

**Disease:** Sudden oak death

**Causal agent:** *Phytophthora ramorum*



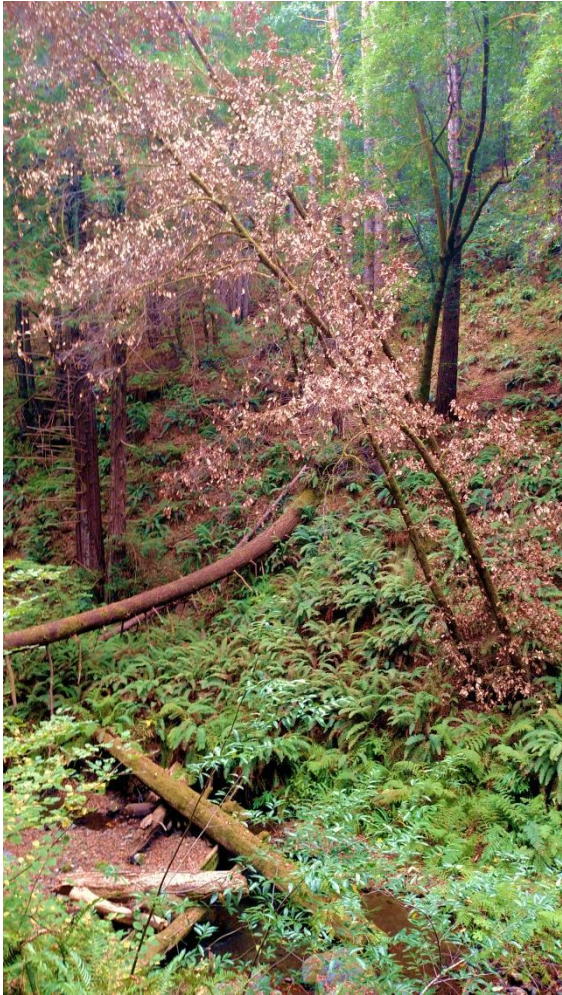
Dan Stark, Brendan Twieg, and Yana Valachovic

UC Cooperative Extension-Humboldt/Del Norte

Thursday, May 30, 2019



# Overview



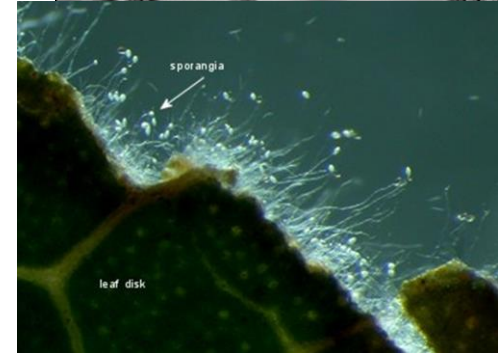
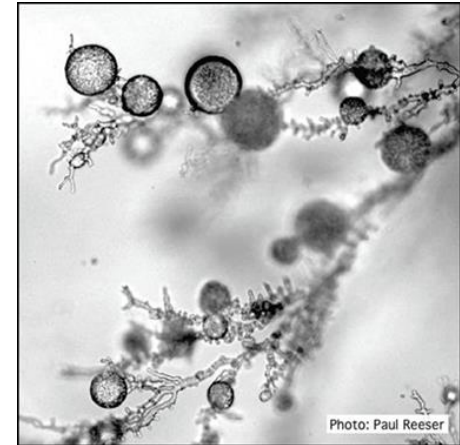
SOD-killed tanoak, Jackson Demo State Forest, Mendocino Co.

- Review of sudden oak death (SOD)
- Monitoring for SOD
- Distribution in Humboldt County

# What is sudden oak death?



- Invasive and introduced fungus-like organism (Oomycete) that disperses by spores;
- Requires moisture to survive; spreads esp. in warm rains
- Over 120 known tree and plant hosts
- Detectible in leaves, woody tissue, soil, water
- Mortality rampant in coast live oak and tanoak



# *Phytophthora ramorum*: One causal agent, two diseases

Few hosts



sudden oak death



Ramorum leaf blight

Many hosts

# Examples of north Coast *P. ramorum* hosts

- Bigleaf maple
  - Blueblossom ceanothus
  - California bay
  - California black oak
  - California buckeye
  - California hazel
  - Canyon live oak
  - Coast redwood
  - Coffeeberry
  - Evergreen huckleberry
  - Hairy and common manzanita
  - Inside-out flower
  - Maidenhair fern
  - Pacific yew
  - Poison Oak
  - Salmonberry
  - Sweet cicely
  - Tanoak
  - Toyon
  - Trillium
  - Vine maple
  - Western star flower
  - Wood rose
- 
- Mendocino Only
  - Coast Live Oak
  - Shreve's Oak





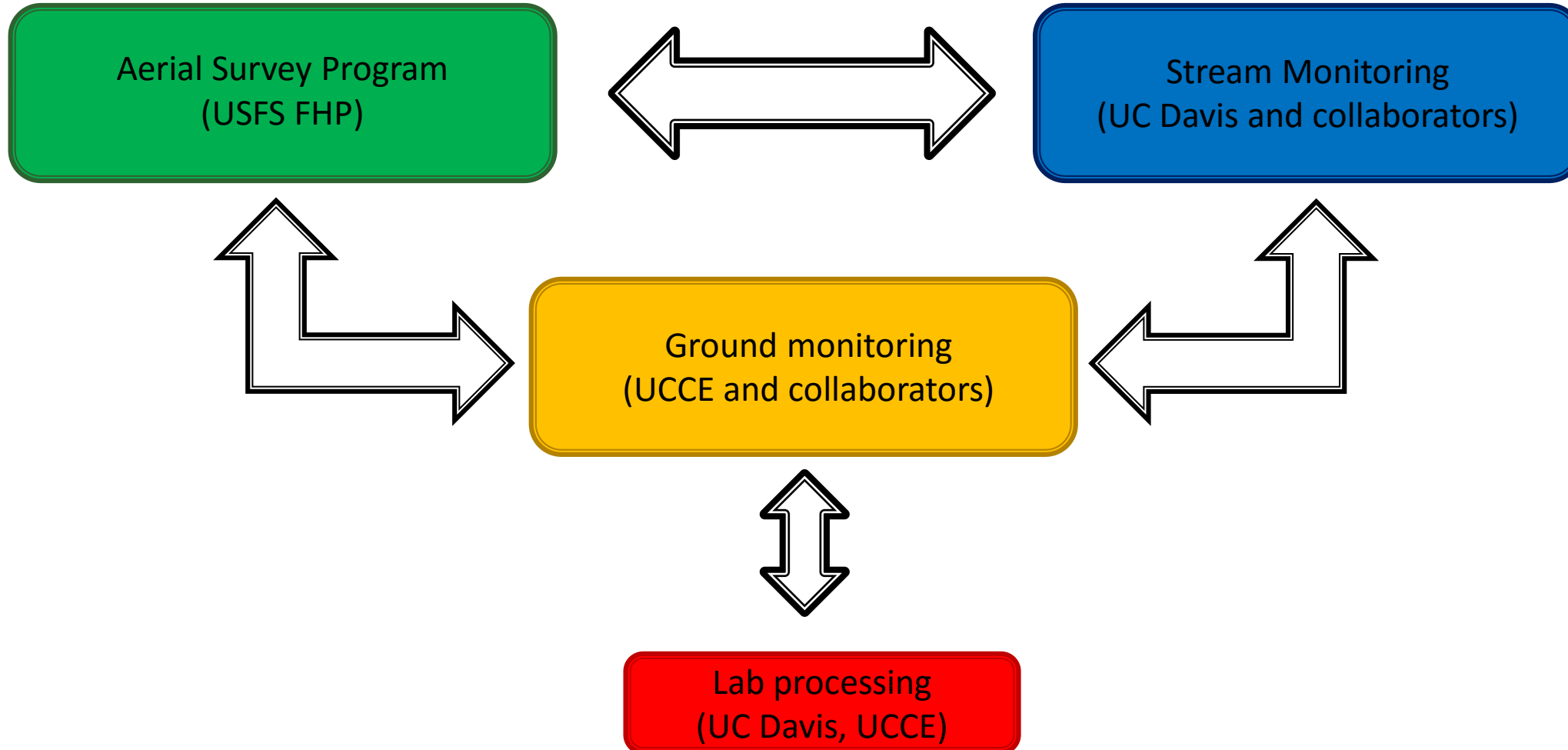
# Quarantine

15 CA counties are currently under quarantine

Once the disease is confirmed in a wildland area, the whole county becomes quarantined

Quarantine prevents host vegetation, soil, etc., from moving outside quarantine area

# Monitoring for SOD



# Stream monitoring



Sampling for *P. ramorum* using rhododendron leaves

- **Collaborative effort:** UC Davis, UCCE, Hoopa, Yurok, Karuk, Humboldt Redwood Co., Green Diamond Res. Co., Del Norte Ag., Redwood Nat'l Park, Bureau of Land Management, and Mattole Restoration Council
- Edges of known infestations are monitored; also high-risk watersheds
- Stream positive indicates pathogen is upstream\*
- Once a stream is positive, next step is to determine source of inoculum







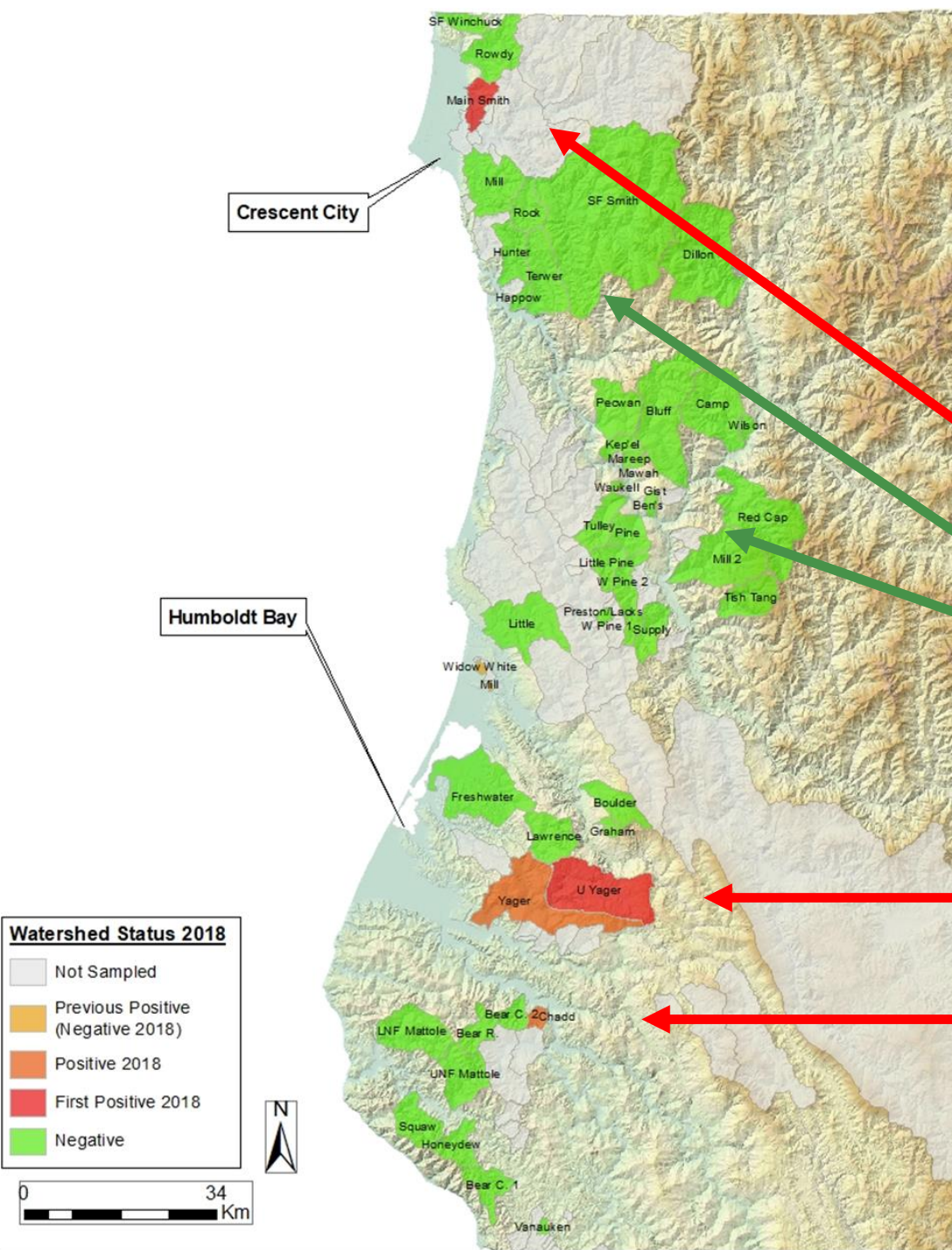
# Stream monitoring 2018

- Humboldt County, 39 sites
- Del Norte County, 9 sites
- Mendocino, no sites monitored (same as in 2017)

\*Mainstem Smith River, Del Norte County. No other positives in Del Norte.  
(*P. ramorum* not detected north or east of the Redwood Creek watershed)

Yager Creek, tributary of the Van Duzen

Chadd Creek, tributary of the Eel



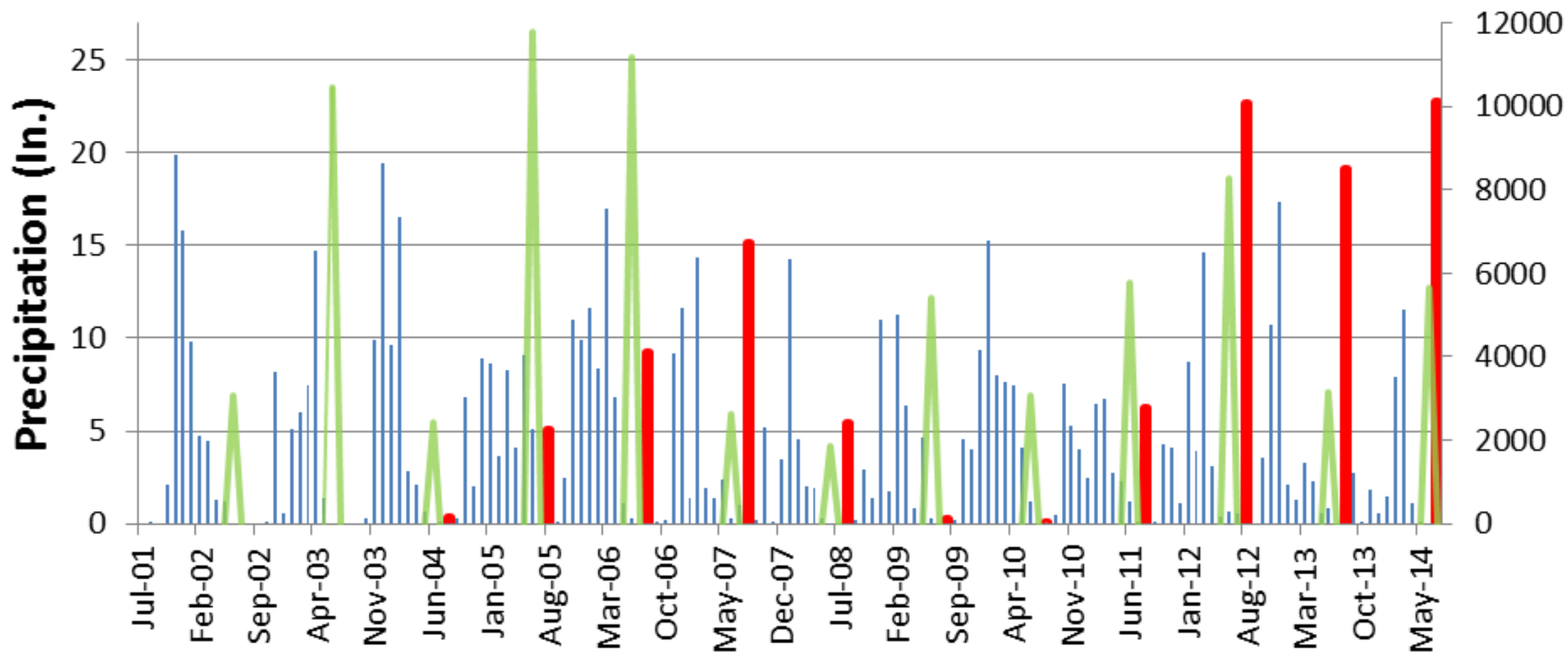
# Preliminary results 2019, thus far

- Del Norte results pending
- In Humboldt County:
  - confirmed Yager Creek
  - Positive once again, Mill Creek in McKinleyville\*
  - (Chadd Creek dropped)

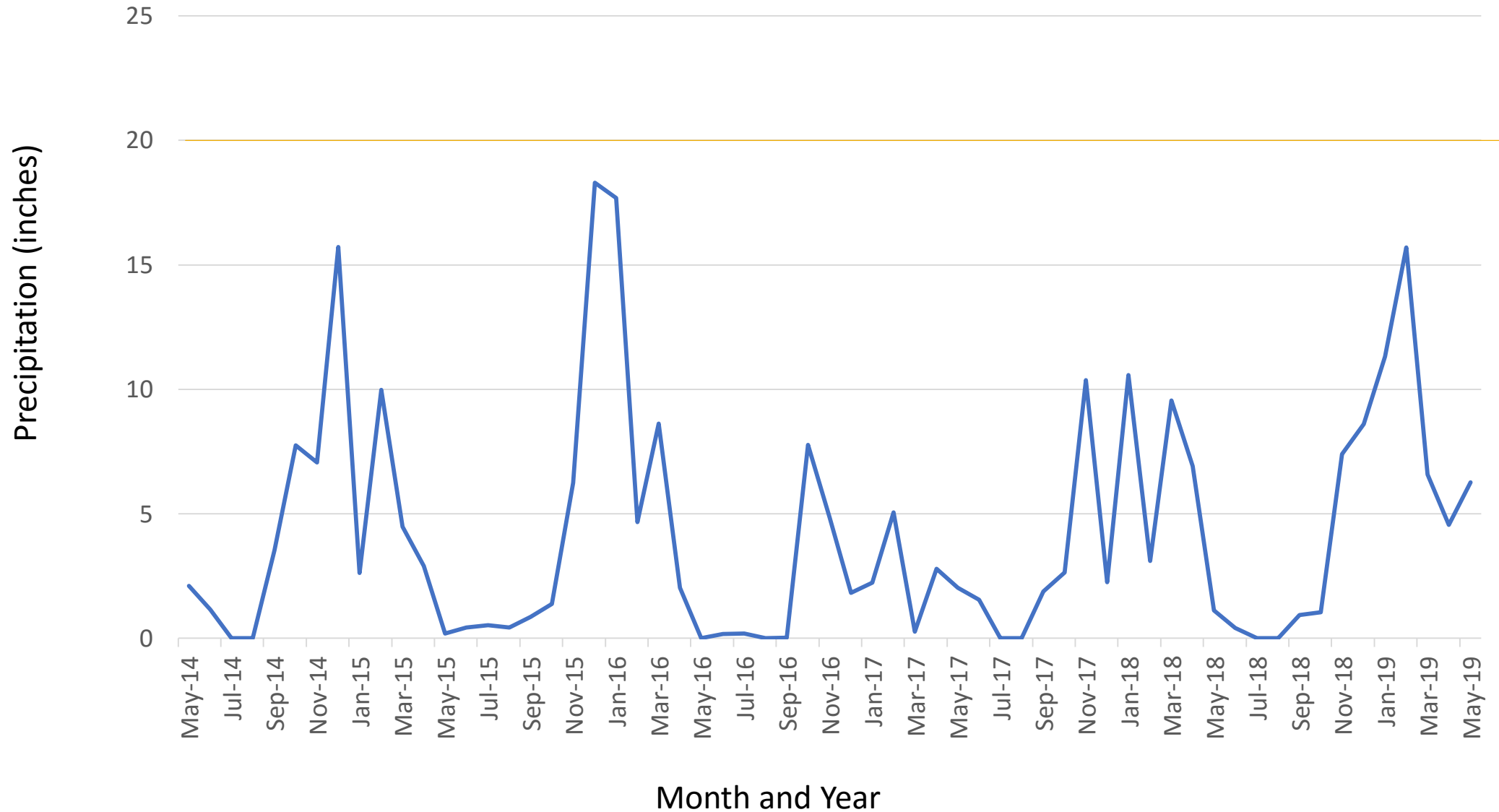


# Redway RAWS Data

Monthly Precip SOD Mortality-Acres Spring Precip



# Kneeland RAWS Data May 2014 - May 2019




# Sudden oak death in Humboldt County

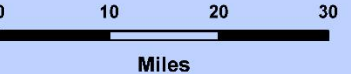
## Sudden Oak Death in Humboldt and Trinity Counties, California, to March 2018

Vegetation Tested for *Phytophthora ramorum*

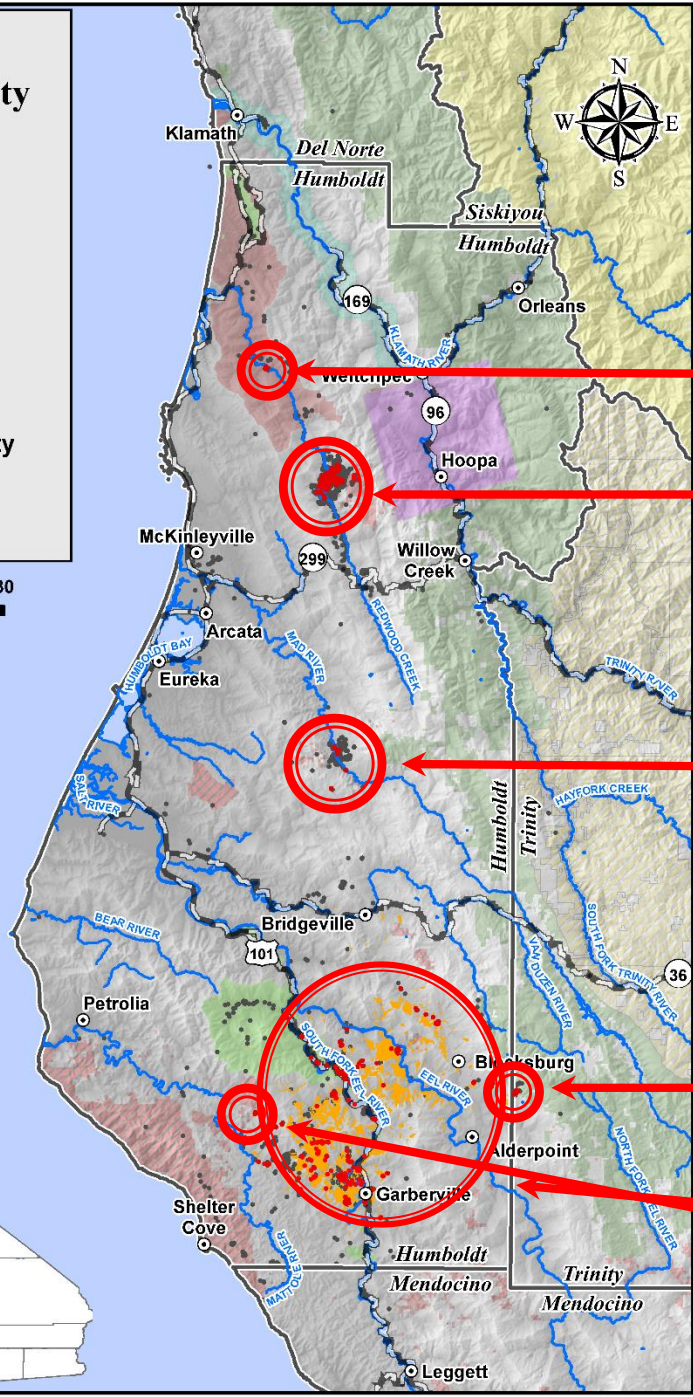
- Positive
- Negative

Tanoak Mortality from USDA Forest Service Aerial Mortality Survey: 2004-2017

 Confirmed, or Very Likely, Caused by SOD



-  Yurok Lands
-  Redwood National Park
-  State Park, Reserve, or Rec Area
-  Hupa Lands
-  Six Rivers NF
-  Bureau of Land Management
-  Klamath National Forest
-  Shasta-Trinity National Forest



Redwood National Park, summer 2014

Redwood Valley, 2011

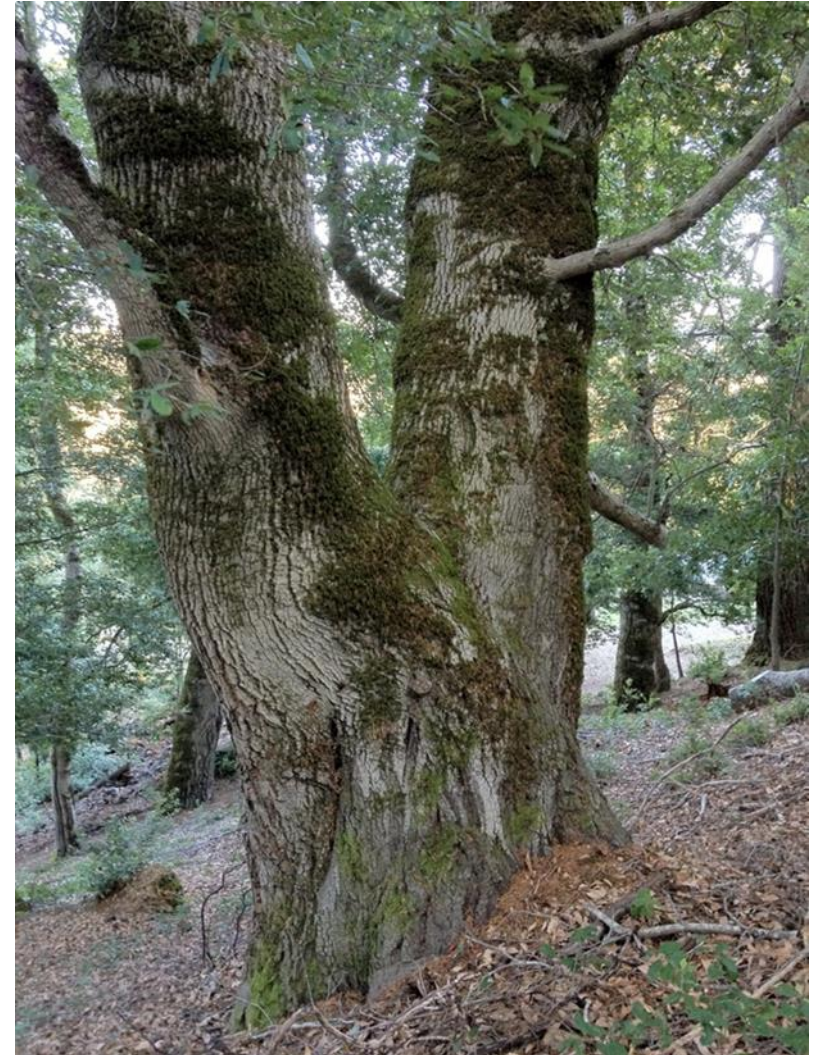
Mad River, 2013

Trinity County, 2014

Southern Humboldt, 2002  
Mattole Canyon Creek, 2018

# Future ground monitoring efforts in Humboldt, Del Norte, and Trinity counties

- Northern borders of Del Norte County
- Smith River watershed\*
- Northern Humboldt and southern Del Norte
- Redwood Valley and Lacks Creek
- Redwood Creek w/ Redwood National Park
- McKinleyville
- Mattole
- Mad River
- Southern Humboldt
- Southeastern Humboldt County and southwest Trinity County





# Update on tanoak genetics trials

Dorena Genetic Resource Center (Oregon)

Dr. Richard Snieszko *et al.*

- Fall 2018
- Collections from traditional groves throughout Humboldt and from landowners in southern Humboldt
- Collected from “families”: individual or group
- Transported to Oregon for germination and assays



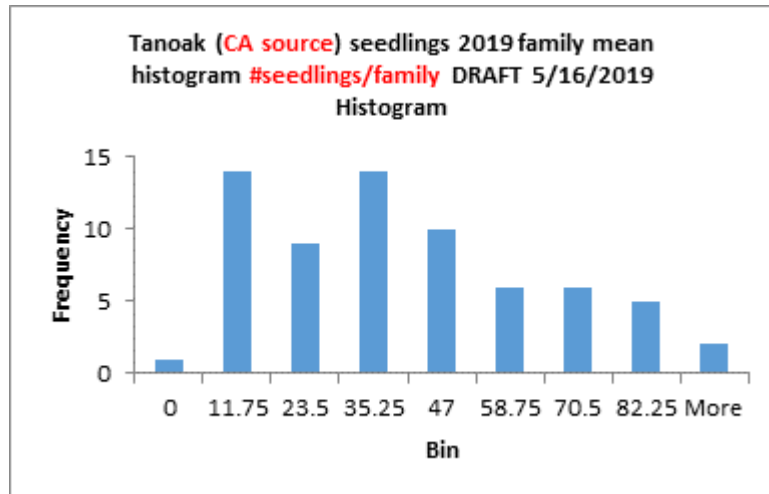


# Update on tanoak genetics trials

Dorena Genetic Resource Center (Oregon)

Dr. Richard Sniezko *et al.*

**2875** total viable acorns collected;  
**2382** successful seedlings!







# THANK YOU!

