

Canopy Coverage, Air Temperature, and Water Temperature Along Copeland Creek at Sonoma State University

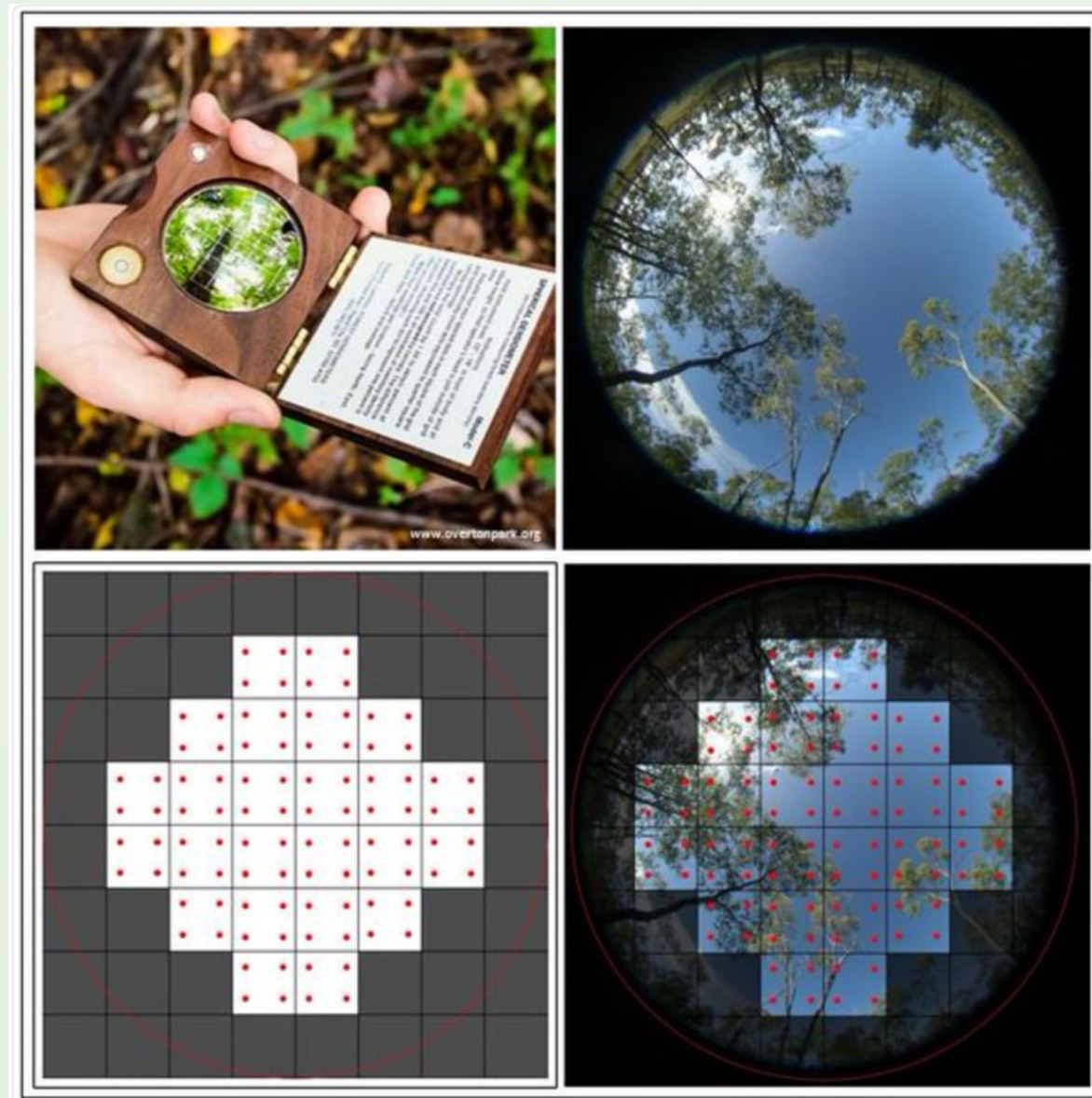
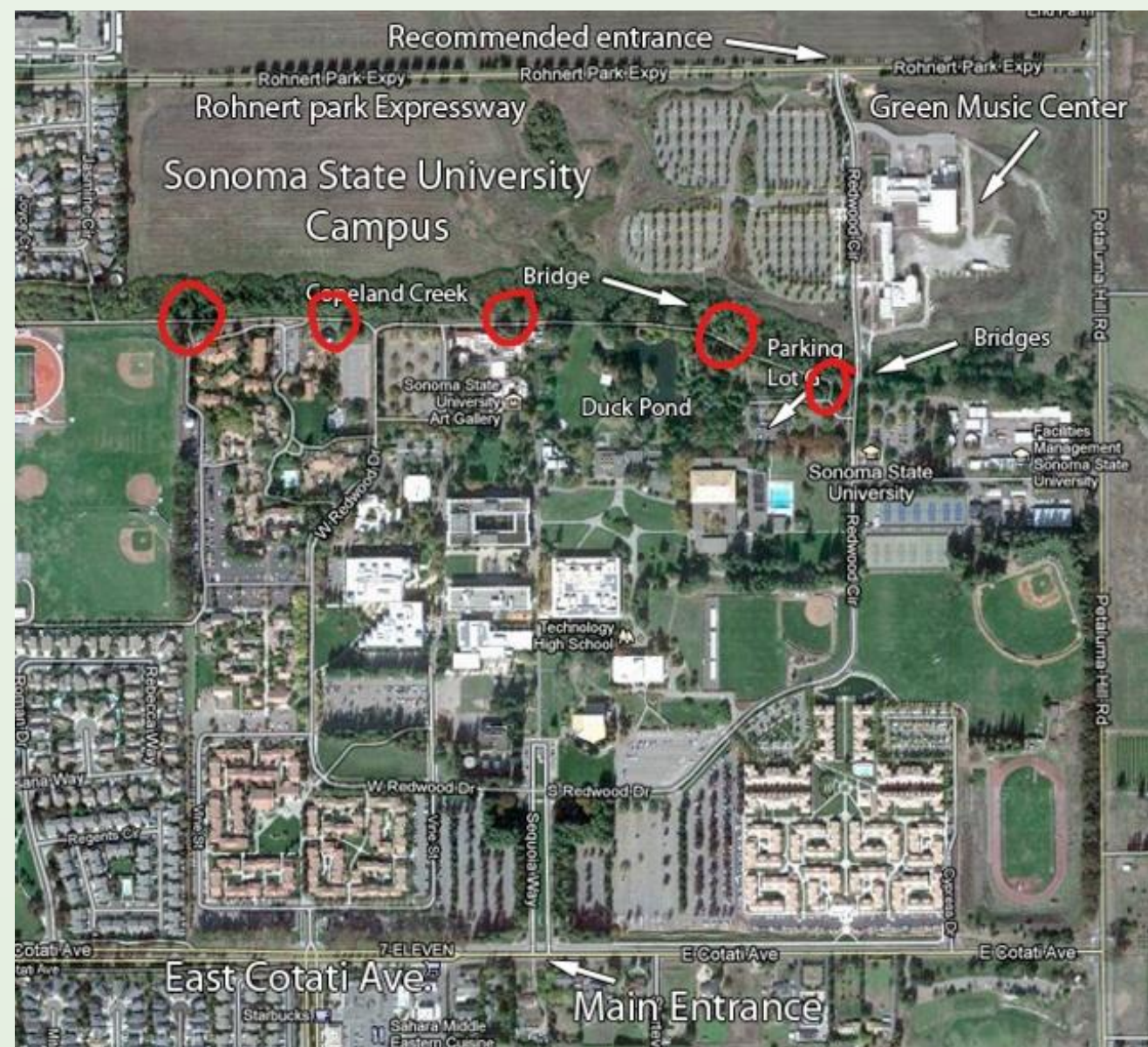
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Introduction and Background

Amphibians can tolerate a range of air and water temperatures based on the climate of the areas where they live. Temperate amphibian species require water temperatures between 15.5 and 21 degrees Celsius in order to thrive. Additionally, amphibians are known to have temperature-dependent immunity to diseases. Because of this, temperature changes in their environment can increase the possibility that amphibians will be susceptible to diseases. We wanted to investigate how the canopy coverage along the creek may impact air and water temperatures, to determine whether or not the temperature conditions in and along Copeland Creek are within an appropriate range for amphibians, to reduce a risk of susceptibility to disease.

Research Methods

- We collected air temperature, water temperature, and canopy coverage at five sites on April 14, April 24, and April 26 (see map)
- Canopy coverage was measured with a spherical convex densiometer
- We compared the data from different days at the same sites to observe how the temperature varied as we moved along Copeland Creek.



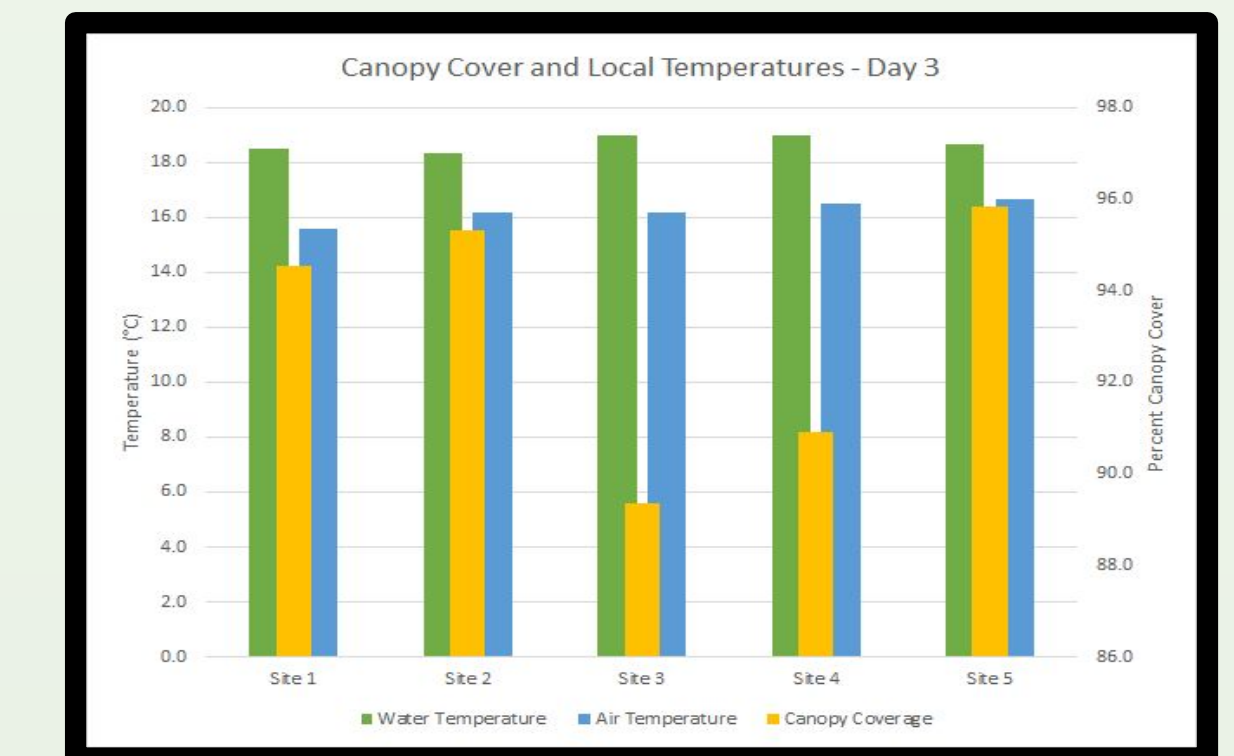
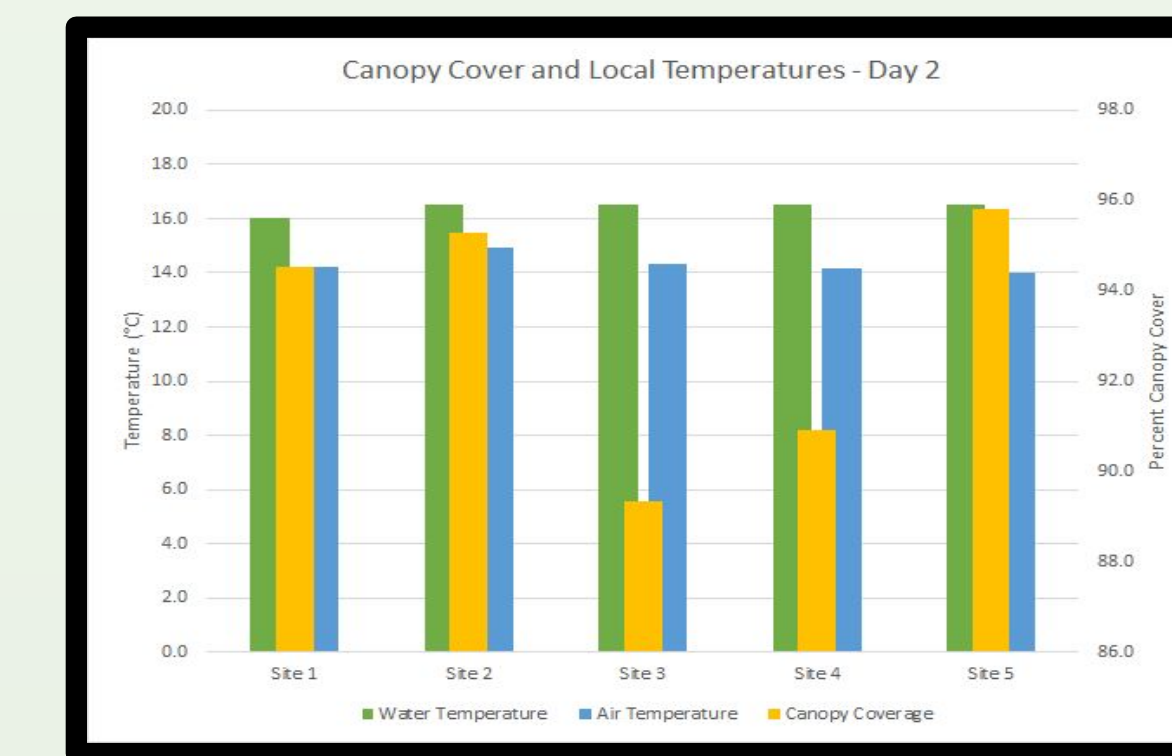
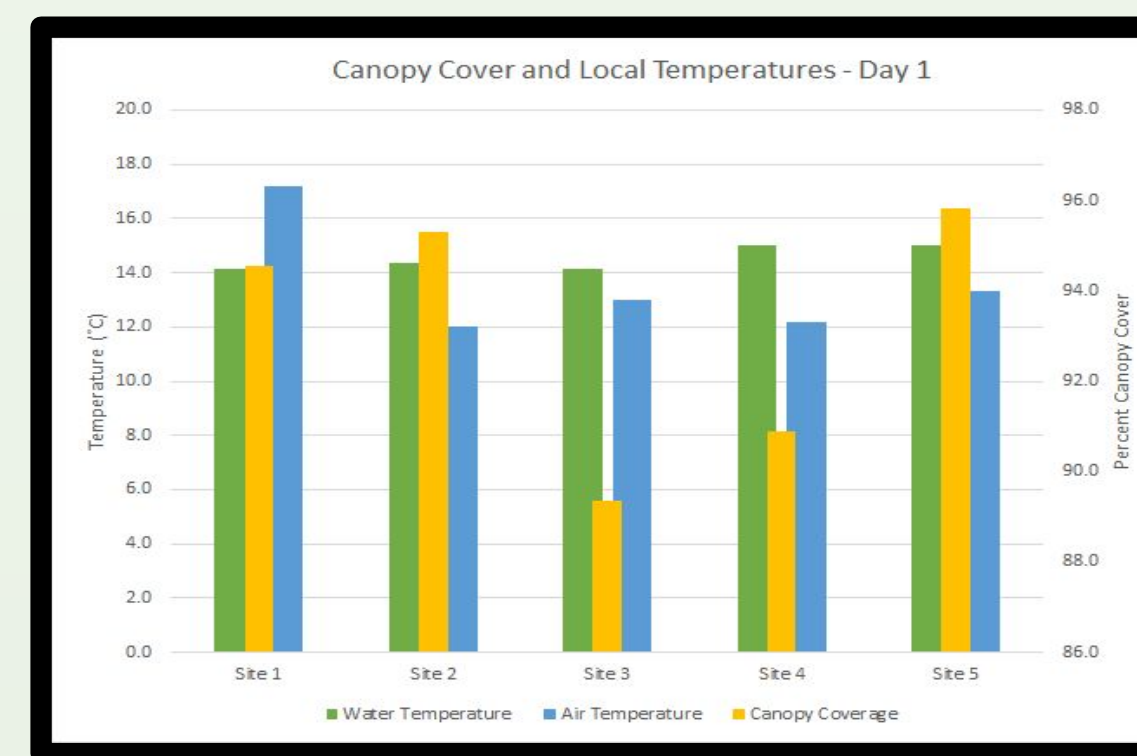
Spherical densiometer image © Eric Lundberg



Acknowledgements

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Results



- As we moved up Copeland Creek to the east, water temperature slightly increased. Air temperature fluctuated.
- The temperatures recorded for the sites were different on each day due to the range of weather conditions.
- We found a slight correlation between water temperature, air temperature, and canopy coverage of an area.

Discussion

- Our results were fairly consistent at sites along Copeland Creek, as well as during different days.
- In areas with higher canopy coverage, the temperatures were slightly higher than those with lower canopy coverage which is the opposite of what we expected.
- More data can be gathered from areas with more dramatic differences in canopy coverage in order to further support our data.

Conclusion

- Canopy slightly impacts the temperature of an area, but doesn't create a dramatic increase or decrease. Amphibians on campus shouldn't be impacted by differences in canopy coverage along Copeland Creek, as temperatures are at or near their preferred range.
- Other researchers can use our methods to compare canopy coverage of an area to its temperature. Our data can also be used to investigate how air temperature, water temperature, and canopy coverage change along Copeland Creek.

References

- Snyder, G. K. (1975, January). Temperature Adaptations in Amphibians. Retrieved March 23, 2017, from <http://www.journals.uchicago.edu/doi/abs/10.1086/282976>
- Raffel, T.R., Rohr, J.R., Keisecker, J.M., Hudson, P.J. (2006, July). Negative effects of changing temperature on amphibian immunity under field conditions. Retrieved March 30, 2017 from <http://onlinelibrary.wiley.com/doi/10.1111/j.1365-2435.2006.01159.x/full>