

CA drought and associated mortality

Beverly M. Bulaon USDA

Forest Service Forest

Health Protection

November 2016

Outline and Updates

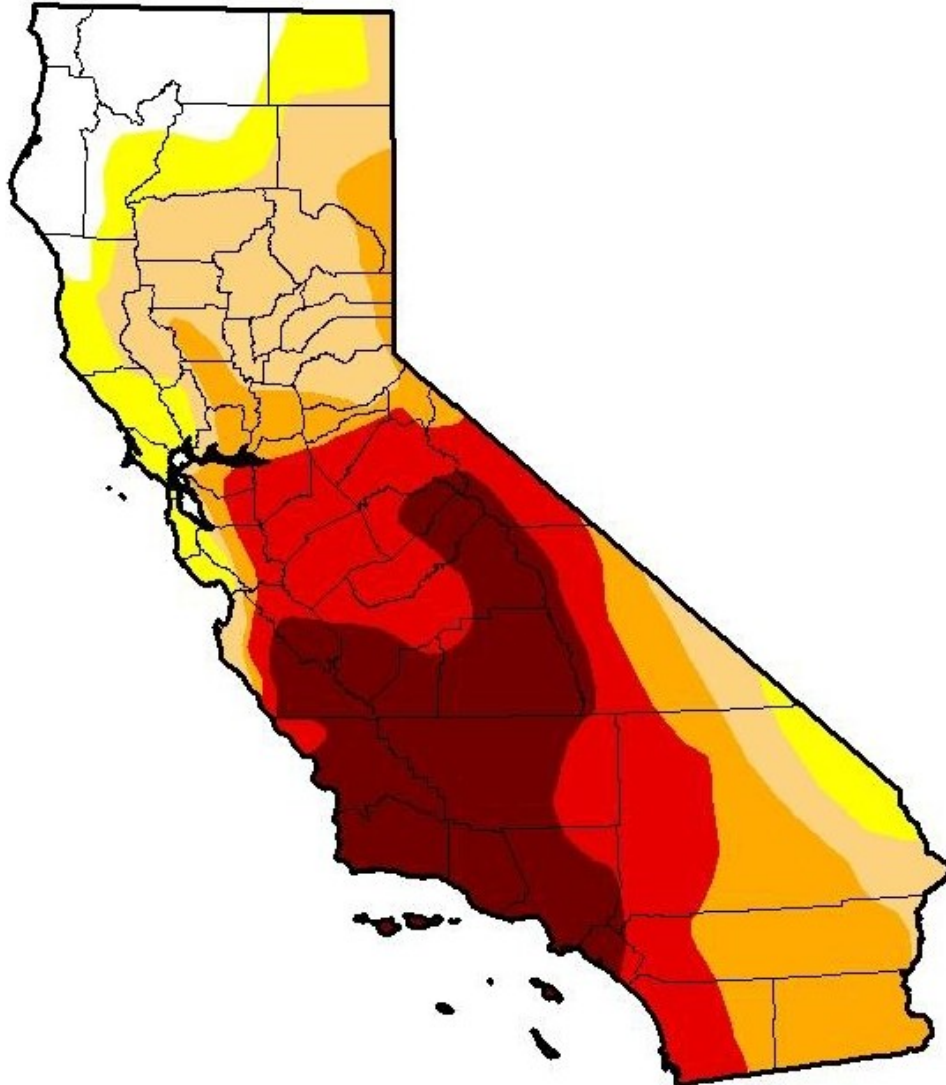
- ▣ Latest **ADS** and **ground** information
 - *What, when, where*
- ▣ **Bark Beetles**: things to know
- ▣ **Management**: new, old, effective?
 - **Planning** for the future

**27 million trees estimated dead, over 4.5 million acres of
southern Sierra Nevada, 2016**



U.S. Drought Monitor California

October 25, 2016
(Released Thursday, Oct. 27, 2016)
Valid 8 a.m. EDT



Drought Conditions (Percent Area)

	None	00-04	01-04	05-09	10-14	15-19
Current	8.96	91.04	81.12	61.80	42.80	21.04
Last Week <i>10/18/2016</i>	7.77	92.23	81.12	61.80	42.80	21.04
3 Months Ago <i>7/26/2016</i>	0.00	100.00	83.59	59.02	42.80	21.04
Start of Calendar Year <i>12/29/2015</i>	0.00	100.00	97.33	87.55	69.07	44.84
Start of Water Year <i>9/17/2016</i>	0.00	100.00	83.59	62.27	42.80	21.04
One Year Ago <i>10/27/2015</i>	0.14	99.86	97.33	92.27	71.08	46.00

Intensity

- 00 Abnormally Dry
- 01 Moderate Drought
- 02 Severe Drought
- 03 Extreme Drought
- 04 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

Author:
David Simeral
Western Regional Climate Center





Bark Beetles

- ▣ Western Pine Beetle



- ▣ Mountain Pine Beetle



- ▣ Fir Engraver



- ▣ Pine Engravers





Pine Engravers

Western Pine Beetle;
Mountain Pine Beetle;
Jeffrey Pine Beetle

< 6 inches/horizontal:

- Pine engravers

Red Turpentine

Western Pine Beetle: Ponderosa (and Coulter)



- Outbreaks develop during droughts
- **Seek weak, stressed trees**
- Attack groups
- **Stand to landscape mgmt.**



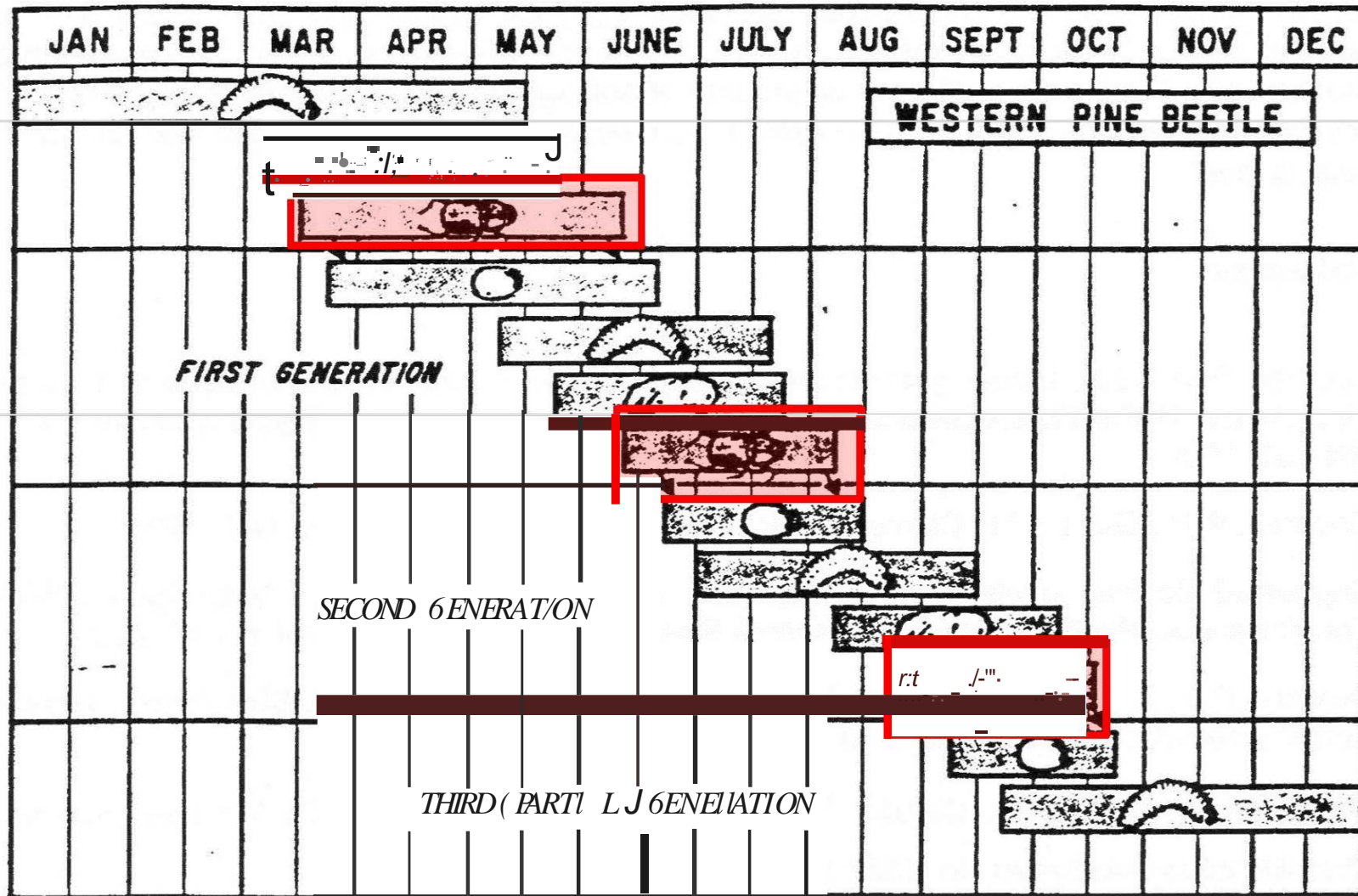
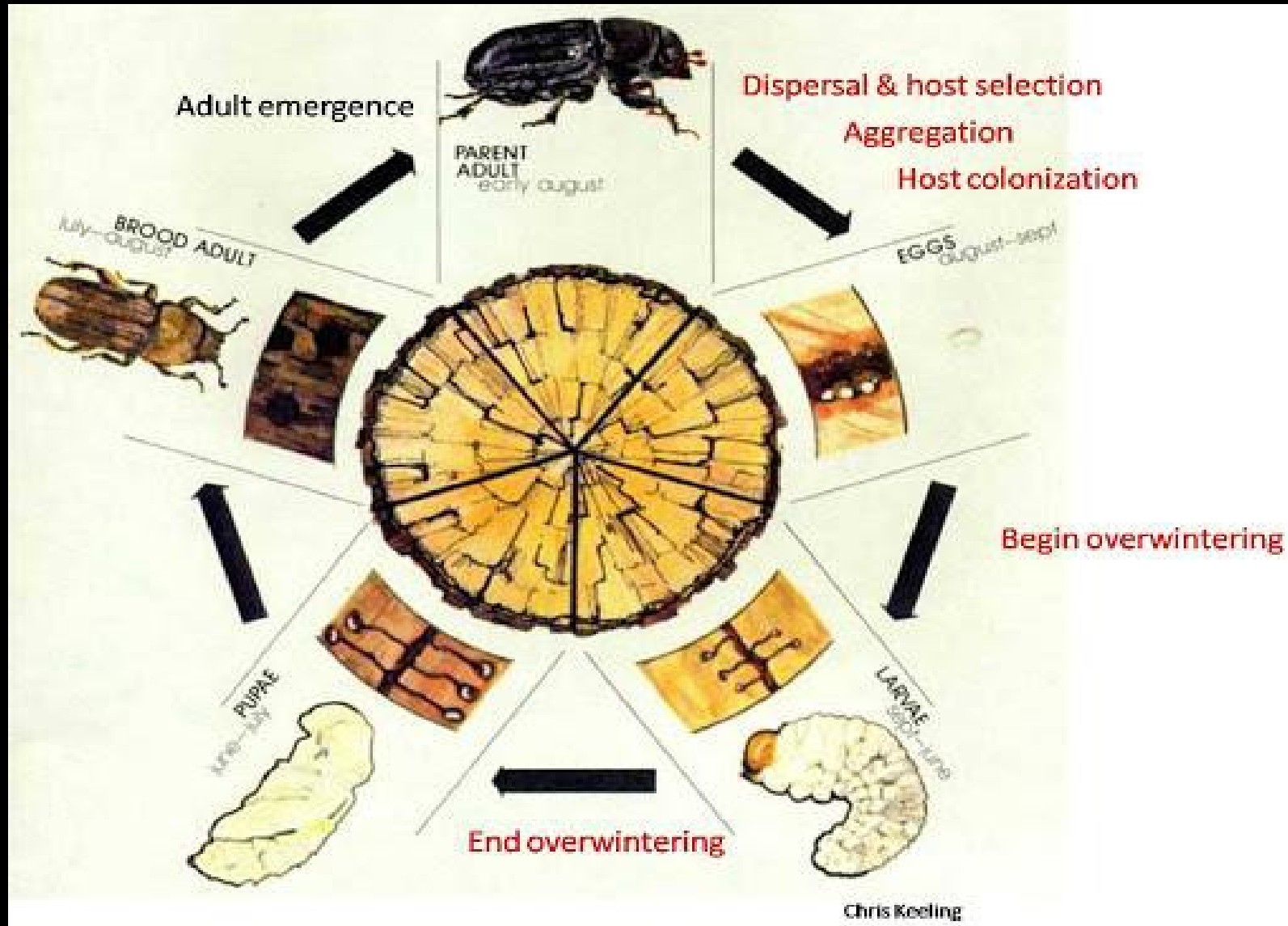


Figure 10. Life cycle of western pine beetle

The life cycle of the western pine beetle is shown in Figure 10. The life cycle of the beetle is shown in Figure 10. The life cycle of the beetle is shown in Figure 10.

Mountain Pine Beetle – Sugar Pine

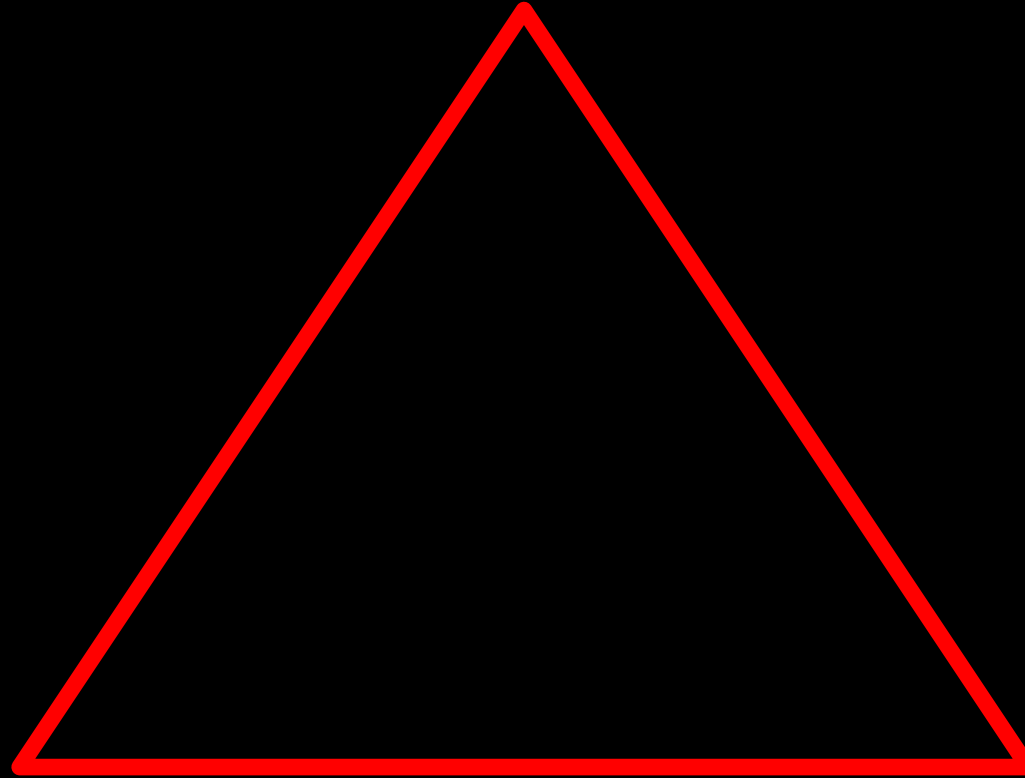


Management Options

Environment

PEST

HOST



Management Options

- ▣ There are no guarantees
- ▣ *No Action*
- ▣ **Silviculture**
- ▣ *Cultural*
- ▣ **Chemical**
 - Injectables
 - Topical sprays
 - pheromones

Silviculture

- ▣ There are no guarantees
- ▣ **Thinning** to thresholds of BB prevention
- ▣ **Diversity**
 - Age classes
 - Size classes
 - Species



Illilouette Basin, Yosemite NP. *Photo courtesy of Amy Quintin, Curtis Jerome Haynes*

Cultural

- ▣ There are no guarantees
- ▣ **Watering**
- ▣ **Mulching**
- ▣ **Proper care**
 - Proper tree for site
 - Compaction
 - Injury
 - Too much love

Chemical

- ▣ There are no guarantees
- ▣ *Injection*
 - Tree-Age® (emamectin benzoate A.I.)
- ▣ *Topical sprays*
 - Pyrethroids (Permethrin, Bi-fenthrin A.I.)
 - Carbaryl-based (Carbaryl A.I.)

Pheromones

- ▣ There are no guarantees
- ▣ **SPLATverb®** – only for **Sugar** pines

Incense Cedar . .

- ▣ *Study from Dinkey Creek CFLR (High Sierra RD, Sierra NF), L. Piles and Ramiro Rojas 2016*
 - probability of survivorship of individuals >20" higher
 - Poor understory mortality driven by poor crown and root development
 - Insects eventually killing trees – mostly *driven* by water stress
 - Retain larger diameter IC



Planning for Future

▣ **Native species**

- *Adjust seed zones*

▣ **Diversity**

- Age classes
- Size classes
- Species




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Publications

Most publications listed below are available through the University of California [on-line catalog](#).

Defensible Space

[Home Landscaping For Fire \(download\)](#)

[Home Survival in Wildfire Prone Areas - Building Materials and Design Considerations \(download\)](#)

<http://ucanr.edu/sites/forestry/Publications>

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Society of American Foresters

Forestry Help Line:

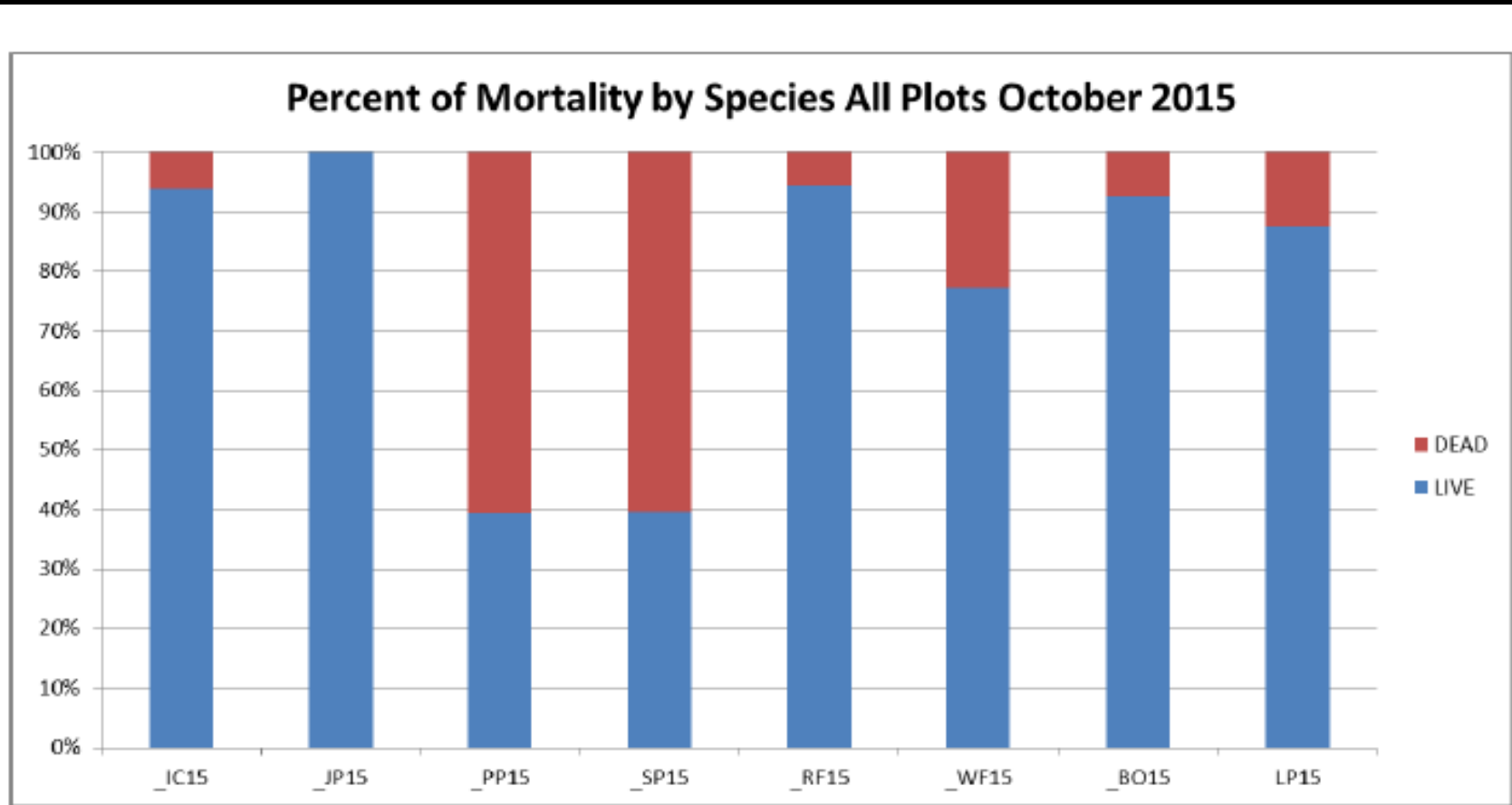
1-800-PET-TREE

California Forestry Stewardship Helpline

1-800-738-8733

Dr. Richard Harris

What and where



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

*2015 October results, Dinkey
Creek CFLR, Ramiro Rojas,
Sierra NF*