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

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ABSTRACT

Phytoplankton play a vital role in the marine ecosystem. In addition to supplying half of the world's oxygen, they serve as the foundation of the ocean food web. Currently, there is limited knowledge about the distribution, abundance, and taxonomic composition of phytoplankton in American Samoa. The purpose of this research is to determine the abundance of phytoplankton relative to streams and nutrient sources, and is one of the first studies in American Samoa to characterize the assemblage. This information will elucidate which environment is most favorable for phytoplankton in Pago Pago harbor. Four sites were selected to gather samples: Pago Pago Boat Ramp (85 meters from Pago Stream), Malaloa (800 meters from Pago Stream), and Pago Pago Port (1,360 meters from Pago Stream). The fourth site, Auasi Harbor, served as the control due to minimal stream input and was therefore closest to open ocean conditions. We hypothesize that locations nearer to streams will have higher concentrations of phytoplankton. To test the hypothesis, three replicate plankton net samples were collected from each site over the duration of the study. Each sample was towed for three minutes per the NOAA phytoplankton monitoring protocol and later examined microscopically for relative abundance and taxonomic diversity. Concurrent water quality measurements were taken using a multiparameter sonde. Weekly sampling and analysis of phytoplankton was conducted in July 2022. The significance of this research is to provide baseline information on abundance and biological diversity of this ecologically valuable resource relative to stream proximity in American Samoa.

KEY WORDS: phytoplankton, taxonomic diversity, relative abundance, stream input, plankton net

ACKNOWLEDGEMENTS: The STEP-UP High School program is supported by the Nation Institute of Diabetes and Digestive and Kidney Diseases of the National Institutes of Health, Grant Number: R25DK78386-16. Field assistance included Tilali Scanlan, Alisha Gill, Valentine Vaeoso.