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The Effect of Gasoline on Zooplankton Found in the Marina and Open Water at the Cranberry Lake Biological Station

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Science and Forestry



Photo by Aaron Goodell (2016)

Background:

- ❖ Zooplankton are primary and secondary consumers (Frisch, 2015)
- ❖ Indicators: sensitive to environmental changes (Hanazato, 2001)
- ❖ Unable to move against currents, makes them vulnerable (Frisch, 2015)
- ❖ Boats have the potential to release chemicals (Avallone, 2015)

Photo by Elizabeth Becker
(2016)



Rationale:

- ❖ Zooplankton are vulnerable to pollutants such as copper (Gibson, 1977) and oil (Almeda et. al., 2013)
- ❖ Will zooplankton have higher mortality rates in the presence of gas or can they become better adapted to it?
- ❖ Experimental Units: Zooplankton exposed to different conditions
- ❖ Sampling Units: Zooplankton deaths per beaker



Photo by Aaron Goodell (2016)

Hypothesis:

H_0 : No difference in mortality will be seen in zooplankton from the marina compared to zooplankton from the dock when exposed to $100\mu\text{L}$ of gas.

H_A : Marina zooplankton will have lower mortality rates than zooplankton collected from the dock when exposed to $100\mu\text{L}$ of gas.

Methods:

● = water was collected

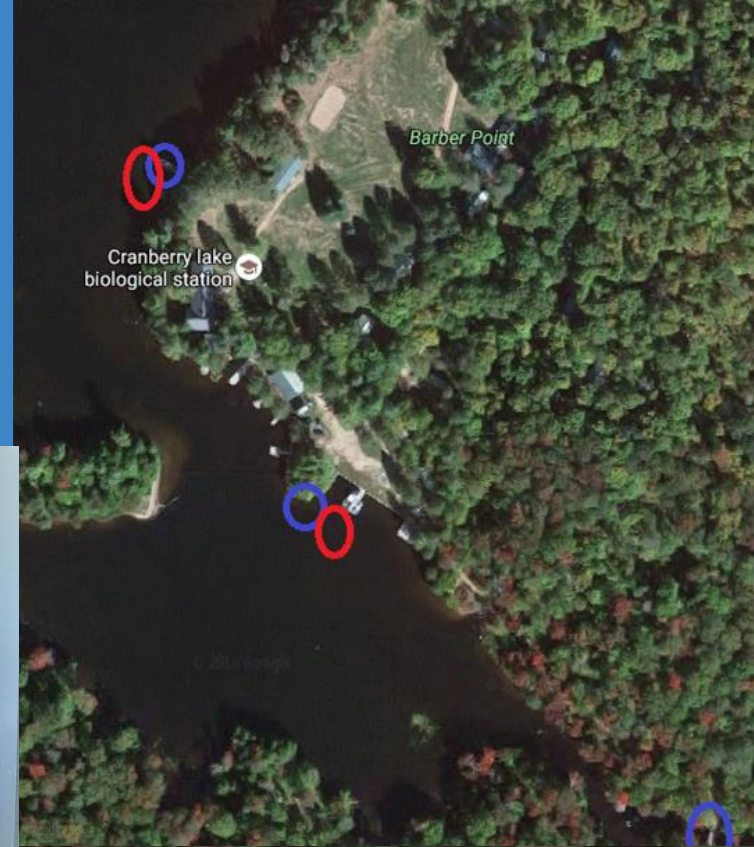
● = plankton was collected



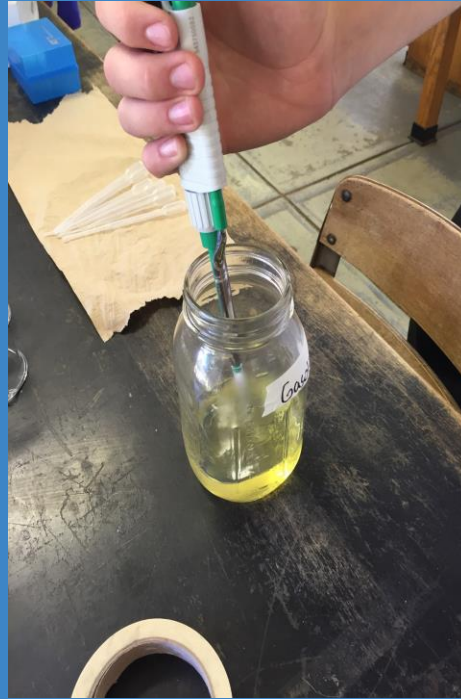
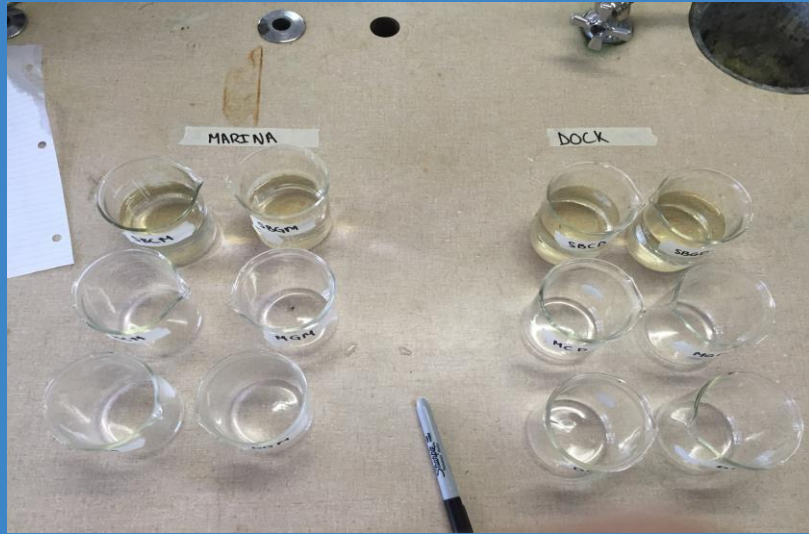
Photo by Andrew Franceschini (2016)



Photo by Aaron Goodell (2016)



Methods Cont.



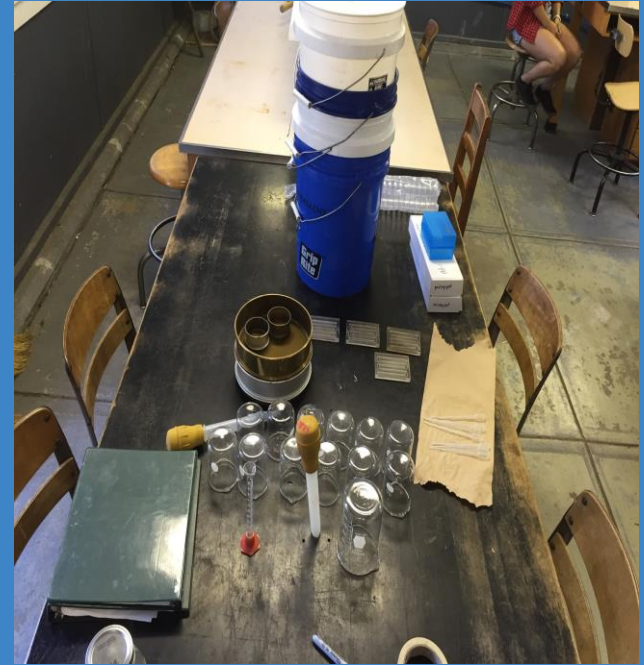
Methods Cont.



Photos by Andrew Franceschini (2016)

Methods (Statistical Analysis):

- ❖ ANOVA and Paired T-Tests
- ❖ Independent variable: Time and concentration of gasoline (μL^{-1})
- ❖ Dependant Variable: The mortality of zooplankton during experiment



Photos by Andrew
Franceschini (2016)

Results:

❖ Zooplankton seen

➤ Marina:

- Polyphemus
- Rotifers
- Bosmina

➤ Dock:

- Polyphemus
- Rotifers



Photo from Wikipedia (2015)

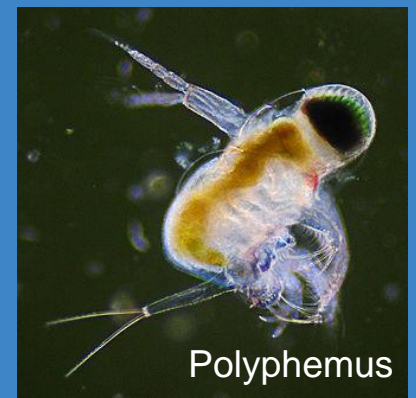


Photo from Wikipedia (2012)



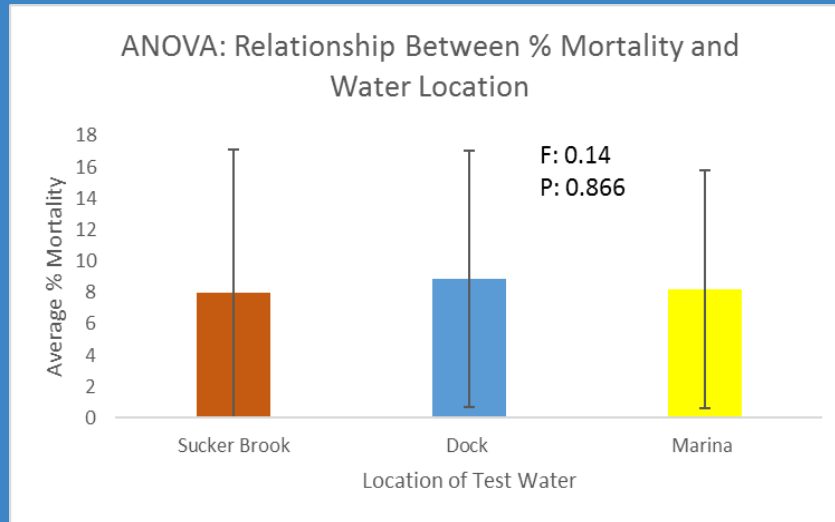
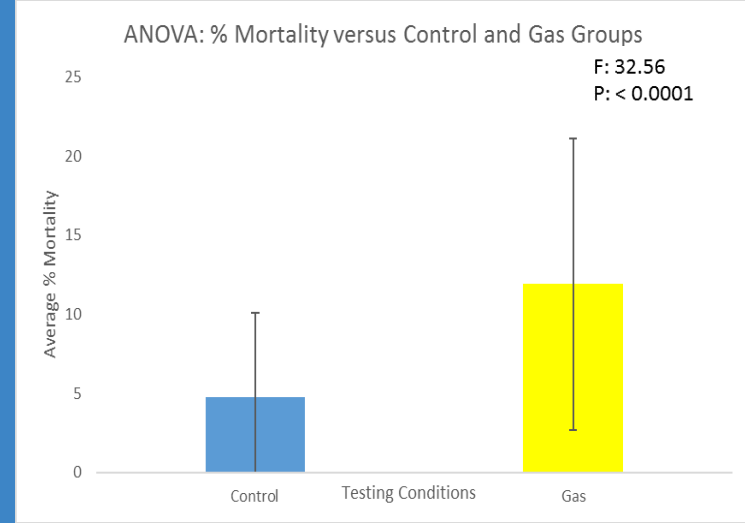
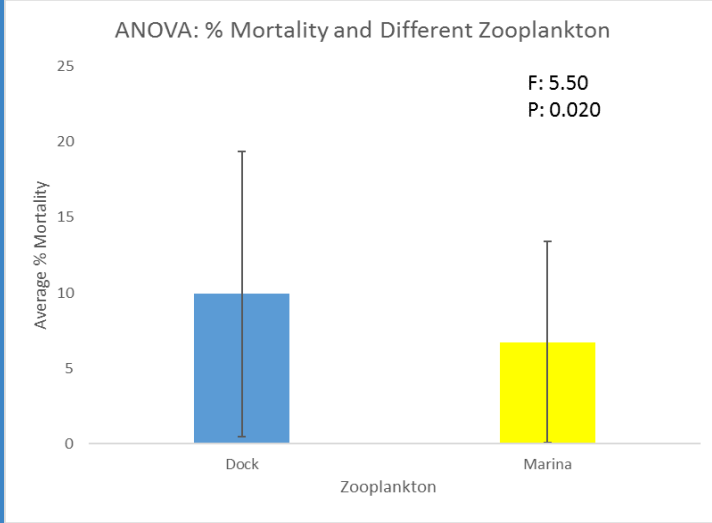
Photo from CMU (2016).



Photo by Andrew Franceschini (2016)

Results: ANOVA

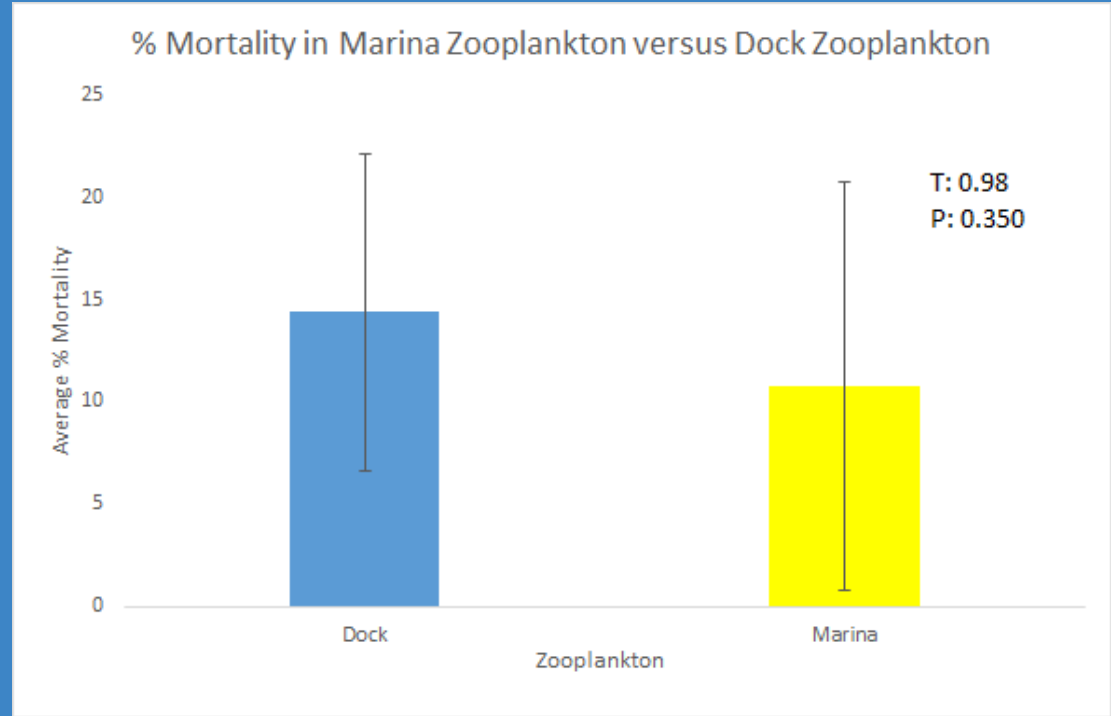
❖ P-values < 0.05
to be
significant



Results:

Paired t-test

- ❖ Comparing zooplankton from 2 locations
- ❖ Both control and exposed to gas
- ❖ Test incorporates all 3 water samples



Discussion

- ❖ Only trials with samples from 2 locations were completed
- ❖ Precise concentrations of the gas in the marina could not be determined
- ❖ Only 250 micron mesh sieves were used



Photo by Andrew Franceschini (2016)

Future Studies:

- ❖ Varying concentrations of gas
- ❖ Varied timed trials
- ❖ Genetic analysis
- ❖ Using smaller sieves
- ❖ Seeing if certain zooplankton species do better in the presence of gas
- ❖ Bioaccumulation of gas



Conclusion:

We found statistically significant differences in percent mortality between zooplankton found in the marina and the dock when exposed to gas, rejecting our null hypothesis. More zooplankton died from the dock sampling site than the marina site. We conclude that the zooplankton from the marina are better adapted to gasoline in their environment than the zooplankton from the swimming dock.

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Questions?



Photos by Andrew Franceschini (2016)