

## Building a polychaete species database for water management purposes in American Samoa

### Basic Information

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| <b>Title:</b>                   | Building a polychaete species database for water management purposes in American Samoa |
| <b>Project Number:</b>          | 2014AS430B   |
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| <b>Congressional District:</b>  | 1  |
| <b>Research Category:</b>       | Biological Sciences  |
| <b>Focus Category:</b>          | Conservation, Invasive Species, Management and Planning                                |
| <b>Descriptors:</b>             | None   |
| <b>Principal Investigators:</b> | Julie Helen Bailey-Brock   |

### Publications

There are no publications.

## **Problem and Research Objectives**

The biodiversity of marine invertebrates from the American Samoa has been poorly characterized. Most of the efforts are concentrated on studying the coral reefs, which encompasses one of the most diverse assemblages of corals and fish of the south Pacific. The Indo-Pacific polychaete fauna is one of the most diverse worldwide, but only 30 species are recorded for the Samoan Islands and this is probably a result of few collecting efforts.

There is an extensive literature and interest on Palolo worms from Samoa with the first accounts dated from 1847 (Stair 1847). The swarming event of this species is celebrated and a cultural aspect of American Samoa as the worms are scooped up and eaten raw or cooked by the islanders. The interest on these worms has increased along the years and several papers describe its morphology (Woodworth 1903) and reproductive characteristics (Caspers 1964, 1984; Krämer 1897). More recently, Brown (2009) described additional notes on the spawning behavior of this species and Schulze (2006) shed some light on the phylogenetic relationships between the Pacific and Caribbean palolo worms.

Although palolo worms have been well-studied, other polychaete families that are known as being bioindicators of ecosystem health are poorly characterized in American Samoa. Some previous research concerning polychaetes from the Pacific Ocean are based on samples collected from sites around American Samoa and describe species that are endemic to that area. The first studies, with a taxonomic perspective were done by Treadwell (1921, 1922, 1926). Treadwell described 16 species collected from Pago Pago Harbor and among them 4 were endemic species to that area. Augener (1927) and Hartmann-Schröder (1965) increased this number to about 30 species.

Shallow water polychaete species were characterized qualitatively at several sites around American Samoa. The intent was to determine the polychaete species present in soft sediments, diverse algal assemblages and coral rubble to provide a polychaete species list that would be useful for future biomonitoring projects. There are few accounts of Samoan polychaetes and only about 20 species are recorded for those islands. The Indo-Pacific polychaete fauna is one of the most diverse worldwide and the low richness of species found in the Samoan Islands is probably due to scarce collecting efforts.

## **Methodology**

### *Study Area*

Fine and coarse sediment, coral rubble, and several species of algae and one species of sponge were hand collected around the surrounding areas of American Samoa with the intent of finding a diverse polychaete assemblage. Twenty sampling stations were selected around the island of Tutuila (Figure 1). All samples were collected on shallow waters up to 5 m deep. After collection, samples were sieved with seawater and all the polychaetes retained were sorted and preserved in 70% or 90% ethylic alcohol. Some individuals were observed and photographed while alive.

Polychaetes were sorted and identified using dissecting and compound microscopes. Species considered to be new to science will be fully described, illustrated, photographed under a Scanning Electron Microscope, and published in peer reviewed scientific journals. Samples were collected under a scientific research and collecting permit from the National

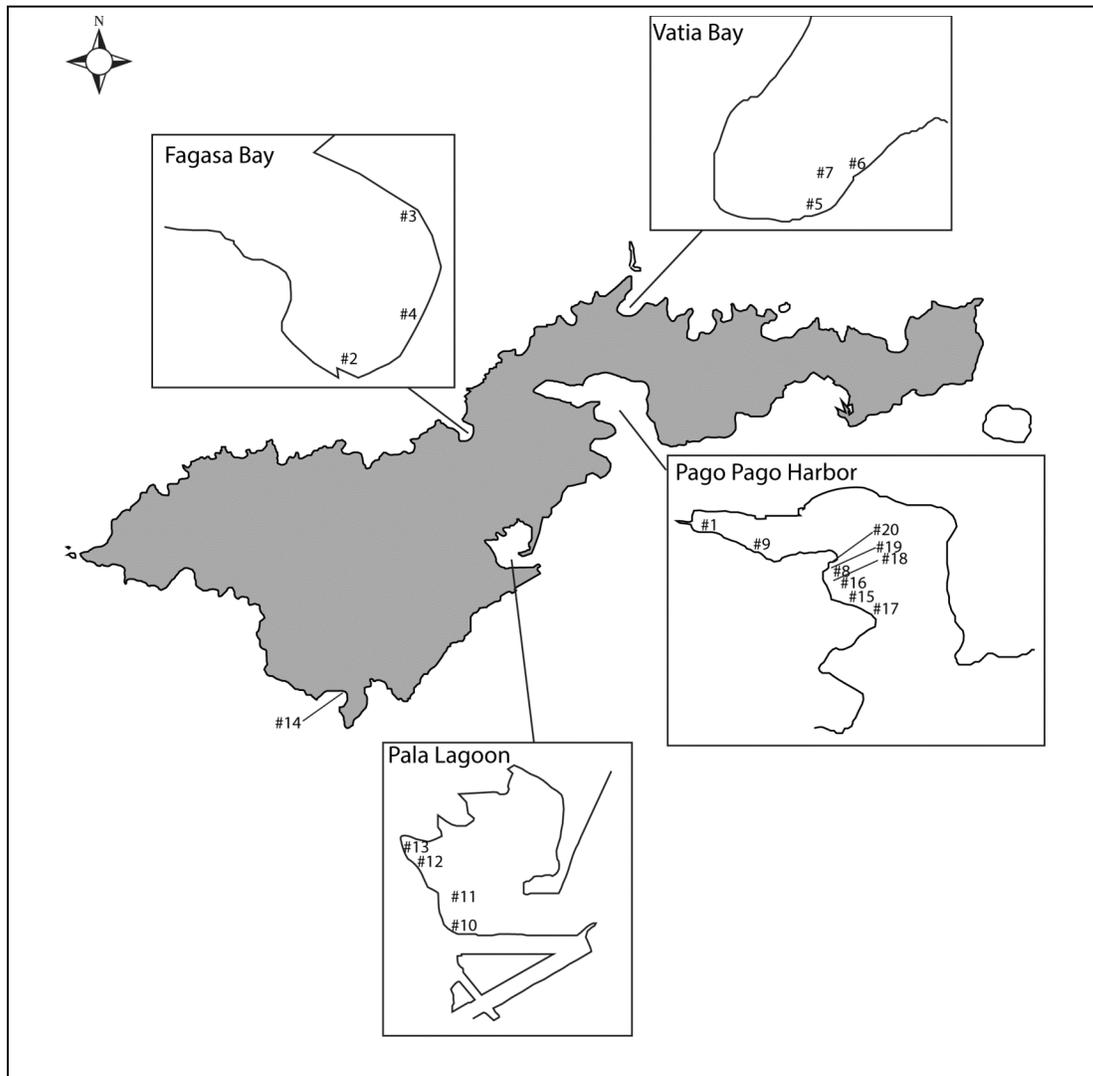


Figure 1. Map of Tutuila Island in American Samoa showing the sampling stations and including inset maps for Fagasa Bay, Vatia Bay, Pala Lagoon and Pago Pago Harbor.

Park of American Samoa (NPSA-2014-SCI-0007) and a scientific permit from the Department of Marine and Wildlife Resources from the American Samoa Government No. 2014/005.

### Principal Findings and Significance

1. The shallow water polychaetes of American Samoa are very diverse with a total of 546 individuals collected in this study representing 26 families and more than 73 species.
2. At least one new species was collected from samples taken from this project and will be formally described and named.

3. Most of the species collected in this study (67 out of more than 73 species) represent new records for American Samoa and increase our knowledge of the polychaete worms present in that region of the southern Pacific Ocean.
4. The polychaete species from American Samoa appear to be significantly different from those of North Pacific including Hawaii and west of the United States coast, and more similar to the communities described for New Zealand and Australia.
5. The species *Hydroides elegans*, *Dipolydora socialis*, *Salmacina dysteri*, and *Sabellastarte spectabilis* are likely to have been transported to American Samoa and are accidental introductions. Impacts of these species have been reported in other regions of the Pacific Ocean.
6. The tube builder species *Mesochaetopterus minutus*, was collected in high abundance in Vatia Bay. This species is a gregarious worm that forms tufts of sand-covered tubes and play an important role in these assemblages by binding the sediments once suspended. It represents an ecologically important species for its rapid reproduction and propagation in disturbed sandy regions.
7. This was the first comprehensive study aimed to taxonomically describe and identify the polychaete worms around the island of Tutuila in American Samoa. All specimens will be deposited in the Bernice Pauahi Bishop Museum collection and made available for future researchers working on water quality and the effects on the benthic macrofauna in American Samoa.

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