

# Monitoring and evaluation in climate adaptation - a view across 3 case studies

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Conservation science  
for a healthy planet.



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# Point Blue

Conservation science  
for a healthy planet.

- Founded in 1965 as Point Reyes Bird Observatory
- 160+ seasonal and full-time staff
- 2022 budget: \$17 million
- Promote climate-smart conservation and nature-based solutions for wildlife and people



# Point Blue's approach to monitoring and evaluation



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# Three case studies - CAF Projects

- Drought Tolerant Oaks (2018 CAF Award)
  - PI - Blair McLaughlin, Hampshire College
  - Point Blue team - Libby Porzig, Alissa Fogg, Bonnie Eyestone, Point Blue partner biologists, STRAW team
- Inoculant-Supported Restoration (2019 CAF Award)
  - Point Blue PI - Chelsea Carey
  - Point Blue team - Isaiah Thalmayer, Libby Porzig, STRAW team
- Biostimulants for Post-Fire Recovery (2021 Award)
  - Co Renewal Led - PI Mia Maltz, & Maya Elson
  - Point Blue Team - Chelsea Carey, Liz Chamberlin, STRAW team
  - UCR - Sydney Glassman
  - Duke University - Lauren Czaplicki



# Drought Tolerant Oaks: Adapting to drought: building genetic resilience to climate change into oak woodland ecosystems

# Conserving blue oaks in the face of drought and climate change



blue oak mortality in 2015 at a xeric edge site called Griswold Canyon - photo credit: Ryan O'Dell

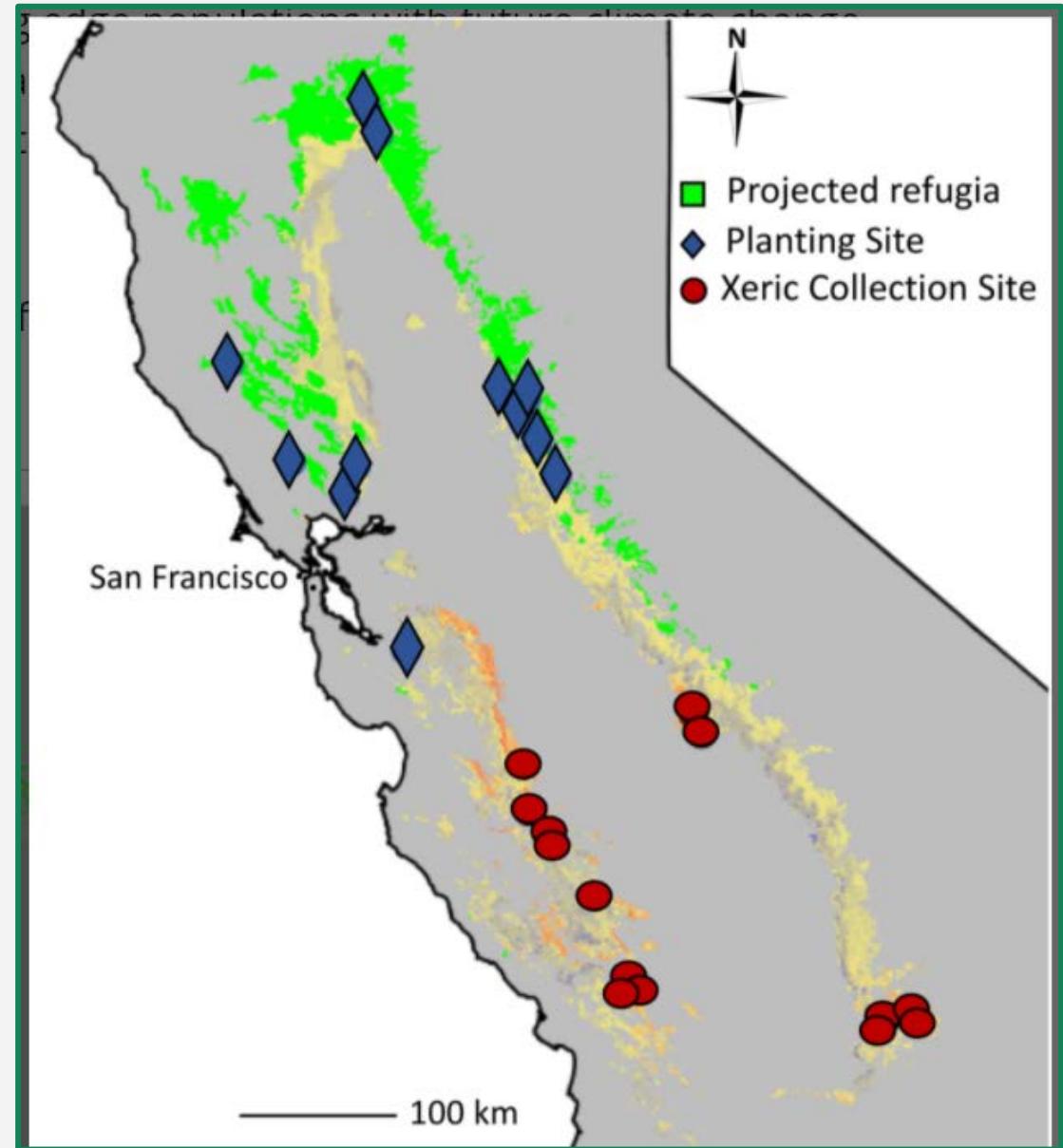


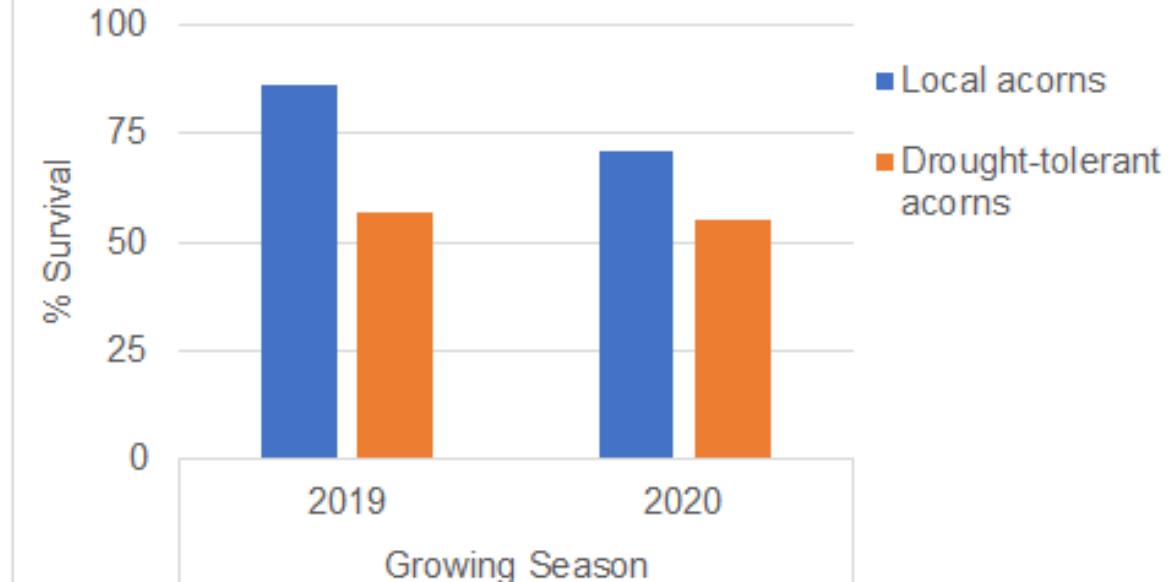
Figure from McLaughlin et al. 2021

# Questions:

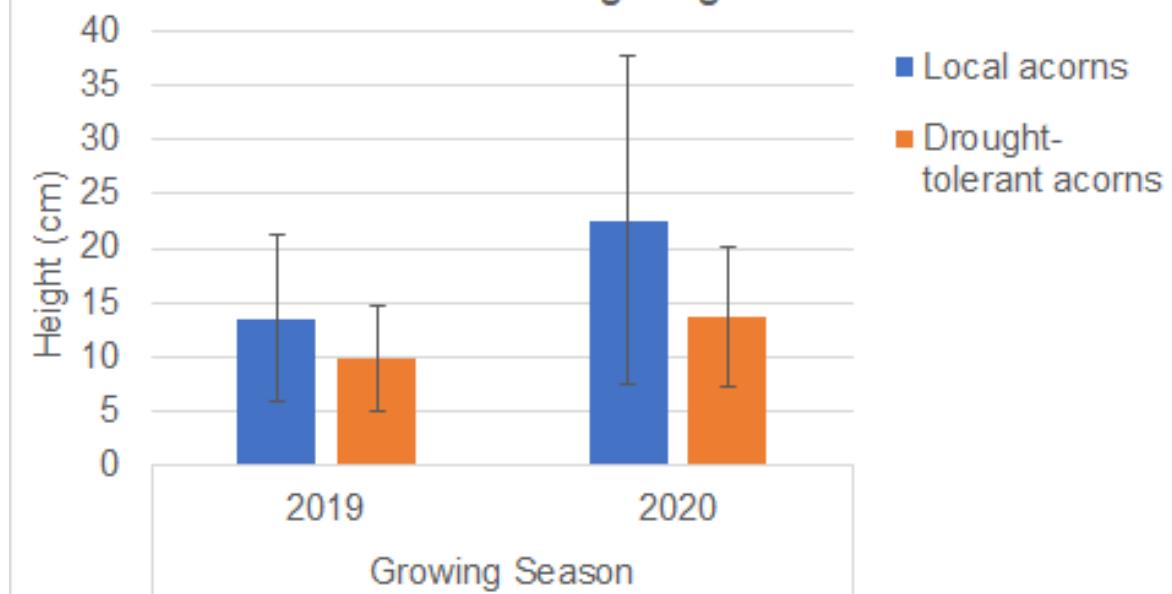
- Would xeric edge transplants survive the initial climate mismatch?



Seedling Survival



Seedling Height



## Questions:

Are there trade-offs between growth and drought tolerance that could confer a potential future advantage with climate change?

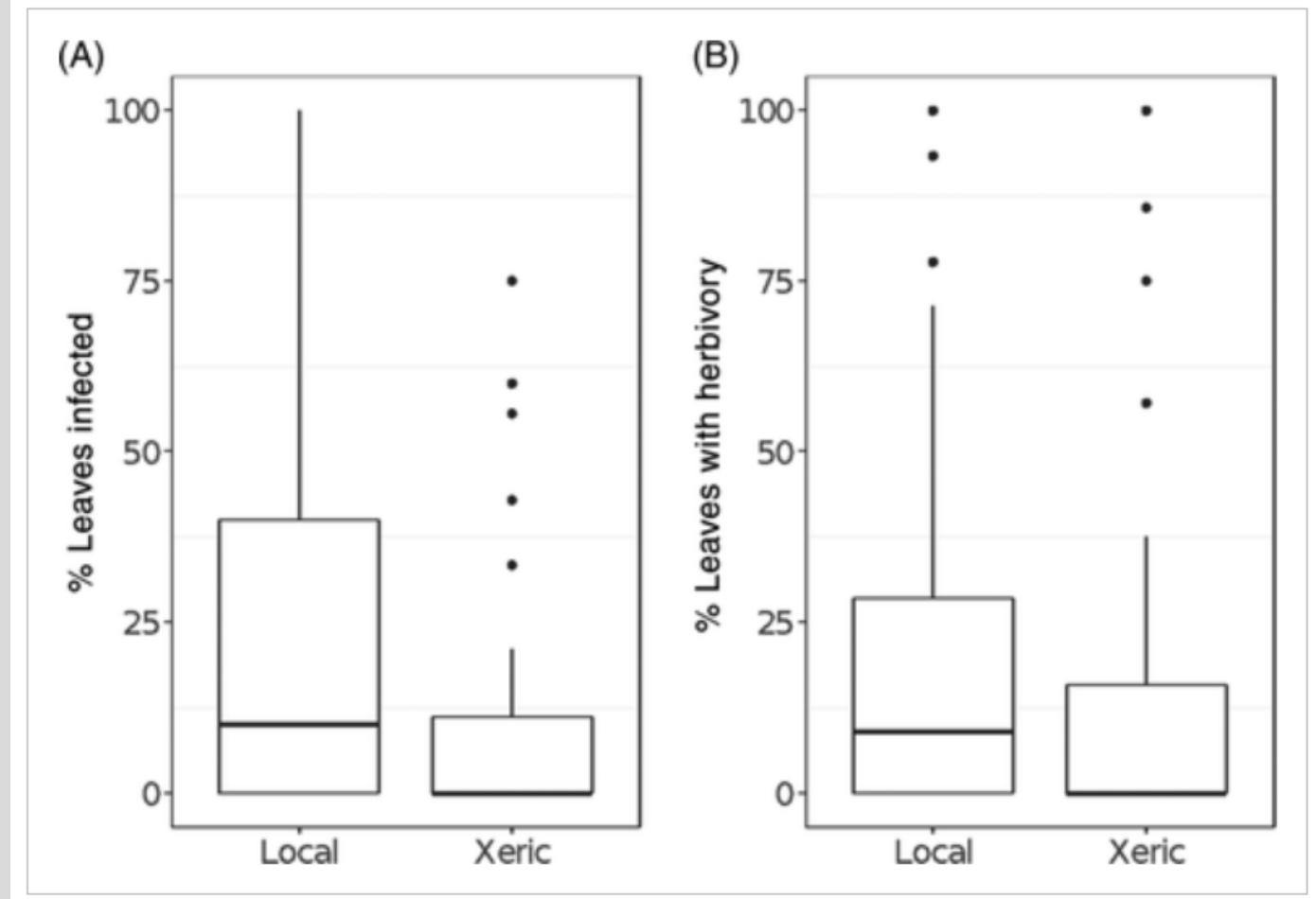
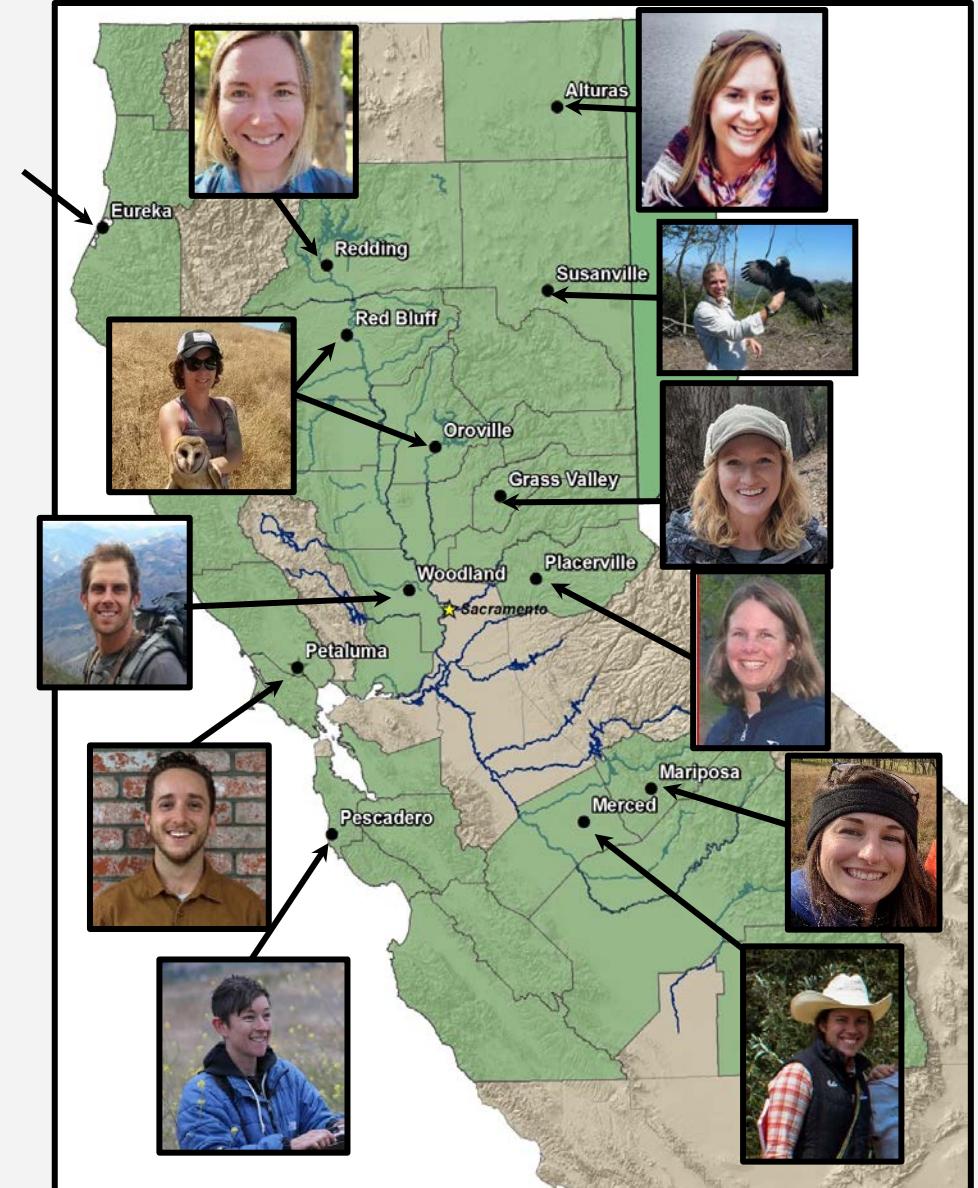


Figure from McLaughlin et al. 2021

# evaluation

It was important that we monitored indicators related to both performance and adaptation

**Ongoing monitoring will be critical.**



# Case Study 2: Inoculant-Supported Restoration



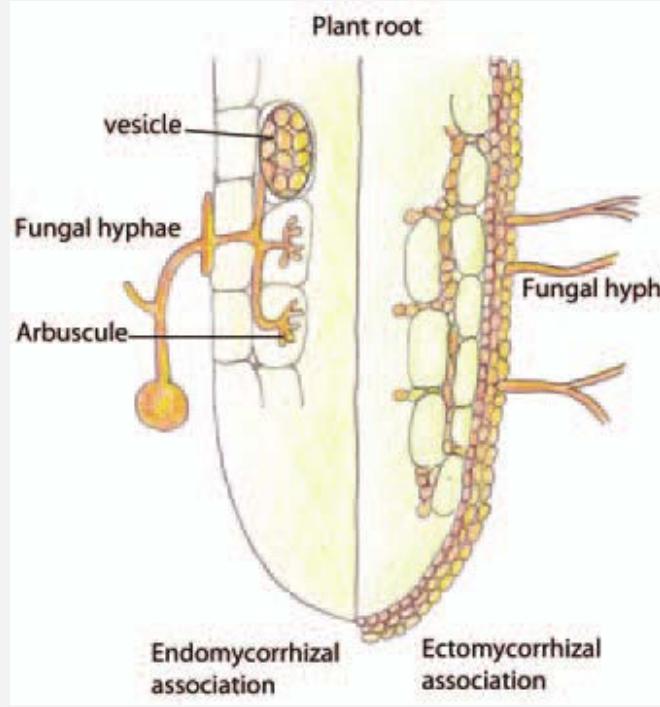
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# Inoculant-Supported Restoration

- Mycorrhizae = essential plant partners



# Inoculant-Supported Restoration

- Can whole soil inoculum increase plant ectomycorrhizal associations, survival and vigor?
- Does inoculum from warmer, drier climates increase plant survival, and/or vigor compared to local inoculum?

photo from Dybala et al. 2022  
showing, left to right:

- acorns for an oak replicate
- willow sprigs for planting
- Douglas fir saplings



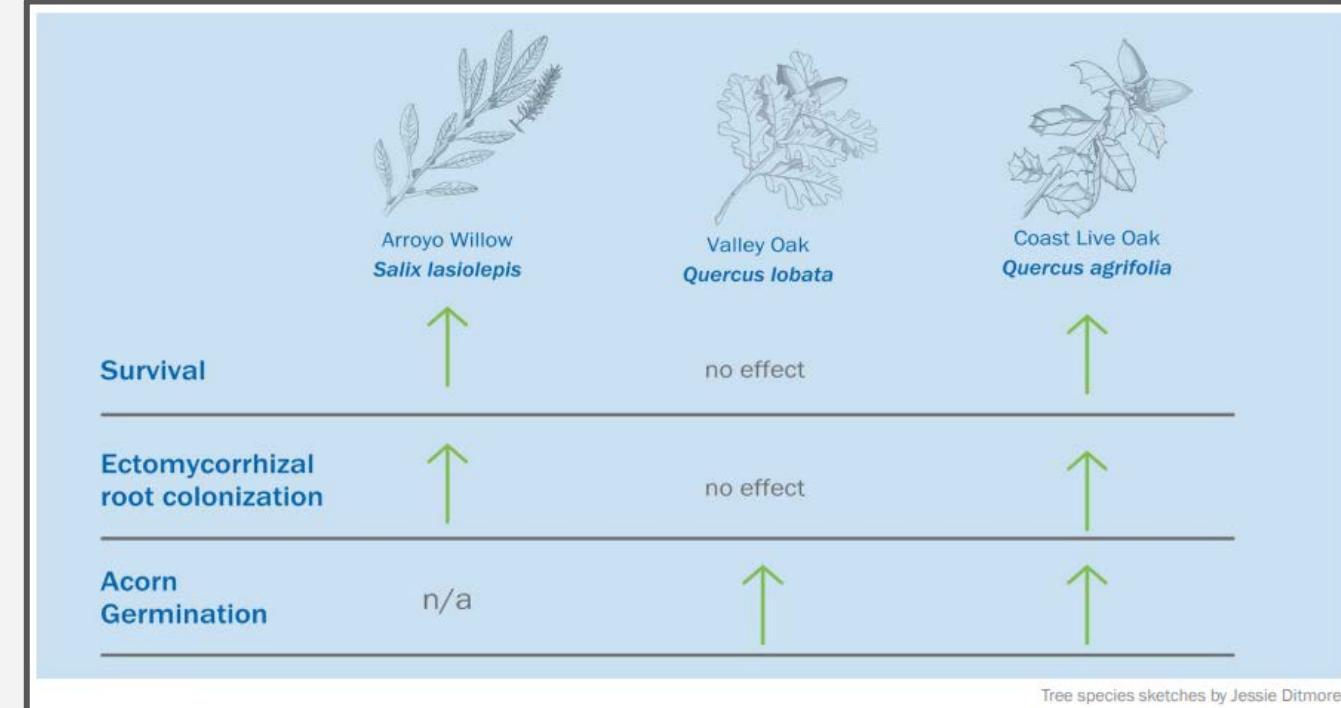
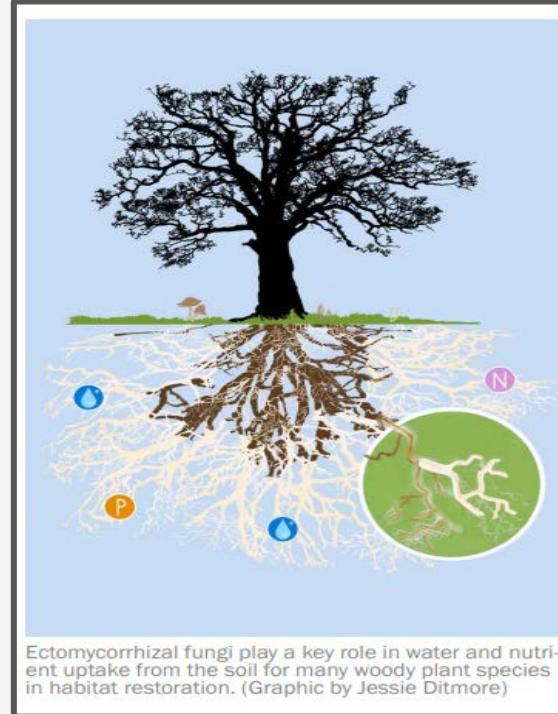
# I-SR monitoring

For 2 years (2019, 2020), we monitored:

- oak germination
- plant survival
- root colonization with ECM



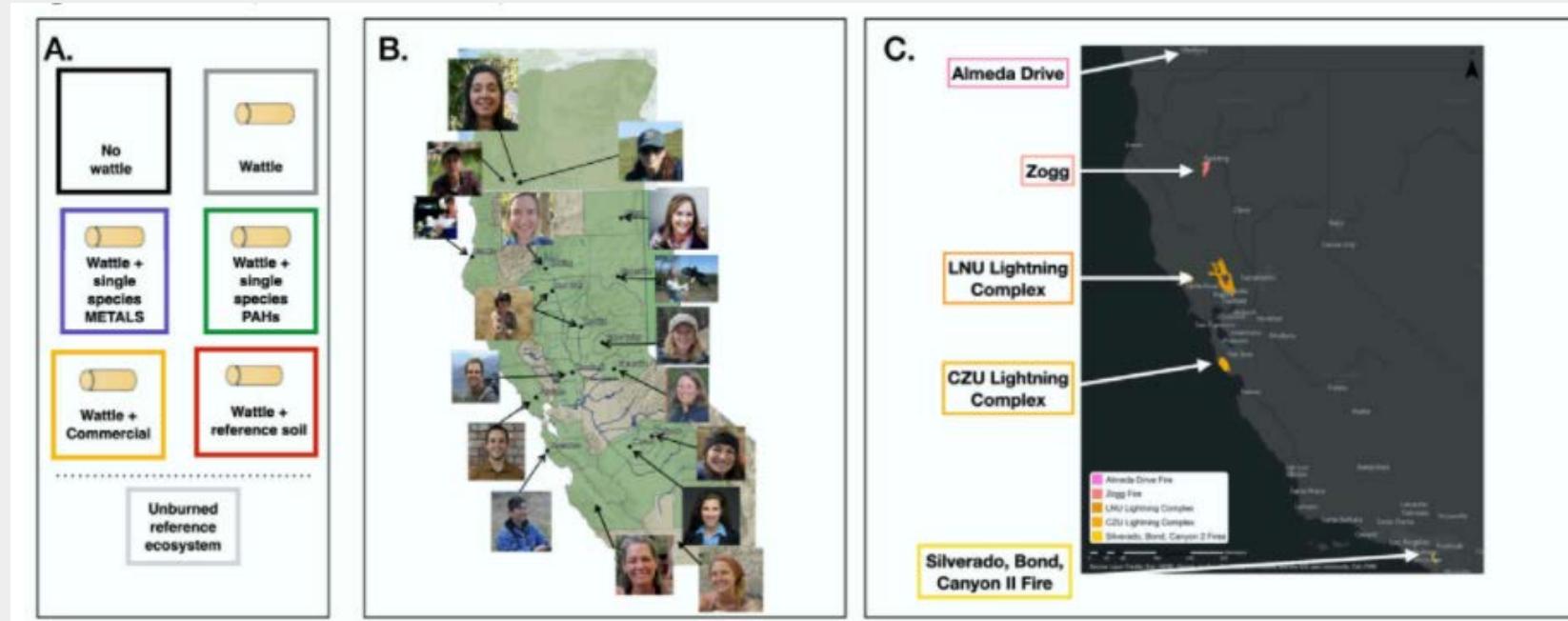
# evaluation



- Strong evidence that I-SR more than tripled the odds of survival in Arroyo Willow and Coast Live Oak
- Arroyo Willow and Coast Live Oak had higher rates of root colonization by ectomycorrhizae
- The odds of acorn germination doubled for Coast Live Oak and Valley Oak
- **There was no evidence of any negative effects of I-SR**
- **Ongoing monitoring will be important**

# Case Study 3: Biostimulants for Post-Fire Recovery

“Effects of Microbial Inoculation on Post-fire Microbial Community Resilience and Ecosystem Recovery”  
2021 WCS CAF Award



- Lead Organization - CoRenewal (PI: Mia Maltz)

# Biostimulants M&E approach

## Main questions:

- (1) Can fungal and bacterial inoculants help regenerate ecosystems post-fire?
- (2) Can we optimize post-fire microbial inoculation for maximum benefit?



*photo: CoRenewal*

## Monitoring:

- microbial structure (diversity and composition)
  - DNA amplicon sequencing at 1, 6, and 18 months post implementation
  - characterize microbial function and C sequestration potential
- indicators of ecosystem recovery
  - soil pH, nitrogen pools, hydrocarbon degradation, aggregate stability, water content and infiltration, heavy metal concentrations, C storage, and plant diversity and cover

# M & E Takeaways

- Monitoring is most effective when not designed in a vacuum
  - adaptive learning across time & projects - mainstreaming
  - conserve resources - simple is often best
- Long-term monitoring is necessary & challenging
  - dispersed staff/ partners can aid long-term efforts
  - funding for long-term monitoring



G Grant Halstrom

# Thank you!

Wildlife Conservation Society Climate Adaptation Fund

Project leads and teams including:

- Blair McLaughlin
- Mia Maltz
- Chelsea Carey
- Isaiah Thalmayer
- Alissa Fogg
- Libby Porzig
- Isaiah Thalmayer
- Point Blue STRAW team & partner biologists



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