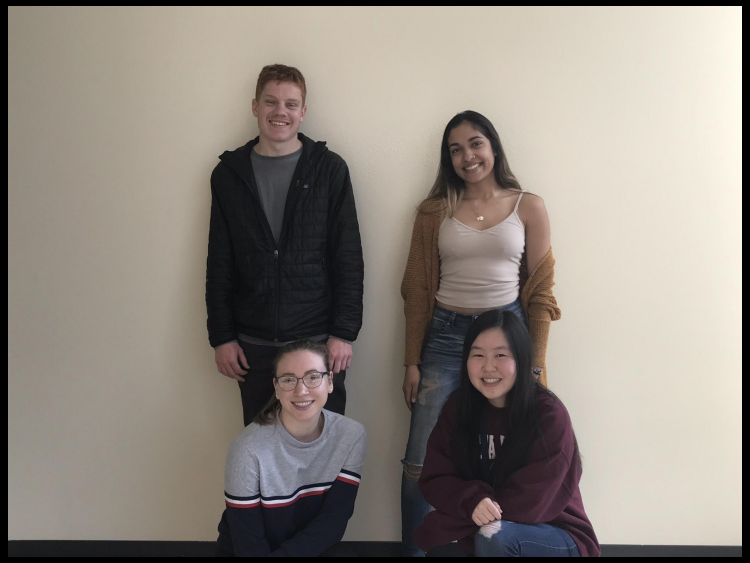
# How abundant are Western Black-Legged ticks in grasslands at Fairfield Osborn Preserve in the early spring?

SONOMA School of Science and Technology

Science 120



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# Background I

- Sonoma County averages about 8 cases a year from people getting Lyme disease from ticks (Kovner, 2016).
- The general problem our research investigates is how abundant the Western Black-legged tick population is in the grasslands of Fairfield Osborn Preserve.
- Stakeholders at the Fairfield Osborn Preserve want to know about the abundance of ticks to keep visitors informed and prepared.

# Background II

- Western Black-Legged Tick(Deer Tick):
  - Carrier of Lyme disease
  - Reaches peak in January/February, and decline or become rare by June/July
  - Similarly in Sonoma county, adult tick activity peaked in November/ December
  - Adult ticks seem active in the fall and appearance was associated with first rainfall of the season (Salkeld, 2014)
  - Females do readily attack and feed, but males do not transmit disease because they do not feed on the blood (Tick Identification, n.d. *a*)

**Western Black-Legged Tick**

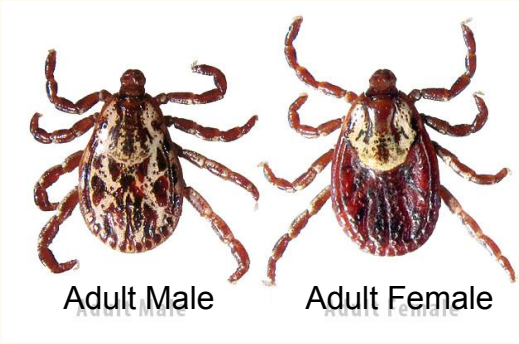

**Female Black-Legged Tick after feeding**

# Background III

- <u>Other types of ticks that can be found in Northern California:</u>
  - **Pacific Coast Tick:**
    - Adults are active all year round but more active during April and May
    - Females feed on hosts; males only feed on hosts for a short period of time
    - Do not carry Lyme disease ( Tick identification, n.d. *b)*
  - **American Dog Tick**
    - Adults most abundant from April- August
    - Females do feed on blood; males do also but do not swell
    - Do not carry Lyme disease ( Tick Identification, n.d. *c*)

**Pacific Coast Tick**


**American Dog Tick**



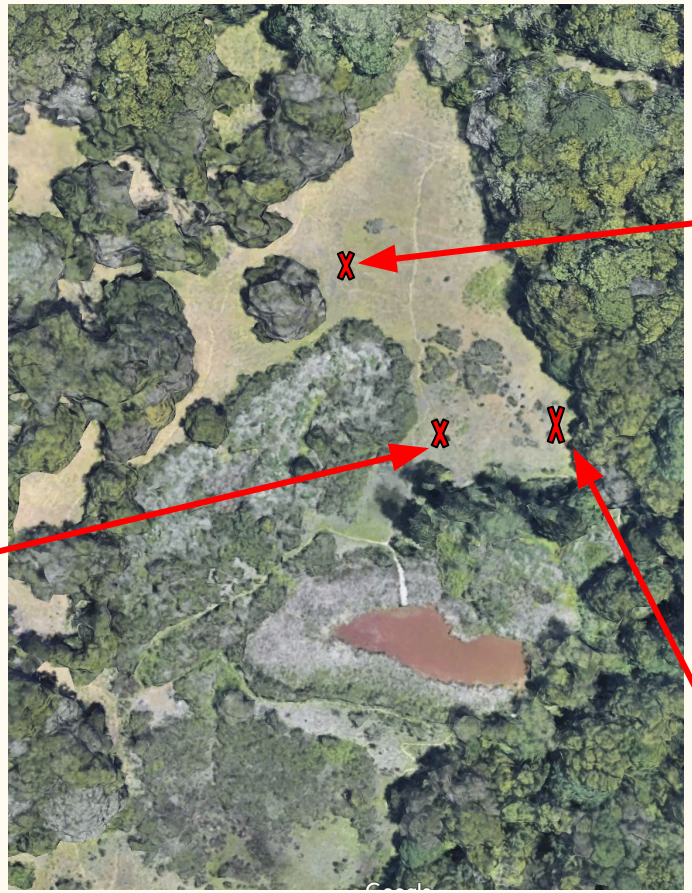
# Hypothesis

Ticks are most commonly found in open areas where tall grass is present. Based off the sources and data that we found, we predicted that the Western Black-Legged tick abundance will be relatively high in these areas due to the time of year.

# Methods I: Locations

Three different grassland areas:

Turtle Pond: 50 meters north of Turtle pond in grassland area




Upper meadow: 50 meters northwest of the Turtle pond site

Woodland border: 23 meters east of the Turtle pond site

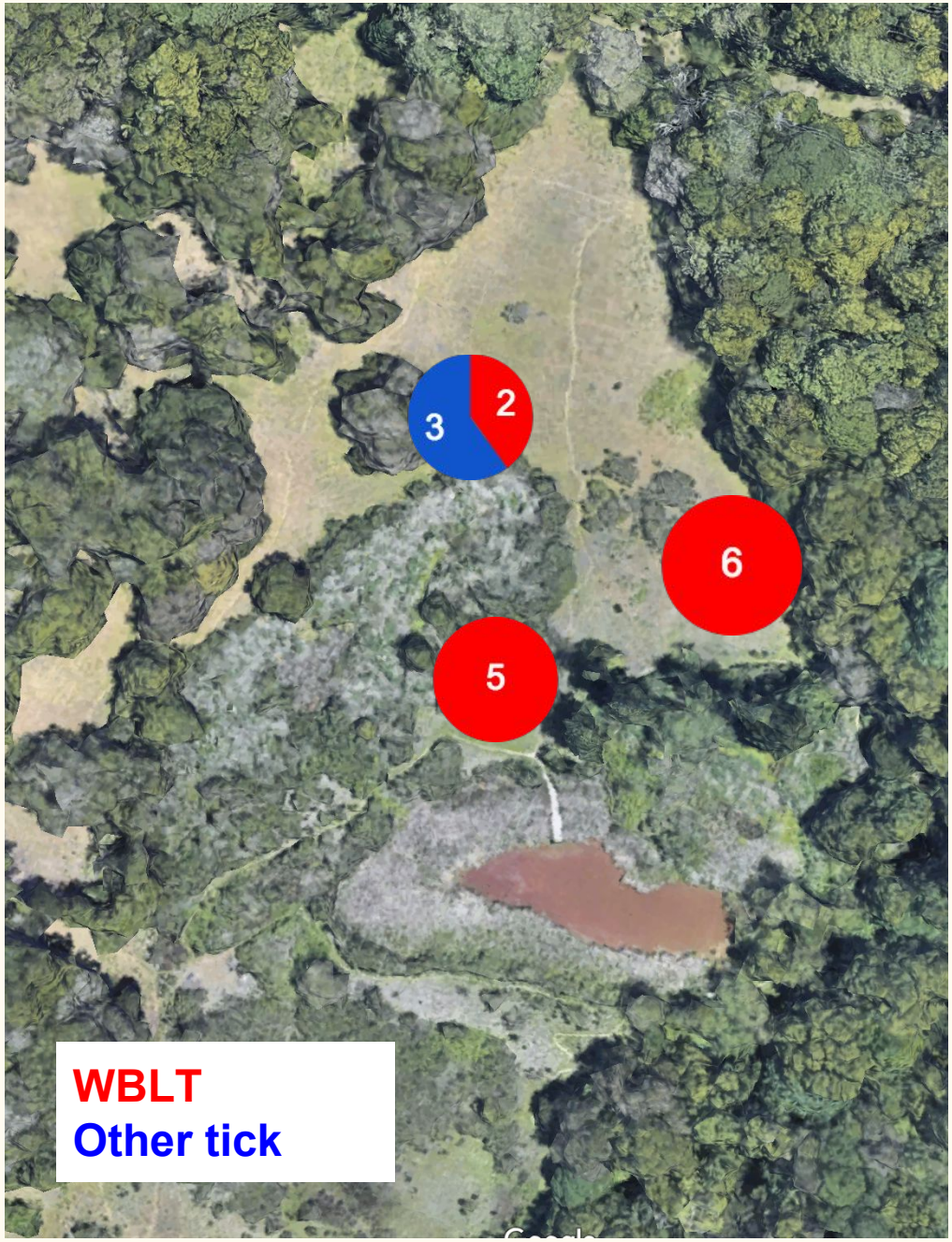
# Methods II: Procedure

- <u>In the field:  February 23</u>
  - Took GPS coordinates
  - Used 1m by 2m white flannel cloth (folded over) mounted on a pole tied to the length of a rope
  - Dragged the cloth once for about 40-50 paces in a zigzag formation
  - Used forceps to collect the ticks off the cloth and put them in vials filled with ethanol (Russel, 2016)
  - <u>In the lab:</u>
    - Used a microscope and sorted the ticks from each site into different vials based on:
      - Female/male
      - Site
      - Type of tick

# Results I

| | Turtle pond | Woodland border | Upper meadow |
|---|---|---|---|
| Western Black-Legged Tick | 2F/3M | 4F/2M | 1F/1M |
| American Dog Tick | -/- | -/- | 0F/1M |
| Pacific Coast Tick | -/- | -/- | 2F/0M |

- There is a variety of female and male ticks found in each site. Collectively we found there was more female in the grasslands at Fairfield Osborn Preserve.
- We found different species of ticks at the sites.




# Results II

- The most common species among the sites is the Western Black-Legged tick.
- Western Black-Legged ticks were found at all three sites.
- There was a similar amount of Western Black-Legged ticks at each site which shows the abundance is relatively the same all over the grassland. There's the same abundance of ticks in general.
- Only found adult ticks at each site.
  - This correlates with research found before.

# Conclusion

- Our results showed us that the Western Black-Legged ticks are abundant in the grasslands at the preserve in the early spring.
    - Supports our original hypothesis because there was a relatively high abundance of Western Black-Legged ticks.
- Western Black-Legged ticks were the most present meaning that there is a higher chance of getting Lyme disease if you get bitten.
    - We found two other species of ticks that do not carry lyme disease.
        - They do carry other diseases such as the spotted Rocky Mountain Fever which are also very serious/dangerous, but is rare in California.
        - Pacific Coast Tick Fever, not as serious (Pacific Coast, 2016)
- This will be useful to the preserve so they can inform their visitors about the ticks/disease/grasslands in the early spring.

# References


Kovner, G. (2016, March 5). Ticks and all, Sonoma County is ground zero for Lyme disease in California. *The Press Democrat*. *Retrieved* from https://www.pressdemocrat.com/news/5282345-181/sonoma-county-is-ground-zero

Pacific Coast tick fever: Rickettsia philipii. (2016,October 12). Retrieved from https://www.lymediseaseassociation.org/about-lyme/other-tick-borne-diseases/pacific-coast-tick-fever-rickettsia-philipii

Russel, C., & Jain-Sheehan, N. (2015). *Active Tick Dragging: Standard Operating Procedure.* Toronto, ON: Queen's Printer for Ontario. Received from ISBN 978-1-4606-6615-9

Salkeld, D. J., Castro, M. B., Bonilla, D., Kjemtrup, A., Kramer, V. L., Lane, R. S., & Padgett, K. A. (2014). Seasonal activity patterns of the western black-legged tick, Ixodes pacificus, in relation to onset of human Lyme disease in northwestern California. *Ticks and tick-borne diseases*, *5*(6), 790-796.

Tick Identification > Dermacentor occidentalis (Pacific Coast Tick). (n.d.*a*). Retrieved from https://tickencounter.org/tick_identification/pacific_coast_tick

Tick Identification > Dermacentor variabilis (American Dog tick). (n.d.*b*). Retrieved from https://tickencounter.org/tick_identification/dog_tick

Tick Identification > Ixodes scapularis (Blacklegged tick or Deer tick). (n.d.*c*). Retrieved from https://tickencounter.org/tick_identification/deer_tick