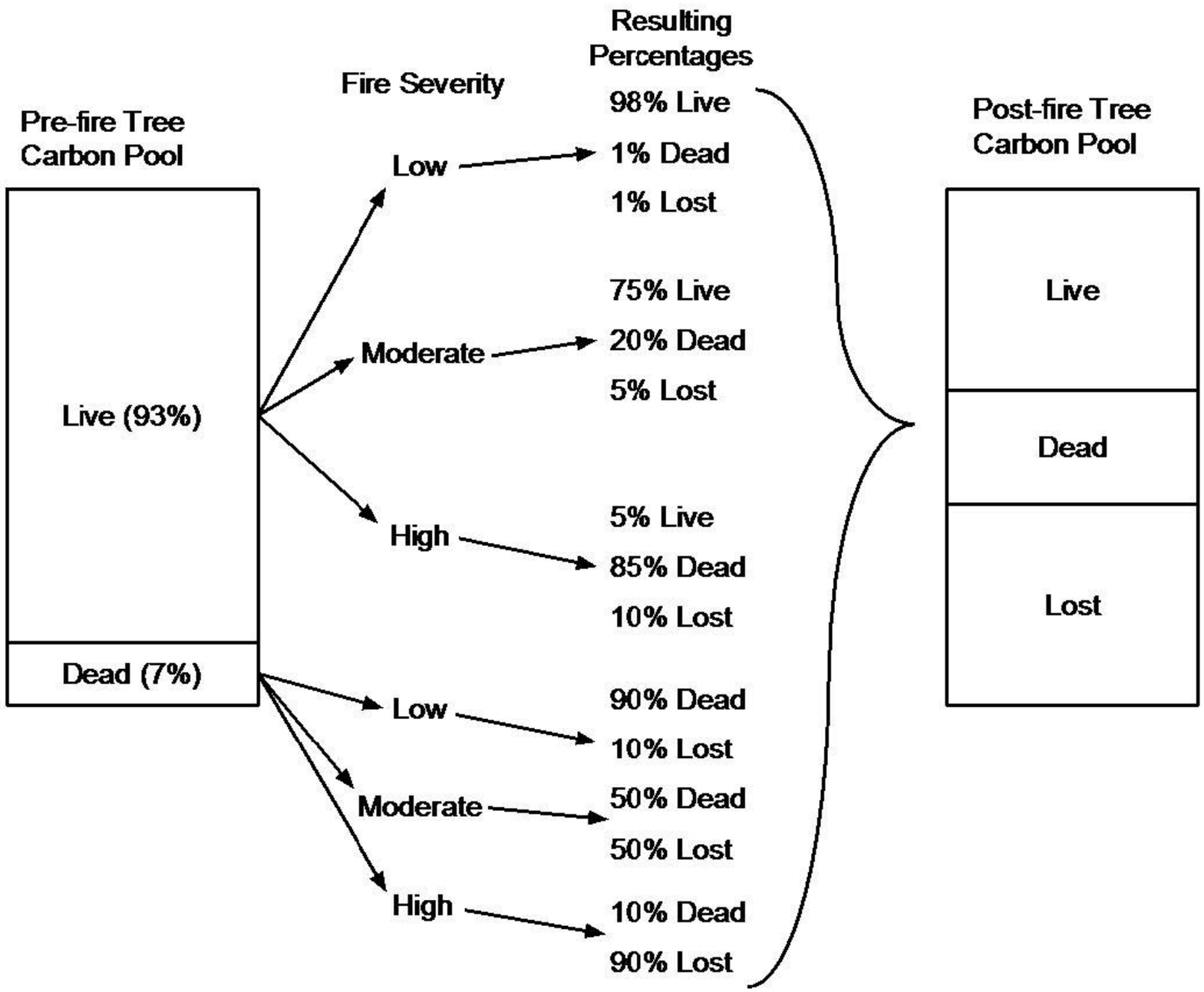
Agenda Item X
Policy- Related Science and Research Overview

Presented by:
Nic Enstice

Sierra Nevada:
Carbon, Water, and Air

www.SIERRANEVADA.ca.gov

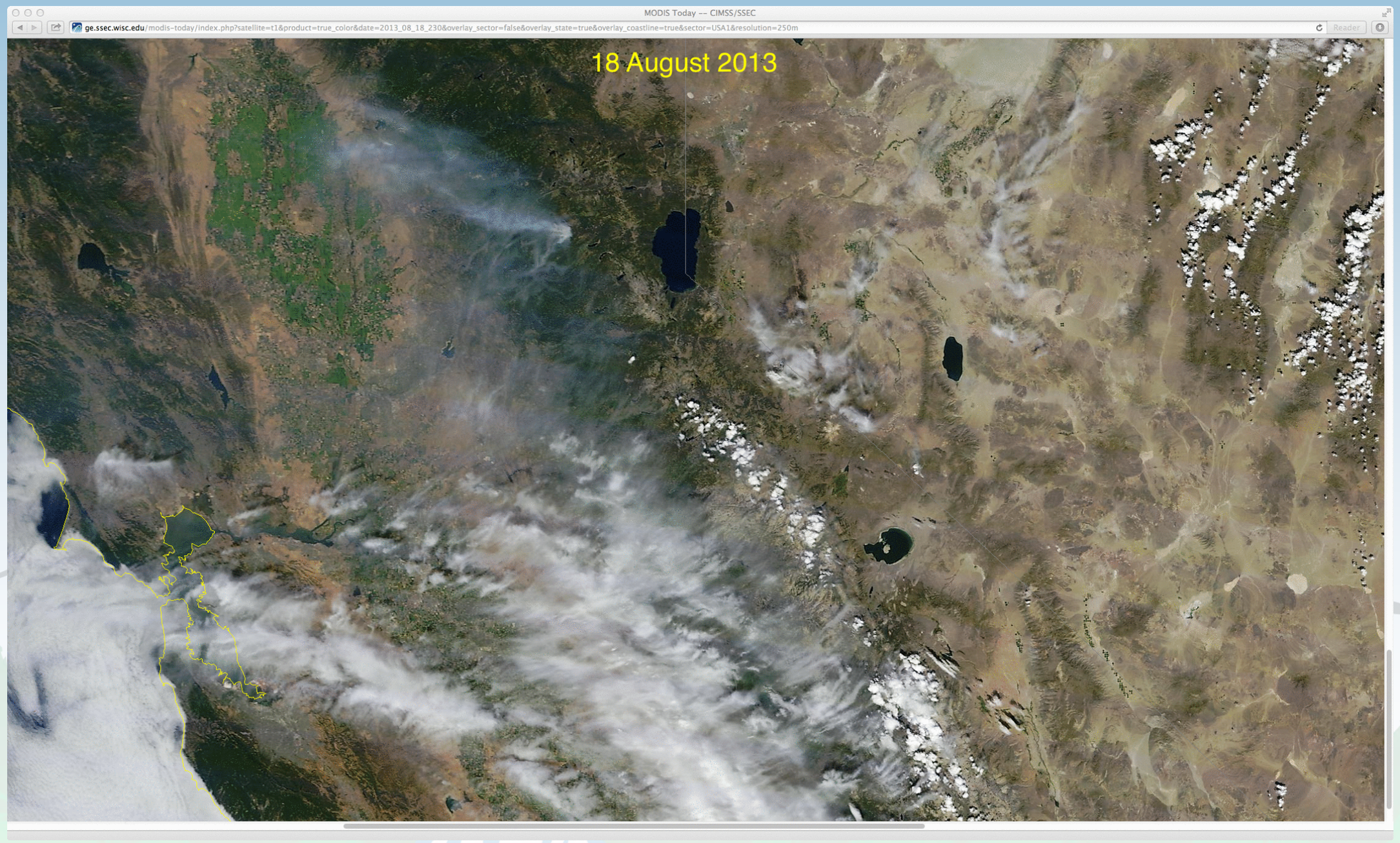
Carbon and Fire



Carbon and Low Intensity Fire

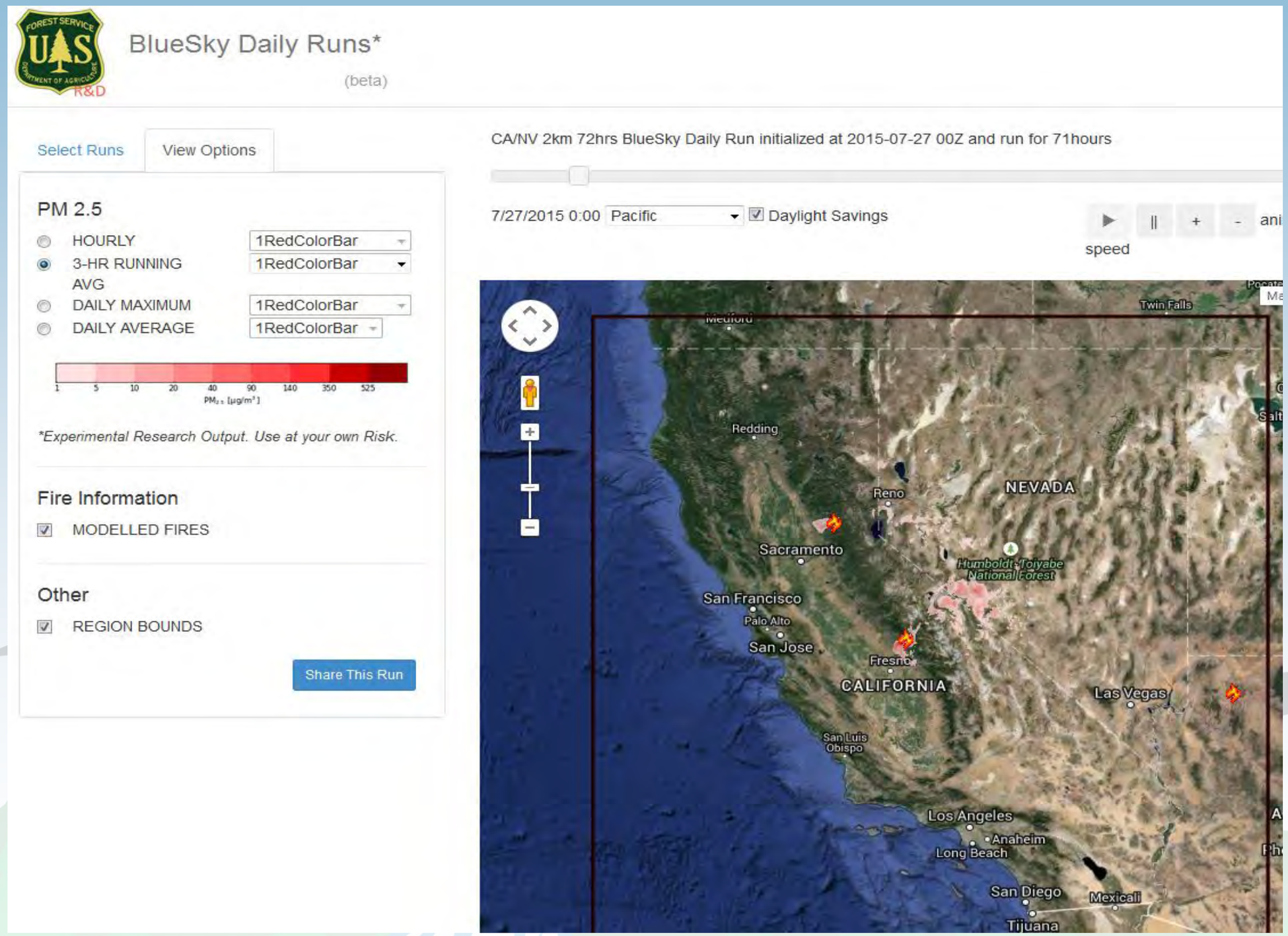
Carbon and High Intensity Fire

Rim Fire Emissions – Aug 18 – 30, 2013

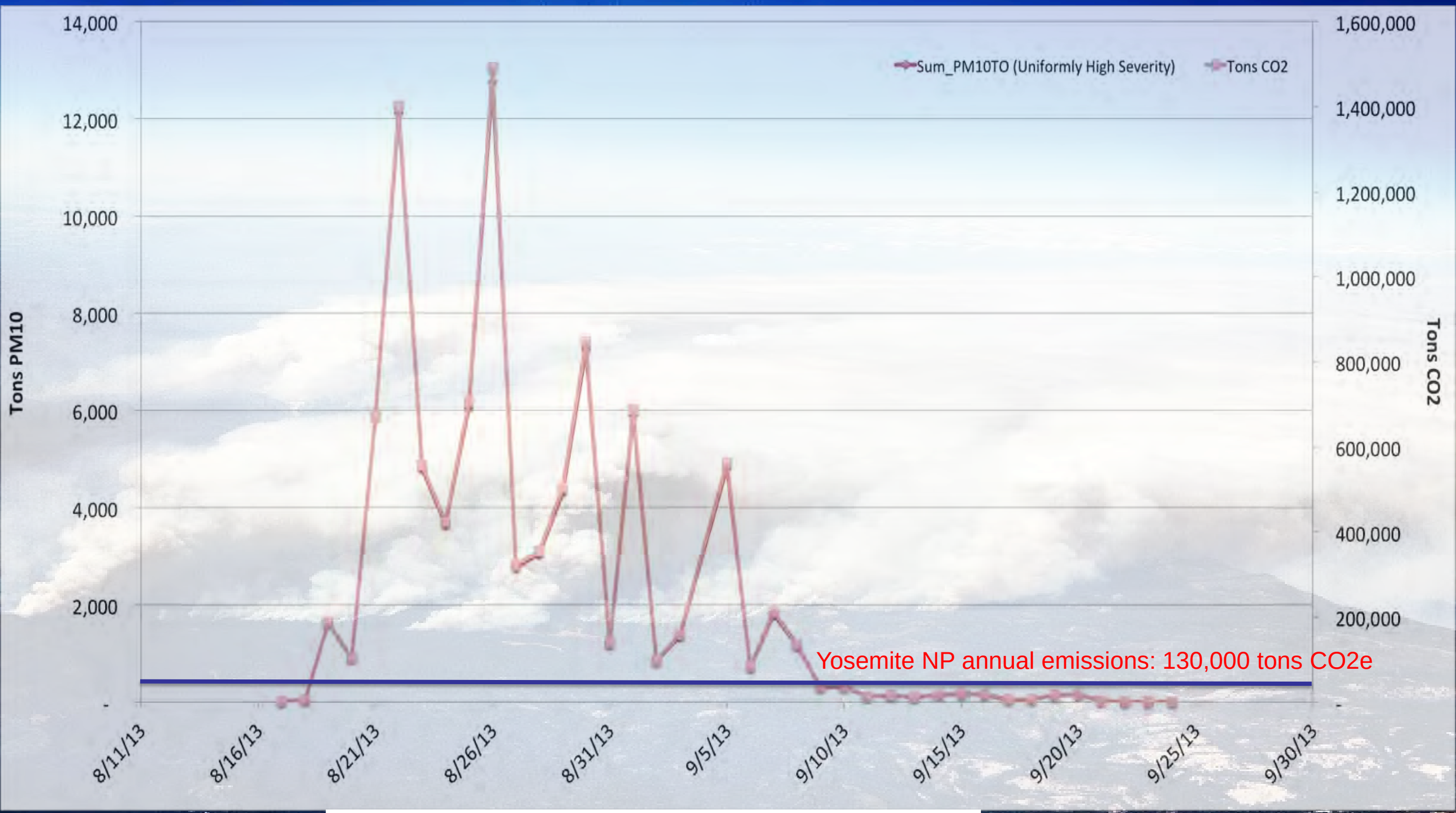


Current Fire Emissions

http://viewer.smoke.airfire.org/run/standard/CANSAC-2km/2015072700/



Daily GHG emissions from the Rim Fire



Villalba et al., 2013

Slide from Leland Tarnay

http://www.arb.ca.gov/ei/see/see.htm

CARB:
Short-lived Climate Pollutants

Short-lived climate pollutants are powerful climate forcers that remain in the atmosphere for a much shorter period of time than longer-lived climate pollutants, such as carbon dioxide (CO_2). Their relative potency, when measured in terms of how they heat the atmosphere, can be tens, hundreds, or even thousands of times greater than that of CO_2. Reducing these emissions can make an immediate beneficial impact on climate change.

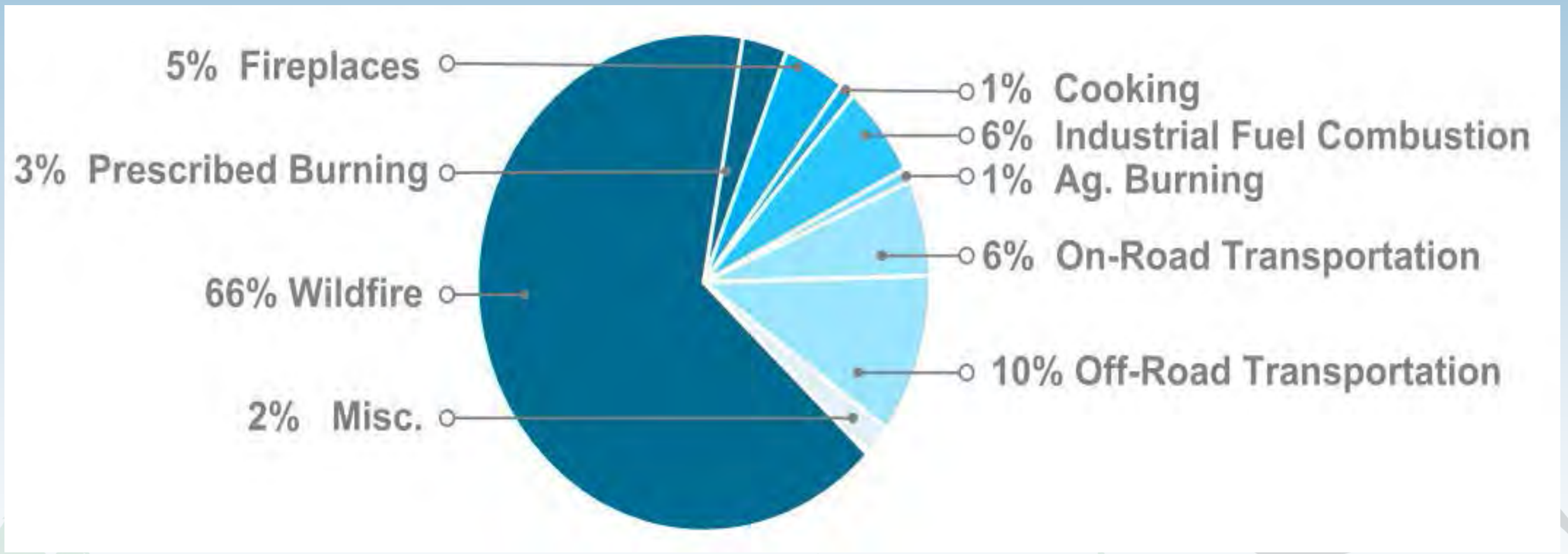
CARB:
Short-lived Climate Pollutants

Short-Lived Climate Pollutants

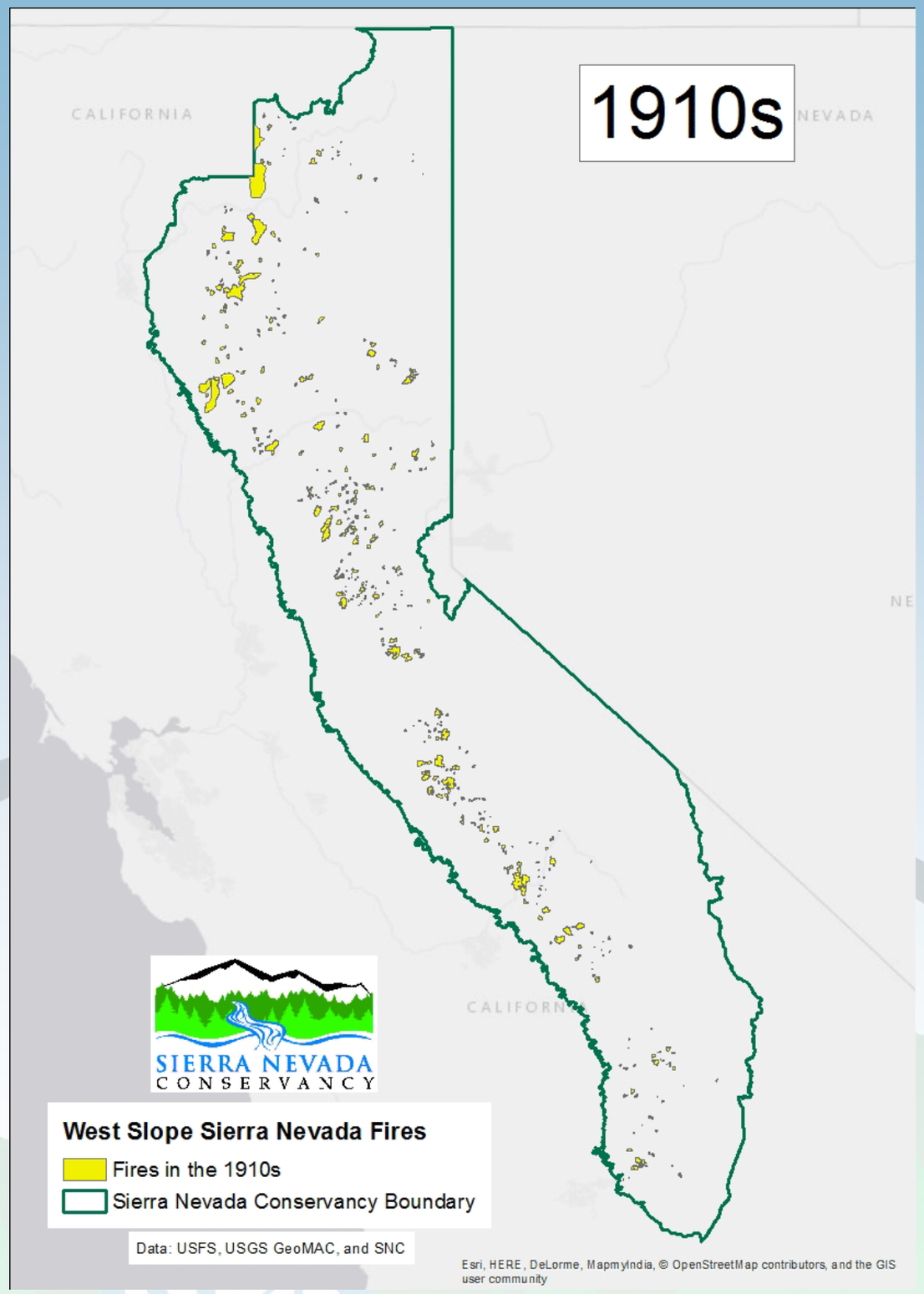
- Methane
- Black carbon
- Fluorinated gases ("F-gases")
- Tropospheric ozone

Ozone and black carbon are also harmful air pollutants. Broad action to reduce short-lived climate pollutants can cut global warming in half by 2050 and save an estimated 2.4 million lives annually, by 2030.

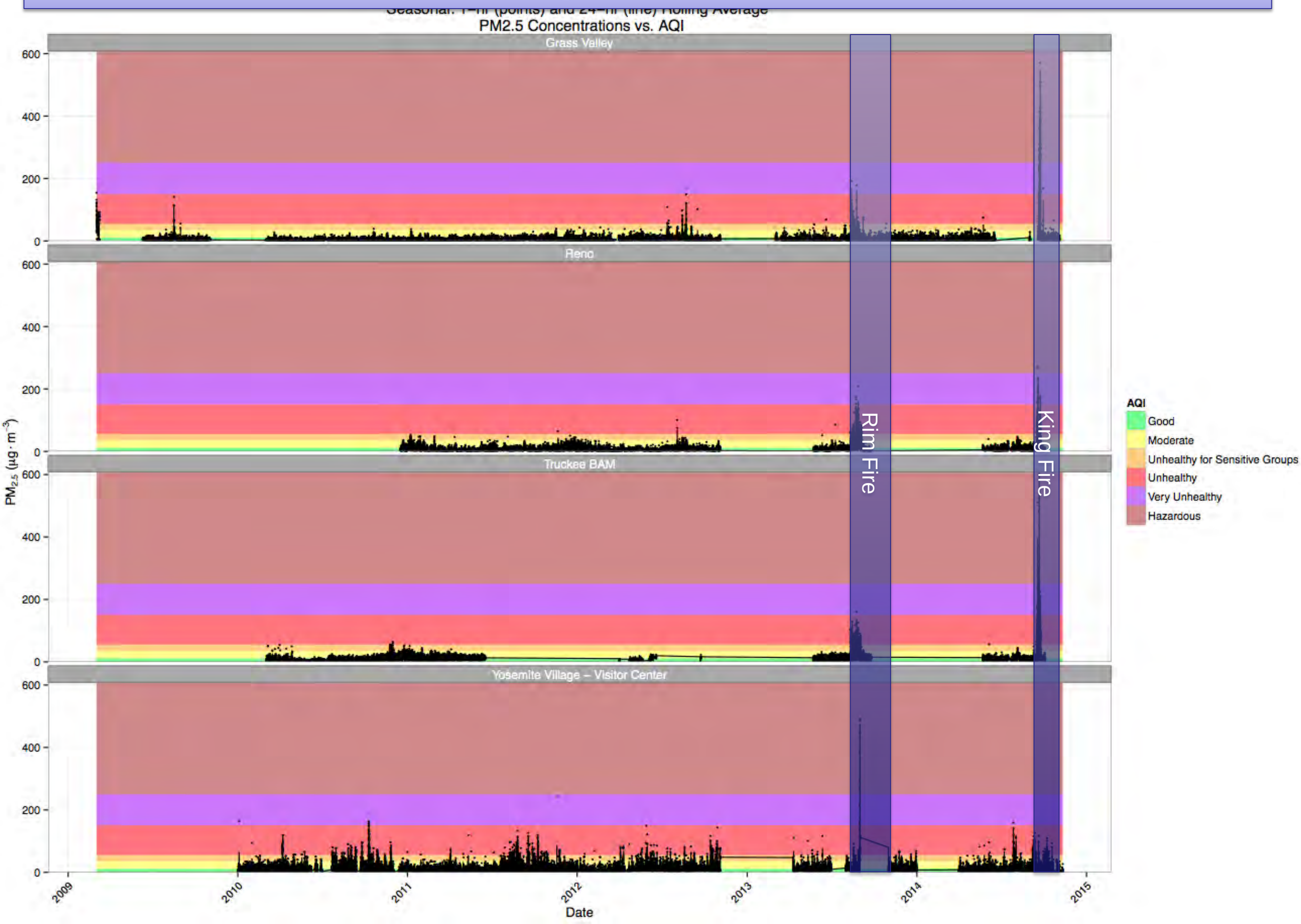
2013 CA Black Carbon Emission Sources - CARB



Size of Fires - Emissions



Air quality during the Rim and King Fires

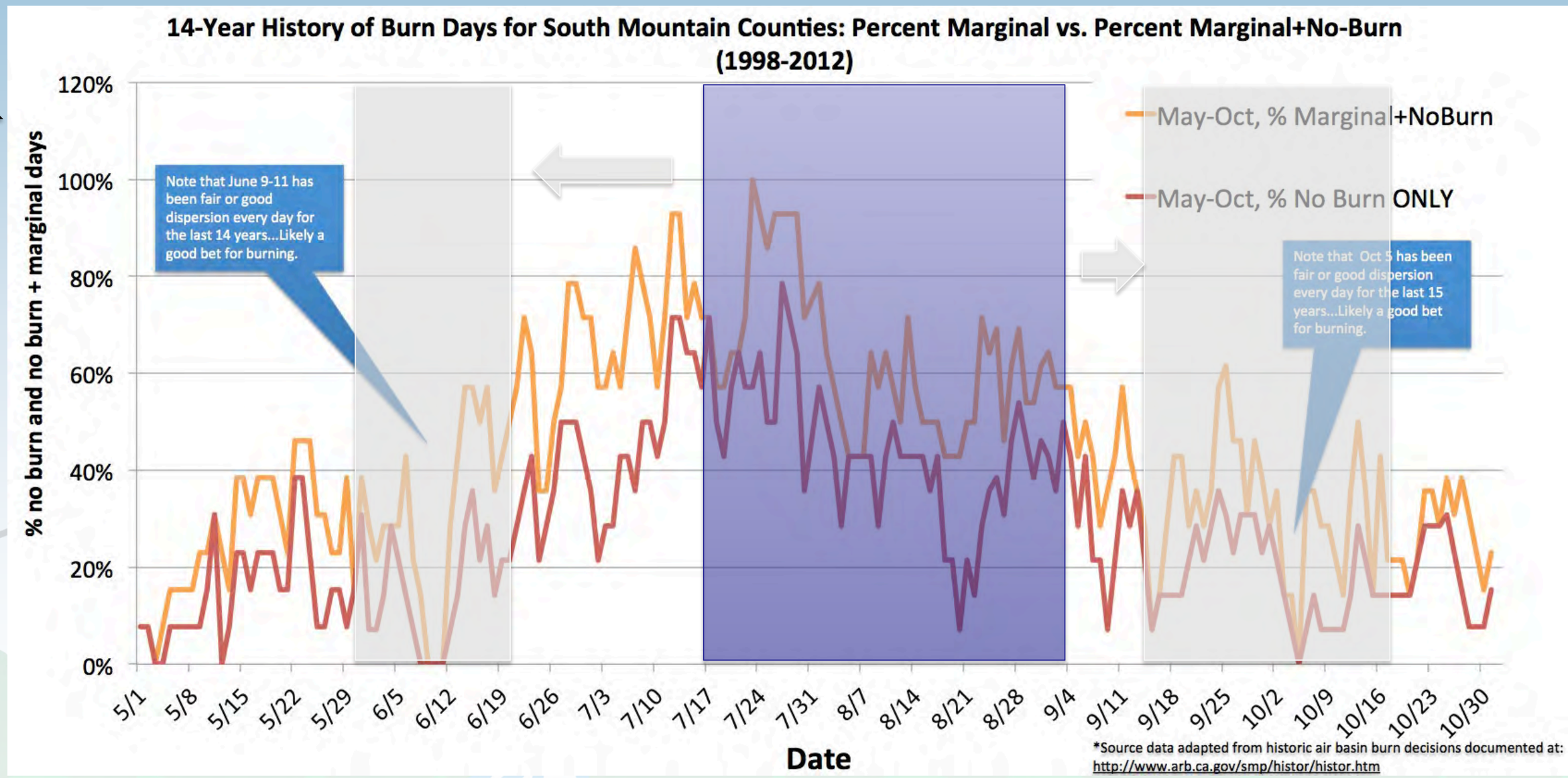


Vegetation Density - Emissions

Vegetation Density - Emissions

Matching emissions to dispersion

Worsening Dispersion



Slide from Leland Tarnay

TNC Study

Oregon
Nevada
California
Battle
Mill
Deer
Butte
Feather
Yuba
Bear
Truckee
American
Cosumnes
Mokelumne
Sacramento
Stockton
Reno
Legend
Watershed Boundary
US Forest Service Lands
0
10
20
Miles

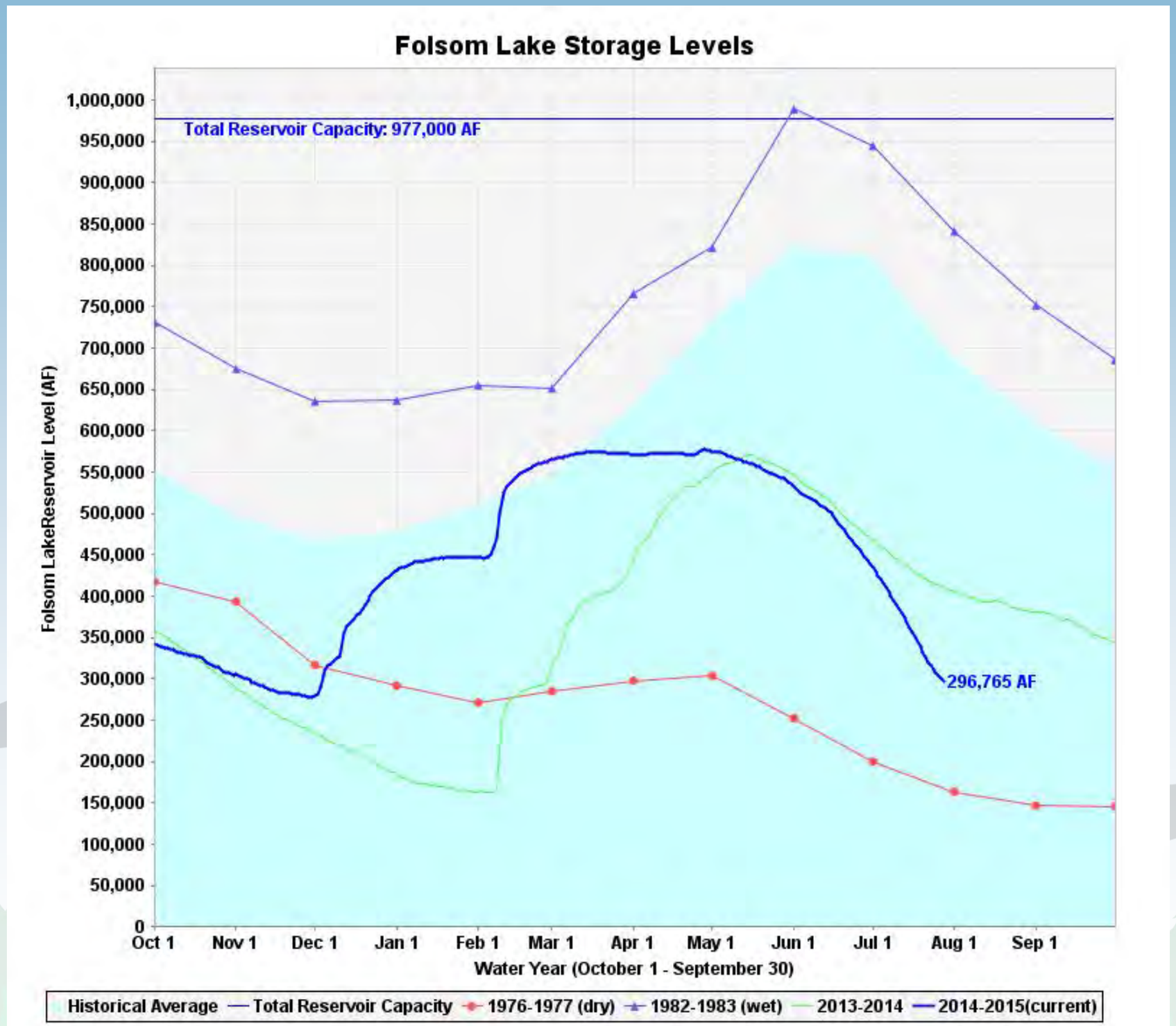
TNC Study

Before

Photo Credit: The Nature Conservancy

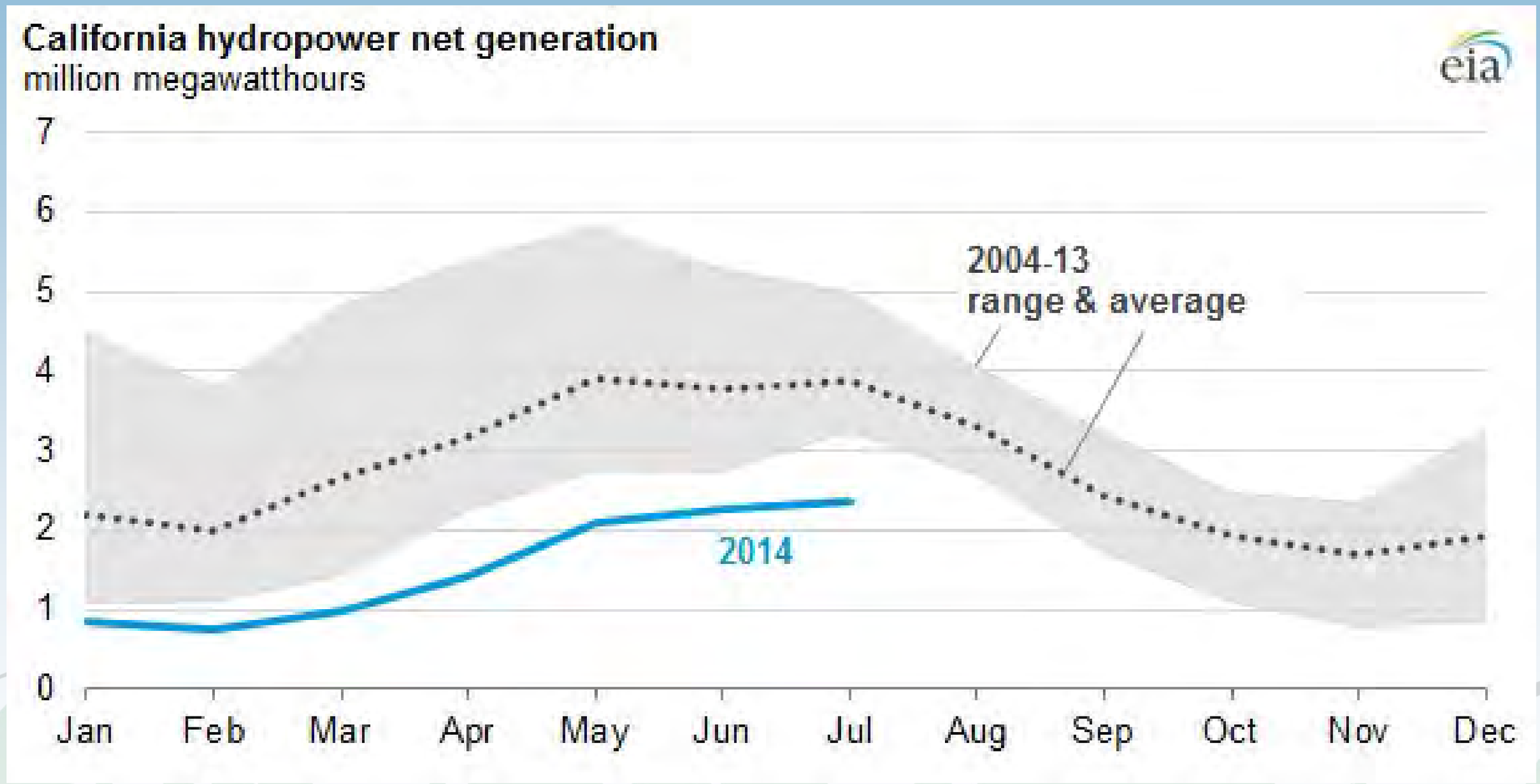
After

Water Storage



Vegetation Density – Water Yield

Hydropower – Water Yield



Hydropower – Deficit

CALIFORNIA ENERGY COMMISSION
Energy ALMANAC

California Electrical Energy Generation

California Electrical Energy Generation*
Total Production, by Resource Type
(Gigawatt Hours)

	2010	2011	2012	2013	2014
California Generation plus Net Imports *	291,141	293,761	302,239	296,850	292,575
Total Hydroelectric	34,222	42,731	27,459	24,097	16,477
Large Hydroelectric	29,040	36,355	23,133	20,754	14,052
Small hydroelectric	5,182	6,376	4,326	3,343	2,424
Nuclear	32,214	36,666	18,491	17,860	17,027
In-State Coal	3,406	3,120	1,580	1,018	988
Oil	52	36	48	38	46
Natural Gas **	109,882	91,270	121,877	121,088	121,855
Geothermal	12,740	12,685	12,733	12,479	12,183
Biomass	5,960	5,986	6,121	6,429	6,351
Wind	6,172	7,598	9,242	12,694	12,908
Solar	912	1,097	1,831	4,287	10,365
Other	12	13	14	14	16
Direct Coal Imports***	13,119	13,032	9,716	11,824	12,370
Other Imports****	72,451	79,525	93,126	85,022	81,990