

Is the Decrease in Canopy Cover Caused by Sudden Oak Death Affecting Flowering Bay Laurels and Ground Plants in the Fairfield Osborn Preserve?

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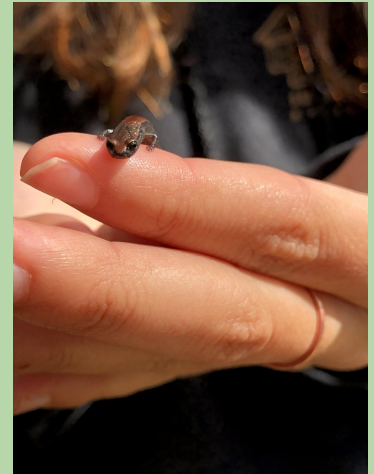


Background I - Pollinators

- Pollinators are bees, flies, birds, etc.
- Pollinating flowers are an indicator species for bees (Davis, 2014)
- Bees are struggling, and ensuring that Fairfield Osborn Preserve is pollinator friendly is important for the health of wildlife



www.suddenoakdeath.org



Background II - Sudden Oak Death

- Bay laurels are the primary host of *P. ramorum* in California. (Harnik, 2004)
- Sudden Oak Death originates in infected oaks that die rapidly, with foliage turning brown within several weeks (Rizzo, 2003)
- The time from initial infection to tree death can range several months to several years (Rizzo, 2003)



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Background III - Forest Health

- Vegetation assessments of diseased sites showed reduced
 - Species richness
 - Litter
 - Shrub
 - Canopy cover
 - Flowering scores

(Davis, 2014)



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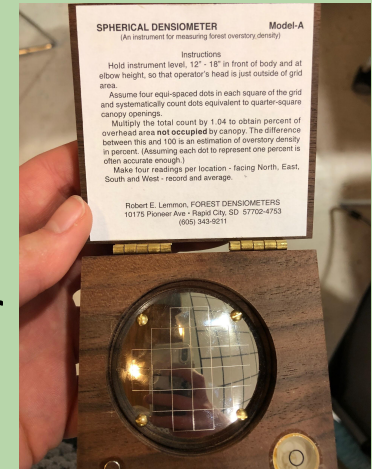


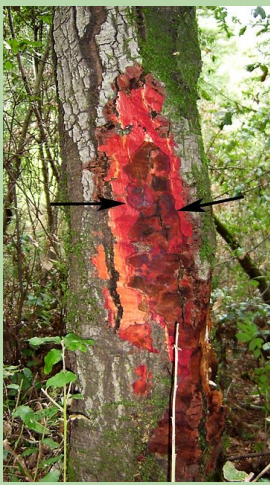
Methods I

- In a 20 x 20 meter plot of land
 - Measure shade coverage
 - Survey open canopy due to Sudden Oak Death
 - Note prevalence of flowers
 - Measure health of oaks and bay laurels

- Equipment:

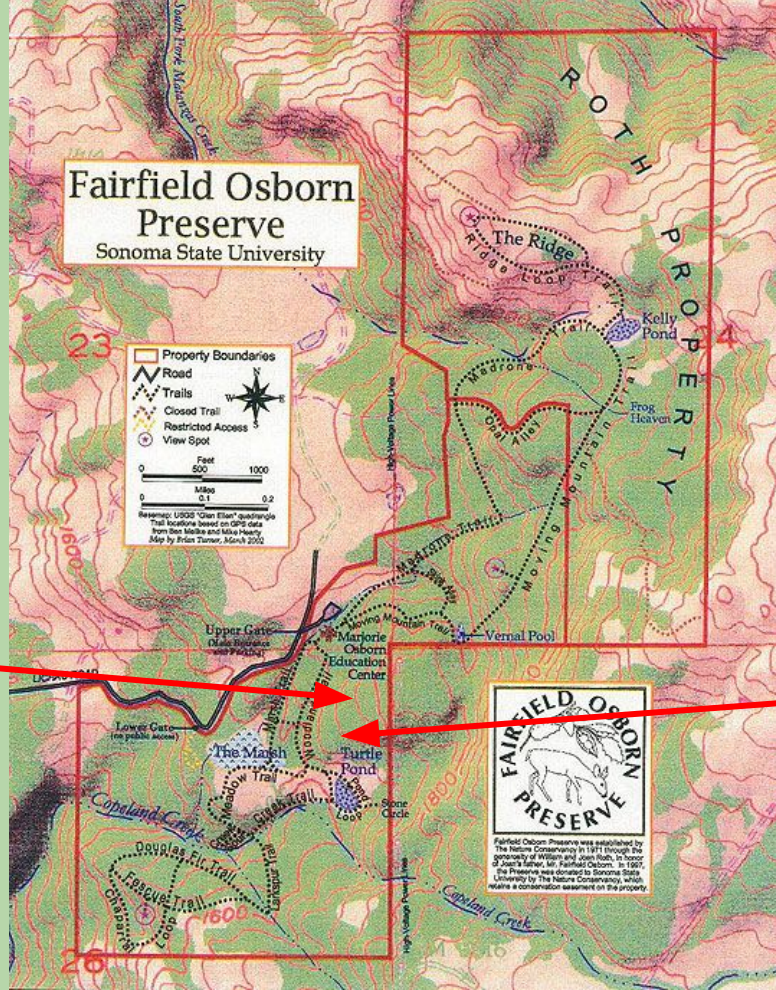
- GPS
- Compass
- Map
- Densiometer



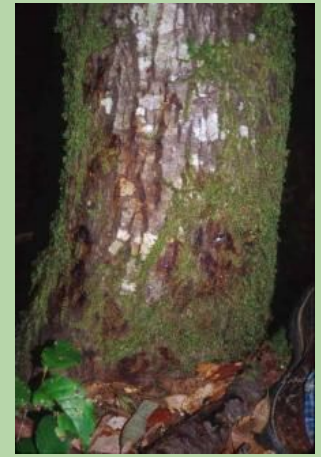


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Location 1:
High
Mortality &
Higher
Elevation



www.sonoma.edu



www.pnwhandbooks.org

Location #2:
Low
Mortality &
Lower
Elevation

Methods II

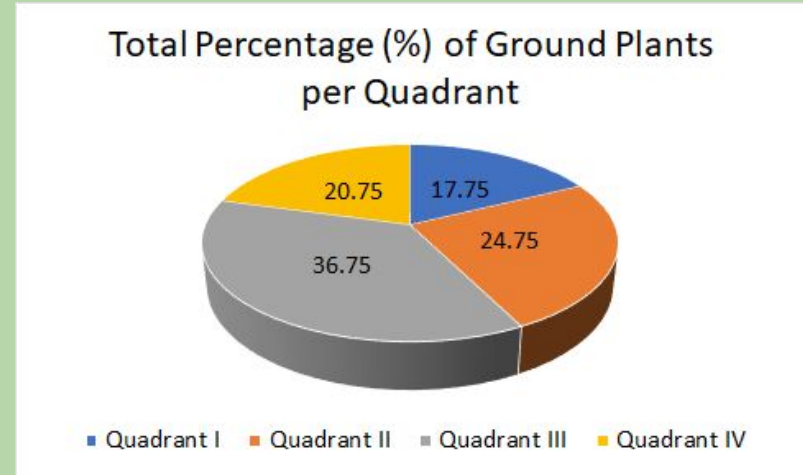
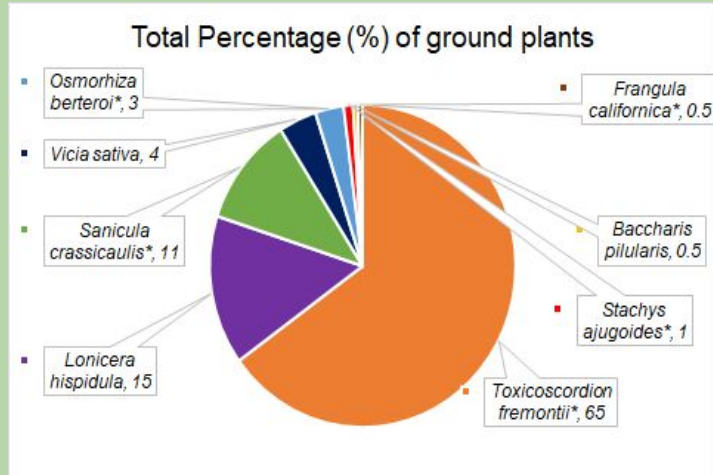
- Team up with another group
 - Prevent inaccurate data collection from measurement error like calculations and observations
- Group members will record findings in lab notebook

No. 972

Find	Location #1	Location #2
Notes (weather, location, etc.)		
Coordinates		
Canopy		
Coverage		
SOD (high, med, low)		
Amount of Flowers on bay laurels		
Presence of ground plants (scale 1-3) 1 - literally everywhere, Widespread 2 - Patchy 3 - Rare		

Scale: 1 square = _____

Results I - Location #1 High Mortality



- No flowers on bay laurels
- No relationship between quadrant and total percentage of ground plants
- *Toxicoscordion fremontii* was in the majority of location #1
- Five plants were in the bottom 9% and were extremely rare

Plant	Scale (1-3)	Quadrant	Total Percentage (%) of ground plants
	1- Widespread		
	2- Patchy		
	3- Rare		
<i>Toxicoscordion fremontii*</i>	1	ALL	65
<i>Lonicera hispidula</i>	2	II/III	15
<i>Sanicula crassicaulis*</i>	2	III	11
<i>Vicia sativa</i>	3	Center	4
<i>Osmorhiza berteroi*</i>	3	IV	3
<i>Stachys ajugoides*</i>	3	III	1
<i>Baccharis pilularis</i>	3	IV	0.5
<i>Frangula californica*</i>	3	I	0.5

*Toxicoscordion fremontii**



@Loarie_iNaturalist

Lonicera hispidula



@natureate_iNaturalist

*Sanicula crassicaulis**



@catchang_iNaturalist

Vicia sativa



@mattpostles_iNaturalist

*Osmorhiza berteroi**



@DonLoarie_iNaturalist

*Stachys ajugoides**



@linghe_iNaturalist

Baccharis pilularis



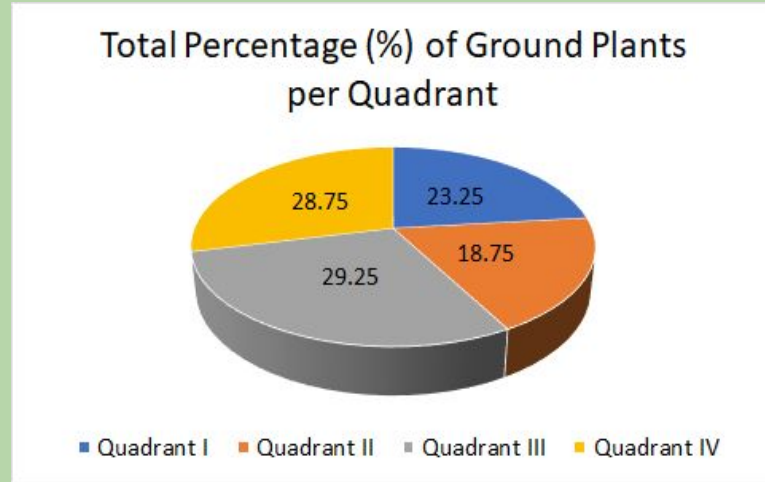
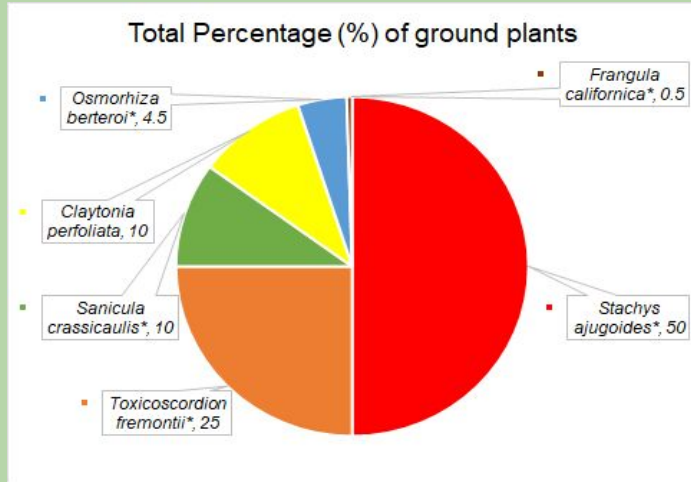
@annecurran_iNaturalist

*Frangula californica**



@direbecca_iNaturalist

Results II - Location #2 Low Mortality



- No flowers on bay laurels
- Widespread is 25% and above and is in all four quadrants (2 total)

- Patchy is between 10 and 25% (2 total)
- Rare is below 10% (2 total)
- 30% of ground is plants and 70% of ground is rocks

Plant	Scale (1-3)	Quadrant	Total Percentage (%) of ground plants
	1- Widespread		
	2- Patchy		
	3- Rare		
<i>Stachys ajugoides</i> *	1	ALL	50
<i>Toxicoscordion fremontii</i> *	1	ALL	25
<i>Sanicula crassicaulis</i> *	2	III	10
<i>Claytonia perfoliata</i>	2	IV	10
<i>Osmorhiza berteroi</i> *	3	I	4.5
<i>Frangula californica</i> *	3	III	0.5

*Stachys ajugoides**



@linghe_iNaturalist

*Toxicoscordion fremontii**



@Loarie_iNaturalist

*Sanicula crassicaulis**



@catchang_iNaturalist

Claytonia perfoliata



@JonSullivan_iNaturalist

*Osmorhiza berteroi**

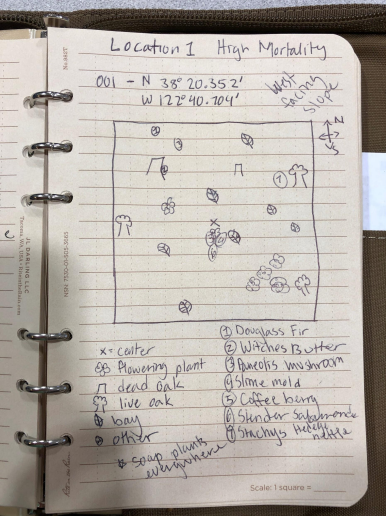


@DonLoarie_iNaturalist

*Frangula californica**



@direbecca_iNaturalist



Location 1

N 38° 20.352'

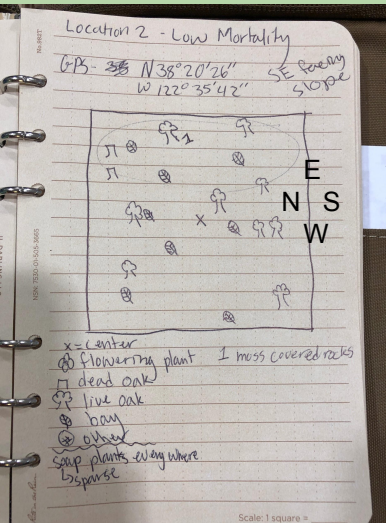
W 122° 40.704'

- Unhealthy area
- More dead oaks
- Higher elevation

Found:

- Douglas Fir on edge of plot
- Witches butter
- Slime Mold
- Stachys hedgenettle
- Soap plants all over

Results III - Maps of Locations



Location 2

N 38° 20' 26"

W 122° 35' 42"

- Healthy area
- Lots of live oaks
- Lower elevation

Found:

- Lots of moss covered rocks on the North Eastern side
- Soap plants all over
- Slippery Salamander
- Lots of Bay saplings

Results IV - Canopy Cover and Tree Health

Canopy Cover

Quadrant	Location 1 - High Mortality	Location 2 - Low Mortality
1	78	84
2	64.75	82.5
3	85.75	66.75
4	69	80.25
Center	73	61.5
Average	74.1	75

Tree Health

Location 1

	Healthy	Infected	Dead	Total
Bays	12	34	-	46
Oaks	8	6	8	22
Total	20	40	8	68

Location 2

	Healthy	Infected	Dead	Total
Bays	17	62	-	79
Oaks	26	7	5	38
Total	43	69	5	117

Conclusions

- Fairfield Osborn Preserve can use the results for:
 - Expecting more forbes as trees die off
 - More compost
 - More flowering bays
- At higher elevation the temperature is cooler than at ground level
 - At lower elevation there were flowering bay laurels but there were no bay laurels flowering in the two locations



Acknowledgements

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References

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- Rizzo, D. M., & Garbelotto, M. (2003). Sudden oak death: endangering California and Oregon forest ecosystems. *Frontiers in Ecology and the Environment*, *1*(4), 197-204.