Projected future conditions & disturbance agents of North Coast forests

Susan Frankel,
USDA Forest Service,
Pacific Southwest Research Station,
Albany, CA, sfrankel@fs.fed.us

Photos: CAL Academy, Cal Photos
Outline

What is shaping change in North Coast forests?
What will North Coast forests be like in 2114?

Forest pests concerns on the horizon???
- Gold spotted oak borer
- Shot hole borer
- Laurel wilt
- 1000 cankers & walnut twig beetle
Klamath/North Coast Bioregion

Photos: Marc Hoshovsky; Jo-Ann Ordano © California Academy of Sciences
Klamath/North Coast Bioregion ---- Threats


Marijuana grows – Pesticides, potential violence. Loss of habitat, tranquility, etc.

Lack of water - Klamath and Trinity river water irrigates hay

Development & people pressure - Tourists & invasive species. Wildlife poachers & vandals.

Grazing.

Photos: CAL Academy of Sciences
Klamath/North Coast climate projections

- Temperature. Expected increase 1.7–1.9°C by 2070
  Significant increase in extreme temperature events.

- Precipitation decrease 10 – 20%. Highly uncertain!

- Snowpack – decrease by 73% (Trinity Mtns)

- Sea level rise. 11 to 72 cm by 2100.
  Coastal and estuary habitats! Tidal marshes.

Increase in plant productivity (+water use) may offset tidal surge.
Predicted spread of sudden oak death: early long-range spread

Tanoak. Interacting threats...

11,000 hectares at high risk – includes Hoopa & Yurok lands

Silviculture – herbicides, species shift from tanoak

Sudden oak death

Development

Fire – Altered regimes

Increasing stand density

Altered species composition

Root disease,
Dwarf mistletoe,
Beetles

Fire suppression
Aerial Survey - 2013

Bear Damage to Douglas-fir is #1 damage agent in Del Norte & Humboldt Cos.

Summary:
- Acres surveyed: 1.9 million acres
- Acres with mortality: 15,542
- Number of dead trees: 54,210
- Acres with other damage: 1,689

Figure 2. Dead tanoak in the North Fork of the South Fork Noyo River in Jackson State Forest.

Figure 3. Dead tanoak and bear-damaged Douglas-fir in Redwood Creek in Humboldt County.

Direct questions pertaining to this report to Zachary Heath [email: zheath@fs.fed.us; phone: 530-758-1751]. Report Date July 3rd, 2013.

Z. Heath, USFS, FHP
Swiss Needle Cast Survey - 2013

Swiss Needle Cast not detected in Del Norte & Humboldt Cos.

Figure 1. Map showing site locations.

Site 1

Site 2

Figure 2. Site 1 on the map.

Figure 3. Site 2 on the map.

Z. Heath, USFS, FHP

ODF photos
Gold spotted oak borer, *Agrilus auroguttatus*

Coast live oak in San Diego Co. and CA black oak in Riverside Co.
Range of coast live oak

Range of CA black oak

Range of gold spotted oak borer?
Laurel Wilt – Threat to California Bay Laurel

Redbay ambrosia beetle, *Xyleborus glabratus*

*Raffaelea lauricola*

Credit: UC Riverside, Center for Invasive Species Research
Thousand Cankers Disease and the Walnut Twig Beetle in California

Walnut twig beetle, *Pityophthorus juglandis* & *Geosmithia morbida*

Credit: UC IPM Online
Shot Hole Borer (*Euwallacea sp.*) and Fusarium Dieback (*Fusarium sp.*)

- Los Angeles and Orange Counties
- Hosts: Coast live oak, box elder, avocado, big leaf maple, California sycamore and more
What will drive forest change?
Acknowledgements

USDA Forest Service,
Pacific Southwest Research Station
Manage water for forest health!

Mulch
Thinning and species selection
Soil conservation
Irrigation

Water for fish? Water for farms? Water for city people?
Or – water for the forest?

How will forests respond to climate change?

Warming will

- decrease snowpack,
- cause earlier snowmelt,
- increase summer evapotranspiration,
- increase the frequency and severity of droughts,
- increase risk of frost injury
- change germination time
- change time of bud set and bud break

Why do trees die after drought?

Aspen - Hydraulic damage persisted in dying trees

Deterioration - 9 years post stress.

Similar findings for pinyon (Mueller, 2005)