

# Water Quality Assessment & Climate Change Analysis: My NOAA-NGI Experience at MSU

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Mentor: Dr. John J. Ramirez-Avila

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# About Me

- Junior at Mississippi State University
- Civil Engineering Major with an Environmental Concentration
- Interests:
  - Water Quality
  - Sustainability



# Mentor

- Dr. John J. Ramirez
- Assistant Research Professor in the Civil Engineering Department at Mississippi State University
- Area of Study:
  - Water Resources Engineering (hydrology, water quality assessment and modeling)





# Projects

- Water Quality Assessment at Eckie's Pond
  - Supporting research that compares two methods to measure Sediment Oxygen Demand;
  - Monitoring and measuring environmental factors
- Climate Change Analysis
  - Observed trends in climate change over a period of time

# Water Quality Assessment



Luis Laurens' graduate research project on field and laboratory methods to estimate sediment oxygen demand.

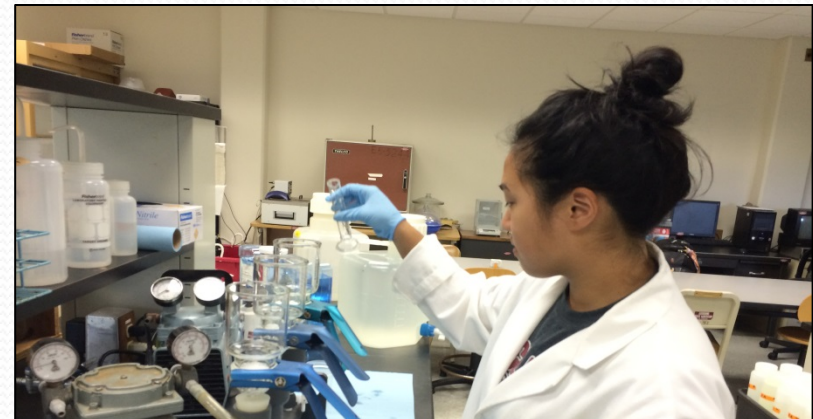


Use procedures for chambers and cores as directed by the EPA.



# Water Quality Assessment

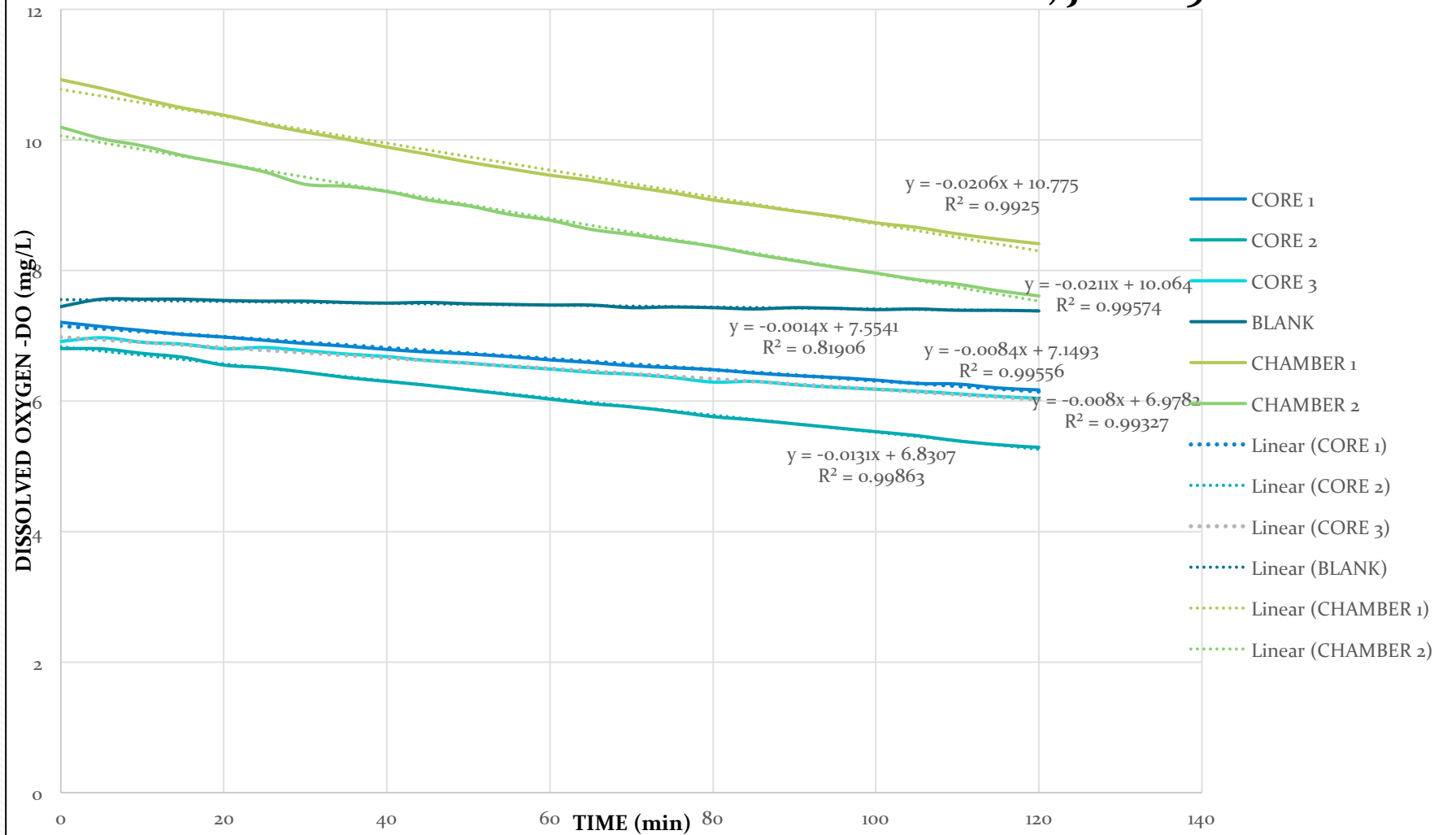
- Sampling and Monitoring of Eckie's Pond
- Observed and measured:
  - SOD
  - Dissolved oxygen
  - Salinity
  - Turbidity
  - pH (in lab)
- In lab testing for all water samples for total suspended solids, total phosphorus and nitrogen.



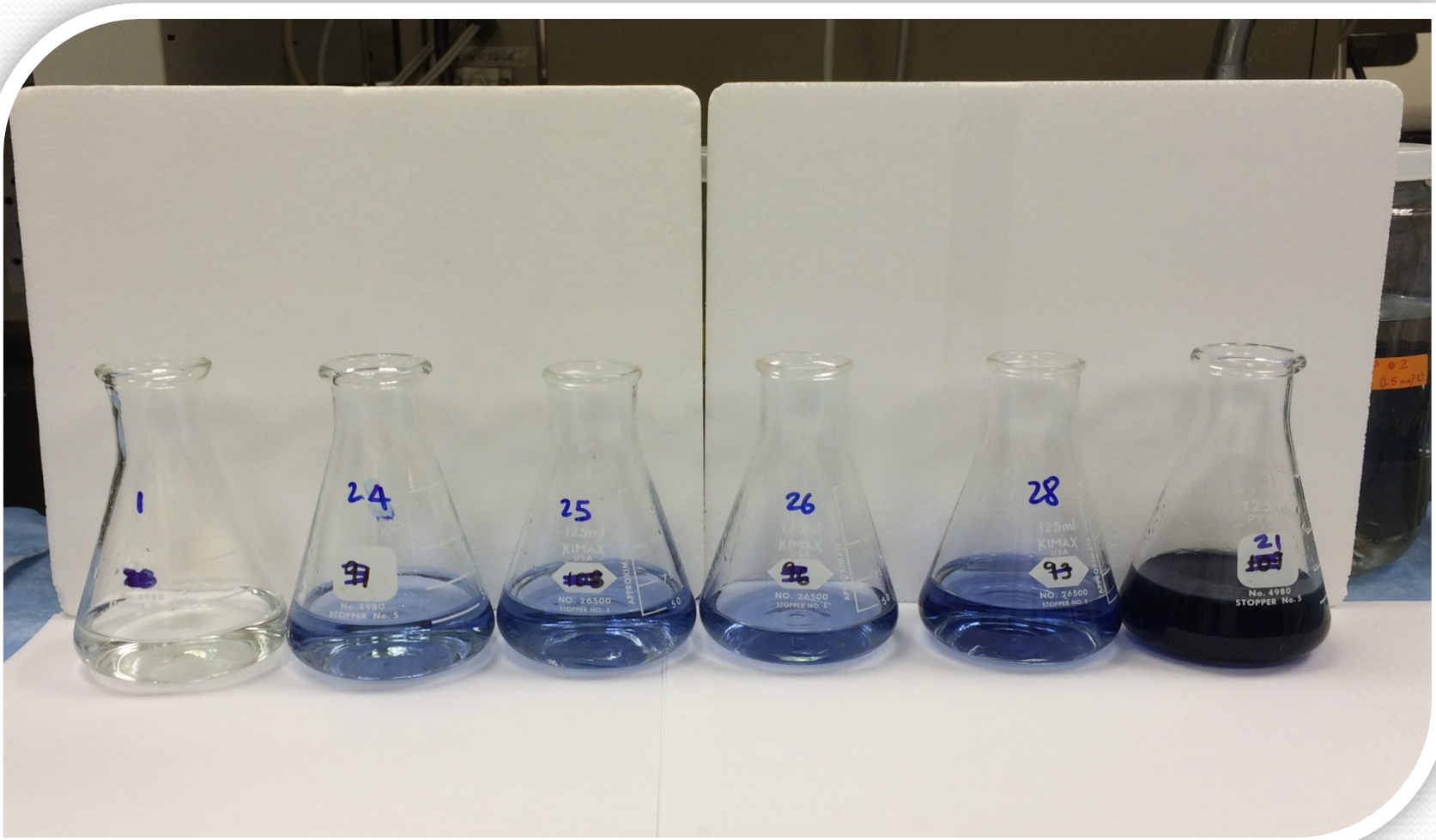


# Results—Water Quality

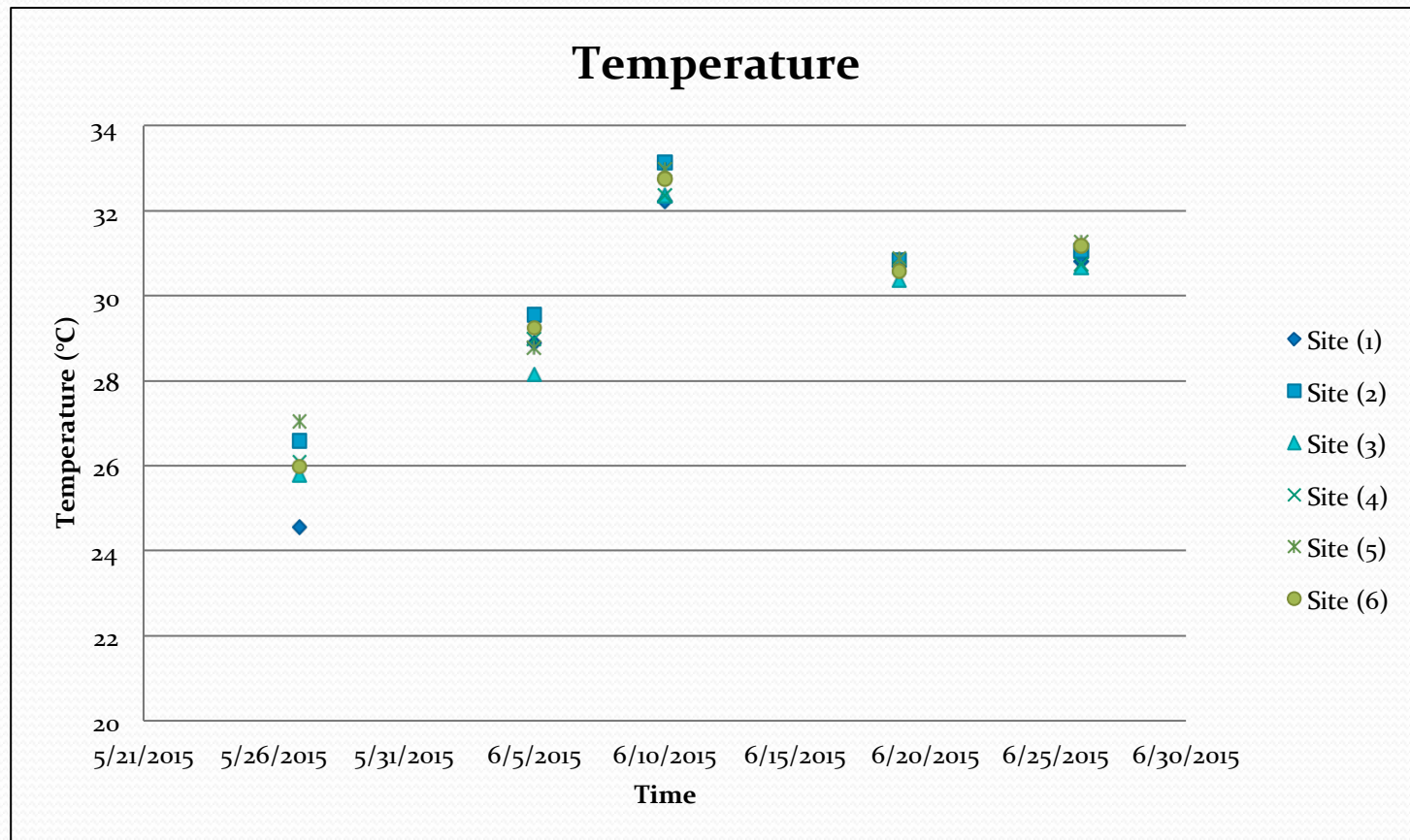
## DO Measurements in Chambers and Cores, June 09



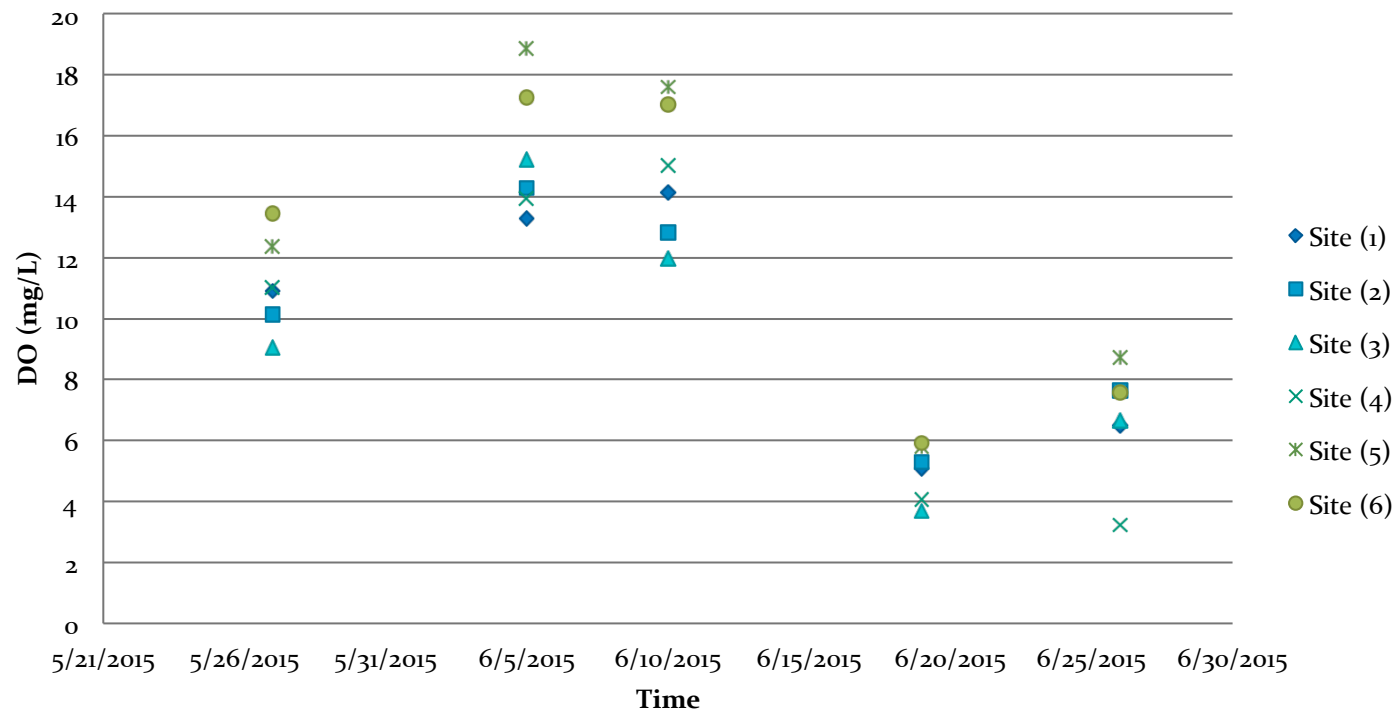




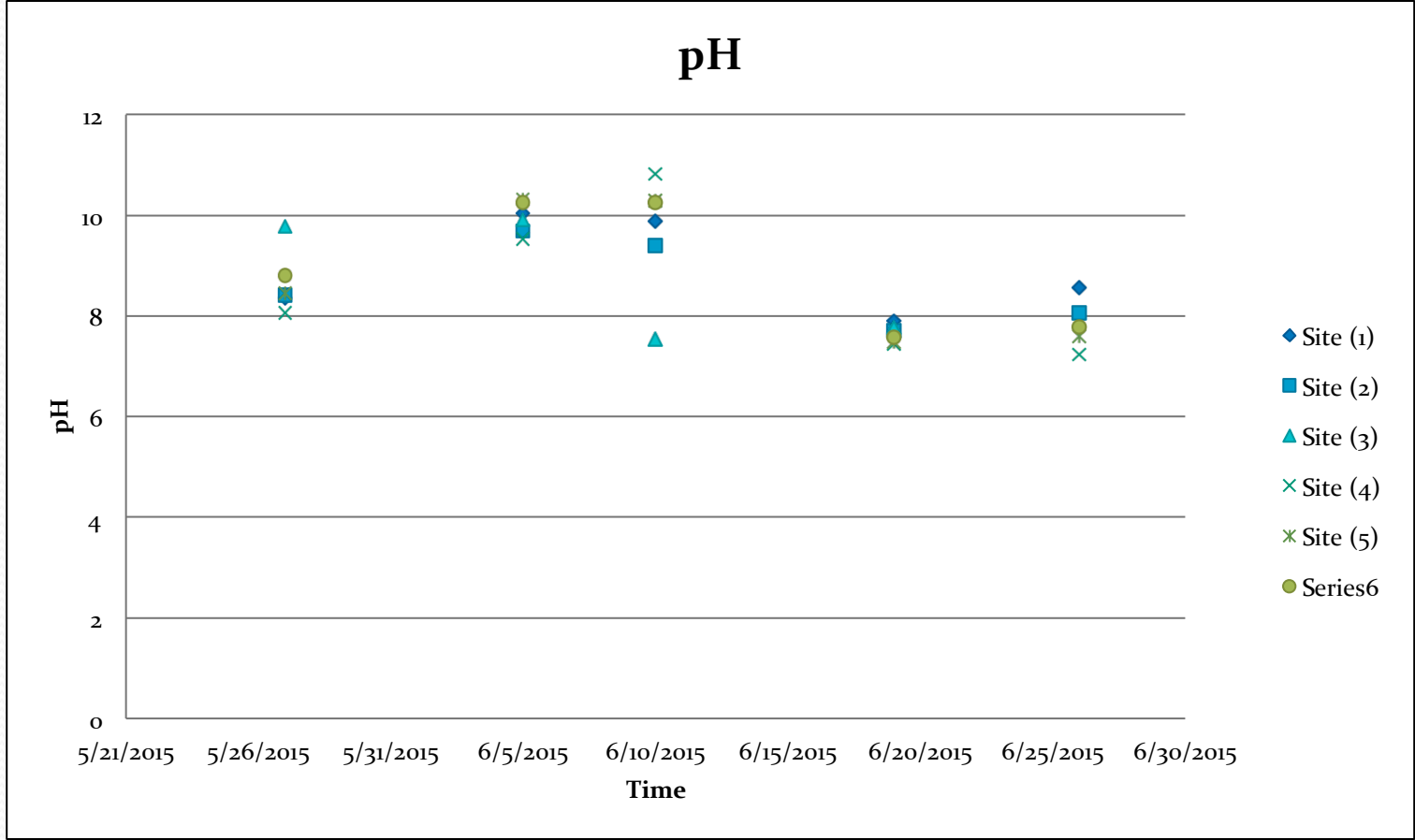
# Results—Water Quality

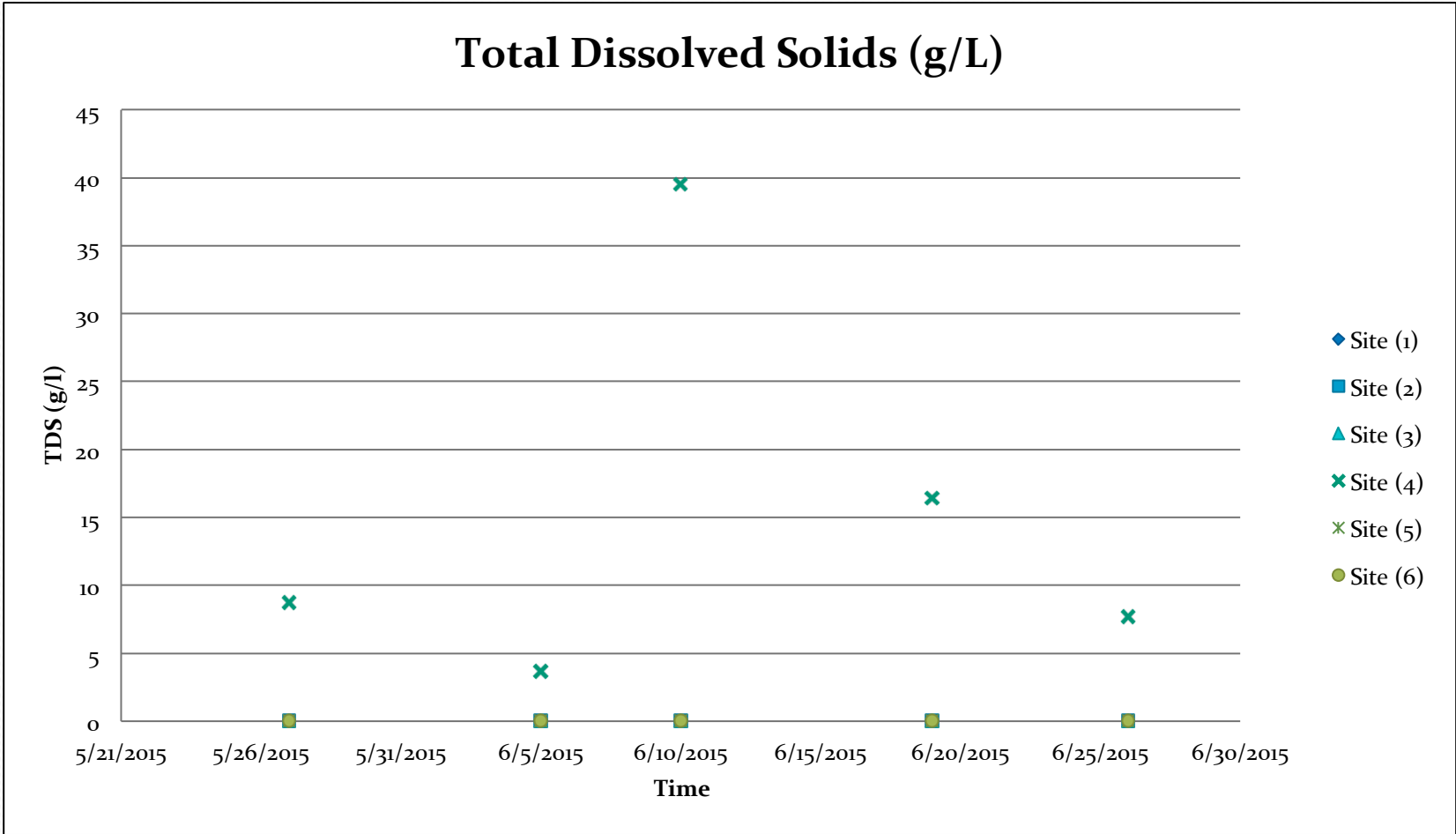


## Dissolved Oxygen

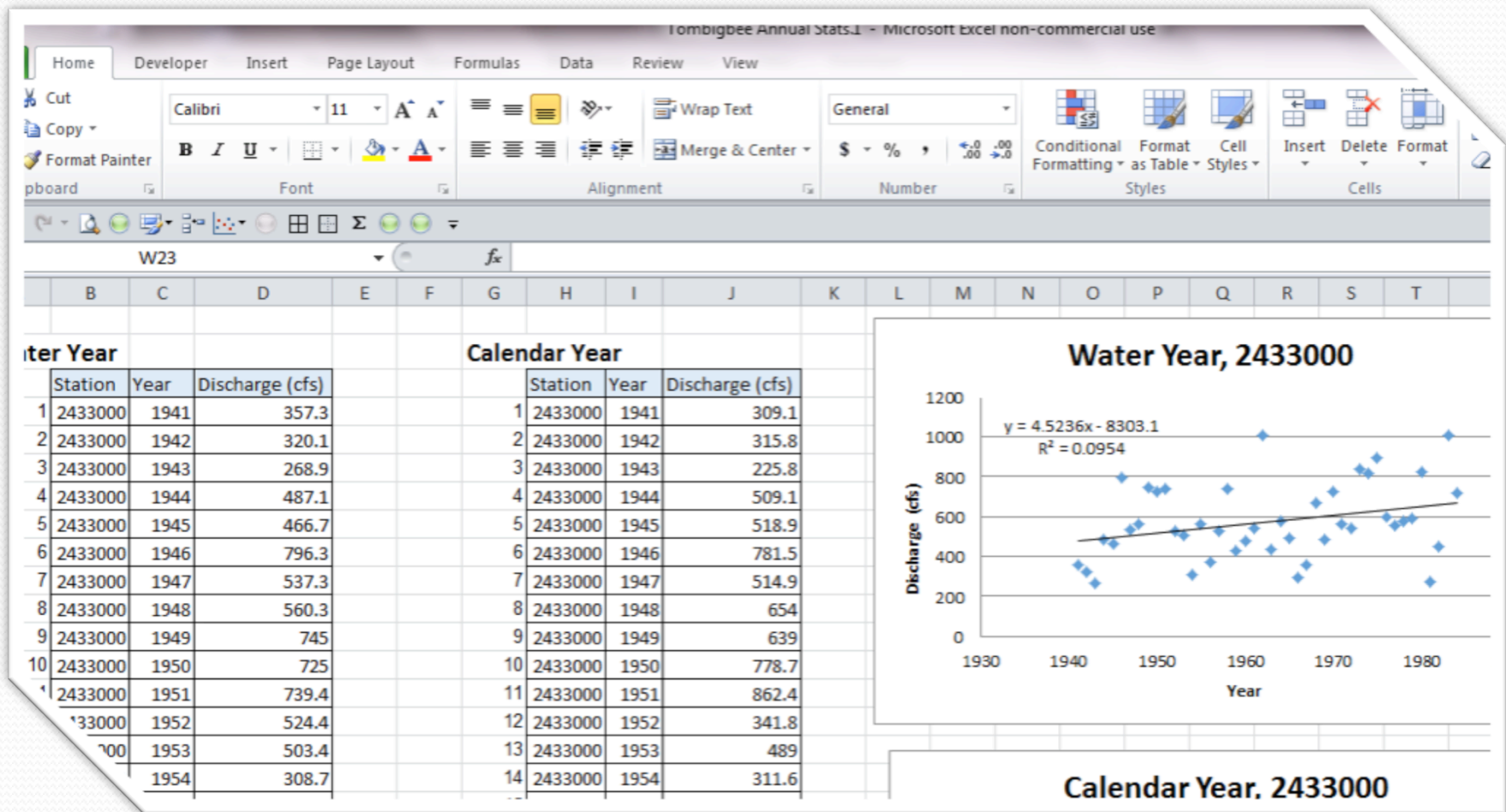


# pH

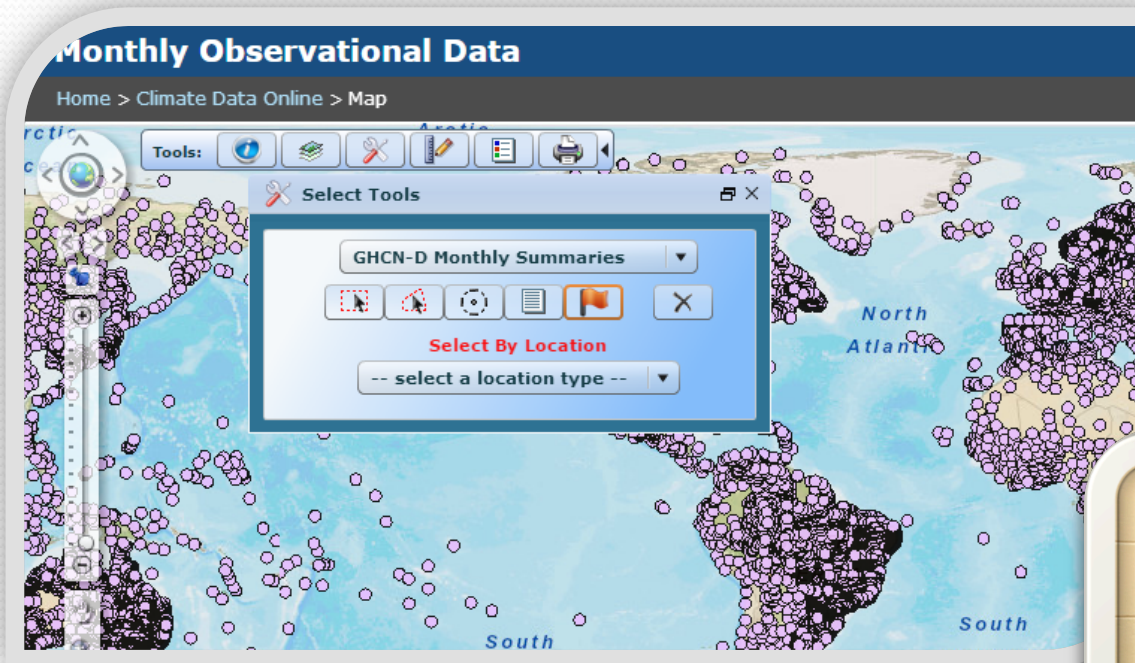






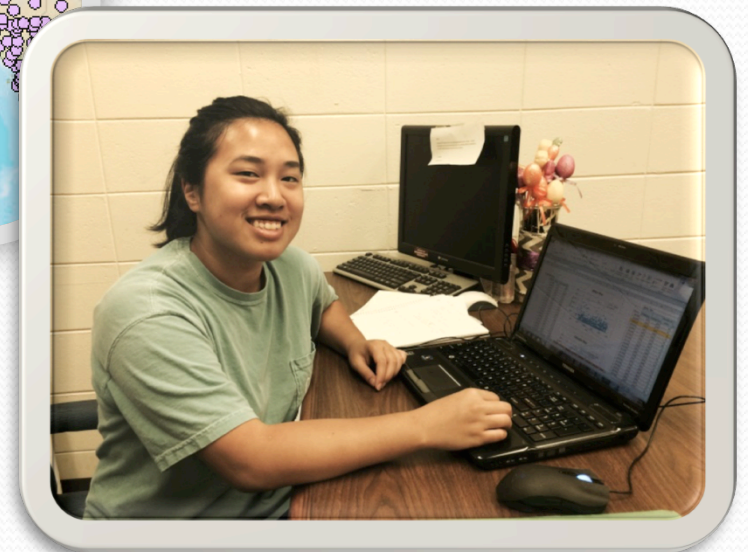


# Climate Change Analysis



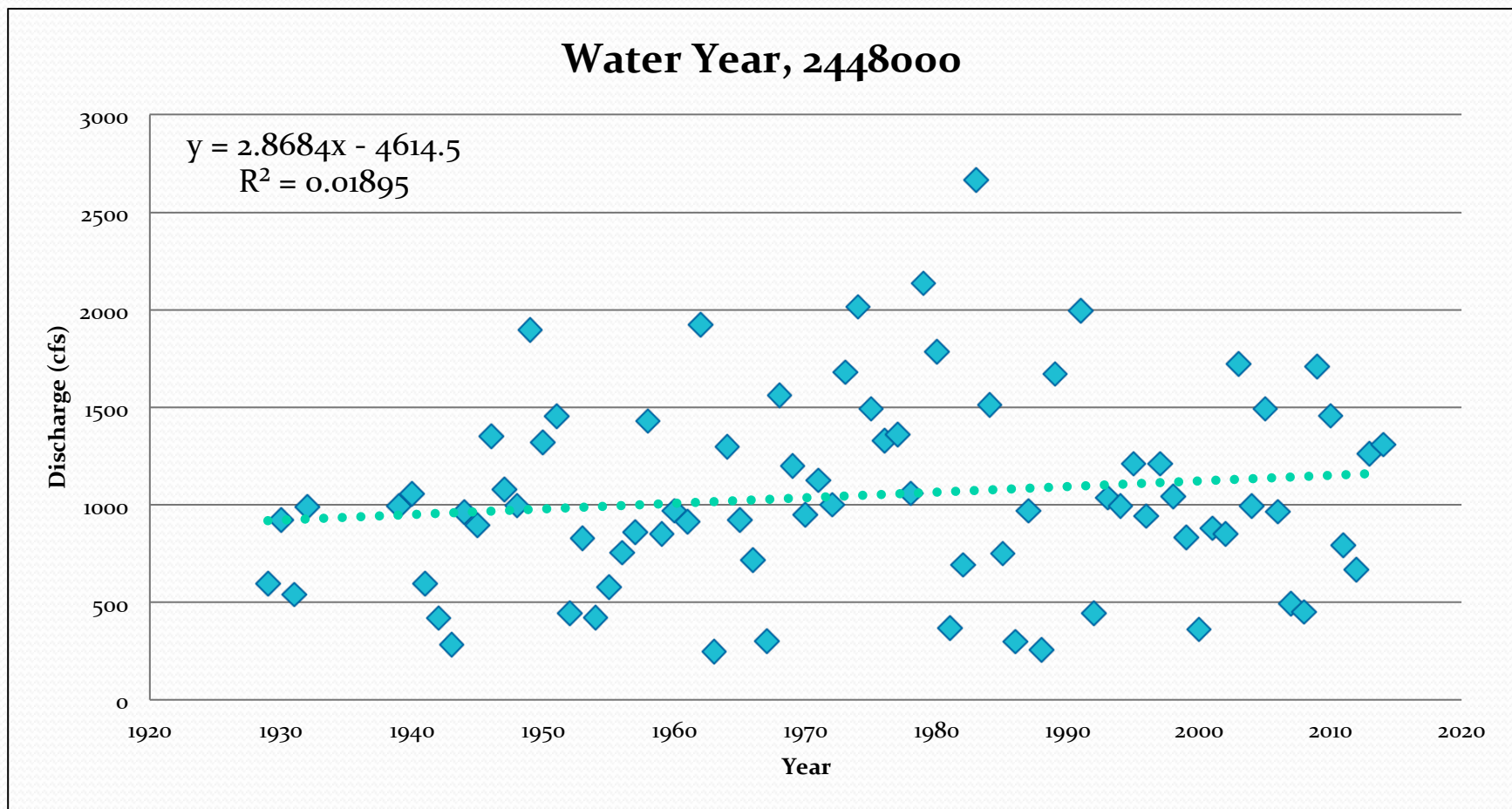
- Collected data from the National Climatic Data Center ([www.ncdc.noaa.gov](http://www.ncdc.noaa.gov))
  - Watersheds: Tombigbee, Sunflower, Pearl River

- Observed trends in precipitation and temperature.



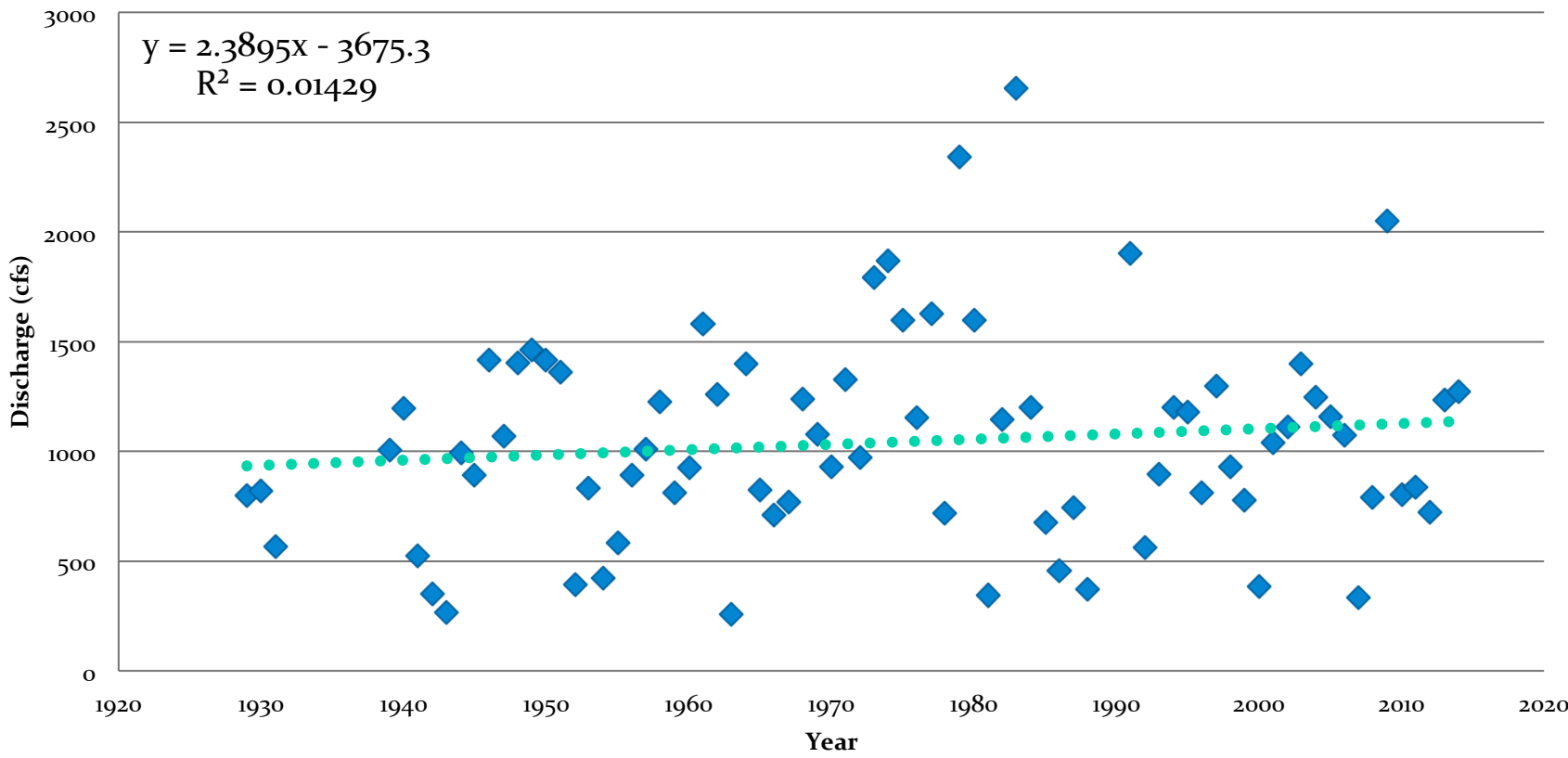


# Analysis of Climate Change

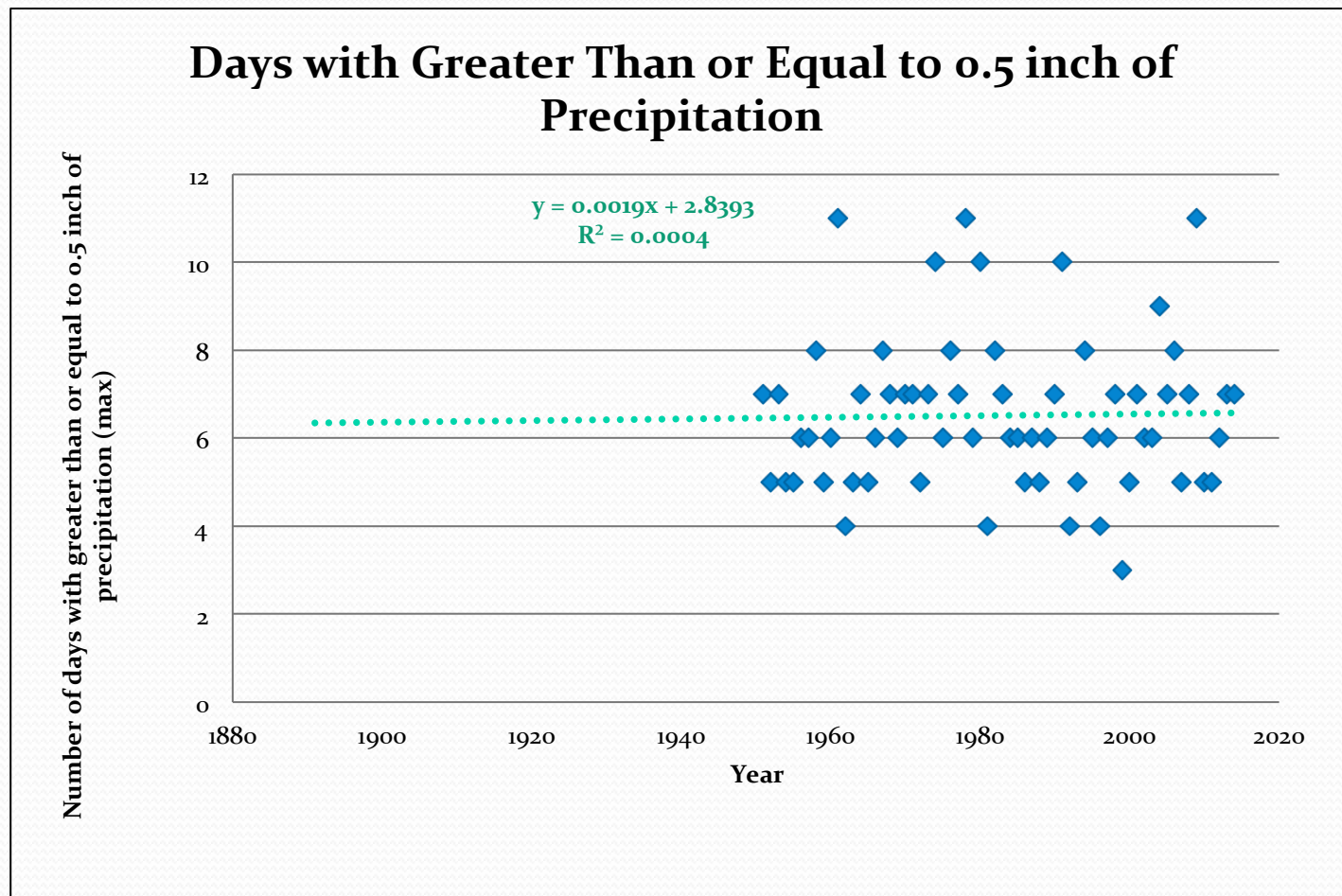




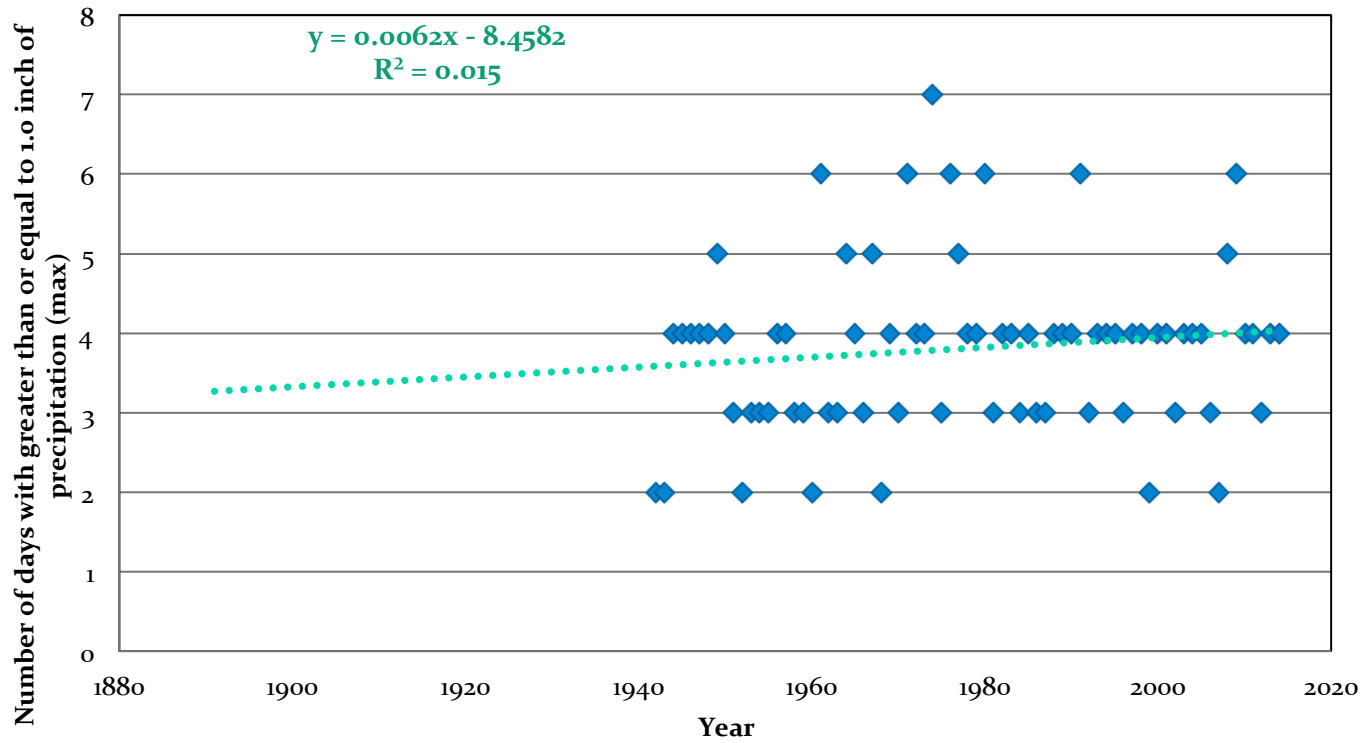
### Calendar Year, 2448000



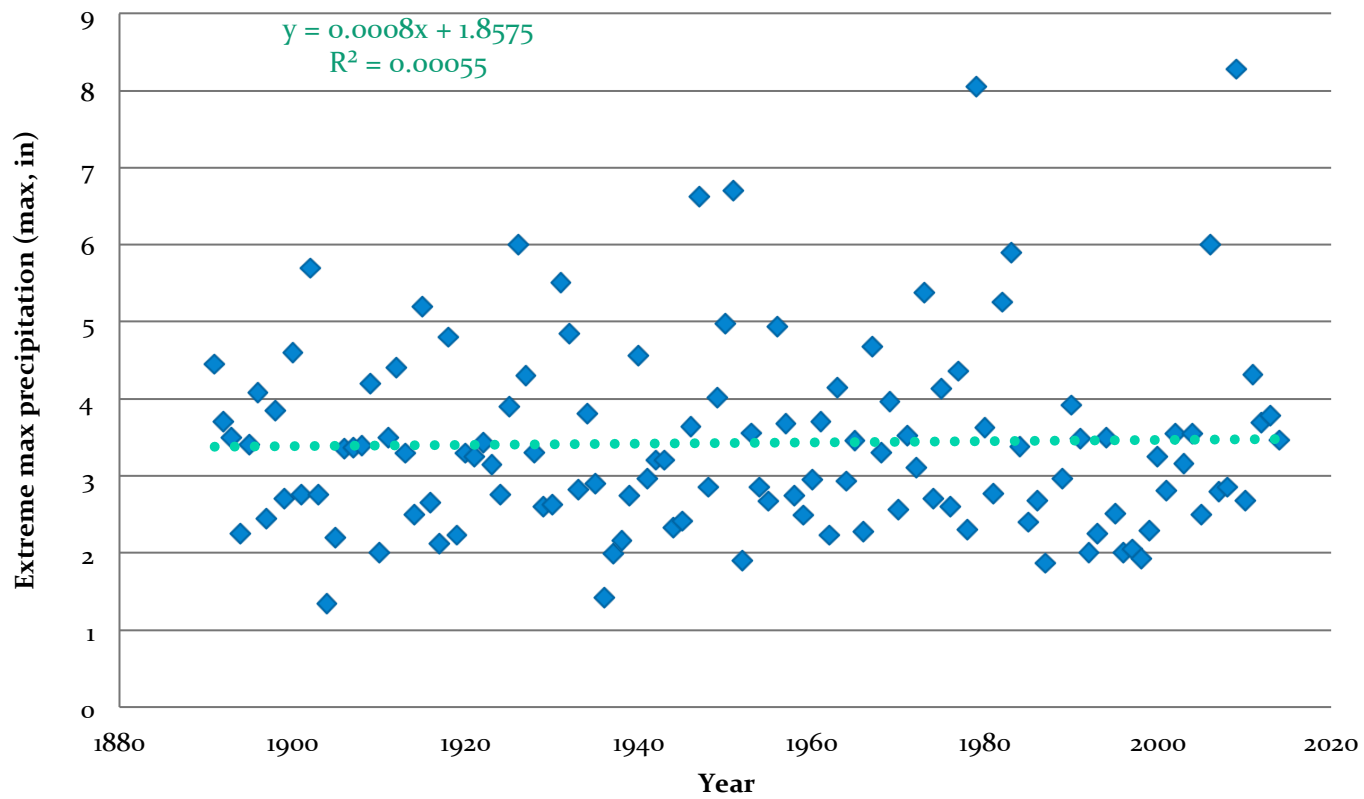
# Analysis of Climate Change

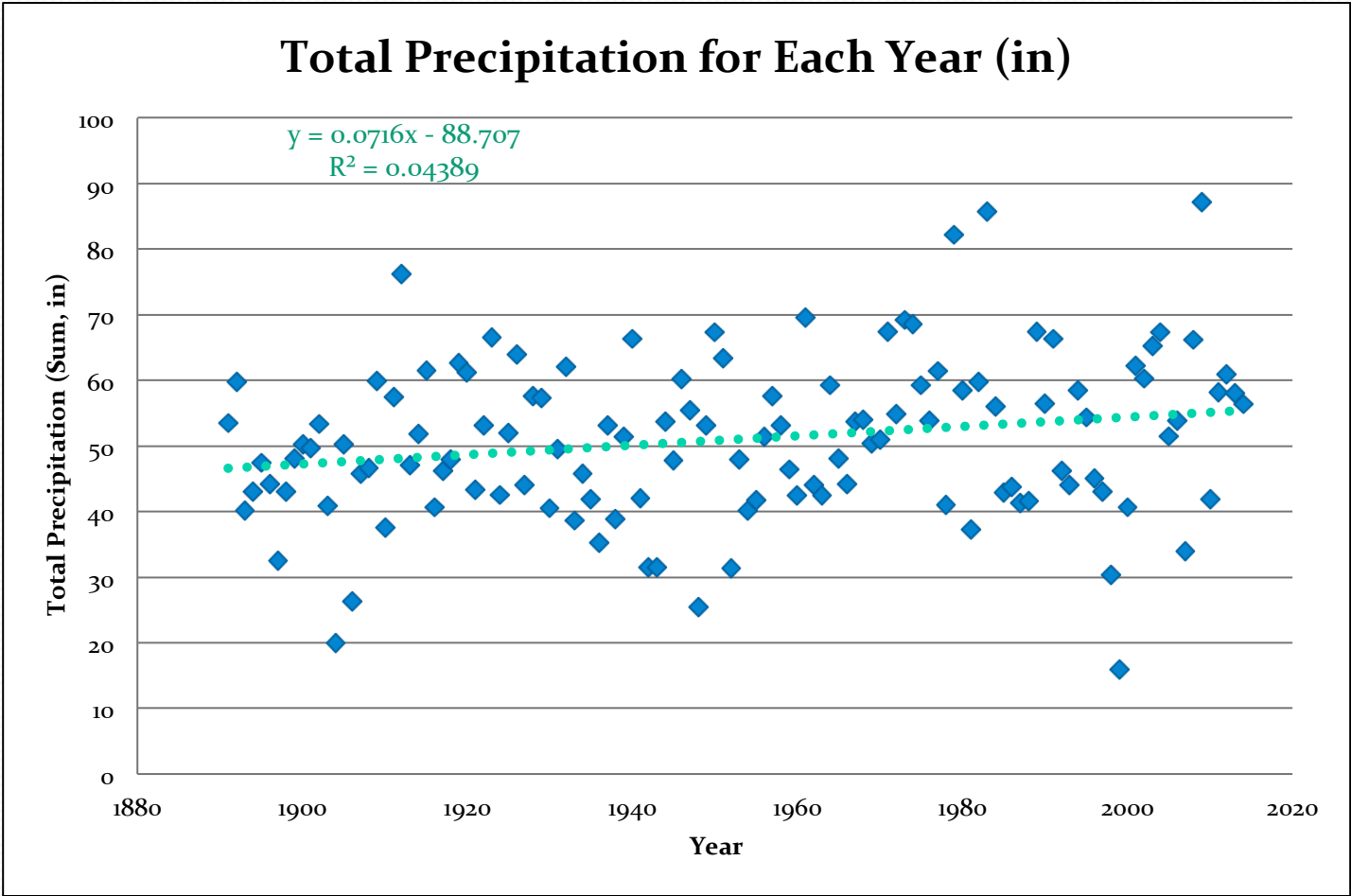


## Days with Greater Than or Equal to 1.0 inch of Precipitation



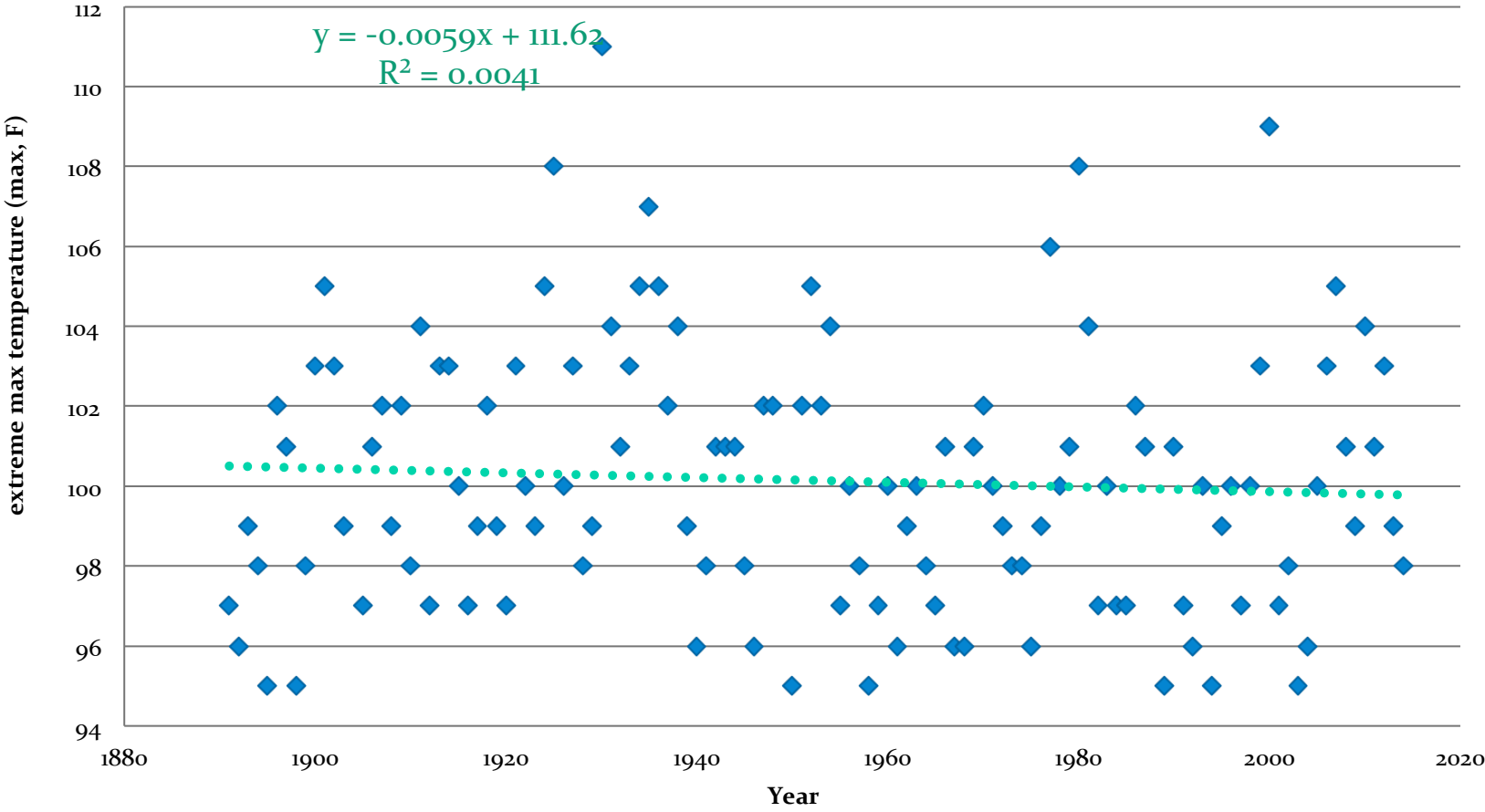
## Extreme Maximum Precipitation Annually (in)





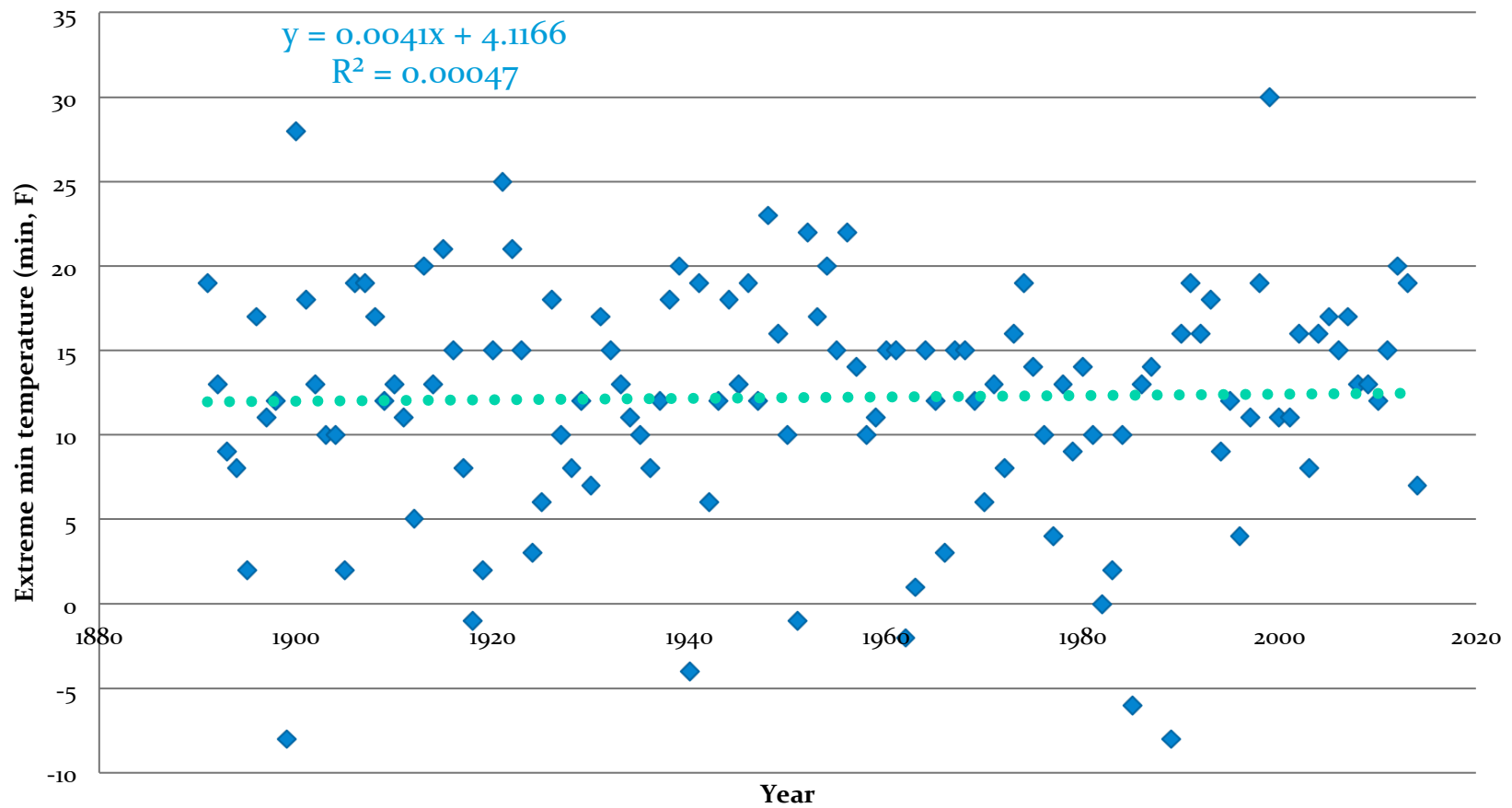


# Extreme Maximum Temperature Annually





## Extreme Minimum Temperature Annually







# Conclusions

- For the validation of methods between chambers and cores, the cores showed expected numbers, but the chambers showed values higher than those expected.
  - However, a new procedure is needed with the methods of chambers so we can see the trends that are needed.
- For monitoring of Eckie's Pond, there might be important variability in the data from precipitation, temperature, mowers, and fertilizers.
- There is evidence of a correlation between the values of temperature and precipitation in some locations, and most show a trend of increasing precipitation.



# Things I learned

- Learned more about the data NOAA and NCI collect for water quality and climate.
- Sharpened skills dealing with data collection and analysis as well as increased laboratory knowledge.
- I attained a better knowledge of different types of water quality sample collecting and procedures to go about them.

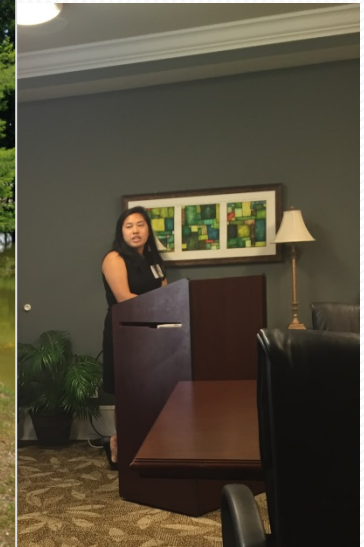


# Challenges

- Correctly interpreting data analysis correctly and seeing if the trend is significant in the models.
- YSI needed to be calibrated each time and also had to be sent in with other lab equipment for repairs.

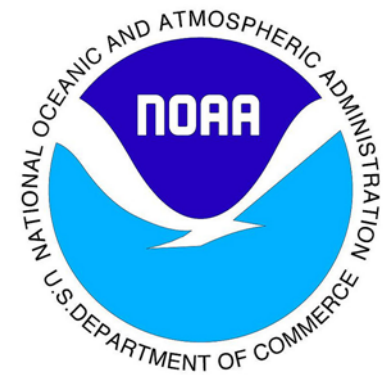
# Experience

- I really valued my experience with the internship program and all the people I got to meet.
- Made connections and networking with other students and graduate students that I would have not met.
- Enjoyed all parts in field work and data analysis with studying water quality.



# Acknowledgements

- Dr. John Ramirez-Avila
- Sandra Ortega-Achury
- Luis Laurens
- NOAA-NGI Diversity Internship Program
- Dauphin Island Sea Lab



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