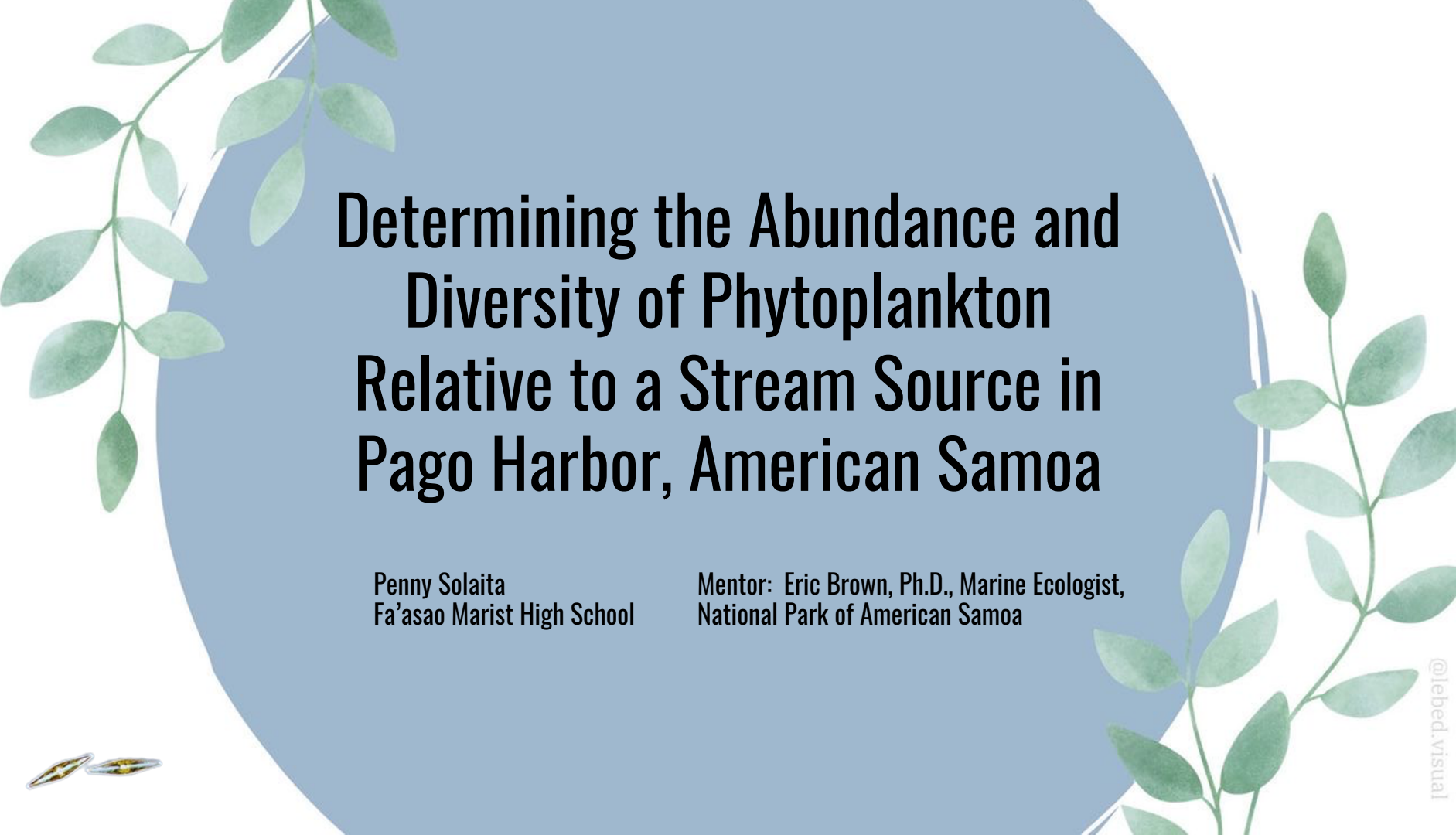




Determining the Abundance and Diversity of Phytoplankton Relative to a Stream Source in Pago Harbor, American Samoa

Penny Solaita
Fa'asao Marist High School

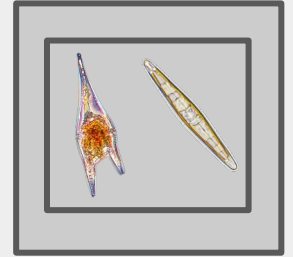
Mentor: Eric Brown, Ph.D., Marine Ecologist,
National Park of American Samoa





<https://www.phytoplankton.com>

Introduction



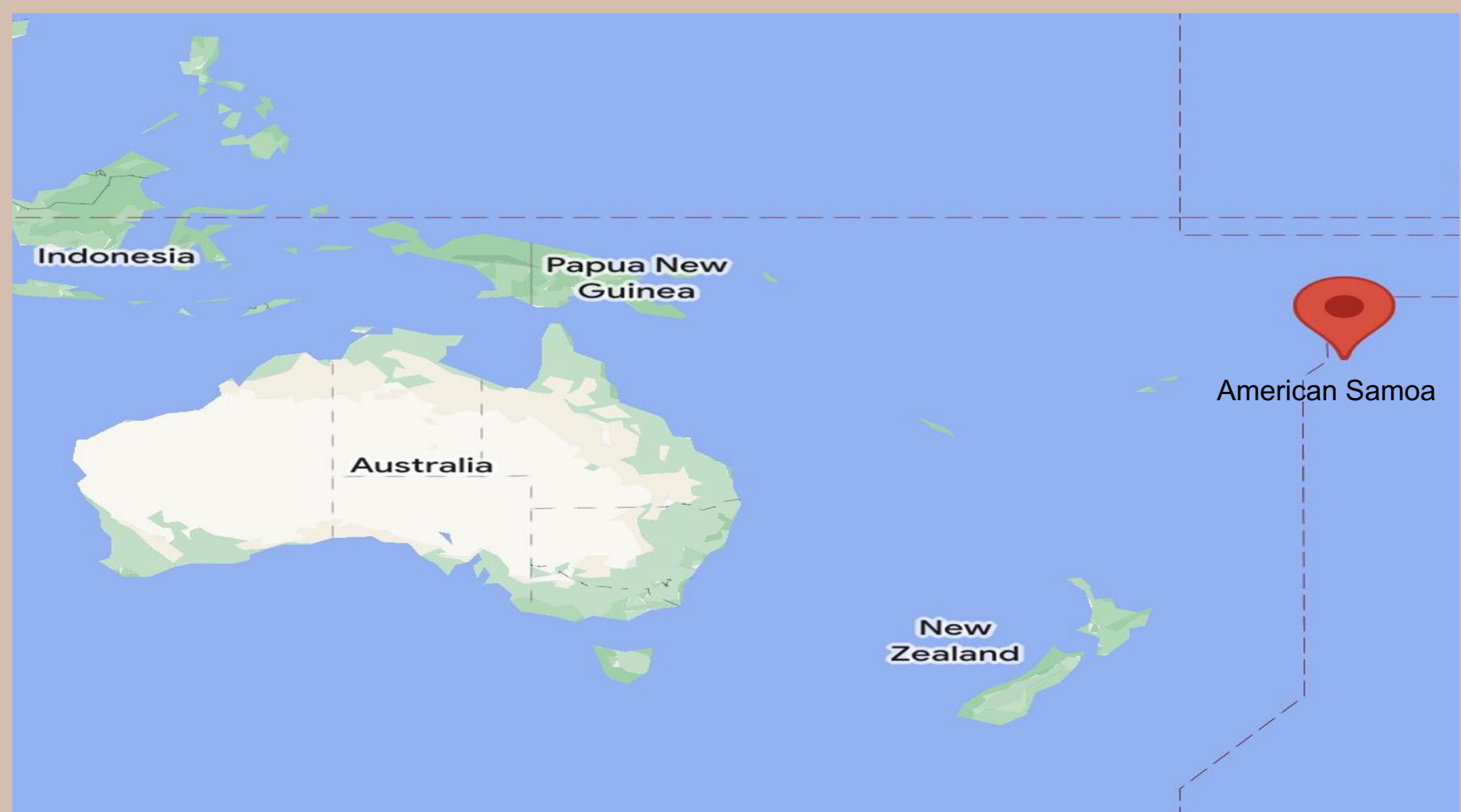
- Phytoplankton: microscopic plants drifting in the ocean
 - Diatoms and Dinoflagellates
- They serve as the foundation of the ocean food web
- They are responsible for producing half of the world's oxygen
- Phytoplankton are vastly understudied in American Samoa
- The purpose of this research is to fill in baseline knowledge gaps on the abundance and diversity of phytoplankton, relative to stream proximity



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Hypothesis

- Null Hypothesis: no difference among sites for either phytoplankton abundance or diversity
- Alternative Hypothesis: we expect phytoplankton nearest to a stream to have higher abundance and higher diversity



Indonesia

Papua New
Guinea

Australia

New
Zealand

American Samoa





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Will phytoplankton be more abundant in areas closer to the stream?



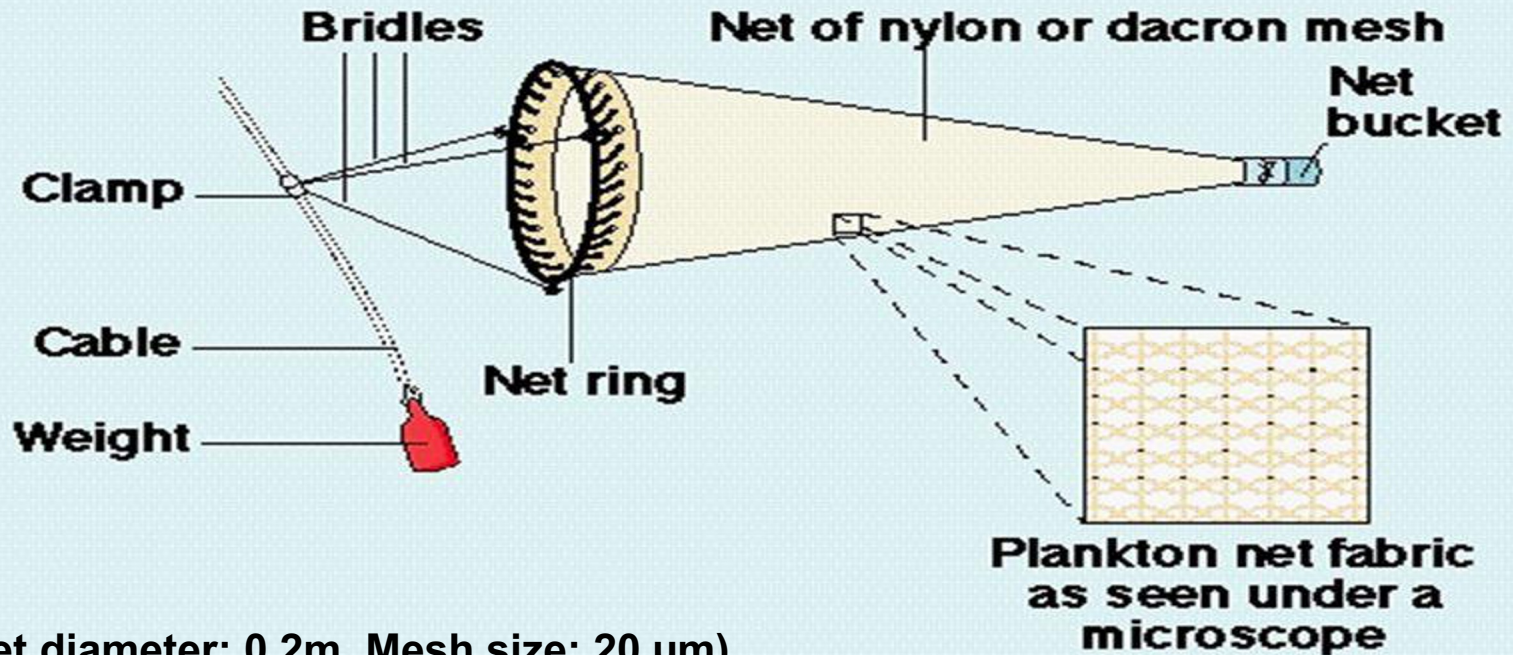


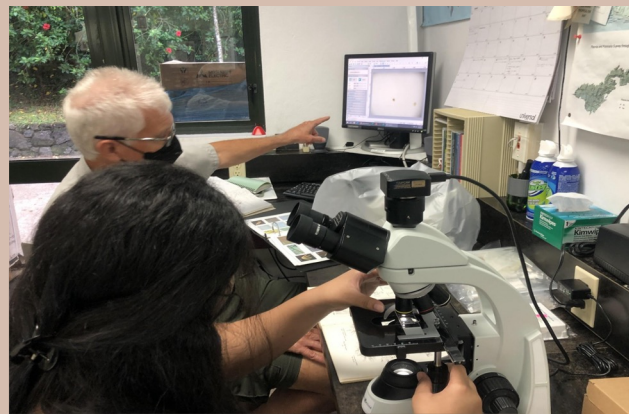
<https://www.phytoplankton.com>

Methods

- Chose 3 sites that ranged from closest to furthest from a major stream and 1 control site with minimal stream input
- 3 replicate plankton net tows at each site. Each tow was 3 minutes in duration and approximately 30 meters in distance (Volume filtered: 0.94 m^3).
- Measured chlorophyll, dissolved oxygen, salinity, temperature, and turbidity with a multiparameter sonde at each site
- Analyzed each preserved sample (Lugol's Solution) microscopically for phytoplankton abundance and diversity

Plankton Nets

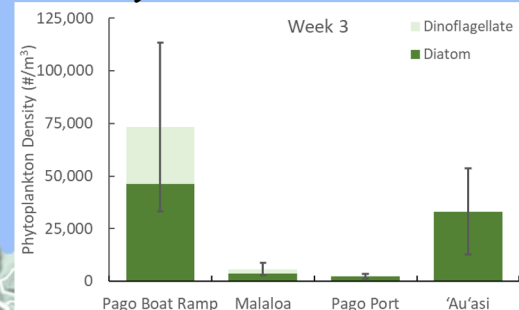
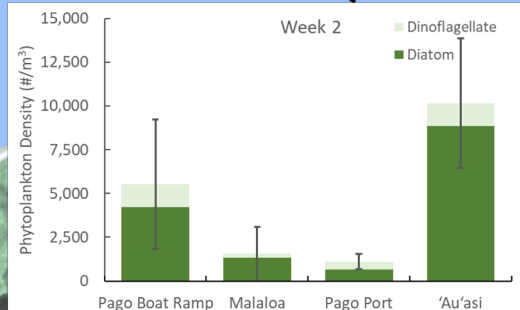
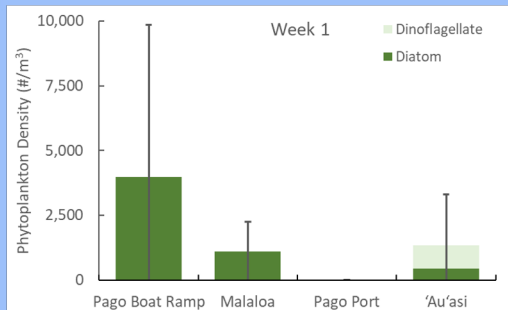


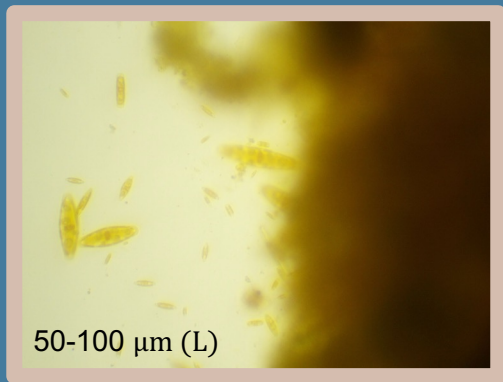




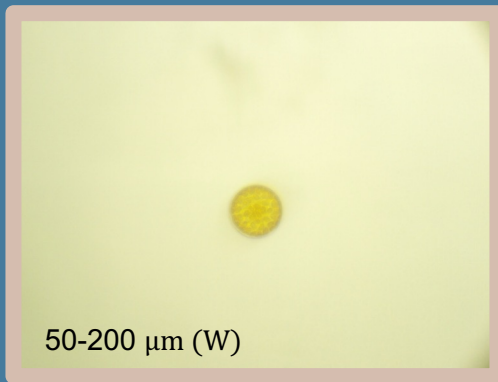
<https://www.phytoplankton.com>

Results - Abundance (mean $\pm$ 95% CI)

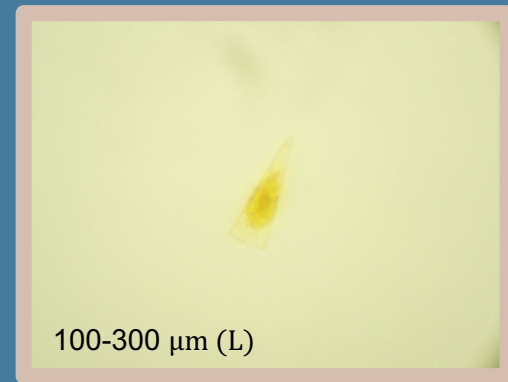




Navicula

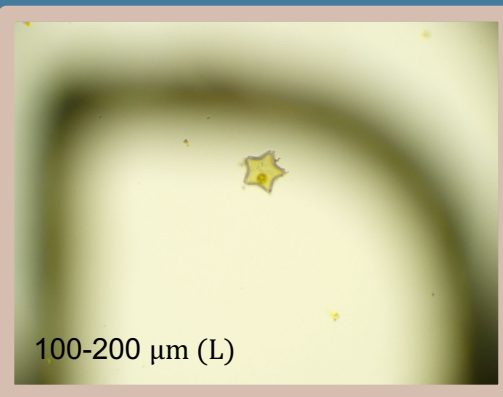


Coscinodiscus



Licmophora

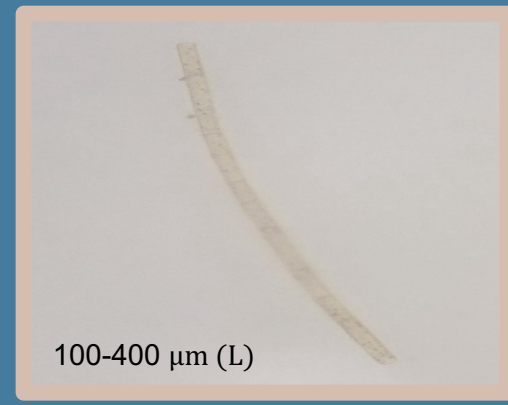
Triceratium



Ceratium furca



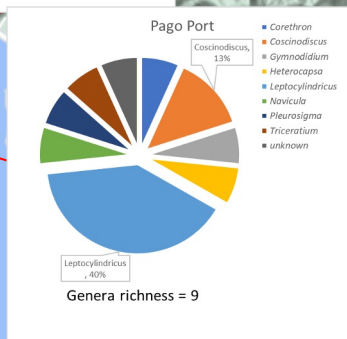
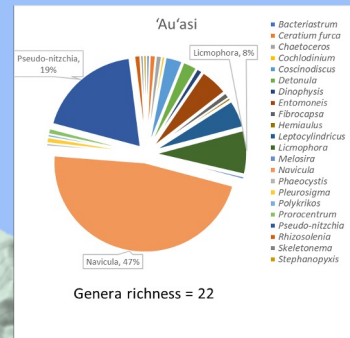
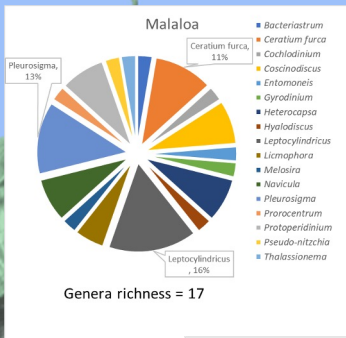
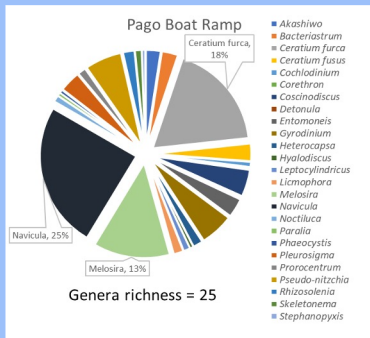
Leptocylindricus





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Results - Genera Richness

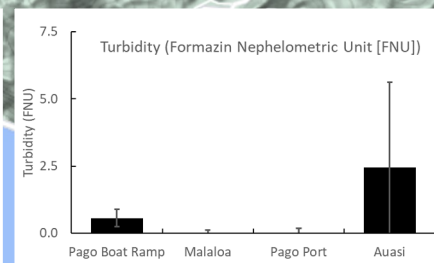
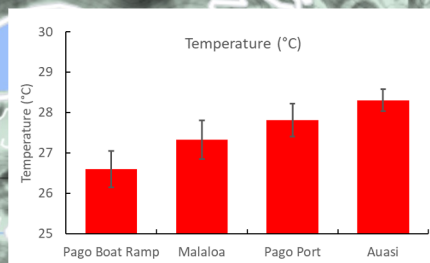
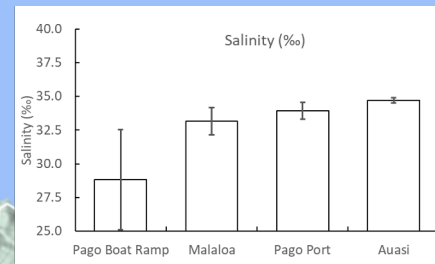
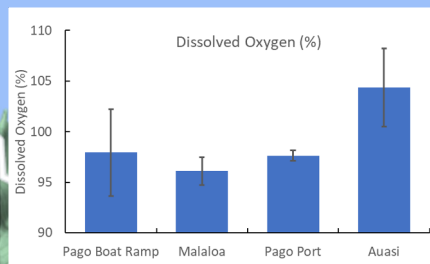
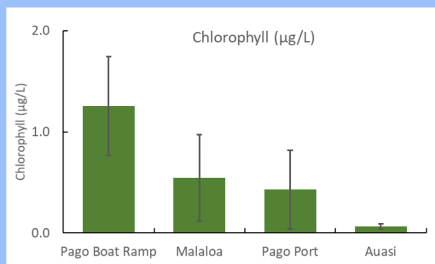




<https://www.phytoplankton.com>



Results - Environmental Observations



2 km



<https://www.phytoplankton.com>



Conclusions

- Hypothesis was partially correct. Site closest to the stream in the harbor showed higher abundance and diversity than sites farther away
- Control site, Auasi, however, had higher abundance than Pago Boat Ramp in the second week of sampling, but diversity was still lower.
- Diatoms were more abundant than Dinoflagellates during the duration of the study
- Environmental observations:
 - Temperature and Salinity were lowest at Pago Boat Ramp and highest at Auasi
 - Dissolved Oxygen was lowest at Malaloa and highest at Auasi
 - Chlorophyll was lowest at Auasi and highest at Pago Boat Ramp
 - Turbidity was lowest at Pago Port and highest at Auasi



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Significance

- Phytoplankton abundance is a critical indicator of ocean and planetary health
- Baseline information of phytoplankton distribution is important in identifying healthy regions of the ocean
- Phytoplankton identification can identify toxin producing species, especially during red tides



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Future Improvements/Recommendations

- Analyze nutrients from stream
- Increase sample size to decrease/improve confidence intervals
- Experiment with different plankton net sizes
- Examine zooplankton abundance in relation to phytoplankton abundance
- Comparison studies of abundance at different depths (coastal and open ocean)



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Acknowledgments

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- CRAG - Coral Reef Advisory Group
- My Parents: Melanie and Fuli Solaita



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G A M E O V E R



No internet

Try:

- Checking the network cables, modem, and router
- Reconnecting to Wi-Fi

ERR_INTERNET_DISCONNECTED

