25 MW
Mendota	25 MW
Oroville	18 MW
Tracy	18.5 MW
Westwood	12 MW
Total Capacity of these 13 Powerplants	236.5 MW (would consume 1.9 million bone dry tons of wood waste annually)

By October 2016, there are an additional 7 biomass powerplants whose energy price contracts will have expired and likely lead to the powerplants shutting down. They have a combined operating capacity of 207 MW and would consume 1.7 million bone dry tons of wood waste annually.

Biomass Powerplant	Operating Capacity (MW)
Wheelabrator (Anderson)	54
Buena Vista (Ione	18
Burney Forest Power	30
Chinese Station	22
Fresno-Rio Bravo	24
Fresno-Rocklin	24
Honey Lake Power (Wendel)	35

It cost at least $5 million/1 MW to construct a biomass powerplant. This includes a site plan, perform feasibility and engineering design, do CEQA, obtain a County Permit to Construct and construct the plant. The above 20 biomass powerplants have already made the capital investment. With the environmental benefit they provide, there is a huge inexpensive opportunity for the State of California to incentivize the biomass powerplant industry.

Providing new 10 year energy price contracts that would allow these 20 powerplants to remain in business for the long run, would increase the capacity of the industry to about 820 MW consuming about 6.6 million bone dry tons of wood waste from the agriculture, urban, and forest sectors.

Strategies Versus Actionable Items

The Strategy (p. 54) is looking to the Forest Carbon Plan to provide the direction that will lead to increasing the rate of fuel reduction to reduce

wildfire risk and black carbon emissions from pile burning. The Forest Carbon Plan lays out "Goals and Strategies" (pages 21-27) but does not provide any Actionable Items that would lead to measurable black carbon (or methane) emission reductions.

Without Actionable Items in the SLCP Strategy and in The Forest Carbon Plan, there will be no measurable accomplishment. Both documents need to incorporate Actionable Items.

CFA believes one obvious Actionable Item has been demonstrated in our comments here, and, that is, incentivizing the Biomass Powerplant Industry to achieve an operating capacity of 1,200 MW (consuming about 10 million bone dry tons of wood waste per year).

Without incentivizing the biomass powerplant industry, the industry will continue in decline and will consume fewer and fewer bone dry tons of wood waste annually. With an ARB goal of eliminating organic waste disposal in landfills by 2025, there's no option other than open field pile burning, which produces the most black carbon and methane emissions/bone dry ton.

If the biomass powerplant industry capacity drops to 350 MW fall, 2016, that will leave about 7 million bone dry tons of Agriculture, Urban, and Forest wood waste to be open field pile burned.

From Springsteen etal (2015), **the black carbon and methane impact of open field pile burning 7 million bone dry tons of wood waste annually will be:**

Pollutant	**Consumed in Biomass Powerplant**	**Open Field Piled Burned**
Black Carbon (2.5 micron)	3.15 Tons	18,500 tons
Methane	0.25 tons	17,500 tons

A second obvious Actionable Item would be to heavily invest in the least expensive category per ton of emission reduction, namely, Forest Health and Fuels Reduction at $4/ton of emission reduction. This investment should be targeted toward the 7 million acres of National Forest productive forest land in need of forest health/fuels reduction treatments and California's 4.5 million acres of private non-industrial forest lands that essentially can't manage their lands due to the burden of California regulations.

A third actionable item would be to increase California's gross vehicle weight from 80,000 lbs. to 105,000 lbs. to be consistent with adjacent State gross vehicle weight limits. That would increase payload capacity 50%, reduce the number of out-of-state long haulers in California by 30%, decrease their diesel consumption by at least 20%, and thereby decrease NOx, PM2.5 and Black Carbon from heavy duty trucks in California by 20%.

Summary

CFA believes much can be done to: 1) dramatically reduce wildfire black carbon and methane emissions through an aggressive program of forest health and fuels reduction projects, 2) incentivize the biomass powerplant industry to produce renewable heat and power through consuming the annual agriculture, urban, and forest wood waste stream and 3) increase California's gross vehicle weight limitation to 105,000 lbs.

CFA believes the Strategy could be greatly strengthened by having specific Actionable Recommendations.

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Enclosures

Bibliography

Enclosure #1 - Acres Burned on National Forests and Statewide 2001-2015

Year	Forest Service Acres Burned	Total Acres Burned	Estimated Total CO_2 equivalent Emissions (@37 tons/burned Acre)
2001	106,798	329,126	12,177,662
2002	365,945	506,696	18,747,752
2003	363,964	793,402	29,355,874
2004	49,437	242,057	8,956,109
2005	19,583	202,754	7,501,898
2006	453,500	678,919	25,120,003
2007	551,932	1,087,110	40,223,070
2008	919,716	1,375,781	50,903,897
2009	305,371	405,585	15,006,645
2010	39,288	109,529	4,052,573
2011	41,777	126,854	4,693,598
2012	297,212	869,599	32,175,163
2013	350,642	577,675	21,373,975
2014	400,005	530,794	19,639,378
2015	537,446	893,362	33,054,394
Average	320,174	581,950	21,532,133

Source: National Interagency Fire Center, Fire Information, Historical Year-End Fire Statistics by State
http://www.predictiveservices.nifc.gov/intelligence/2015_Statssumm/fires_acres15.pdf

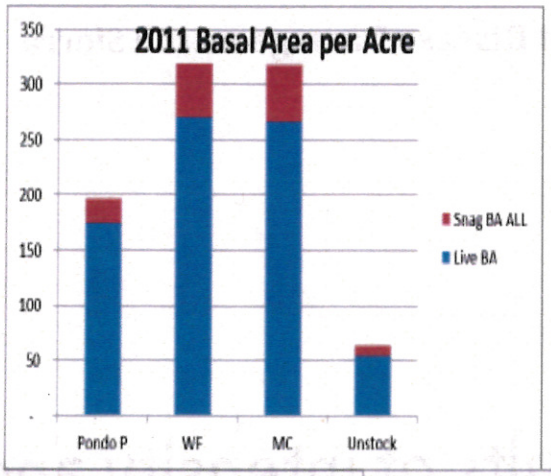
Enclosure #2 – Report on Insect and Disease Damage on the Sierra National Forest (October 2015)

Preliminary Results of intensity and extent of Insect Mortality on the Sierra National Forest

October 2015

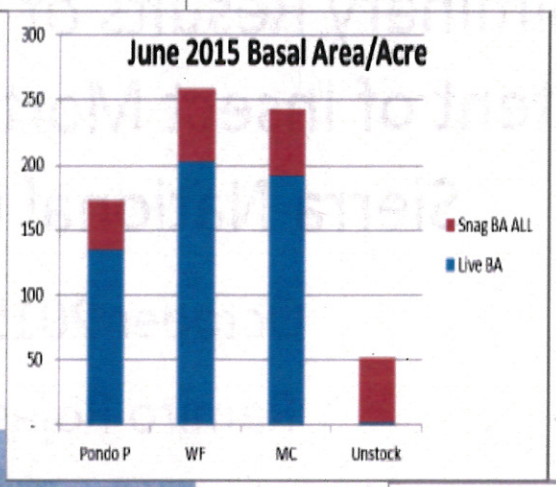
Ramiro Rojas

District Silviculturist



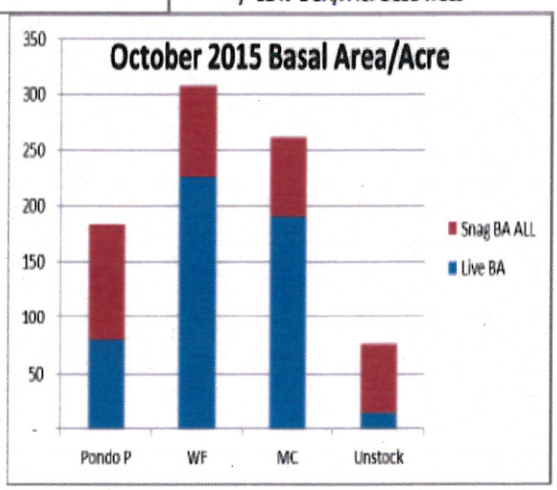
Percent Basal Area per Acre Mortality			
Forest Type	August 2011	Jun-15	Oct-15
Ponderosa pine	12%	22%	52%
Mixed Conifer (WF)	15%	22%	25%
Mixed Conifer (Pine)	16%	21%	27%
Unstocked	17%	96%	77%
Grand Total	15%	23%	33%

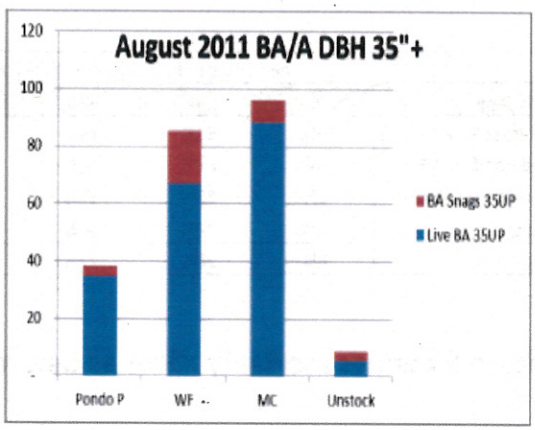
June and October 2015 data from 258 plots across elevational range of the Dinkey CFLR; October 2015 revisited June plot locations- 2011 data from 1600 plots originally collected to calibrate lidar



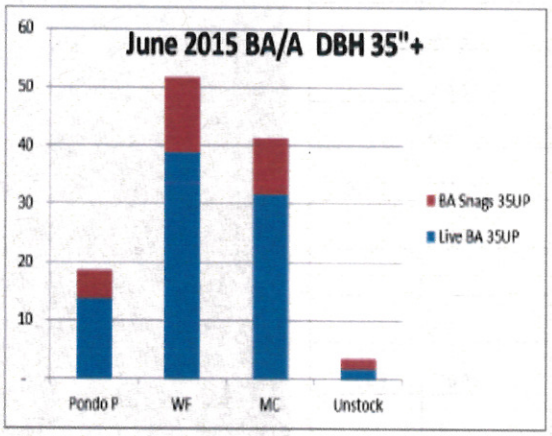
Mortality is increasing and is at levels never before seen in the Sierras

+/- 12 ft^2 BA/A for Dead Trees

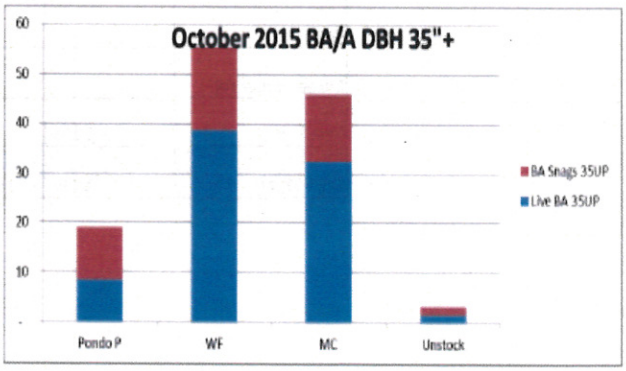




Percent Basal Mortality Trees > 35" DBH			
Forest Type	August 2011	Jun-15	Oct-15
Ponderosa pine	9%	26%	55%
Mixed Conifer (WF)	21%	25%	30%
Mixed Conifer (Pine)	8%	23%	29%
Unstocked	35%	50%	50%
Grand Total	10%	24%	33%



Large trees are being killed at rates that exceed the ability to replace. Replacement will take a hundred years.



+/- 4 BA/A for Dead Trees

Dinkey CFLR USFS Acres Conifer Zone

Forest Type	CFLR ACRES	Deforested Acres
Alpine Shrub	19	
Annual Grass	41	
Aspen	1	
Barren	6,801	
Blue Oak	66	
Jeffrey pine	929	
Lodgepole	1,209	
Chaparral	2,199	
Montane chaparral	2,394	
Montane Hardwood/conifer	2,140	
Montane Hardwood	2,100	
Ponderosa Pine	15,501	7,596
Red fir	10,147	
Redwood	70	
SubAlpine	326	
Sierra mixed conifer	36,056	6,129
Urban	21	
Water	4	
Mixed conifer (WF)	245	29
Meadow	1,143	
Grand Total	81,414	13,755

	percentage of plots by mortality class			
Forest Type	0	<50%	50%+	Grand Total
Ponderosa Pine	0%	51%	49%	100%
Mixed Conifer (WF)	0%	88%	12%	100%
Mixed Conifer (Pine)	0%	83%	17%	100%
Unstock	36%	24%	40%	100%
Grand Total	4%	70%	27%	100%

Region 5 defines mortality >50% as deforested

- Based upon the 260 CFLR plots Taken in October 2015 a rough approximation of Forest wide Insect Deforest Acres can be made. Deforest acres being those with more than 50% of the trees (basal area) dead.
- Across the Sierra National Forest Insect Deforested Acres:
- Ponderosa Pine Forest ~ 37,900 acres
- Mixed Conifer (pine and fir) Forest ~ 46,400 acres

- Total Sierra National Forest Insect Deforested Acres ~ 84,400

Numbers of Dead Trees Across the Dinkey CFLR > 15" is approximately 1 million

Numbers of Dead Trees Across the Sierra NF > 15" DBH is Approximately 8 million

More than 340 million Board feet in the Dinkey CFLR and more than 1 billion board feet across the Sierra National Forest

Forest Type	Average Snags/Acre > 15" DBH	Dinkey Acres	Dinkey total snags	Sierra NF Acres	Sierra NF total snags
Ponderoda Pine	25	15,501	380,473	77,491	1,902,032
Mixed conifer (WF)	19	245	4,724	2,603	50,192
Mixed Conifer (Pine)	17	36,056	597,906	271,339	4,499,531
Unstock	16	2,394	37,637	86,539	1,360,516
All Forest Types	19	54,196	1,020,740	437,973	7,812,272

19 snags per acre average across the forest types +/- 3 trees per acre

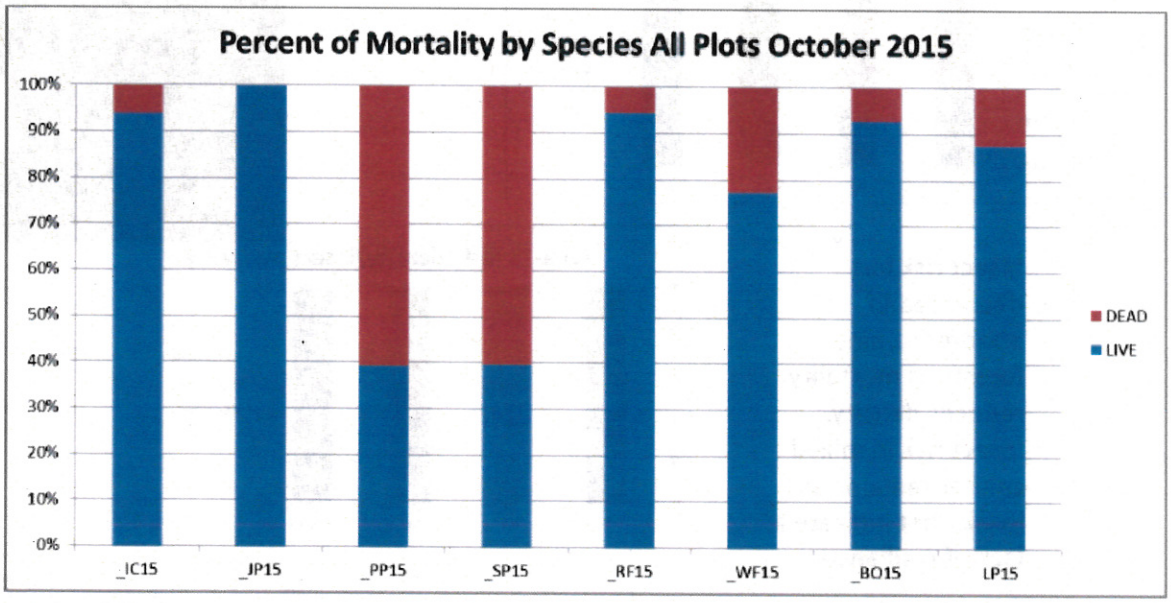
The dead trees in this photo are mostly sugar pine

Sugar pine makes up 5% of the live trees and 17% of the dead trees

Ponderosa pine makes up 16% of the live trees and 51% of the dead trees

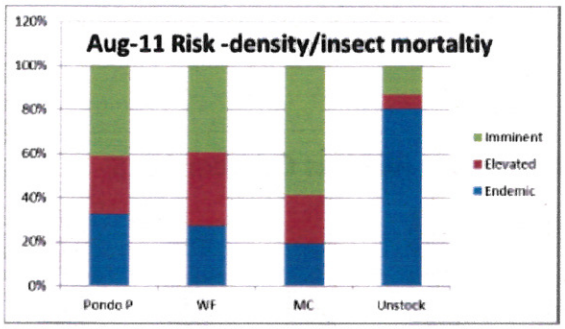
White fir makes up 44% of the live trees and 27% of the Dead trees

Percent of live and dead basal Area by species > 15" DBH --- October 2015									
	_IC15	_JP15	_PP15	_SP15	_RF15	_WF15	_BO15	_LP15	Total
Dead	3%	0%	51%	17%	1%	27%	1%	0%	100%
Live	23%	0%	16%	5%	5%	44%	7%	1%	100%

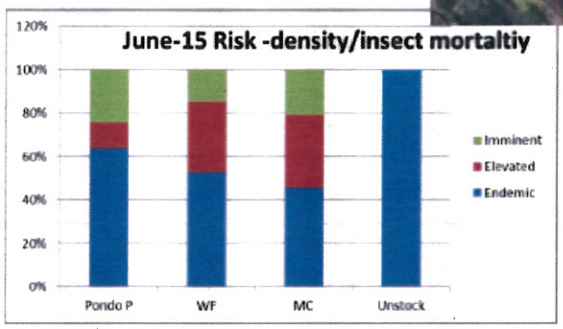


Pine species are being lost at an alarming rate. Approximately 60% of all measured sugar pine and ponderosa pine > 15" DBH are dead.

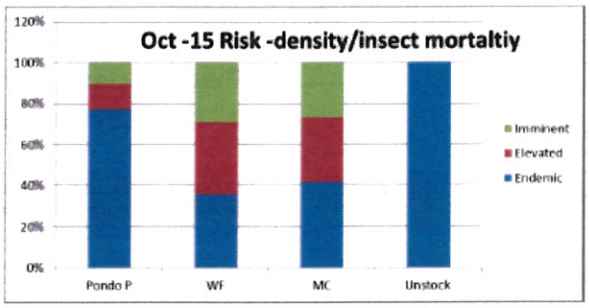
The Graph represents the percent of trees > 15" DBH live and dead measured for all plots.
Ic= incense cedar, JP=Jeffrey pine, PP=ponderosa pine, RF=red fir, WF=white fir, BO=black oak, LP=lodgepole pine



Insect risk has decreased in ponderosa pine forests as mortality reduces density. Insect risk in mixed conifer remains at levels that indicate a lack of resilience.



	Oct-15 Risk of Density/Insect Induced Mortality			
Forest Type	Endemic	Elevated	Imminent	Grand Total
Ponderosa Pine	77%	12%	11%	100%
Mixed Conifer (WF)	35%	35%	29%	100%
Mixed Conifer (Pine)	42%	32%	27%	100%
Unstock	100%	0%	0%	100%
Grand Total	55%	24%	20%	100%



Take Home Messages

The Southern Sierras are experiencing an unprecedented insect mortality outbreak - as a result on the average 1/3 of the trees in pine forests or forests with a mix of pine and white fir are dead.

1/3 of these pine forests or forests with a mix of pine and white fir are in a deforested condition.

The mortality will continue until drought weakened trees are all dead or several years of above normal rainfall occurs and trees regain vigor.

It appears that maintaining dense stands:

- will not result in increasing large trees,
- Will not maintaining pine species,
- Will not maintaining owl habitat even without high severity fire.
- Insects are killing trees >35" faster than they can be grown.
- The combination of high severity fire and insect mortality make the current objectives of maximizing owl/fisher habitat unsustainable.

Enclosure #3 – Legislative Analyst's Office "Estimated Average GHG Reduction Cost is High With Wide Variation Across Programs" (April 16, 2016) http://www.lao.ca.gov/Publications/Report/3445

Estimated Average Cost Per Ton of Reduction Varies Greatly

Program	Cost Per Ton[a]
Organics and recycling loans	$4
Forest health	4
Dairy digester research and development program	8
Organics composting/digestion grants	9
Forest legacy	10
Recycling manufacturing	15
Delta and coastal wetlands restoration	30
State water and efficiency and enhancement program	33
Clean vehicle rebates	46
Sustainable agricultural lands conservation	59
Mountain meadow ecosystems restoration	113
Urban and community forestry	116
Water-energy grant program	141
Affordable housing and sustainable	191

communities	
Single-family solar photovoltaics[b]	209
Transit and intercity rail capital	259
Single-family energy efficiency and solar water heating[b]	282
Large multifamily energy efficiency and renewables[b]	343
Enhanced fleet modernization program "plus-up"	414
Truck and bus voucher incentives	452
Incentives for public fleets pilot project for DACs	725
Overall Average	**$57**

[a]Calculated as the amount of cap-and-trade funds awarded to a program divided by the total estimated greenhouse gas (GHG) emission reductions from the projects that receive cap-and-trade funds.

[b]Assumes GHG reductions at the midpoint of the administration's estimated range.

DACs = disadvantaged communities.

Enclosure #4 – 98% Reduction in Pollutants from Burning Wood Waste in a Biomass Boiler Versus Open Field Pile Burning

Comparison of Emissions Between Biomass Boilers and Field Burning

Pollutant	Field Burning (lb./ton)	Biomass Boiler (lb./ton)	Percent Reduction for Biomass Boiler (Percent Reduction)
Sulfur Oxides	1.7	0.04	97.6
Nitrogen Oxides	4.6	0.70	84.8
Carbon Monoxide	70.3	0.40	99.4
Particulate Matter (PM)	4.4	0.26	94.1
Hydrocarbons	6.3	0.00	100.0
Total	87.3	1.4	98.4

Emission factors from "Hydrocarbon Characterization of Agricultural Waste Burning", CAL/ARB Project A7-068-30, University of California, Riverside, E.F. Darley, April 1979.

Enclosure #5 – California Biomass Powerplant Situation (January 15, 2016)

BIOMASS ENERGY:
Producing Renewable Energy, While Lowering the Risk of Wildfire and Reducing Greenhouse Gases

Source: *State of California, FRAP (Map); California Forestry Association (1/15/16)*

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