



NOAA Technical Memorandum NMFS-PIFSC-24

June 2011

Historic Fishing Methods in American Samoa



Karen Armstrong
David Herdrich
Arielle Levine

Pacific Islands Fisheries Science Center
National Marine Fisheries Service
National Oceanic and Atmospheric Administration
U.S. Department of Commerce

About this document

The mission of the National Oceanic and Atmospheric Administration (NOAA) is to understand and predict changes in the Earth's environment and to conserve and manage coastal and oceanic marine resources and habitats to help meet our Nation's economic, social, and environmental needs. As a branch of NOAA, the National Marine Fisheries Service (NMFS) conducts or sponsors research and monitoring programs to improve the scientific basis for conservation and management decisions. NMFS strives to make information about the purpose, methods, and results of its scientific studies widely available.

NMFS' Pacific Islands Fisheries Science Center (PIFSC) uses the **NOAA Technical Memorandum NMFS** series to achieve timely dissemination of scientific and technical information that is of high quality but inappropriate for publication in the formal peer-reviewed literature. The contents are of broad scope, including technical workshop proceedings, large data compilations, status reports and reviews, lengthy scientific or statistical monographs, and more. NOAA Technical Memoranda published by the PIFSC, although informal, are subjected to extensive review and editing and reflect sound professional work. Accordingly, they may be referenced in the formal scientific and technical literature.

A **NOAA Technical Memorandum NMFS** issued by the PIFSC may be cited using the following format:

Armstrong, K., D. Herdrich, and A. Levine.
2011. Historic fishing methods in American Samoa. U.S. Dep. Commer.,
NOAA Tech. Memo., NOAA-TM-NMFS-PIFSC-24, 70 p. + Appendices.

For further information direct inquiries to

Chief, Scientific Information Services
Pacific Islands Fisheries Science Center
National Marine Fisheries Service
National Oceanic and Atmospheric Administration
U.S. Department of Commerce
2570 Dole Street
Honolulu, Hawaii 96822-2396

Phone: 808-983-5386
Fax: 808-983-2902

Cover: Polynesian Photo Archives, American Samoa, Jean P. Haydon Collection.



Pacific Islands Fisheries Science Center
National Marine Fisheries Service
National Oceanic and Atmospheric Administration
U.S. Department of Commerce

Historic Fishing Methods in American Samoa

Karen Armstrong¹
David Herdrich²
Arielle Levine³

¹Social and Cultural Anthropology
PL-59 (Unioninkatu 38), University of Helsinki 00014, Finland

²American Samoa Historic Preservation Office
Executive Offices of the Governor, American Samoa Government
American Samoa 96799

³Joint Institute for Marine and Atmospheric Research
1000 Pope Road, Honolulu, Hawaii 96822

ACKNOWLEDGMENTS

This research was sponsored in part through a NOAA Preserve America Initiative Grant, as part of the project: “Documenting Traditional Knowledge and Marine Resource Use and Management in American Samoa.” The research involved interviews with elder fishermen from coastal villages in Tutuila and the Manu’a Islands. The grant also supported the production of a related video “Palolo: The cultural and environmental significance of American Samoa’s marine worm,” which provides video documentation of some of the material presented in this report. Additional copies of this report or the palolo video can be obtained through the NOAA Pacific Islands Fisheries Science Center (PIFSC). A PDF file of the report is available on the PIFSC library website at http://www.pifsc.noaa.gov/pubs/techpub_date.php.

Additional support was received from Academy of Finland, project SA-118442.

Our thanks to Paul Anderson of the South Pacific Regional Environment Programme for creating the maps, Evelyn Lilio for providing photos from Fagasa village, and American Samoa’s Department of Marine and Wildlife Resources.

DISCLAIMER

This report has been financed in part with Historic Preservation Funds from the National Park Service, Department of the Interior. However, the contents and opinions do not necessarily reflect the views or policies of the U.S. Department of the Interior.

NONDISCRIMINATION AND EQUAL OPPORTUNITY

This program received Federal funds from the U.S. National Park Service. Regulations of the U.S. Department of Interior strictly prohibit unlawful discrimination in departmental Federally Assisted Programs on the basis of race, color, national origin, age, sex, or handicap. Any person who believes he or she has been discriminated against in any program, activity or facility operated by a recipient of Federal assistance should write to: Director, Equal Opportunity Program, U.S. Department of the Interior, National Park Service, P.O. Box 37127, Washington, D.C. 20013-7127.

CONTENTS

Introduction.....	1
Fishing Seasonality	4
Atule.....	5
Palolo and Seasonality	6
The Pleiades (<i>Mata-lik</i> i)	8
Samoan Social Structure	8
Division of Labor in Fishing.....	12
Fishing Techniques	13
Technique: Nets	13
Ordinary Family Fishing.....	14
Fishing for Two Kinds of Mullet.....	15
Fish Drives in Pago Harbor.....	16
Technique: Fish Weirs	17
Technique: Fishhooks	18
Technique: Floats (<i>uto</i>).....	21
Technique: Specialized Fishing with Boats.....	22
Fishing for Sharks.....	22
Bonito Fishing.....	24
Technique: Fish Poisoning.....	28
Other Types of Fishing	29
Squid Lures: Catching Octopus	29
Traps and Pots: Fish, Crabs, Crayfish, Lobsters.....	31
Turtles	32
Prawns.....	32
Eels.....	33
Legends: Significance and Continuity	33
Atule Stones: Aoloau	34
Atule Stones: Fagasa.....	35
Talking Chief Sala’s Tale	35
The Dolphins of Fagasa	37
The Blessing of the Rocks, Fagasa	38
Atule Rock: Asili	39
Fishing Rock: Fagamalo	40
Conclusion	40
Photographs:	42
Polynesian Photo Archives Photographs	42
Recent Atule Rock Photographs	50
Evelyn Lilio: Atule Rock and Traditional Fishing Photographs	51
Annotated Bibliography.....	55
Appendix A: Traditional Fishing Chronology.....	A-1
Appendix B: Fish Terms and Size	B-1
Appendix C: Dictionary of Samoan Terms Used in This Document	C-1

(This page is intentionally left blank.)

INTRODUCTION

Fishing and marine resources play a central, social, cultural, economic, and subsistence role in the Pacific islands. Recent recognition of the depleted state of many coral reef and nearshore fisheries resources around the world has brought increased attention to the outcomes and sustainability of local systems of fisheries use and management.

In working to protect and manage coastal resources, it is important to understand local patterns of use and traditional systems of marine management. Incorporating local community concerns, practices, and cultural particularities have been shown to be critical to the success and stability of marine management systems (White et. al., 2002; Christie, 2004). Evidence documented throughout the Pacific has illustrated that traditional fisheries were, and in many cases still are, frequently accompanied by active local management systems designed to foster the sustainable use of local fish stocks (Johannes, 1978; Cinner and Aswani, 2007). Cinner and Aswani (2007) suggest that efforts to develop management systems should consider hybrid approaches that integrate traditional management systems or methods with socioeconomic factors influencing communities today.

The islands of Samoa have already incorporated traditional systems into their fisheries management policies by establishing community-based fisheries management programs. It is recognized that historic practices, and associated historic sites, hold the promise to inform and improve modern management policies. Still, much remains unknown regarding how traditional marine resource use and management systems have changed over time, given the dearth and relative inaccessibility of archival accounts documenting these types of activities.

The Samoan Islands are a culturally homogeneous group although, since 1900, they have been split into two political units: American Samoa and Western (now independent) Samoa (see Fig. 1). Villages in both independent Samoa and American Samoa now work with government agencies to integrate traditional local practices and tenural systems with modern fisheries rules and regulations (King and Fa'asili, 1999; Fa'asili and Sauafea, 2001). Minimal specific information, however, has been documented to understand the impact on Samoan natural resources. It seems an opportune moment, therefore, to collate a profile of traditional Samoan fishing methods so as to assess their impact on the environment and their role in the community.

This report presents a coherent view of previously published research on traditional fishing practices in Samoa. By using this material to compare what we know of previous practices with the contemporary situation, scientists may be able to better measure the changes that have taken place. In turn, this documentation can help to inform modern community-based management

programs and potentially revitalize traditional practices that are supportive of the conservation and sustainable use of natural resources.

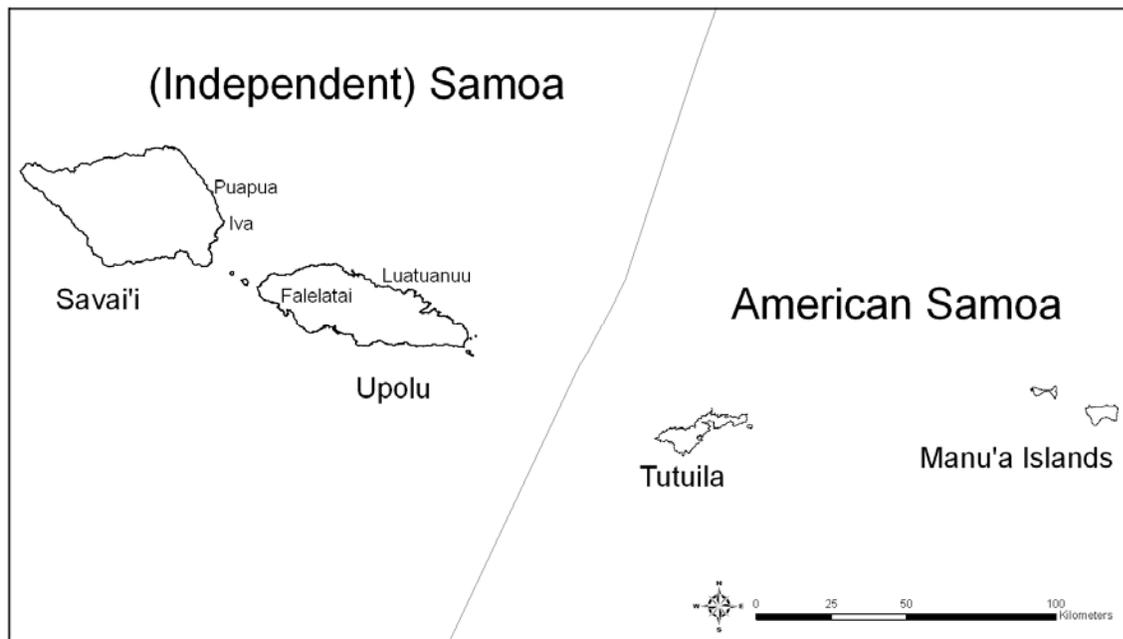


Figure 1.--Overview map of the Samoan Islands.

Marine resources have traditionally played an important cultural, economic, and subsistence role in Samoan village life. This report focuses on traditional fishing practices prior to 1950 and includes data collected from all the islands. However, whenever possible, we have cited examples specific to American Samoa in order to trace changes in the use of marine resources within this island group. The islands of American Samoa have undergone rapid cultural and economic transformations, with exposure to Western influences and incorporation into the global economy. The introduction of modern fishing gear and technology, the presence of the tuna canneries as a major economic force in Pago Pago, the dominance of the Christian religion as a village organizing force, and the gradual but continuous introduction of Western cultural norms and practices have altered American Samoans' relationship with the sea. American Samoans continue to maintain Samoan traditions and various village-based systems of governance, but fishing practices have become more commercialized, particularly during the latter half of the 20th century. This report is meant to be read alongside reports documenting more recent information as a way of measuring the impact of changes in the use of marine resources, and of course, the impact of these changes on the environment. It is also intended as a "take-off" point: hopefully Samoan readers will add to it with stories of fishing practices in their own villages.

Because our focus is on fishing practices prior to 1950, the report relies on the observations of explorers, missionaries, and ethnographers who recorded what they observed and learned from talking to Samoans of their day. Other reports about the pursuit and use of marine resources (e.g., Severance and Franco, 1989; Dye and Graham, 2004; Linnekin et al., 2006) have described the general history and context of the Samoan Islands. We narrow the focus to look more specifically at fishing techniques over a roughly 50-year period, from 1900 to 1950, and more specifically at the islands of American Samoa (for map of locations referred to in this report, see Fig. 2).

For our period, Augustin Krämer (1994,1995 [orig. 1901, 1903]) and Te Rangi Hiroa (1930) provide the most exhaustive descriptions of Samoan fishing practices, with illustrations and photographs of the various material items associated with fishing. Krämer was a German medical doctor who came to Samoa with the German navy as part of their colonial mission in the 1890s. He learned Samoan and, through his contacts with Samoan patients, he interviewed Samoans and traveled extensively around the islands. Following the methods of German ethnology, he made extensive notes, took photographs, and collected material items. This was the era of “salvage ethnography,” when there was a sense that the life of “native peoples” should be recorded before it died out as a result of Western contact and the adoption of modern innovations. This became the driving force behind Krämer’s project.

Te Rangi Hiroa (a.k.a. Sir Peter Henry Buck) was also a medical doctor; his research followed that of Krämer by about 30 years. Hiroa was born into a European-Maori family in New Zealand, and he developed an early interest in Maori culture. Later, he worked at the Bishop Museum in Honolulu and was director of the museum from 1936 until his death in 1951. He traveled extensively throughout the Pacific, and much as Krämer had done, used the methods of ethnology to record, photograph, and collect material culture. By the time of Hiroa and his contemporaries, the idea was not to “salvage” these cultures but to record them for comparative purposes. By recording practices carefully, they hoped to compare similarities and differences across the Pacific region as well as across time.

Using these writings as baseline data, therefore, we have snapshots of two time periods: the late 1890s, when Krämer was collecting his data, and 1927, the year of Hiroa’s visit to Samoa as part of the Bishop Museum group that included Alfred Judd and Bruce Cartwright. We supplement these two texts with a chronology that lists the observations of earlier navigators and missionaries and with observations by a few other people who visited American Samoa between 1900 and 1950. There are few detailed records of fishing practices and fish catch prior to the latter half of the 20th century for American Samoa. Therefore, we have included some interview data collected more recently from elders in American Samoa (compiled by Levine and Sauafea-Leau, n.d.). The interviews offer an insight into fishing practices since 1950 and provide another source for measuring continuity and change.

Common fishing techniques, such as gathering on the reef, diving, rod and line, netting and trapping (including communal fish drives), and boat fishing, were practiced throughout the Samoan Islands. However, slight differences in practices were based on particular village rules and techniques related to the habits of the marine resources. The village has been, and remains, an important organizing unit in Samoan society (Keesing, 1934), and the village customarily controlled the usage rights to a lagoon and its resources. While individual and family fishing occurred on an almost daily basis, villages also organized communal drives for certain fish species, and men sometimes fished outside the lagoons under the leadership of a fishing expert, a *tautai*. There were rules that certain fish were to be given to the chiefs, and restrictions were occasionally made regarding the lagoon and its resources. All of these practices were, in essence, under the control of the village and its decision-making body, the village *fono*. In the context of these general practices, we review practices regarding fishing for certain resources—*atule*, *i’a sina*, *palolo*, *’anae*, sharks, and bonito—while at the same time anchoring our examples in descriptions of fishing practices and historic sites in communities in Tutuila and Manu’a.

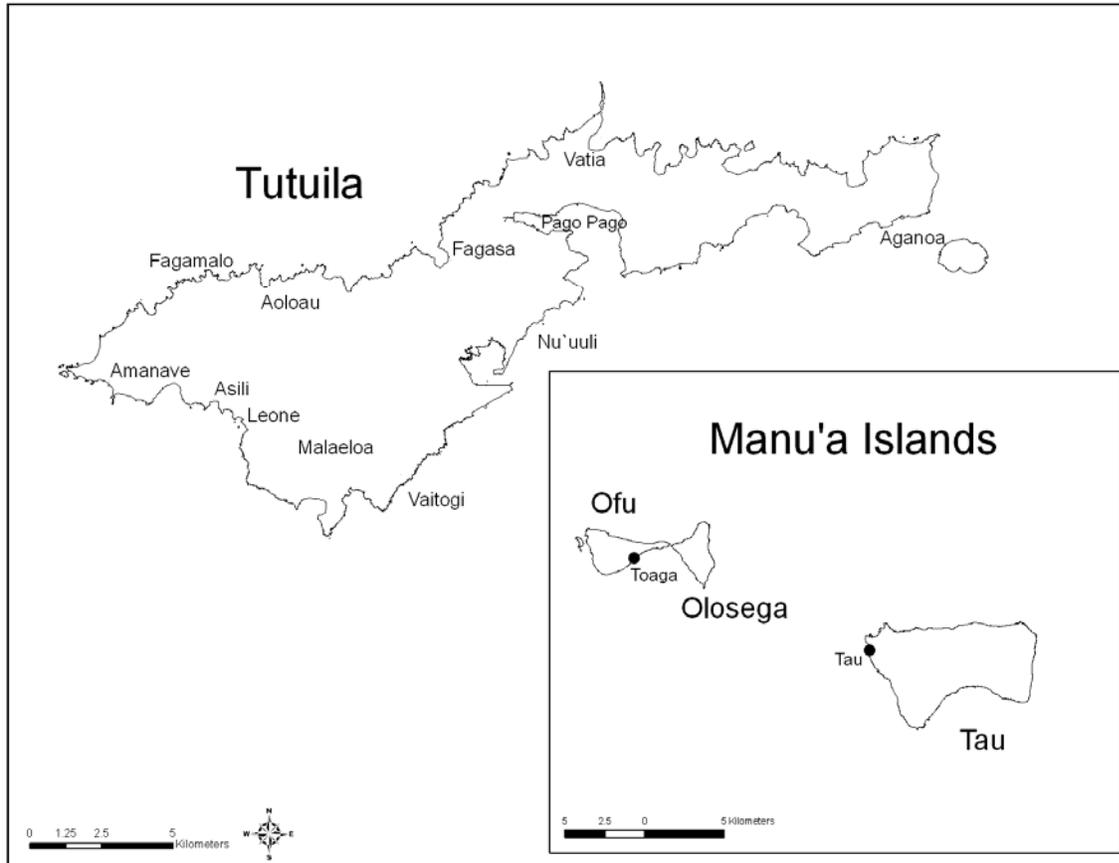


Figure 2.--The islands of American Samoa and relevant historic locations cited in this report.

FISHING SEASONALITY

The availability of fish year round in the Samoan Islands led Krämer (1995:198) to conclude that “the sea is just as inexhaustible as the land.” However, there was, and is, seasonal variation in the availability of certain species, and Samoan fishing methods were also synchronized with the tides, time of day, cycles of the moon, and weather and surf conditions. According to the observers, and the evidence agrees, Samoans understood intimately the behavior of the marine resources they pursued.

In virtually all cases in ancestral Polynesia, the ‘year’ was partitioned into two periods (Kirch and Green, 2001: 261). In Samoa there are marked wet and dry seasons and seasons when certain marine resources appear. According to Krämer, the beginning of the rainy season, which occurred between September and October, was considered to be the most productive time for fishing. During this time, the fish spawned and moved in great numbers at high tide from the open sea to the lagoons. In October and November, at the time of the appearance of *palolo*, a sea worm to be explained in the following section, numerous schools of young fish arrived in the lagoons; for example, the *lō*, the *palai’a*, the *nefu*, and the *palagi*, often followed by larger fish,

came in and the lagoons were full of fish (Krämer, 1995:198). *Vaipalolo* was the period of the wet season, beginning with the rise of the *palolo* in October or November (Milner, 1966: 310). The fact that tides were noted and significant to the fishing effort is reflected in the various words and phrases which include the word *tai* (tide). For example, '*Ua a'e le tai lō* translates as game or fish in season; *taivale*, a poor season when fish are scarce (Milner, 1966: 229; Krämer, 1995: 233).

Because of the need to synchronize with the tides or because of the characteristics of the fish, much of the fishing was done at night, sometimes all night. For example, Krämer (1995: 202) reports that fish spearing took place at night by torch light on the reef at the time of the new moon or full moon when the spring low tide occurred around noon and midnight. Llewella Churchill (1902: 127) describes how women frequently fished at night at low tide with coconut leaflet torches and spears at Vaiala, on the island of Upolu. Bruce Cartwright (1927) also describes the use of torches as observed during his visit to Aunu'u Island, off the coast of Tutuila:

The natives do much fishing with rod and line and torches here. The eastern half of the island is occupied by a hill with deep water along the shore while the western half is low-lying with shoal water extending out quite a distance and then abruptly dropping into deep water—heavy surf breaks on this reef shelf.

We saw many women bound along the NE shore of Aunu'u carrying bundles of thin sticks about 4 ft long and with a diameter of a fountain pen. Upon inquiring, we found that about half of these rods were tied together and used as torches in fishing on the reefs at low tide, at night (Field Notebook I: 93-94, from the Bishop Museum Archives).

Atule

Fishing for *atule* is a good example of how Samoans considered factors of seasonality, time of day, and tides in their fishing practices. The *atule* appeared in large schools in March/April/May and October (Milner, 1966: 29; Krämer, 1995: 218), and they were often caught by using communal labor to drive the fish towards a trap with branches (*lauloa*). The effort began at night, when the fish had come in with the high tide. Then, as the tide went out, the fish, seeking to reach the sea through the trap's opening, were scooped up as they tried to get through (Krämer, 1995: 218). The fishing ended with low tide in the morning. Many thousands of *atule* were caught with this method and were distributed equally to all the village families who participated in the fishing. A large catch allowed for gifts, to family and friends in other villages. Gifts of fish are part of the reciprocal relations and constant circulation of food and gifts that maintains Samoan social structure to this day. Krämer notes that the missionaries called this fish herring because it also glistens like silver and comes in large numbers (1995: 236, footnote 81), but *atule* (*Selar crumenophthalmus* or bigeye scad) is a neritic-pelagic species that is related to the bonito.

Palolo and Seasonality

The *palolo* worm (*Eunice viridis*), which is also found on other islands in the Pacific, is a classic example of a marine animal exhibiting lunar periodicity regarding the time of its spawning (Caspers, 1984: 229; Krämer, 1995: 475, Fig. 44). The color of the male worm is reddish brown; the female is bluish green. The *palolo* appears during 3 days of the third quarter moon, usually first in October, with a second, smaller appearance in November.¹ The epitokous segments of these worms break off from the head (the atokous segments) and have been, and are, a favorite food of Samoans. The *palolo* swarms at different times on the different Samoan Islands. Generally, it appears with regularity, moving from east to west: near Manu'a at 10:00 pm, at Tutuila at 1:00 am and off Upolu and Savai'i at 4:00 to 5:00 am (Caspers, 1984: 230; Drees n.d.: 97). Krämer (1995: 477) says it appears at the time of the lowest, or spring, tide, at the time when the sun is nearest its zenith in the southern hemisphere (the following section on the Pleiades will show this to be wrong). At the time of the *palolo*, numerous small fish appear in the reef lagoons and some swim up freshwater rivers. People on Upolu reported that about 10 days before the *palolo* appear, a common crab (*mali'o*) living inland moves down to the sea to spawn during the night (Krämer, 1995: 480-481). On Ta'u, others claimed that they could predict the coming of the *palolo* by the odor of the reef, called *pua palolo* (Hiroa, 1930: 439), and even today people on Tutuila say this.

In an article published in 1928, an anonymous author makes a strong case for the central event of the rise of the *palolo* worm in the Samoan calendar year. First, the author notes that the Samoan word for year is *tausaga*, from the Polynesian root word *tau*. According to Pratt,² this word originally meant a season, a period of 6 months, corresponding to the wet and dry seasons (Anonymous, 1928: 229; see also Kirch and Green, 2001: 261). The lists of names for the months of the year, collected from Krämer, Turner, and others are not very consistent. It seems that they varied from place to place, sometimes because a month was named for a local deity. Reverend Stair, a missionary who lived on Upolu from 1838 to 1845, reports that July and August are named for the consumption of *palolo* in certain districts where it is found (1897: 143). The anonymous article shows some consistency, however, in the names for months connected to the growth of taro and the appearance of marine resources. For example, in some places the month of April was called *Lō*, from the name of the fish which was plentiful during that month. Significantly, July was called *Palolomua* (“*mua*” meaning “first”), and designated as the first month of the season for consuming *palolo*, distinguished from the other half of the year which was called the trade wind season. August was called *Palolomuli* (“*muli*” meaning “the end” or “last”), the time after *palolo*. The author reports that according to the local explanation, while *palolo* were caught in October and/or November, July and August were the months when the preserved *palolo* would be eaten and finished off. November was called *Taumafamua* according to some, meaning the first month of plenty because fish were numerous this month, and December was sometimes called *Toetaumafa*, the finish of the feasting (of November)

¹ Sometimes the *palolo* may only appear in one or the other of these months.

² The author does not give a reference for Pratt, but he is likely referring to Rev. George Pratt, “Grammar and Dictionary of the Samoan Language,” 3rd edition, London, 1893, or 4th edition, Apia, 1911. Rev. George Pratt was a missionary of the London Missionary Society.

(Anonymous, 1928: 233–34; Krämer, 1994: 484).³ In all these distinctions, the appearance of the *palolo* is connected with the season of plenty for marine resources.

According to the anonymous author (1928: 236), the Samoans had no name for “week” but the names of the days of the month, as he found in Krämer, follow the phases of the moon (*masina*).⁴ Here, too, several day names were connected to *palolo*: *Masina usunoa*, first day of the appearance of the *palolo*; *Masina motusaga*, first real appearance of *palolo*; *Masina tatelega*, the great scooping up of *palolo* (Anonymous, 1928: 236; Krämer, 1994: 484-485; Krämer, 1995: 478). All of this lends credence to the claim that the arrival of *palolo* in the lagoon and periods designated for consuming *palolo* were significant markers of time during the calendar year.

Krämer reports that special festivities were organized for the night before the *palolo* catch, according to the timetable of Upolu and Savai’i. The chief of the village which had jurisdiction over the reef channel would send the fishermen out to search for the first signs of *palolo* (the first day). When they reported success, preparations were begun at the *faleali’i*, the house of the high chiefs in the village. Food was amassed and ‘ava⁵ was prepared by the *taupou* (the high-ranking village virgin), who left immediately after the ‘ava was prepared. All other women were excluded from the preparations. Once the food was piled up in the house on the final night before the harvest, everyone would gather at the chiefs’ house (the *faleali’i*) for feasting and amusements until the time arrived for all to go to catch the *palolo*, which would have been shortly before dawn in the western islands (Krämer, 1995: 481).

Traditionally, the worms were caught in small funnel-shaped baskets (Stair, 1897: 141). When brought on shore, the worms were tied up in leaves in small bundles and baked. Large quantities were also eaten uncooked. Messengers were sent immediately in all directions with gifts of worms for those parts of the islands where none were found (Stair, 1897: 142). Reverend Stair witnessed the *palolo* catch in 1843 on Upolu and, while the net for catching *palolo* is different, much of his description of the harvest and the distribution of the *palolo* is still recognizable today.

Krämer (1995: 202) described two types of scoops that were used for *palolo*: one was a coconut fabric scoop while the other, stronger one was the coconut leaflet midrib scoop. By 1927, both were no longer in use according to Hiroa (1930: 440). Hiroa found that people made *palolo* nets by using thin gauze that could be bought from the traders; on Manu’a it was said that people saved gauze from the naval infirmary for their *palolo* nets. Hiroa witnessed the *palolo* catch at Ta’ū on October 17, 1927, at about midnight, at full tide; it lasted until the rising of the moon, when the tide went out, taking the *palolo* segments with it (Hiroa, 1930: 441).

According to Hiroa (1930: 441), the chief’s *palolo* was cooked with coconut cream. But it was common everywhere to wrap the *palolo* in banana leaves and keep it fresh throughout the whole year by re-cooking and pouring coconut milk on it (Anonymous, 1928: 233; Hiroa, 1930: 441).

³ See also Kirch and Green (2001: 268). They use the month names reported by Turner (1884).

⁴ The proto-Polynesian word **maasina* meant moon and/or month, and referred to a lunar calendar (Kirch and Green 2001: 261)

⁵ *Piper methysticum*, also called “kava.” The root of this plant is prepared for ceremonial purposes in Samoa and throughout the Pacific.

The Pleiades (*Mata-lik*)

In their analysis of time reckoning in ancestral Polynesia, Kirch and Green (2001) do not find evidence of a clear beginning for the calendar year. The evidence indicates that it could be late November–early December or June. As a result, they conclude that “the risings and settings of Pleiades were widely observed in many Polynesian societies, where they were used to mark the change in seasons and/or to mark the commencement of the year” (Kirch and Green, 2001: 263). The Pleiades (“Seven Sisters”), known in Polynesia as *Mata-lik* (or a version of this), consist of six stars visible to the naked eye. The *acronitic rising* of Pleiades (when Pleiades first becomes visible just after sunset) occurs about November 20 and the *heliacal rising* of Pleiades (when visible on the eastern horizon just before dawn) occurs 30 to 40 days after the *acronitic setting* of Pleiades (when Pleiades are last visible just after sunset) at the end of April (Kirch and Green, 2001: 262-263).

The appearance of *palolo* corresponds with the acronitic rising of Pleiades and signals the beginning of the wet season, the “season of plenty”, the harvest, and the offering of first fruits, while the heliacal rising corresponds with the arrival of the dry season, sea turtles to deposit their eggs in the sand, the harvest of turmeric, and the commencement of yam garden work (Kirch and Green, 2001: 265). While Kirch and Green (2001) link the calendar year to the seasonal yam crop, they recognize also the significance of the seasonal reproductive behavior of the green sea turtle (*Chelonia mydas*), which arrived at the beginning of the dry season. In Polynesia, the turtle often had sacred status; it was often associated with chiefs and deities and could be a ritual offering in ceremonies. This status is reflected in the Samoan word for turtle: *i’asa*—literally, “sacred” (*sa*) “fish” (*i’ a*). In Samoa, at the To’aga site, the archaeological evidence includes relatively high concentrations of turtle bones (Kirch and Green, 2001: 260). Kirch and Green (2001: 269) argue that the ancient ritual link between turtles and Pleiades was significant and was carried into later time periods.

Thus, time reckoning in ancestral Polynesia, including Samoa, consisted of an interlocking set of systems: the cycle of the wet/dry seasons, the observations of Pleiades which marked the transition between seasons, a lunar calendar, and a system of intercalation that kept the lunar calendar in sync with the tropical year (Kirch and Green, 2001: 273). Horticulture, fishing, and ritual activities were all based on this system of calendar reckoning. The analysis of Kirch and Green (2001) relies on, and clarifies, the earlier ethnographic descriptions of seasonal activities in Samoa.

SAMOAN SOCIAL STRUCTURE

The basic units of Samoan social structure were (and are) the family and village. Unlike Western society, the family (rather than the individual) was the central unit, and unlike Western capitalist society, the emphasis was on reciprocity rather than individual accumulation. “High virtues are to be polite, kind and generous to relatives, friends and dependents; ... prestige comes through generous distribution, not accumulation, of wealth” (Keesing, 1934: 30-31). The generous distribution of food marked—and still marks – every occasion, and from the 19th century into

the early 20th century, fish and other marine resources were central items in the circulating baskets of food. For example, the Wesleyan missionary Peter Turner (1837: 66) describes a feast for the opening of a chapel on Savai'i in the 1830s that included 260 pigs, 1900 baskets of taro, 60 bunches of bananas and 600 fish. About 100 years later, in the 1930s in Vatia on Tutuila, the visiting Superintendent of Schools was presented, all together, "thirty fish, sixty taro, twelve lobster and crabs, six wild pigeons, twenty breadfruit, several dozen little bundles of *palusami*, and ... a seventy-five pound roast young pig..." (Drees, n.d.: 70).

Within the village, the basic unit of organization was, and is, the extended family (*'aiga*), a group with a wide membership based on descent, adoption and marriage. At the head of the group was (and is) the *matai*, whose title carried with it the authority (*pule*) over the land and resources used by members of the group. The *matais* of a village constituted the village *fono*, or village decision-making and administrative group. The *matais* were ranked according to local hierarchies of titles, and the basic *fono* organization was reproduced in district and island-wide political organizations. However, for organizing work, the family and the village remained central. In the 19th century and early 20th century, it was customary for the *matai* to allocate tasks each day to the untitled men and women in the plantations, in fishing, or working around the village. Fishing was often a village effort. Typically, the heads of families in the village met in a guest house, and over a bowl of *'ava* decided, according to the season, what form of community fishing should take place (Hiroa, 1930: 517). The control of natural resources, therefore, was mediated based on sociopolitical attributes specific to a given village (Watters, 1958a: 56). By 1950, this system of communal labor had changed as wage labor became more common.

There was recognition of individual talent regarding fishing, building canoes, and house building, and men who were noted specialists were called by a special term (*tufuga*). A village gained enviable social status for its rich taro gardens, the skill of its bonito fishermen, or the skill of its canoe builders (Watters, 1958a: 55). In fishing, the *tautai* (or *tautai ali'i* as Thilenius [1900] reports) was a recognized expert at fishing, and during fishing he had higher status and authority than a *matai* who might otherwise rank higher on land in the *fono*. Margaret Mead gives a description of the *tautai's* role in Ta'u in 1926:

Although all men fish, the master fisherman (*tau tai*) is always distinguished. He is usually also a master net-maker, and weaver of eel traps. He combines skill in fishing, the ownership of a good bonito boat, and proficiency in the secondary industries dependent on fishing. Usually the *tau tai* knows only the rudiments of the carpenter's art and is therefore more dependent upon other craftsmen, *tufuga*, than is the less skilled man who combines a general knowledge of all the arts with a special skill in no one of them. Between house builders (*tufuga fau fale*) and canoe builders (*tufuga fau va'a*) there is no hard and fast line. This is becoming increasingly true with the decrease in the manufacture of larger native canoes (Mead, 1930: 68).

According to Mead's observations on Ta'u, the village *fono* regulated the food supply, especially for anything involving the consumption of a great deal of food, like ceremonies and emergencies, and this was probably in line with other village practices:

The usual formal food regulations are of two sorts: to tapu the sea (*namu le tai*) and to tapu the land (*namu le ele'ele*). These are not necessarily exercised together. The tapu of the sea forbids reef fishing, but when the occasion is economic and not ceremonial (for identical tapus are observed during mourning for a high chief) it does not forbid deep-sea fishing where the supply would be only slightly affected. Special prohibitions may be laid upon coconuts, taro, pigs, or more special prohibitions may be declared under which each family is allowed to make *palusami* (a dish made of grated coconut meat and taro leaves which requires a great many coconuts) only once a week or once every ten days. (The sale of coconuts for copra has greatly enhanced their value and the rigor of the prohibition regarding their use has probably greatly increased.) The *fono* also decides upon the making or renewing of a *masi* pit (fermented breadfruit stored in the ground) or the baking of a communal *ti* oven (only resorted to in times of great food scarcity).

The food supply is further regulated by feasts for each breadfruit season (until the breadfruit feast has been held by the *fono*, no one else may eat of the breadfruit), and by the assignment of certain rare fish to one or more high chiefs, or of special parts of a pig or fish to special groups; for example, the head of the pig is assigned to the *aualuma*, and the head of the shark to the *aumaga* (Mead, 1930: 16).

In fishing, the families made up the work units, and the fish were distributed in the village to which the lagoon belonged (this is still the case). A communal fish drive—for *atule* or any other fish – was conducted by a village community in its own lagoon (Krämer, 1995: 218). In Samoa in 1930, “[S]upernatural influences are vastly important in human life, and give sanction to the whole political and social system as established by tradition. In olden times these were in terms of Polynesian deities and taboos, but nowadays they are defined mainly according to the interpretations current in the various mission sects” (Keesing, 1934: 31). Reverend George Turner (1989, original 1884), a missionary from the London Missionary Society (LMS) who wrote extensively about Samoan customs, provides many examples of fish and sea creatures that were considered sacred in various districts and villages as well as sanctions associated with violating taboos. For example, Turner relates the following concerning the deity incarnate in the *fe'e* or octopus.

The month of May was sacred to his worship. No traveller [sic] was then allowed to pass through the village by public road; nor was any canoe allowed in the lagoon off that part of the settlement (Turner, 1989: 29). ...In another district three months were sacred to the worship of the Fe'e. During that time any one passing along the road, or in the lagoon, would be beaten, if not killed, for insulting the god (Turner, 1989: 30).

While formal sanctions today come from the church or government, it is still possible in 2009 in American Samoa, following the Polynesian practice of taboos, to make a village lagoon ‘*sa*,’ or restricted.

It should be remembered that for the first half of the 20th century, the population of Samoa was much smaller than it is today. According to the American Naval and German censuses (Keesing, 1934: 33), in 1900 an estimated 5499 people lived in American Samoa and an estimated 32,815 occupied Western Samoa. By 1930, these respective numbers were 8926 and 40,722 (Keesing,

1934: 33). Of course, this means far fewer people resided in American Samoa and Western Samoa in relation to the available land and marine resources.

R. F. Watters (1958a: 45) states that a population density of 130 persons per square mile does not overtax natural resources in a system of shifting cultivation, as in traditional Samoa. He estimates that the population of Samoa was 54,000 in 1840, with a density of 44.5 persons per square mile, after a decline from the pre-European population, which he estimates at 80,000 persons. There were ample agricultural resources in large areas of Upolu and Savai'i ; only in Apolima and Manono (340 persons per square mile), Tutuila (212 persons per square mile) and Manu'a (153 persons per square mile), and possibly coastal areas of Aana on Upolu, was there some population pressure on the gardens (Watters, 1958a: 45). However, Watters concludes that, because traveling parties (*malaga*) from one village could visit another village if the land or lagoon was not providing enough food, population pressure never affected major modifications in the overall intensity of the use of land and sea resources (Watters, 1958a: 47; see also Hudson, 1839: 333). As an economic activity, although fishing came second to gardening, Samoans took full advantage of marine resources. Fish (except seven species that were poisonous or unpalatable and thus were not eaten) were consumed on a daily basis in the Samoan household. However, some species were not eaten in particular families or villages because they were deified (Watters, 1958a: 48; Watters, 1958b: 349, citing Krämer, 1995: 182–183). As a result, fishing activities stood in high esteem in traditional Samoan culture, fishing skill brought high social status, and fishing activities figured importantly in mythology (Watters, 1958a: 49). No evidence from early observers indicated that the lagoons were “fished out” (Watters, 1958a: 49).

Based on John Coulter's (1941: 37) research conducted in American Samoa in 1937, he stressed, even at this early date, the importance of increased population density in relation to available resources and an increased reliance on imported foods. In 1937, he reported the population of American Samoa as 11,906 (including 125 people for Swains Island) and he noted that fishing was less important than in previous time periods because of the availability of canned fish. Judd noted in 1926 that, “Today the natives are not fishing as they could” and Frank Drees (n.d.: 163) describes the distribution of many cases of canned salmon and sardines at a funeral in Vaitogi in the mid-1930s. In 1955, Coulter (1957: 76) reported the population of American Samoa as 20,500, and he cautioned that there was a high population density in relation to available resources (especially land). Additionally, it should be remembered that very little emigration from the islands occurred prior to 1950.

Similar to research conducted in other parts of Polynesia (e.g., Firth, 1975), we do not find evidence in Samoa of what could be called a society of “natural conservationists.” That is, Samoans, like other groups, observed the animals and birds in their environment and drew conclusions regarding their behavior. Sometimes their deductions assisted them in the food quest, for example, when they observed that flocks of sea birds were following shoals of bonito. By spotting these birds in pursuit of these fish, Samoans could find bonito (Hiroa, 1935: 51). Samoans synchronized their behavior with that of the animals they hunted, in what Marcel Mauss (1979) has called ‘symbiotic’ behavior. On the one hand, many fish were taken (“many thousands of atule” as Krämer reports) and on the other hand, Samoans recognized that men and the natural environment were in a symbiotic relationship. It was not the reflexive thinking of the 21st century (e.g., “we must conserve”); it was a practical recognition of the relation of human

society to its environment. Mauss (1950), following Durkheim, used the term ‘social morphology’ to describe how this balance worked, not only between men and the environment but as part of the entire fabric of culture and social relations. In Samoa, with the *matai* and village social organization, decisions about the usage of resources were not determined on an individual basis; they were subject to cultural beliefs that were enacted through the village political structure.

Prior to 1950, we find evidence of a non-Western or noncapitalist economy that emphasized social relations and sustainable use over profit maximization or monetary gain. This point has also been made more generally by R. Johannes (1978) regarding traditional fishing methods in Oceania. With the influence of westernization and the availability of markets to sell fish, there was a different attitude about economic and natural resources—a capitalist one—and this, combined with new technology (like scuba gear) and the possible refrigeration of the catch, led easily to overfishing practices that were not traditionally common. Having said this, Johannes (1978: 360) cites an example from (Western) Samoa, after monetary economies had been introduced, in which a local chief, under his traditional authority, issued a taboo on a section of the beach to limit the taking of turtle eggs after he realized that too many people were taking them. Today, for example, both territorial law and customary law in most villages forbid the use of poison or dynamite in reef fishing, although previously the use of poison was practiced widely. Traditional village management practices, therefore, can be appropriate for contemporary conservation goals and have been part of a plan for the management of subsistence fisheries in Samoa (King and Faasili, 1999).

Division of Labor in Fishing

As reported by Krämer (1995: 205, 200 Illustration #57), Hiroa (1930: 447-449), Judd (field notes 1926: 97), and, more recently, Linnekin et al., (2006: 59), only Samoan women gathered shellfish, octopus, seaweed, and small fishes on the reef. Men fished by snorkeling, diving with a spear, and angling with a rod; women took fish that dug under the sand. Only the men used large nets, and only the men hunted turtles. Both men and women used the ‘*enu* (fish basket) to catch small, school fish like the *i’a sina*, and both men and women participated in the communal fish drives. Young men did most of the diving while older men fished with poles. Only men fished for bonito and shark, using boats.

According to Krämer (1995:198), women armed mainly with a stick gathered small fish and small creatures (*figota*). During the new moon and full moon periods, when the low tide was in the forenoon, women went to the dried-up reef lagoons with a short stick, a longer stick, and a fish basket (*ola*). They used the sticks to poke in the reef and catch many species of small fishes and shellfishes as well as octopi, which they killed by biting them through the neck (Krämer, 1995: 199) or between the eyes (Hiroa, 1930: 420). The men caught the more dangerous species of morays, sea eels, and large crabs.

The smallest trap, the *fanga fa’atau tu’u’u* – the size of a child’s head – was used only by women during the day when fishing amongst the coral in the shallow parts of the lagoon. It was used to catch the dark fish, the *tu’u’u* (angelfish).

The *tu'u'u* is recognized as an aggressive fish, ready to fight fishes of similar size. Samoans recognized this trait, using it to their advantage to catch the fish. Samoan women would initially lay a trap on its side on the bottom of the lagoon and place a dark stone about the size of the fish in the trap. Standing nearby with her head submerged, the woman would watch the trap. Her presence would not disturb the fish. As the *tu'u'u* entered the trap to fight the other “fish,” the woman would place her hand on the entrance and lift the trap, thus catching the fish. This fish then replaced the stone as a decoy. The woman pushed a coconut leaflet midrib through the lower lip of the fish to tie the live fish to the trap (Krämer [1995: 205] says they attached it by its tail). Hiroa notes that the women caught fairly large numbers of *tu'u'u* in this manner, and that the introduction of water goggles (by 1927) greatly assisted this method (Hiroa, 1930: 447).

Hiroa did not see any of these traps on Tutuila, although they were known by the people living there. He notes that it was the most common form of fishing for women in Savai'i and the easiest way for them to catch a large number of fish for the daily meal (Hiroa, 1930: 448).

The *tu'u'u* is a fish that is eaten raw, for which there is a saying: *Euliuli fua le tu'u'u ae otangia* (the *tu'u'u* is black but is eaten raw). According to Hiroa (1930: 449), although blackness is generally associated with dirt and low status, the significance of the saying lies in the fact that a fish eaten raw shows that it has edible status over many other fish that are not eaten raw (see also a slightly different proverbial expression as given by Milner (1966: 293) in Appendix II, p. 101).

Tutui or *tuinga*, according to what Chief Tufele told Alfred Judd in 1926, was a method of fishing practiced only by women who worked in pairs. Each held a stick or short pole which was jabbed under opposite sides of a coral rock in the shallows, thereby driving small fish into a basket laid in the water nearby. This method was practiced at Ofu, and a similar method of fishing by women – called *sasa'e* – is described by Krämer (1995: 206). The women searched the corals with their right hand while they held the fishing basket in their left hand. Then they spoke the following words aloud: “Go inside *malau*, inside *tu'u'u*, inside *fō*, inside *fuga*, inside *pone*, inside *sugale*, inside *lō*” (Krämer, 1995: 206).

Safunua is a fishing method in which about two dozen women formed a semicircle in place of a net and then moved forward in close formation towards the shore, scooping up the trapped fish in small nets (Krämer, 1995: 214).

FISHING TECHNIQUES

Technique: Nets

Based on the descriptions of fishing for various species, nets – both large and small – were seen as important gear in traditional Samoan fishing. Krämer (1995: 233, footnote 1) notes that Stair recorded 130 different types of nets, although he did not detail the names of all of them or what exactly they were used for. According to Reverend Barradale (1907: 112-14), a missionary, the women of the inland villages made most of the nets on Upolu and Savai'i because the nets were

made of tree fiber and the inland villages were closest to the source of the fiber. Krämer (1995: 206) reports that the tree fiber, *fau sogā* (*Pipturus argenteus*), was used for fine nets, whereas coconut husks were used to make coarse nets (see also Whistler, 2000: 164).

According to Krämer, fishing with nets was more important and more frequently practiced than fishing with baskets, and netmaking could involve a special meal for the artisans, called an *umusā* (sacred meal). Although both women and men participated in gathering the materials to make the net, and some nets were made by both women and men, the making of fine-mesh nets was often accomplished by a male netmaking specialist. The *matai* who was organizing the netmaking would first order his family to collect all the materials needed, and the women, girls and men would twist the sennit for the net for several weeks. After this, the *matai* would make a piece of wood the length that would correspond to the mesh size and would make an agreement with an artisan to make the net to a specified length and with the mesh of a certain size. After the man wove the net, the *matai* would direct the family to prepare for the tying of the net by preparing a feast of banana, coconut, and taro baked in the oven. When this “*loloi*” dish was ready, other people brought food and, under the direction of the netmaker other fishermen helped to tie the net. After the net was tied, the netmaker distributed the food to the fishermen who assisted in tying the net. Finally, they drank *’ava* so that many fish would be caught with the net (Krämer, 1995: 211-12).

Missionaries, Krämer (1995: 205-222), Hiroa (1930: 469-488), and the Wilkes Expedition (1839) all show evidence that nets of all sizes and varieties were a staple tool in Samoan fishing. Fishing with nets ranged from everyday family fishing in the lagoon to fishing with more specialized nets to catch certain species.

Ordinary Family Fishing

Short nets (‘*upenga fa’alava*) of 8 to 10 fathoms with pegged float lines and stone sinker lines were used in ordinary family fishing by a small party. At Leone, Hiroa participated with the Ripley family in this form of fishing. Two persons were stationed with a net that was spread across a channel. The channel is called *ava*, and the method of fishing by stretching the net across it was called *tu ava ava*. The fisherman dove down to see that the sinker line rested on the bottom and adjusted it into holes, depressions, and around rocks so that no openings were left below the sinker line. The other members of the family spread out in a curve and worked down towards the net by splashing and beating the water to drive the fish into the net. As they did this, they subjected rocks to close scrutiny by diving down and feeling or spearing in the crevices. In this manner, they caught several fish while others were driven into the net. Every crevice and hole in the rocks was familiar to the family. After the drive, the net was taken up and carried across to another channel. The net, which was short and light, was quickly folded at the float line and carried over the shoulder of one person. The part of the lagoon adjacent to the family dwellings was worked with this technique (Hiroa, 1930: 482-83).

Short nets were also used with artificially made rock heaps. After driving the fish into the heaps, the net was run around it and the sinker line carefully adjusted to the bottom. The stones were then removed by dropping them outside the net line. The fish were speared or caught up in some form of scoop net and the surrounding net prevented their escape, some being caught in the meshes.

The casting net was used for the above purposes quite readily. When opened out across a channel or used around a rock heap, it was an *'upenga fa'alava*, but when folded and cast, the same net was an *'upenga tili* (Hiroa, 1930: 482).

Fishing for Two Kinds of Mullet

Different netting techniques were used for catching *'anae*, grey mullet, and *ia'eva*, the current Samoan term for the red-lipped mullet (Hiroa, 1930: 439, 478, 485; Krämer, 1995: 219-221; AusAID No. 19, July 2000). Hiroa says that, for Samoans, *'anae* (mullet) and *atule* (mackerel) were two important fishes that swam in shoals. The mullet hand net (*alangamea*) was used for catching mullet as they jumped over a seine net. The Samoan mullet was usually caught with an ordinary net, but the *alangamea* was used to catch mullet in Nu'uuli village on Tutuila and in some villages in Upolu and Savai'i. Hiroa says that the use of the *alangamea* net in Nu'uuli was a practice imported from Upolu and Savai'i. Krämer shows a picture of an *alangamea* net on Upolu, circa 1900 (1995: 220, Illustration #66).

In Upolu and Savai'i, a long net (*tolo matu*) was used in connection with catching mullet. Mullet will not go through the net but endeavor to escape by leaping over it. The nets are used to form an enclosure around the fish. The fish are actually caught with the *alangamea* net: after the long net has been set across the direction in which the fish are moving, the fishermen, each armed with an *alangamea*, take up their positions outside the net and close together.

The mullet caught with the *tolo matu* and the *alangamea* are red-lipped mullet and were called *'anae ngutu mumu*. This distinguished them from the other mullet (*'anae Samoa*). Tradition says that Sina (a well-known female figure in Samoan legends) brought the red-lipped mullet from Fiji and that the family of Toaloea in Pu'apu'a, Savai'i has the authority (*pule*) over the fishing arrangements for her mullet (Hiroa, 1930: 485-86; 522). In Tutuila, the red-lipped mullet appeared only at the western end. They appeared first at Lauanae and then moved westward to Amanave near the lighthouse island. Here they were caught in nets stretched across the channel between the small island and the coast. No *alangamea* scoop was used (Hiroa, 1930: 485).

The season for red-lipped mullet extended from October to December. The spawning of the red-lipped mullet was known in the villages of Luatuanu'u and Moata'a on Upolu, at Pu'apu'a on Savai'i, and at Nu'ulopa Island near Manono, in addition to Lauanae and Amanave on Tutuila. By 1993, the red-lipped mullet was almost nonexistent, although they were considered an indicator species for the health of the lagoon fishery (AusAID, 2000: 36). By 2000, there was a substantial recovery of the fishery in Pu'apu'a, Savai'i. Traditionally, most of the families of the village made a section of net and joined together to encircle the school of fish when it came inshore to spawn (a similar method was used for *i'a sina* and *atule*, and managed by an expert, according to Hiroa, 1930: 432). The last mullet net of this type was used in 1960. Today, an attempt is in progress to restore the fishery at Pu'apu'a, under the leadership of a "fish leader." A description of the Samoan fishing techniques in 2000 demonstrates the village's continuity in organizing their fishing efforts and by banning certain activities at Pu'apu'a:

A village elder was in charge of the fishing. When he believed the mullet were about to enter the lagoon, he called together a group consisting of five of the village orators

(known as *aitu ole i'a*). The group decided whether to have a fish drive and advised the village families. At this time, no one was allowed to enter the lagoon. Before dawn the next day, all 60 or so families would gather with their nets and scoops at the shore and join their pieces of net. An elected 'fish leader' is said to be the only person that the fish will follow. If the mullet are present, he blows a shell horn to tell the villagers to set their net. He then paddles his canoe past the school using a particular flick of the paddle. The fish follow the canoe and enter the net which is then closed. Once encircled, the fish attempt to escape by jumping over the net, to be caught by the villagers using scoop nets. When the orators decide that enough fish have been caught to satisfy village needs, they end the fishing. The catch is placed on a flat rock and shared out. There is a ban in the village on the sale of the fish, though there is some distribution, notably to the pastor. In an average year, such group fishing activities would occur about five or six times (AusAID, 2000: 37).

Both Krämer and Hiroa emphasize in their descriptions how the Samoans understood the natural behavior of the various species fished and adjusted their techniques accordingly. While the red-lipped mullet appeared only in certain places, the grey mullet was more common. Krämer reports that it was a special fishery and a favorite occupation of chiefs because of the inclination of mullets to jump over the net. Samoans made an analogy between this fishing (*seu 'anae*) and pigeon hunting (*seuga lupe*), which was also a favorite pastime of chiefs, because both mullets and pigeons were caught with nets while in the air (Krämer, 1995: 222).⁶

The following description also shows how Samoans distinguished fish according to size and age: for instance, the small *'anae* was called *āua* (see Appendix II for more examples). *Āua* fishing depended on a large number of people, about 100-150 Krämer (1995: 221) reports, who were led by a special fish spotter. At the time of rising water, the fish spotter went into the lagoon in his canoe and when he saw the young mullet (called *āua* at this stage) either feeding on the bottom or swimming on the surface, he twisted his oar as a sign to the six to eight canoes behind him who held the net. Following his instructions, they laid out the net to the right and left with the help of about 40-50 canoes who composed the net-laying fleet. When the fish spotter lowered his paddle straight into the water, they lowered the net. They then jumped out of the canoes and, standing by the net, they caught the *āua* in flight as the fish jumped over the net (Krämer, 1995: 222; see Krämer, 1995: 207, Illustration #60, the drying of a large net for grey mullet fishing).

Fish Drives in Pago Harbor

This description was made by Commander E. M. Blackwell, who was in Pago Pago in 1900 with Commander Tilley. It is the only description we found about communal fish drives in Pago Harbor.

They had a peculiar fishing custom there. An old man named Magia who lived about 200 feet up on the side of the mountains above Pago Pago claimed that he owned all the fish in the harbor. At certain seasons they would have fish drives. Magia would be up at daybreak calling the fish. All the boats would stretch across the mouth of the harbor with lines running across them and coconut branches weighted and hanging down 10 to 15 feet in the water. The boats would pull

⁶ See Herdrich's (1991) discussion of pigeon-hunting for a further understanding of this metaphor.

slowly up the harbor, scaring and driving the fish before them. When they got up near the end and the water became shallow, they would stretch a long net or seine in front of the boats from shore to shore and haul that up gradually until the fish got in a very small space. Men would stand outside and spear and keep fish from jumping over, and men, women and children would be inside catching them and throwing them on shore. When all were caught and piled up, every man, woman and child there was entitled to a share of the fish. They would form a line, Magia presiding, and pick up a fish as they passed the pile and keep this up until all the fish were taken. Whenever this would happen, we would send our mess steward up there with the mess boys to get our part of the fish (Blackwell, 1948: 31-32).

Technique: Fish Weirs

Walled weirs of stone were known throughout the Samoan group but were confined to one village on each of the three large islands and in the Manu'a group. They were situated at the mouth of a bay or lagoon. The walls, made of loosely built coral stone, were termed *pa*, and the fish weir, *pa i'a*. Hiroa's data and diagrams of these weirs were obtained from the answers sent in reply to a Bishop Museum questionnaire on walled fish traps. By 1927, the time of Hiroa's visit, the weirs had all disappeared (Hiroa, 1930: 446).

In Savai'i, at Iva, the walls of loosely built coral were renovated each year prior to the season; "they are not used now and have fallen down" (Hiroa, 1930: 444; see Hiroa, 1930: 445, Fig. 259, sketches of walled fish weirs).

In Upolu, according to Dr. E. Schultz, Chief Justice of German Samoa in 1911, men in the village of Falelatai waited at the entrance of the *pa* when the tide was going out and scooped up fish with a hand net. The Falelatai weirs, about 5 ft high, were temporary and were pulled down after use to allow the boats free use of the lagoon. Schultz claimed six types of fish were caught with this method, including *malauli* (Hiroa, 1930: 445).

The only trap known on Tutuila was a stone weir between Nu'uuli and Tafuna, as reported by N. E. Crosse, Governor of American Samoa in 1911 and Mr. J. L. Lisonbee (with a sketch by Mr. Lisonbee). The weirs were built across the lagoon entrance, with six narrowed openings towards the sea and seven openings towards the shore. Fishermen used nets to catch fish at the inshore openings on the rising tide, as well as intercept fish returning to the sea on the falling tide at the seaward openings. The traps were visited by Mr. A. G. Mayer in 1920, but by that time only the remains were seen, as the walls had been knocked down by a storm and the weirs had gone out of use (Hiroa, 1930: 445-446). The length of the weirs was reported to be about 208 rods (a rod is 16.5 ft); they were about 2 to 4 ft wide at the bottom and about 3 ft high. When in use, they were probably higher. The traps belonged to the people and had been in existence since "before the time of the grandparents of the oldest inhabitants."

On Manu'a in 1920, the pointed ends of a stone weir were in good preservation but Hiroa saw nothing of them 7 years later. Krämer pictured the Ta'u weir as it was being used to catch *atule* (1995: 217, Illustration #65) when he observed the *atule* catch in May 1898.

Both the Falelatai and Nu'uuli weirs provide converging walls that force the fish through an opening into the net. The methods at Iva and Ta'ū are simply an open enclosure that must be closed with the coconut leaf *lau*loa.

On Savai'i, Hiroa observed two leaf weirs, each with 20-yd-long sides, used to catch *i'a sina*. The *i'a sina* move in shoals towards the east in the morning (the optimal time is before 5:30) and towards the west in the evening (sunset is best), and both times they swim close to the bottom of the weir. A weir made of banana leaves was constructed to catch the fish as they move east while a weir of coconut leaves nearby was to catch them in the evening. The fisherman stood alongside, outside the weir, and scooped the fish out with small nets attached to the narrow opening of the weir (Hiroa, 1930: 432).

In Upolu and Savai'i, by 1927 there were many V-shaped weirs with walls made of wire netting supported by stakes driven into holes made with an iron crowbar. According to Hiroa, the form was old but the method of execution was modern. At Fagamalo, large numbers of *atule* were caught, and elsewhere the wire trap was used for *i'a sina* (Hiroa, 1930: 477). The advantage of a wire netting trap was that it was permanently set and did not need watching (Hiroa, 1930: 446).

Technique: Fishhooks

According to legend, Samoan fishhooks have divine origins because the shell that was used for the original fishhook was said to have been brought down from heaven (Krämer, 1995: 197). Archaeological evidence show that fishhooks made from Turbo shell (*Turbo setosus*) have been found at two of the earliest known sites in American Samoa, the To'aga site on Ofu Island in Manu'a, and the Aganoa site on Tutuila (Kirch, 1993:160-161; Pearl and Sauck, 2007: slides 30-32). The fishhooks from these sites date to approximately 2500-2200 B.P. (Kirch, 1993: 87; Pearl and Sauck, 2007: slide 30).⁷ The presence of fishhooks, as part of Samoan material culture, has also been noted by the earliest explorers including Bougainville in 1768, La Perouse in 1787, and Von Kotzebue in 1824, as well as missionaries such as Williams in 1830 and 1832, Turner from 1841 to 1860, and Stair from 1838 to 1845 (Bougainville, 1772; La Perouse, 1799; Turner, 1861, 1989 [1884]; Von Kotzebue, 1967 [1830]; Stair, 1983 [1897]; Moyle, 1984). The anthropological writings of Krämer (1995 [1903]), Demandt (1913), Beasley (1928), and Hiroa (1930) have the most detailed descriptions of traditional Samoan fishhooks. Of the four, Hiroa provides the most complete descriptions of the greatest number of known hooks and their manufacture. Hiroa (1930: 490-522) has extensive detailed drawings illustrating how the hooks were made and a photographic plate showing many of the hooks discussed in the text (Hiroa, 1930: Plate XLVII).

The general Samoan name for hook is *matau* with more specific names given to hooks using different methods to attract the fish, such as baited hooks, gorges, and trolling lure hooks. Hooks were designed to catch particular species of fish, with design features compatible with certain fishing methods. For instance, a hook called the *pa'atu* was a trolling style of hook (*pa*) (Krämer

⁷ Jeff Clark (Clark and Landrum n.d.) has found a number of fishhooks from the Va'oto site, just south of To'aga on Ofu, which fall into the same time period and later.

calls a *pa* a “spinner”) used to catch bonito (*'atu*). It was a composite, two-piece lure made of a shell shank, lure or spinner (*pa*) with a barbless turtle shell hook. As noted earlier, this design made it possible for the fisherman, using a fishing rod, to pull the fish out of the water and throw it into the front of his boat in one motion with the fish easily sliding off the hook since it was not held by a barb.

The term *matau* for hook is broader than the English term “hook” as it includes gorges which are not hook shaped but is rather a straight piece of wood or bone. The gorges, attached to a twisted fiber line, were baited and once a fish took it, it became lodged in the fish’s mouth or throat. Hiroa (1930: 489-90) describes three varieties of wooden gorges and a single type of gorge that used a float and fish bones (see description of floats in next section). John Williams described this gorge plus float device in 1832 as follows:

The Samoans form a float of hollow wood about eight inches in diameter & eight inches high. To this they attach a sharp piece of fish bone straight like a needle. This is tied in the middle & suspended by a piece of fine line about ten inches below the float & baited with cocoanut [sic], 20 or 30 of these floats are then strung together at some little distance apart on a strong string. The fish are attracted I believe by the whiteness of the float with which the wood is made and seize the bait. The fish bone pierces on each side the mouth by which the fish is held. The violent motion of the float indicates to the fisherman that a fish is fast (Moyle, 1984: 227).⁸

Hiroa (1930: 489-517) also describes 8 basic types of hooks with at least 11 varieties that were named for different colored shells and materials used. The types include: a hook for catching the *mumu* fish outside of the reef opposite the reef channel; a hook for catching freshwater eels in streams and wetland areas called a *matau tuna*; a *masimasi* or dolphin fishhook; a hook for catching *tagi* (a large open ocean fish) called a *pa tagi*; a hook used to catch bonito on the open ocean called a *pa 'atu*; a hook used for catching *malauli* (just outside the reef and sometimes in the reef area in the early morning and evening) called a *pa ala*; and the hook for catching small fish was called a *pa seuseu*. Hiroa (1930: 517) lists the names of the small fish in question as follows: *gatala* (*Epinesphelus*)⁹ when about 6 in long), *'ata'ata* (*Epinesphelus* when over one foot in length) *matamu* (*Lethrinus*), *malai* (*Lutjanus* when about one foot long), *matalau* (unknown scientific name), *umiumia* (*Polydactylus*), *sugalupe* (unknown scientific name), and *patagaloa* (*Thalassoma*).¹⁰

Hiroa (1930: 404, 514) notes that the *pa 'atu* and *pa ala* hooks had additional names that were tied to differences in shell color. For the *pa 'atu* those names included: *pa tio*, *pa usi*, *pa laumilo*, *pa ulia*, *pa lautofe*, *pa sulu*, *pa lanulua*, and *pa lupovai*. For the *pa ala* hooks the names were: *pa ulutoto*, *pa laveuli*, *pa ululalafi*, *pa lau* and *pa ala sina*. Hiroa explains that the variety of colors did not indicate a one-to-one relationship between different types of shell used and different colors; rather, “The craftsmen were expert in producing shades of color by varying the amount of dark outer [shell] surface removed in grinding” (Hiroa, 1930: 498).

⁸ This quotation from Williams was referred to in the next section regarding Ripley’s story of the flying fish float.

⁹ A genus that encompasses species of grouper.

¹⁰ Scientific names and their related sizes were found, whenever possible, in Milner 1966.

The hooks were made of various materials including wood from a tree fern, coconut tree wood, including the midrib of the coconut leaves, whale ivory, bone, fish bone, the shell from various invertebrates, and turtle shell. In addition, fine threads were used for lashing, a three-ply twisted string made from *fau sogā* was used as a snood (line attached to the leader line), and *fau sogā* strips were used for the hackle (at the end of the hook). Milner (1966: 60) identifies *fausoga* (one word) as a small tree (*Pipturus* sp.); presumably the lines were made from strips of its inner bark.¹¹ Feathers were also used as hackle with some types of hooks, though Hiroa (1930: 513-14) argues, *contra* Stair (1983: 203), not with the bonito hook (*pa'atu*).

A wide variety of shell was used for fishhooks. Early explorers and missionaries frequently referred to the shell used as "pearl" or "mother of pearl" (Bougainville, 1772; La Perouse, 1799: 110; Turner, 1861: 179; Von Kotzebue, 1967: 268; Stair, 1983: 203; Moyle, 1984: 227), but while imported pearl shell was commonly used in the 1920s, Hiroa (1930: 498) points out that such shell was not native to Samoan waters and was unlikely to have been used in pre-European times. This seems to be borne out archaeologically in that recovered ancient fishhooks tend to be made from Turbo shell (Kirch, 1993; Pearl, pers. comm., 2008),¹² and historically wherein a wide variety of shells have been identified in museum collections of Samoan fishhooks collected in the 19th and early 20th centuries.

In Hiroa's review of the literature (1930: 510, 515), he notes that the following types of shell were used to make the shanks for trolling/lure style fishhooks: *pala'au* (*Pterocera*), *fatuaau* (*Spondylus*), *foafoa* (*Cypraea*), *'ali'ao* (*Trochus*), *alili* (*Turbo*), *faisua* (*Tridacna*), *fole* (*Pinna*), and *tofe* (*Perna*). In addition, in the case of the *pa seu seu* Hiroa (1930: 515) notes that *tupe* or the *operculum* of the *Turbo* shell was also used likely because the *pa seu seu* was the smallest of the trolling hooks. Historically, the pointed hook that was lashed to the shank was most commonly turtle shell, though Hiroa (1930: 497-98, 501) says that sometimes other materials such as wood (including *niu vao*, wild palm, and *oliolī*, tree fern),¹³ shell, and bone were sometimes used. He notes that a bonito hook made entirely of wood was seen on Ta'u (Hiroa, 1930: 501).

The trolling hooks were the most difficult to manufacture. They required the shaping of the shell shank (by a combination of cutting and grinding) to resemble a small fish along with the drilling of holes in order to tie down the snood and the carving of grooves for lashing (*fau sogā*) on the curved turtle shell hook. Hiroa (1930: 495-96) describes and illustrates a drill (*vili*) that had a point made from a stone flake or spine of a sea urchin, the *vana* (*Echinus*). The turtle shell hook had to be carved into a hook-like shape that included a flat edge on the bend that butted up against the shank with a point at the end of the material forming the opposite bend of the hook. All of the hooks for trolling (Hiroa calls them points) had holes drilled through them along the flat edge so that they could be tied down to the shank (*pa*) using strong thread material. In some cases, such as the *pa ala*, the holes also were used to attach feathers and additional *fau sogā*

¹¹ Krämer (1995: 206) and Whistler (2000: 164) also discuss the use of *fau sogā*; see our earlier discussion of fine nets.

¹² Roger Green (Green and Davidson, 1969: 271) mentions Hiroa's statement but notes that, from his own conversations with Samoans, pearl shell does occur in Samoa, if rarely.

¹³ *Niu vao* (*Clinostigma* spp.) wild palms or "inland palm" and *oliolī* or "tree fern" (*Cyathea* spp.) were both used to make sharp sticks, points, or hooks (Whistler, 2000: 187, 189).

strips for the hackle. The lashing was complex and each expert hook maker had a style of lashing that he found lucky. Hiroa (1930: 499-503) provides a full example of a “lashing formula” that was written down by Le’oso Ripley when he held the senior orator (*tulāfale*) title for Leone, Tutuila, and demonstrated for Hiroa by Le’oso’s son Fepuleai Ripley.

Once made, the hooks were attached by using a 9- or 10-ft fine leader line to five-ply sennit braid about 22 ft long. This would, in turn, be attached to one of two types of fishing rods (bamboo poles with wooden handles). One type was a long rod (*launiu*) 15 ft 6 in long while the other was a shorter rod (*matila*) about 8 ft long (Hiroa, 1930: 503-504). In some cases, however, the line was paid out from a boat as a hand line or even attached to a toe (Hiroa, 1930: 514).

F. Pearl and W. Sauck (2007) note that some of the hooks they found at the Aganoa site seem to have this flat edge that suggests a hook designed to be lashed to a *pa*. No *pa* were recovered and none of these hooks had holes drilled in them, but the possibility is open that these hooks were broken in the manufacturing process or otherwise rejected for use before holes were drilled in them.

Technique: Floats (*uto*)

A bait float was used for shark fishing (see next section for description), and wooden floats were used for octopus fishing with nets and the line of a squid lure. The floats were termed *uto*, meaning a piece of wood of the *tou* tree that is very light and can float on the sea (Krämer, 1995: 211). A green branch tied to an eel line also acted as a float and was termed *fa’autouto* (to act as an *uto*). One special float, not seen by Hiroa but described by Fepulea’i Ripley of Leone in 1927, was the flying fish float, *uto malolo* (Hiroa, 1930: 427).

According to Fepulea’i Ripley, a particular bone in the flying fish (*malolo*) was tied to a line at an angle to form a crude hook. The short length of line was tied to a wooden float and the bone baited with a variety of coconut called *niu uto*. A number so prepared were set in line outside the reef and the fisherman watched from one end of the baited line. When the float moved out of line, he knew that a fish was on the hook. He paddled down, removed the fish, and reset the float in line again. When Hiroa asked about it, the method was apparently unknown in Manu’a and Savai’i, yet Pratt’s dictionary had a term, *pangi*, as the bait for flying fish, and *pangiuto*, to fix the bait for flying fish, indicating that the bait (*pangi*) was fixed by a line to the float (*uto*), and that the technique was more widely known (Hiroa, 1930: 428). Ripley claimed that the bone of the flying fish was used to make the hook, and he quoted his father, “*E fano le malolo i lona au*” (“the flying fish perishes through its own sharp point”), a saying that also applies to someone who brings trouble upon himself. Hiroa quoted this saying in Savai’i and described the hook technique but they didn’t know it (Hiroa, 1930: 428).

When Hiroa returned to Leone, he asked Ripley to make one of these floats for him, but Ripley could not do it. Following Ripley’s suggestion, Hiroa consulted with High Talking Chief Le’oso, who knew the saying but claimed that the *au* was not the bone but the liver of the fish, used as bait on an ordinary hook. After investigation, and by consulting the journal of John Williams,

who gives a description of the bone, Hiroa concluded that Ripley's story was correct: the bones were used as gorges to catch the *malolo*.

Krämer reports (1995: 207) that flying fish were often scooped out of the sea with nets by torch light at night. They could also be fished with fishhooks made of fish bones that were attached to floats along a line; used primarily to catch flying fish, the method is called *tagataga* in Pratt (Krämer, 1995: 208). According to Krämer (1995: 207), the *uto* (float) method, with strings of cooked breadfruit as bait, was used to catch *palagi* on the small island of Apolima near Upolu. This, too, supports Ripley's description of a method that was used apparently throughout the islands.

Technique: Specialized Fishing with Boats

Fishing for Sharks

Hiroa describes the shark noose in some detail because he claims that, while noosing was common in Samoa, it was rare in other parts of Polynesia. He saw a proper shark rope at Leone, about 22 ft long; netting sharks in Samoa were rare, as were catching them with a hook (1930: 421).

There were two kinds of bait used in shark fishing: the float bait to lure the shark near to the boat, and the near bait (usually a bonito head) to get the shark near for noosing. The bonito head was preferred as bait because of the strong odor; it might be that they used a shark rattle also to lure the shark near to the boat (it mimicked the movement and activity of small fish). When the shark came near the canoe, the expert managed the noose. As the shark bit the bonito head bait, the expert slipped the noose over the shark's head and pulled the noose when it was beyond the lower jaw. He had to accomplish this when the head was directed downwards or his hand could be bitten. After the shark was in the noose, they used a club to kill the shark when it was next to the canoe; often they jammed a shark spear (*taova'a*) into its mouth so that it couldn't bite (Hiroa, 1930: 424-25).

In Ta'u, shark nets (*'upenga malie*) were sometimes used and were made of the thick three-ply twisted cord of *matiata* bast.¹⁴ The mesh was large; the length about 50 yards, and the depth 18 ft. Floats made of breadfruit wood were attached to the upper rope at about 2 ft apart. Large stone sinkers were attached at either end, with a lighter one in the middle (Hiroa, 1930: 487). One of these stones, with a well-marked longitudinal groove on either side, was secured by Albert Judd at Leone for the Bishop Museum and was said to be an anchor for special bait used in connection with the net. It could serve both purposes. The bait of fish attracted sharks and other large fish which, in trying to secure the bait, got caught by the gills in the meshes of the net. The net was set outside the reef and at right angles to it. The net was set in the afternoon and left until morning; the fish were caught by the gills at night. When the net was set, it was

¹⁴ Another name for *mati* (*Ficus tinctoria*); "the bast fibers of one species, perhaps *Ficus tinctoria*, were formerly used to make fishing nets and possibly fishing lines" (Whistler, 2000: 182).

described as *fa'atofa le 'upenga* (putting the net to sleep for the night), a phrase used only with a shark net (Hiroa, 1930: 487).

Sharks could be fished with hooks when many sharks appeared in a lagoon. In this method, the shark bites the hook and is dragged to shallow water, where it eventually dies of exhaustion (Krämer, 1995: 228).

Shark fishing, as with bonito fishing (see next section for description), was surrounded by ceremony. When a *tautai* caught a shark, the boats would make a procession home with the *tautai* in the lead canoe. He stood in the canoe and jiggled his oar as a sign of a successful catch but no shouting or singing occurred, as, like bonito fishing, all noise, loud talk, and similar actions were forbidden. Then the *tautai* who had noosed the shark was met with a mat by his wife on shore; after this, he gave the shark to the chiefs because it was a forbidden fish (*i'a sã*) for commoners, and he retired to his house; he sat in his house looking sad (i.e., gave the appearance of mourning) and returned to the group only after being summoned by the chiefs to come to them and receive his title of *tautai ali'i* (Thilenius, 1900: 129; Krämer, 1995 : 228).

By contrast, in Leone in 1903 there was a lively arrival of the boats after sharks were caught. In the Governor's Annual Report for fiscal year ending June 30, 1903, Commander E. B. Underwood states that shark fishing took place frequently when there were no trade winds and the Samoans could take their boats to the feeding grounds of the sharks. He says that the boats went out for one day, stayed out all night and returned the following day. Large numbers of sharks were caught, and the boats arrived back displaying a sign of their good luck:

The return of the boat is a picturesque sight, the natives singing while laboring at the oars, and there being displayed from a mast or pole a towel, handkerchief, or other similar token for each shark caught. I have seen a returning boat with nine of these signals flying (Underwood, July 10, 1903).

There was a large species of shark called *naiufi* that was regarded by fishermen as the king of sharks and treated with ceremonial respect. Speeches were given to the shark and if it was seen but not fished, the head fisherman gave a speech about how he would return to meet it. It was considered a great honor to kill a *naiufi*. As the canoe came in with a *naiufi*, the shell trumpet was sounded and the canoe paraded backward and forward before the village. The canoe owner met the returning fishermen at the landing with a fine mat and touched the head of the shark with it. The mat was given to the *tautai* and the shark was given to the canoe owner and the village chiefs, where it was ceremonially divided among them. The *tautai* who noosed a *naiufi* thus established his authority. The son of a successful *tautai* might succeed him after he retired. According to Hiroa, in an argument between two aspirants to the position, the decision in favor of one is clinched if it can be said, "His father caught a *naiufi*" (Hiroa, 1930: 521).

On Tutuila there were festivities prior to fishing for sharks, and, as with bonito, there were special words for parts of the shark, for example, *tulāgogo* (dorsal fin), which is called "resting place for seagulls" (Krämer, 1995: 228). The shark, like the bonito, was cut into ceremonial divisions, with certain parts given to certain people according to rank. For example, the shark's stomach and intestines were regarded as the best parts of the fish and they were shared by the talking chief and the head fisherman (Hiroa, 1930: 125). The village of Leone on Tutuila was

divided into seven parts, each with its own chiefs, so when the canoes came in, they took their catch to their own part of the village, only to come together again later for a communal meal and *’ava* (Hiroa, 1930: 125). In these situations, chiefs from neighboring villages might hear of the catch and would then ask for their official shares. The only acceptable excuse for refusing them was if the shares were already eaten or given away; otherwise, this request could not be denied because these exchanges were central to the social organization of the village (Hiroa, 1930: 126).

L. Becke (1901) tells this story of a particular technique for hunting the *tānifa* (shark) at Vaivasa River, Upolu. The *tānifa* seldom exceeds 10 ft in size, but the shark has a solitary nocturnal habit of haunting the mouths of shallow streams; they were a serious threat to people using or crossing the streams. After one was seen, the Samoans failed to catch it with a metal hook or shoot it with a rifle. Then two sharks appeared, each about 8 ft long. An old man took two strips of green bamboo, charred the pointed ends, and coiled them into a small ball, bound by the skin of a fish known as the “leatherjacket.” At that point, two dogs were killed and eviscerated, and the bamboo coils were put into the stomachs of the dogs in order to use the dogs as bait. The dogs were snatched by the sharks when they came near. As soon as the dogs were digested, the skin of the fish was intended to break and the coil would fly apart, killing the shark. A week later they found one dead shark with the bamboo protruding from its belly and assumed that the other had died at sea.

Bonito Fishing

One of the earliest recorded contacts between Europeans and Samoans was made by Captain Roggeveen and his crew in 1722, when they traded 4-5 strings of glass beads for 4-5 flying fish off Ofu. Here, Roggeveen and his men saw very neat and fast canoes with three paddles. At Ta’ū he noted that some canoes were not made of hollowed-out trees but were made of planks very neatly joined together (Roggeveen, 1970: 151-153). In both cases, he seems to be describing bonito canoes, which were made of planks and typically were manned by three men (although it could be two men in Western Samoa). Hiroa reports that the sight of bonito canoes far out at sea in the 18th century caused Bougainville to call the Samoan Group the Navigator Islands (1930: 509). Other authors (most recently, Severance and Franco, 1989; Linnekin et al., 2006) have written about Samoan bonito fishing, perhaps because, as Krämer writes, it was “the most elegant sport on Samoa” (1995: 225). Bonito fishing required a special boat (*va’aalo*) and great strength and endurance in the crew. Every person of high status had a bonito canoe (Hiroa, 1930: 417). In 1926, when he was purchasing material items for the Bishop Museum, Alfred Judd reports that there were few *va’aalo* available on Tutuila, while it was still possible to buy one in Ofu for a price ranging up to \$50 (Judd, 1926: 84).

According to Krämer (1995: 225), the bonito season began in April or May, when the rainy season was over and the consistent trade winds began to blow. At this point, especially if the winds were mild and gentle, the fishermen were able to move out to sea under the best conditions for canoe fishing. However, Hiroa (1930: 509) gives slightly different information. The author states that there were three seasons in the year for catching bonito, and they corresponded to the breadfruit seasons. The first was at the beginning of the year (January and February), the second was during May, June, and July, and the third was at the end of the year, in October, November, and part of December. Here, too, the condition of the sea determined whether or not the boats went out. Bonito fishing was further classified according to the days of the month, when certain

days were considered to be appropriate fishing days. These classifications are (Hiroa, 1930: 509):

<i>'Atu pulapula</i>	Bonito of the new moon
<i>'Atu fa'afitu</i>	Bonito of the 7 th day
<i>'Atu oa toa</i>	Bonito of the full moon
<i>'Atu o ngafoa</i>	Bonito of the half-moon waning

The bonito sought at the end of the month, when they were scarce, were called *'Atu o le sela ma le miti loa*, or “bonito of weariness and profuse perspiration” (Hiroa, 1930: 509).

Building the bonito boat was a special task, done by a specialist who belonged to Sā Tagaloa, the builders' guild.¹⁵ The canoe was paid for by the chief, who commissioned it with a gift of a fine mat over a ceremonial bowl of *'ava*. After they agreed on the conditions, the builder and his party built the canoe. During the process, they had to be fed the best of food and attended to with respect by the chief's family. Interim payments were made as the work progressed, much the same as with house building. When the canoe was finished, more mats, food, and gifts were given. If the builders were unhappy, they could make the canoe unlucky, either by changing the number of lashings or by leaving in one small wooden wedge. If they changed the correct number of lashings, for example, the canoe would never catch more than 10 bonito (Hiroa, 1930: 416).

Krämer claims that four woods were used for building the boat: the breadfruit (or *ulu*) (*Artocarpus*), *Hibiscus*, *Afzelia*,¹⁶ and *Jatropha*¹⁷ (1995: 226). Hiroa (1930: 403), however, has a more complete description of what wood was used for each section of the canoe and his list, in Samoan, seems to be more accurate: *ulu* (*Artocarpus*), *fau* (*Hibiscus*), *fu'afu'a* (*Kleinhovia*), *futu* (*Barringtonia*), *poumuli* (*Flueggea*), and *toa* (*Casuarina*) (see Whistler 2000 for plant names). The bow and stern covers of the boat were decorated with a row of wooden knobs on which were mounted white *ovula* shells (Krämer, 1995: 225; Krämer, 1995: 226, Illustration #68; Hiroa, 1930: 401). Hiroa reports that the number of shells varies, but on a boat in Ta'ū, the bow set consisted of eight shells while the stern set consisted of nine. According to Hiroa, the shells were difficult to get in Samoa and often came to chiefs as presents. As a result, by 1927, some of the sets had been in the possession of the families for quite some time, and some boats did not have shells at all because the family did not have a set of shells available. In Ta'ū, lashing the shell to the end of the middle boom was a sign of distinction. Hiroa says this was the privilege of the Tui Manu'a and the Fiti family (1930: 402). Thilenius (1900: 127) claimed that the shells were a sign that the boat belonged to a master fishermen. Krämer, however, reports that all the bonito canoes in Manu'a were decorated with these shells during the time of his visit, while in Western Samoa at that same time the shells had disappeared almost completely (1995: 237, footnote 112; 1995: 290). In 1927, Hiroa says that he only saw the shell ornamentation in Manu'a, although the wooden knobs remained in other regions and became the decoration (1930: 403; see Hiroa, 1930: 402, Fig. 246, lashing shells to the boat).

¹⁵ See the video, “Vea: Tufuga Samoa,” for one of the last of the specialists at work on Manu'a in 1972.

¹⁶ Thilenius (1900: 127) reports that *ifelele* (*Afzelia*) is used for the boats' planks in Savai'i, whereas breadfruit (*Artocarpus*) is used for the planks in Upolu. *Ifelele* today is labeled *Intsia bijuga* by Whistler (2000: 170).

¹⁷ It's not clear what wood he is referring to here.

The bonito hook is very important in fishing. It is also made by a specialist and it is important to tie the hook correctly. Krämer reports that Samoans said that if the hook was done wrong, misfortune followed and no bonito or shark would be caught.

When the boats and hooks were ready, the bonito boats left shore and went outside the reef as a fleet under the command of the *tautai*. He decided on the movements at sea. Krämer reports that some left at twelve o'clock at night while others left at four o'clock in the morning. Beyond the reef, the man sitting in the bow looked for schools of bonito or for flocks of sea birds which pursue schools of small fish. The canoes raced to intercept the birds because often bonito were following the schools of small fish. When the crew saw the bonito school, they dropped the hook from the back of the boat and rowed through the school of fish, rowing quickly to keep with the school and so that the hook rested in the water. When the *tautai* at the back of the boat caught a fish, he yelled and swung the fish from the right side into the middle of the canoe. A skillful fisherman could flip the rod so that the hook jerked free in the air while the fish landed in the canoe. Hiroa explains that the hooks were not barbed because time spent in unhooking a fish would be time lost, and a barbed hook would be a drawback in bonito fishing. Some boats could catch as many as 100 bonito (Krämer, 1995: 227). Krämer says that, while fishing for bonito, if the *tautai* saw a shark, he would leave the school of bonitos so that he could go after the shark with a noose (Krämer, 1995: 227). Once the school of bonito got past the canoe, the hooks trailed in the water and the fishing was over (Hiroa, 1930: 508).

Bonito fishing was so special that there were many taboos, or restrictions, regarding it. To begin with, bonito was considered a fish for chiefs, and even the supreme god, Tagaloa, wanted a bonito. According to Pratt, cited by Krämer, the bonito is called *pau* in poetry and on Tutuila simply *i'a*. There are many other special terms and phrases related to bonito. For example, the first bonito of the season is called *gatogiā* and should be given to the high chief; the first bonito in a new canoe is called *o le i'a a Tagaloa* (Tagaloa's fish); *sopoluu* means to transgress the laws of bonito fishing by stepping over the canoe, and so on (Krämer, 1995: 227). As with the special language for chiefs, there are special words used for bonito. For example, the common name of bonito is *'atu* (or *'aku*), but it has the honorific names of *pau* and *pa 'umasumu*. In counting bonito, they were grouped in tens expressed by prefixing *tinu* to a unit, such as *tinolua* (20 bonito) (Hiroa, 1930: 520). One saying refers to the fact that bonito chased by a sawfish will often take cover under a bonito canoe. The Samoans did not attempt to catch the bonito in this case for fear that the sawfish may charge if it sees the bonito being taken out of the water. Hence the saying of a hard-pressed man to a more powerful chief: "*O lo'o tuli mata'i nei le 'atu i le sa'ula*" ("The bonito is now carefully watching the sawfish," in other words, "It's your move") (Hiroa, 1930: 508-09).

In bonito fishing, as in netting mullet, the fishermen wore nothing but a *ti* leaf kilt, later a cloth kilt as at the time of Hiroa's visit in 1927 (Hiroa, 1930: 520). The upper body was to be bare, and nothing could be worn on the head except lime to protect the fisherman from the sun. The crew members were prohibited from spinning their paddles in the air, leaning back in the seat, or stretching their legs over the topsides (Hiroa, 1930: 520).

On Manu'a in the 1950s, as reported by Lowell Holmes, the families of the crews and boat owners were forbidden to do any work while the fleet was out. They were expected to remain idle and pray for the fishing. The idle people were called "the family of Tuiatua," since Tuiatua was a kind of patron saint of fishing (Holmes, 1974: 48).

When the *tautai* decided the fishing was over, the fleet returned to shore. Before reaching the shore, however, he made a levy against all the canoes, by going to each one and asking, "How many?" Based on the answer, he demanded his share, which he used for a ceremonial meal for the fishermen. Holmes (1974: 48) reports that, in Manu'a, all the crew shared the ceremonial meal of raw bonito, the *aleaga*, before the boats came ashore individually. In general, fishermen were to give a fish or a portion of a fish to anyone they met in the water of the lagoon or on the shore. Hiroa reports, without specifying who they were, that the people who had not been fishing – and were termed *tui atua* – were entitled to a share of the catch by custom (Hiroa, 1930: 519). Likewise, any *matai* the fisherman met on his way home should be given a fish or could demand a fish. A set division and allocation of the parts of the bonito was customary, with the head going to the high chief, the sides to the talking chief, and the back to the other chiefs. The belly was put aside and the tail was discarded (Hiroa, 1930: 124). The bonito was a favorite dish for eating raw. It was cut up into small pieces in a large wooden bowl with water and lime in it and served as portions in half-coconut shells (Hiroa, 1930: 124).

This one type of fishing, this elegant sport with its specially built canoe, was full of ritual and social significance in Samoa, especially when the bonito was about 60 cm in size and classified as *trevalli* or *malauli* (Krämer, 1995: 226, Illustration #69). At this stage in its growth, it was the food of chiefs and a common fisherman was supposed to give it over to the chiefs and not eat it himself. A transgression of this rule was the basis for the famous "Skipjack Case" in American Samoa in 1900, when the American colonial government intruded into, and denied, Samoan customary law (Gray, 1960: 132; Wright, n.d.). In this case, in the Western District, a junior *matai* named Fagiema caught and cooked a *malauli* which he should have given to High Chief Letuli. As punishment, Letuli ordered that Fagiema's house be burnt to the ground and that his taro and bananas be uprooted (a traditional punishment). Fagiema sought refuge in Leone with High Chief Fai'ivae and Paramount Chief Tuitele, who was also the District Governor (it was the custom also to give refuge). When Tuitele called Letuli to him to explain, Letuli disobeyed Tuitele and did not come. Tuitele (or, Wright suggests, a representative of the London Missionary Society) reported Letuli to Commander Tilley and there was an American-style court hearing. Much of the deliberation focused on the size of the fish. A skipjack about 24 in long is a *malauli*,¹⁸ and as such it is to be given to the high chief. When it is *lupo* (small) or grown so that it can eat a mullet (*soponae*) or full grown (*uluua*), it can be eaten by anyone. The hearing judged against Letuli and he was fined, lost his title for a year, and was confined to Pago Pago for 1 year. From Letuli's perspective, he was following *fa'a-Samoa* (Samoan tradition), but Tilley (and Dorn who wrote the judgment) saw it as taking the law into his own hands (Wright, n.d.). While an incident about a fish may not have seemed especially significant to the Americans, Samoan Paramount Chiefs Mauga and Tuitele later told Governor Graham in the 1920s that this incident was one of many that undermined the local *matai* system because the senior *matai*

¹⁸ There is a discrepancy here: Krämer says a *malauli* is 60 cm (23.6 inches) in size, whereas Milner (1966) defines it as being 12 inches. Twelve inches seems to be too small. Gray (1960: 132) reports the weight to be about 40 lbs, indicating the larger size.

(Letuli) could not punish a junior one according to Samoan custom (Gray, 1960: 134; Keesing, 1934: 243; Olsen, 1976: 78). That same *matai* system was important in managing the local resources and remains important today for the same reasons, although now government agencies (such as the Department of Marine and Wildlife Resources and the Environmental Protection Agency) are also in the mix.

Technique: Fish Poisoning

Samoans are reported to have used as many as four different types of plant-based poisons to stun fish so that they could be easily collected. The poisons reported by various authors include the seeds of the *futu* (*Barringtonia asiatica*) (Stokes, 1921: 230; Judd, 1926: 63; Hiroa, 1930: 443; Coulter, 1941: 30 and 1957: 98; Milner, 1966: 73; Cox, 1979: 398; Moyle, 1984: 227; Krämer, 1995: 204; Whistler, 2000: 137); the leaves, stems, and roots of the '*avasā* (*Tephrosia purpurea*) (Stokes, 1921: 230; Pratt, 1893: 81; Judd, 1926: 63; Milner, 1966: 37; Whistler, 2000: 137); *fue 'o'ona* (*Derris trifoliata*) (Whistler, 2000: 137); and '*ava niukini*, in English "New Guinea kava" (*Derris malaccensis*) (O'Meara, 1990: 88; Whistler, 2000: 137).

Whistler (2000: 137), citing Buck (a.k.a. Hiroa), says there was also a Samoan word for a plant called '*au'u'u*, but he suspects that it is another term for *Derris trifoliata* as he says that it "appears" that '*au'u'u* may be cognate with the Tongan term *kavahuhu* for the same plant. However, Judd (1926: 63) notes that the Hawaiian term '*auhuhu* (which appears to be a closer match) refers to *Tephrosia piscatorial* (syn. *Tephrosia purpurea*) so it could instead be another term for '*avasa*. Note that Stokes (1921) describes the use of '*auhuhu* as a fish poison in Hawaii.

Methods for using poisons varied slightly. The poison from the *futu* seed was used by scraping the seed with a piece of coral *lapa*, or sometimes it was pounded in stone mortars and then the particles were scattered in the water at reef pools during a low tide (Stokes, 1921: 230; Hiroa, 1930: 443; Coulter, 1941: 30 and 1957: 98). Hiroa says that the scrapings were mixed with wet sand to form balls and then introduced into the water. Stokes says that a Mr. Mooker (who witnessed the process many times between 1901 and 1912 on Tutuila) told him that "soon after grating the prepared meal the fishermen threw it into the water by the handfuls, where it sank slowly" (Stokes, 1921: 230). It is said to have stunned the fish that were collected with nets (Moyle, 1984: 227; Krämer, 1995: 204). Krämer (1995: 204) states that balls of the poison were made and the fisherman would dive down and push them into crevices in the coral.

The '*avasā* was prepared by pounding the leaves, stems, and roots with stones. The mash was then formed into a ball and released around the reef (Hiroa, 1930: 444; Whistler, 2000: 137). Hiroa (1930: 444) notes that in addition to the poisoning of pools (*oololo*) that the '*avasā* was also used in *lauloa* fish drives to drive the fish out of their hiding places. Stokes (1921: 23-31), citing Brown (1910), says that '*avasā* was mixed with taro when applied.

Tim O'Meara (1990: 88) reports that '*ava niukini* was also pounded and wrapped in leaves. Again, a fisherman would dive down, open the leaves, and spread the poison around coral heads. This poison, though its use is illegal and banned by village councils, is still used occasionally by fishermen. Herdrich saw it in use in 1986. The stunned fish were collected by hand and placed in

baskets woven from coconut leaves. Whistler (2000: 137) states that *'ava niukini* was introduced into Samoa sometime prior to 1929 and likely came from, as the name implies, New Guinea. The likelihood is good, as Verdcourt says that *Derris malaccensis* is “Used by some tribes [in New Guinea] as a fish poison, an emulsion being made from the roots...” (Verdcourt, 1979: 323).

Lewella Churchill (1902) in her book *Samoa 'Uma* describes the use of a vine that was used as a fish poison. She does not identify the vine, but Stokes speculates that it might be *Ipomea pes-caprae*, *I. terebrethum*, or *Derris uliginosa* that was apparently used in Fiji to poison fish. Perhaps of more interest is that Churchill noted that after a sufficient quantity of fish were collected, the poison vines were collected from the reef tidal pool and put into a reef channel to be carried away so that its poison would not continue to harm the fish sheltering in the reef. Churchill felt that this was evidence of Samoan “recognition of the principles of game preservation” (Churchill, 1902: 125).

We were unable to find descriptions of the uses of the *fue o'ona*, nor have we seen reference to it other than in Whistler (2000).

Other Types of Fishing

Squid Lures: Catching Octopus

The squid lure has been described and diagramed by several authors (Beasley, 1921; Hiroa, 1930: 435-36; Krämer, 1995: 229-30), and we include a drawing made by Cartwright in 1927. (Note that the terms squid, cuttlefish, and octopus were used interchangeably by early explorers, missionaries, and other observers, but as far as we can tell from the context of use and descriptions, they were all speaking of octopus and not true squid or cuttlefish. To the extent that we use the terms squid or cuttlefish it is in keeping with our sources, but we are confident that in all cases they were referring to octopus.) Octopuses were caught at low tide by women using a stick to poke in the holes in the reef. But men caught octopus by using lures inside the reef when the tide was in. Using a small *paopao* (small outrigger canoe), a man paddled backwards and forwards in the parts of the lagoon where he was likely to find an octopus. While paddling, he managed the line of the lure. The lure was lowered to just above the bottom and kept in motion by constant jiggling. This motion was said to look like a rat, and when the shells clicked the stone, it was said to sound like the squeaks of a rat (this method is still used). The octopus was attracted to the lure, and as the lure was drawn away, the octopus held onto it even more with its tentacles. The fisherman drew it out of the water and as both Hiroa and Krämer report, the octopus was bitten between the eyes to kill it.

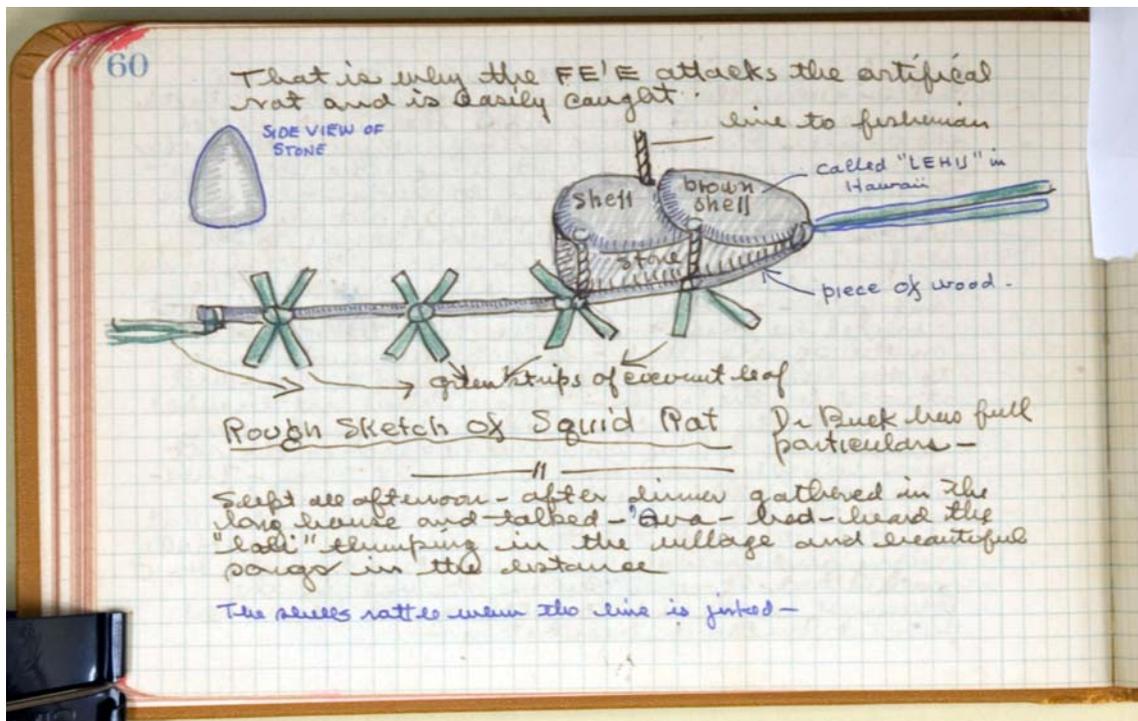
This fishing method, perhaps more than any other, is accompanied by a mythological story, which explains the style of the lure and why it should resemble the actions of a rat. Hiroa (1930: 438) gives a version of the tale that he collected on Tutuila. Here is another version, very similar, collected by Bruce Cartwright in the Western District of Tutuila during the same trip in 1927:

Vaotuuu's Tale

Why squid are caught with imitation rat

Once upon a time 'I SUMU (the rat), UNA (the coconut crab) and VE'A (the rail-bird) met at the land of 'Ā and decided to make a pilgrimage to a celebrated and sacred place located on Cape TAPUTAPU.¹⁹ The rat and the rail-bird wanted to make the journey on foot but the coconut crab objected saying that he could not walk so far. He suggested that they build a "waa" (canoe) in which they could all sail. This was agreed to – so the coconut crab climbed up a coconut tree that hung over a large rock and cut off a coconut which fell onto the rock and split to pieces. The meat in one half was cleaned out by the rat and the coconut crab. It was placed in the sea and they got aboard – the rat sitting in the coconut-crab's lap while he held on to the rail-bird's legs. The rail-bird flapped his wings and the canoe sped over the water. When they had nearly reached their destination a hurricane came down upon them and wrecked the canoe. The coconut crab sank into the water where he was perfectly at home. The rail flew to safety but the rat had to swim. He soon tired in the angry sea and cried out in his distress. A FE'E heard him and coming to the surface told him to climb up on its head and he would take him ashore safely. This the rat did. As they neared the shore and the rat realized he was saved he deposited some pellets on the squid's head. Finally the squid came to the beach and the rat jumped ashore and started for the bush. "You have not thanked me," said the squid. "You will find your reward on top of your head," replied the rat over his shoulder as he hurried away. Thereupon, the squid reached one of his tentacles up to the top of his head and discovered what had been deposited there. He was frightfully angry and grievously insulted and made an oath that forever after when it was in the power of a squid to catch a rat he would kill it without hesitation. (Cartwright Field Notebook II: 58-59, from the Bishop Museum Archives)

¹⁹ Cape Taputapu is a real location in the Western District of Tutuila.



Drawing by Bruce Cartwright, 1927, Field Notebook II: 60, from the Bishop Museum Archives Collection²⁰

Traps and Pots: Fish, Crabs, Crayfish, Lobsters

Various versions of fish pots were used as traps to catch fish, crabs, crayfish, and lobsters. For fish, bait was put in the pot and the pot was set in likely looking pools or passages from the reef (Hiroa, 1930: 451). The open bottom of the trap was fitted on the sand and stones were put around the fish trap, which also served to attract to the spot other rock-frequenting kinds of fish. Often rocks were piled up in shallow water, without a pot, to attract fish. After a week or so, a net was put around the rocks and the villagers lifted the rocks out of the net, thus catching the fish attracted to the rocks (Judd, 1926: 98).

The crab pots, which Hiroa saw at Nu'uuli in Tutuila, were built just like the fish pots, only stronger. Hiroa observed the pots being baited and set at Nu'uuli, where *tupa* land crabs (*Cardisoma* sp.) were broken into pieces and used to bait the traps. The traps were taken out into the lagoon where the water was about waist deep. The fisherman made a depression in the sand and put the trap into it; he also put a stone in the bottom to anchor it. There were no stones around the outside as with the fish pot. Each trap had a float attached to it, and the traps were set about 20 yards apart. The pots were set in the evening and picked up the next morning (Hiroa, 1930: 453). Cartwright gives us an idea of how the crabs were stored in Nu'uuli:

When the rain let up Chief SOLIAI took us for a walk around the village. We saw crab traps and learned that these crabs only occur here and at Leone (occasionally). They can

²⁰ This illustration is covered by copyright restrictions. Permission to reproduce it must be obtained from the Bishop Museum Archives, Honolulu, Hawaii'i.

be kept out of water in baskets filled with leaves for a month – saw one which had been out of water a week was very lively. Dr Buck has description of trap and method of capture. (Cartwright Field Notebook II: 13, from the Bishop Museum Archives)

The crayfish pot was of the same type and technique as the fish pot and was used only for sea crayfish. The pot Hiroa saw was stronger than the crab pot used at Nu'uuli. Sometimes a young crayfish was placed in the pot as a decoy (Hiroa, 1930: 454).

The funnel type of lobster pot ('enu) was still made in Tutuila and Manu'a when Hiroa visited in 1927, where it was sometimes used to catch *i'a sina* (Hiroa, 1930: 455). Judd obtained one of these 'enu at Fitiuta for the Bishop Museum (Judd, 1926: 96). In Leone, Ripley told Judd that the fish trap known on Manu'a as 'enu was known on Tutuila as *faga* (Judd, 1926: 23).

Turtles

Krämer reports that turtle fishing employed a large net made of coconut sennit with meshes about the size of 1 foot. The fishing had to take place at high tide, no matter what time of day. The net was taken out to the outer reef or reef channel on a boat and unrolled in deep water. Ten to twenty people stayed near the net while others came from the beach, striking the sea. The turtles swam into the net and people dove down and brought them up, putting them into the boat. Krämer says they could catch 10 or more turtles this way (Krämer, 1995: 219).

On Savai'i, where Hiroa watched villagers netting turtles, the net was used along the coast where there was no reef. Villagers beat the water and worked the lines of the net inwards to trap the turtles' heads and fins in the net. In daylight, the turtles were easily removed from the net but at night the turtle and net were bundled together and taken to the shore (Hiroa, 1930: 488).

Prawns

Bruce Cartwright has a short description of how boys practiced catching prawns in a mountain stream near Fagasa in 1927:

Our boys went down to the stream and brought us back taro-leaf cups full of delicious cold water. They then returned to the stream to catch prawns, many of which could be seen from where we were. They were about six inches long and when approached, snapped backward, with their tails like all members of the shrimp family.

The boys took coconut leaf mid-ribs at the ends of which they tied small nooses of sennit. These nooses, one to a mid-rib, they tried to place directly behind the prawn. When they succeeded in doing this, which seemed quite difficult, they splashed the water in front of the prawn. This caused him to snap back into the noose, when he was thrown up on the bank. They had great fun, but only caught two prawns, which Fepulea'i casually picked up, pinched the heads off, and ate without comment. (Cartwright Field Notebook I: 97-98, from the Bishop Museum Archives)

Eels

At Malaeloa, Tutuila, Hiroa (1930: 492) went with a local fisherman to observe how he fished for eels. The fishing ground was a marshy spot where the stream flowed over flat ground to form a lagoon. They waded in; the bottom was soft and muddy and occasionally they sank up to their armpits in water. The fisherman baited a hook with a grub, tied the hook to a small branch with leaves, so that the branch and leaves acted like a float. The hooks were set at different places in the evening and left overnight. In the early morning the fisherman picked up the hooks and he could tell immediately by the way the branches floated in the water whether or not he had caught an eel. The tail of the fresh water eel went to the chief (Hiroa, 1930: 126).

Hiroa (1930: 492) says that the process of making the hook (*matau*) is called *fafau matau*. On Tutuila, the *matau tuna* was used in 1927 in the freshwater lagoon at Malaeloa and in the freshwater stream at Aoloau. Alfred Judd collected some of these eel hooks from Ngangi of Malaeloa for the Bishop Museum (Judd, 1926: 62).

Sea eels were caught with snares and traps. When a sea eel was located among the rocks inside the reef, the fisherman used a bait stick to lure the eel, and as the eel followed the bait, he caught it by throwing a noose around its head (Hiroa, 1930: 422). The trap was also used inside the lagoon. Here, bait was put into a tube-styled trap, with an inside slit of coconut fabric. Once the eel had passed through the slit toward the bait, it could not find its way out (Hiroa, 1930: 469).

LEGENDS: SIGNIFICANCE AND CONTINUITY

Many myths and legends are associated with various places and activities in Samoa. Like other artisans, fishermen had their special gods and the fishery was subject to superstitions and mysticisms (Krämer, 1995: 198). A common legend was that, just as Pili taught the Samoans to plant taro and to cook, he taught them to fish, above all, with a net (Krämer, 1995: 196). In Manu'a (and maybe elsewhere), Pili was said to learn fishing from the female demon Sasa'umani, whose son Pulele'i'ite absconded with his wife. Sināsa'umani, Sasa'umani's sister, had been caught by Tagaloaui (the son of the girl Ui and the god Tagaloa) in his net and so Sasa'umani also caught everything she could get (Krämer, 1994: 9). She was a great fisher woman of the olden days and the friend of Fe'e, the octopus who carried on at the Utumanu'a cape on Ta'u (story in Krämer, 1995: 197). On Ta'u, Krämer visited "Sa'umani's net lowering rock," where people formerly offered sacrifices (Krämer, 1995: 509).

Hiroa found that the mesh of a hand scoop in Ta'u was called *mata 'upenga a Sasaumani*, which indicated extra knotting of mesh (Hiroa, 1930: 472-73). He was told that these meshes were said to be derived from the nets of the Sasaumani [sic], an early fishing community on Ta'u (Hiroa, 1930: 472). This community was said to have left Manu'a and migrated to Savai'i due to a number of causes, one of which reportedly being the theft of a turtle belonging to the Tui Manu'a (the highest title holder in Manu'a). According to legend, the Tui Manu'a had a special monopoly on turtles (Hiroa, 1930: 522).

Along with these legends about fishing, special rocks were considered to be attractors for certain marine resources and this was likely part of a wider practice around Polynesia. Hiroa (1935: 51) points out that Polynesians understood the activities of the animals and birds around them, not only as food sources, but also for nonconsumptive reasons. In traditional Polynesian society, inanimate gods were believed to influence the movements of living bodies in order to convey messages to their followers. Birds were typically seen as the messengers of the gods. A further step was taken when families and groups selected certain living things – such as the eel – to represent their specific god, in which case the species became taboo to all followers of the god at all times (Hiroa, 1935: 51).

There were also inanimate objects – such as stones, shells, teeth – that were believed to have favorable powers (Hiroa, 1935: 85-86). Without naming the exact place, Hiroa tells the following story about a bonito rock that could bring good luck (1930: 510):

There is a myth about a rock in a river in Savai'i to which the bonito came and left part of their flesh as an offering. If a bonito is caught off of Savai'i with a portion of its flesh missing, it is held to have been to the rock. Such a fish caught on a new hook is a lucky omen for the owner.

We found attractor stones in American Samoa at several locations and Kirch (1985: 152) has found evidence of similar stone fishing shrines in the Hawaiian archaeological record. While Hiroa gives the bonito example, these stones are often associated with *atule* and sometimes they are more general.

Atule Stones: Aoloau

Bruce Cartwright has a description of Aoloau in 1927, where he describes a stone that was meant to lure *atule* into the lagoon (Cartwright, 1939: 79-80). The account begins with a description of the types of canoes in Aoloau and the division of labor in the village. Aoloau is no longer occupied at this location; the villagers have moved up the mountain. This is a description of the village when it was sited along the shore.

The village of Aoloau is quite primitive and shows very little outside influence. Behind the guest house near the bank of a trickling stream some men were building canoes. One, a large bonito canoe, and two small *pau-pau*. In every house the women were busy making mats, tapas, nets and other articles.

Chief Fuimaono said that formerly there was a stone, which lay in the water near the beach. It was an *atuli* [sic] stone. It had two holes in it, and was very sacred. Large schools of *atuli* came to the vicinity of Aoloau and visited this stone. I asked him if the *atuli* still came to visit the stone. He replied that *atuli* still came to Aoloau at certain times, but that their numbers were not as great as formerly, and they did not visit the stone because it had been removed from the sea and now adorned the western corner of the *pae pae* of his home. We asked if he would show us the *atuli* stone, and he replied

that he would do so with pleasure. ... On the way there I picked up several stone adzes which lay in the path, as did Dr. Buck.

The stone was set in the *pae pae* about 1 foot from the ground and about 2 ft from the western corner of the *pae pae*. It was a round waterworn black basalt lava stone, with a small overlap of lava on the edge of which were two natural holes, probably bubbles, about a half inch in diameter and an inch deep. Chief Fuimaono knew nothing more about it than what he had told us. I asked him if Sina had anything to do with the stone. He said that Sina was a celebrated traditional woman who had a lot to do with most things Samoan, and that it was quite possible that her name was connected with the stone, but he did not remember ever having heard her name used in connection with it. In Hawaii the fish god was KU and his wife was HINA. Hina and Sina would be the same person in Samoa.

Atule Stones: Fagasa

A similar relation of stones to *atule* is found in Fagasa, on the north coast of Tutuila, where the legend can be found today. In Fagasa, two sacred stones are believed to attract *atule* to the lagoon. Here is the story of the stones, as recorded by Cartwright in 1927, along with his illustration of the stones:

FAGATELE – up at dawn

We were taken by Talking Chief Sala and the pastor's father to the pro-wall back of the pastor's to see the two sacred stones placed on a stone "alu" about 2 feet high and surrounded by a hedge of croton bushes. These stones were water-worn and flattish – about 1 foot across

one stone is SIGA, daughter of LIIAWAA, has two holes

other stone is TOGAMANA, son of ALO

Talking Chief Sala's Tale

One stone was once TOGA MANA the son of chief ALO the other stone was once SIGA, the daughter of chief LII-A-WAA.

LII-A-WAA came from PULOTU, an island to the West – then he arrived at UPOLU and could get no food there – he then went to MANU'A for water and food but found none. He heard in Manu'a that there was plenty of food and water on TUTUILA so he came here – to FAGATELE. The people of the village got FAPUTU, and the boat was loaded with food. Chief LII-A-WAA told his daughter SIGA (HINA in Hawaii) to go to the stream and fill 10 water bottles with water. While she was searching for a nice pool (to get the water from) chief LII-A-WAA ordered the boat, a canoe of ALIA type with over 100 passengers, to leave – so they started off and were soon out of sight.

SIGA came back from the stream with her 10 full water bottles and saw just the tip of the sail on the horizon. She ran along the shore in desperation dropping water bottles now and then – these places where these bottles fell and broke are now springs – welled up where people bathe – then she ran out into the water and the 10th water bottle, that belonged to her father, fell into the water – at the place where there is now a fresh water spring cut on the reef under the salt water. She went as far as she could toward the distant sail, but the villagers went out and got her and brought her to the village where they built a house for her and took care of her.

In the meantime the canoe sailed on – SIGA’S absence unnoticed until her father LII-A-WAA wanted *’ava*. He called for his daughter and taupou but she was not on the alia (double canoe). LII-A-WAA took each passenger and threw them overboard telling them to find SIGA and bring her back to him. They turned into 2 varieties of fish – the ATULE (AKULE in Hawaii) and the MUMUA (for when the latter are skinned you can see their human hands – 4 fingers and a thumb and they are tattooed on the sides – you will also find in their stomachs the food that was prepared for them by the people of Fagatele). The *mumua* [dolphins] always come to Fagasa before the *atule* – the latter following them – when they are sighted a paddle is raised as a signal to the village. A chief with a fan and clad in a fine mat then stands on the shore and waves the fan and invites the fish to come in by singing the following song:

VALOGA AU UKI I MA SALOGA

AUTAI MALIU MAI I UTA

MA LE APULUPULU OLE TAI

UA LILIU LE SONA UA ITA INA

UA LE IFO MAINAINA IFO

MAIō

(Song written by Malama, the son of Le’oso, on the spot)

SIGA married TOGAMANA of FAGATELE and before they died, they turned into the stones. (Cartwright Field Notebook I: 82-84, from the Bishop Museum Archives)

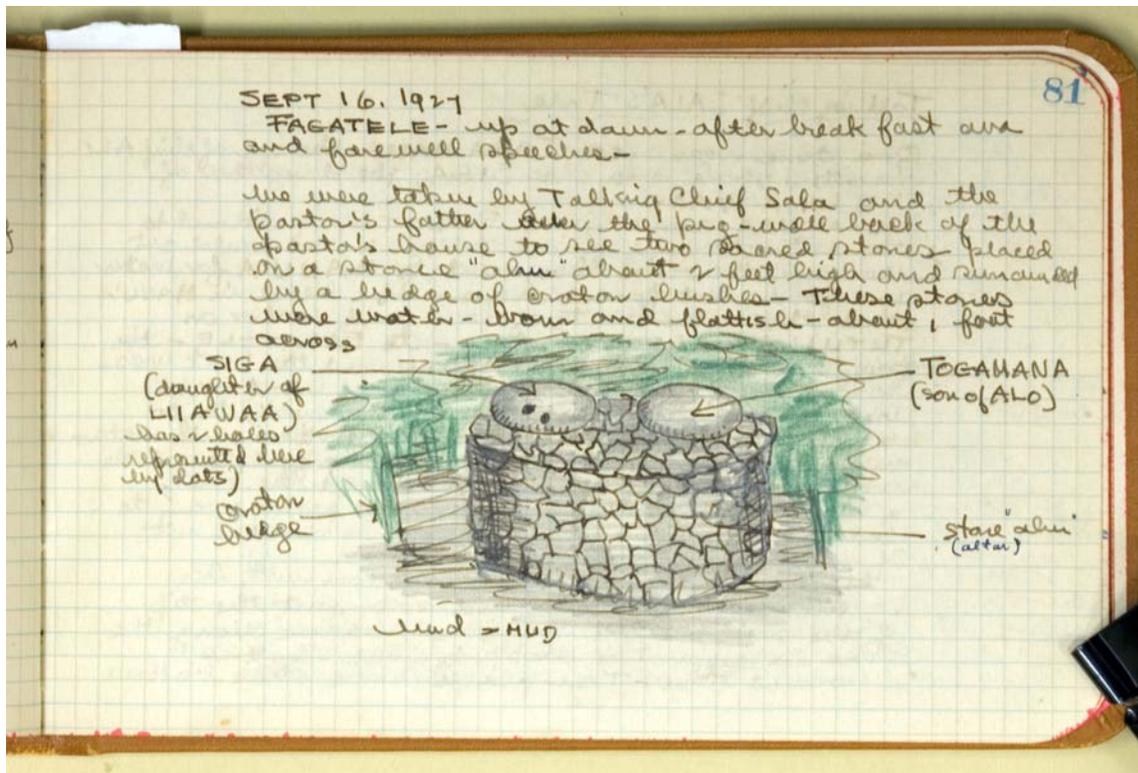


Illustration from Bruce Cartwright, 1927, Field Notebook I: 81, from the Bishop Museum Archives²¹

A similar version of the Fagasa legend was collected by Brother Herman (1970 [1955]) in the early 20th century, although here the emphasis is on the dolphins:

The Dolphins of Fagasa

The boat came from the west and called at Fagasa for a rest. It was the boat of Li'ava'a, the king of Fiji, who was on a voyage with his daughter Sina. It was the king's custom to have his kava daily while sailing on the high seas.

While they were in Fagasa, Li'ava'a asked Sina if she had filled her water bottles. The girl answered, "No." So Li'ava'a sent her to draw water. The girl took the coconut bottles and went to the spring Vaitilofia inland of the place called Taputapu. When Sina had filled the bottles, she wished to pick some Job's tears. The plant grew near the spring. She put down the bottles and got busy picking the berries.

When the Fijians were about to resume their journey, Li'ava'a asked whether Sina had returned. The crew answered that she was asleep. But it was not so; the girl was still engaged picking Job's tears. Li'ava'a ordered: "Raise the anchor and let us go."

²¹ This illustration is covered by copyright laws. Permission to reproduce it must be obtained from the Bishop Museum Archives, Honolulu, Hawai'i.

When the canoe was far out in the sea, Li'ava'a suddenly said, "Awaken Sina that she may chew some kava." They searched and searched, but the girl was not to be found. Li'ava'a now knew that she had been left behind in Fagasa. Then Li'ava'a took hold of the paletua (a stick for the steersman to lean against) and beat the men. The crew cast themselves into the sea and begged Li'ava'a to spare their lives. He answered, "No, you shall die this very day." Then he threw bananas at them. The crew said, "Li'ava'a, please command what we are to do." Li'ava'a replied, "Be changed into dolphins and rise in Fagasa Bay every year."

When Sina had finished picking the berries, she went with her water bottles toward the sea. She stood on the beach. She looked, but there was no boat. Only the mast could still be seen in the distance. Then the girl cried and one of her water bottles cracked. A spring bubbled up which exists to this day. It is called Tufu. Then the girl waded into the sea with the other coconut bottle. She stood on a rock in the sea. She waved her white fan, but no one saw her. The boat was too far away. She cried again and the other bottle cracked. A spring bubbled up from under the rock in the sea. Even at high tide its water is fresh to the present day.

While Sina was standing there weeping, Togamana, who had been out fishing, came along. He asked, "Why do you cry?" The girl replied, "I have been left behind by my father and his crew." So he made Sina jump into his canoe and took her ashore. Then Sina lived with Togamana in wedlock.

Before long, Li'ava'a's boat was seen approaching. Li'ava'a said to Togamana, "Did you notice those dolphins in the sea?" Togamana replied, "Yes, I saw them." Li'ava'a then said, "They shall be Sina's dowry to your Excellency and come to you every year."

In Fagasa there still are two rocks known as "Sina's Rock" and "Li'ava'a's Rock." And to this very day the dolphins appear every year in the Bay of Fagasa.

What makes this story especially interesting is that the stones are still in Fagasa, and in July 2007 they were washed as part of a ceremony to celebrate the return of the *atule*. During this time, the lagoon was made 'sa.' In 2007, High Chief Lilio provided a copy of his version of the legend associated with the stones. It is presented below with his permission.

The Blessing of the Rocks, Fagasa

The Story of Sina and Liava'a as told by High Chief Lilio Aliitai

We believe that the akule [a linguistic variation of the term *atule*] is a blessing from God and was given to our ancestors hundreds of years ago and to this day, still provides food for the village.

As the legend goes, years ago a member of the Royal Tongan family, Liava'a, and his daughter Sina sailed to Tutuila in search of the pure waters of Fagasa. Upon arrival, Sina set off with her coconut shells to locate the beautiful springs. Her father, not realizing that his daughter was on land, ordered the boat to leave as soon as they had filled their containers with water.

When Sina returned to the shore and found her father's boat gone, she knelt, crying loudly in despair at having been left behind. To this day, three fresh water underground streams in Fagasa still flow, signifying the fresh water spilled as Sina ran along the shore, crying for her father's return.

Miles out to sea, her father called for Sina to prepare the 'ava. Learning that his beautiful daughter was not on board, he became enraged and threw his entire crew into the sea with orders to return to Fagasa to take care of Sina. The blessings were upon the men and they were changed to dolphins to hasten their return to Fagasa. Spotting a school of akule outside the bay, they quickly herded the akule into shore to make certain all who cared for Sina would be well fed.

Meanwhile, Sina was taken in by High Chief Lilio of Fagasa who loved her dearly and adopted her as his own. Her death, and the love of her father were forever preserved in stone. From that day on, Chief Lilio and his family are the keepers of the rocks and are given the responsibility of preserving the legendary practice of showing appreciation for the generous harvest of akule.

Atule Rock: Asili

Arielle Levine and Fatima Sauafea-Leau (n.d.) also report on contemporary stories collected from elder fishermen regarding stones of significance to fishing in American Samoa. As part of a series of interviews with elder fishermen throughout Tutuila and the Manu'a Islands in 2007 and 2008, High Talking Chief Maugaotega of Asili reported a fishing rock, called *Afagaila*, which was significant to *atule* fishing in his village. Like in Fagasa, the rock was ceremonially washed before *atule* harvests. The chief believed that *atule* was absent today because the rock was no longer being washed. High Talking Chief Maugaotega explained the beliefs surrounding the *Afagaila* during an interview²² with Taito Fale Tuilagi in 2007:

According to legends, our family has a special rock out in the reefs. This rock is called *Afagaila*... Early in the morning, if you spotted the *akule* [*atule*] near the shore, you must summon me first. You will come and say to me, "Mauga, the *akule* is closing in near the shore." In my beliefs, and also that of my family, this rock was treated like an idol. There are only two people who can bathe this rock: first is whoever is the oldest and the wisest of the family, and second is the one who holds the title *Maugaotega*. If there is no older one, then *Maugaotega* will bathe the rock.

After my children and I finish bathing the rock, as the morning comes and sunlight hits this rock, it will shine. This is why it is called *Afagaila*. So once the *aku* sees this, it will come in and start biting this rock. It will keep biting and biting until the tide goes out. Well, the *akule* is preoccupied with biting the rock and forgets about the tide, so afterwards, when it tries to go back out, it can't exit because it is too shallow. Then the *akule* will swim into a lagoon that we called *Apiolefaga*... *Apiolefaga* is where the fish

²² Translated from the original Samoan by Joe Iosua, Samoan Studies Program, American Samoa Community College.

will stay and hope for the tide to come in. Well, here is where it meets its doom... when people come by and see that the fish are trapped and stranded, then they say, "the fish has met its end." This is some of the evidence that I am trying to share with you about our legend and the *akule*. Different villages have different idols, but this rock is ours.

Fishing Rock: Fagamalo

The village of Fagamalo also has a legendary rock that is tied to fishing (Ofisa and Ripley, 1976). The legend was presented in an interview conducted in 1976 by students from the American Samoa Community College. The students interviewed Chief Loa Mailei and High Talking Chief Moi Falelua of the village of Fagamalo. The story concerns the legendary Siamese twins Taema and Tilafaiga who were said to have been split apart when a wave threw them against a rock in a section of Fagamalo Village (Ofisa and Ripley, 1976: 69).

During the interview when asked if the section of the village where this event happened still exists Chief Moi responded and told the students the following:

Moi: Yes, this part of the village still exists. People often go fishing there. There is that rock that I mentioned earlier, a flat rock (the rock that split apart the twins), which the people of Fagamalo go to fish. It is said that if you cast your nets over that rock your fishing will prosper. But there is one catch to this rock. The moment you touch the rock the fish will disappear. You have to collect the net without touching the rock. For some strange reason once you touch that rock one cannot see a fish or living organism in that area of water.

A preacher wanted so much to see if this legend was true. He journeyed to this part of the village and touched the rock. To his surprise he did not see a fish in the sea for miles. Whether you believe it or not is left up to you.

Cheri: Does it affect you, if you touch it? Will any harm come to you?

Moi: No. It would not affect you or harm you at all.

Solo: What if you do not believe in this saying about touching that rock?

Moi: There will be no fish for your catch whether you believe it or not because as soon as you touch that flat rock no fish can be seen for miles (Ofisa and Ripley, 1976: 71-73).

CONCLUSION

Our sources all report the importance of marine resources in Samoan diet and culture, as well as the extensive knowledge that Samoans had about their environment and the behavior of these creatures. So long as the population was relatively low in relation to available land and

resources, and so long as food was produced and consumed locally, the system remained in balance over long cycles. That is, there were times of large catches, particularly related to mass spawning events, but these harvests were episodic and the fish were caught for local subsistence consumption. The whole system was under the supervision of the village *fono* and the *matai*. If they determined that certain resources were threatened, they could put a ‘*sa*’ on all activities until they were satisfied that the situation was again suitable for fishing or gathering. By the 1930s, our observers report the importation and circulation of canned fish, signaling the beginning of substantial changes that would take place in traditional Samoan systems of food production, consumption, and distribution.

Natural resources are always more than just food; every group adds cultural significance and makes distinctions. Samoan culture and religion, as documented in the 19th century, considered certain species to be animate representations of the gods. For example, some marine resources, and the number of gods they represent, were: turtle (5), stingray (2), octopus (7), eel (4), sea-eel (4), mullet (5), sea urchin (1), cockle (1), and land crab (1) (Hiroa 1935: 53, Table 1). These species were often considered to be sacred and declared taboo, resulting in a prohibition of consumption of these species in certain villages. Such beliefs provided a cultural logic for the protection of natural resources. The introduction of Christianity replaced the belief in animist gods in Samoan culture and removed a number of consumption taboos. While a respect for natural resources remains an element of Samoan culture today, the religious basis for these beliefs has shifted dramatically, limiting the utility of certain traditional beliefs and taboos for modern resource management.

The introduction of new technologies for fishing, food production, food preservation, and transportation in the 20th century also altered Samoan interactions with the marine environment. In particular, new technology promoted greater commercial food production. It became easier to fish, food was produced far from where it was consumed, and new incentives to harvest more than could be immediately consumed in order to generate an economic profit developed. At the same time, the Samoan population grew steadily during the 20th century, adding to the pressure on natural resources (although this has been mitigated by out-migration after 1950). In American Samoa in particular, food production has shifted significantly from the local to the global, bringing with it a shift in the exploitation of resources and reducing American Samoans’ subsistence reliance on local marine produce. This change in the Samoan diet and lifestyle has brought with it resultant health problems of obesity, diabetes, and heart disease, among others (Keighley et Al., 2007). This report provides evidence, when compared to currently reported practices from other sources, that there has been a shift in the production and consumption of marine resources over time. It also illustrates the importance of food produced locally – how the social, cultural and natural are intertwined – and how local systems of production and local interactions with marine resources are a critical component to consider and to incorporate into the management of ocean fisheries at the regional, national, and international levels.

PHOTOGRAPHS

Polynesian Photo Archives Photographs

The Polynesian Photo Archives located in the Feleti Barstow Public Library, Tutuila Island, American Samoa contains over 4,000 historic photographs of Polynesia, with a focus on American Samoa. A keyword search of the archives revealed 11 historic photographs of fishing methods, gear, techniques and legendary sites related to the same. Following are the photographs, with a brief description of each photograph. (The photographs in this report are low resolution copies of the original photographs, but high resolution copies are available from the Feleti Public Library upon request.)

Of particular note are a set of three photographs of “*atule* rocks” and their traditional ceremonial care and use. *Atule*, bigeye scad (*Selar crumenophthalmus*), are prized fish that are historically known to spawn in great numbers in waters adjacent to the village of Fagasa, Tutuila Island, American Samoa. The *atule* rocks relate to a legend associated with the origin of the fish and their continued abundance. The rocks are still in existence and the traditions and ceremonies associated with them, as well as historically known fishing techniques, are still practiced by the Fagasa villagers.

Krämer (1995: 217-218) reported that “many, many thousands” of *atule* were harvested in the reef flat area off of Ta’ū Village, Ta’ū Island, American Samoa during his visit in May, 1898. He provides two photographs of a rock weir technique being used by Ta’ū villagers (1995: 238 [Plate 1] and 217 [Illustration #65]). *Atule* have been harvested in a similar fashion from the waters adjacent to Ofu Village, Ofu Island, American Samoa as recently as 2002 (Craig et al., 2008). P. Craig et al., (2008) report that a historic fishing technique using a rock V-shape weir, a large basket, and villagers to herd the fish is still used by the Ofu villagers in their harvest of the *atule*.



Plate 1. Two *Atule* rocks from Fagasa, Tutuila Island, American Samoa (PH-137-A).



Plate 2. Two *Atule* rocks on altar at Fagasa, Tutuila Island, American Samoa (PH-137-B).



Plate 3. High Talking Chief (HTC) Tua Faima (sitting with bottle), Left to Right: HTC Atuatasi Talosaga, High Chief Alo Su'esu'emanogi W. Steffany, and HTC Mata'u Auvasa; washing of *Atule* Rocks in front of Faletalimalo of Mata'u at Fagatele, Fagasa, Tutuila Island, American Samoa (PH-137-C).



Plate 4. *Paopao* boat; fishing nets in the background, circa 1945 (PH-140-19).



Plate 5. People in several *paopao* boats at Fagasa Bay circa 1950 (PH-CR-14).



Plate 6. *Paopao* boats in Fagasa Bay circa 1950 (PH-CR-18).

31 - Samoan boy returns from fishing. Amouli Village. Pago Pago.



Plate 7. A young fisherman posing with a string of fish in Amouli, Tutuila Island, American Samoa, 1941 (PH-JK-27).

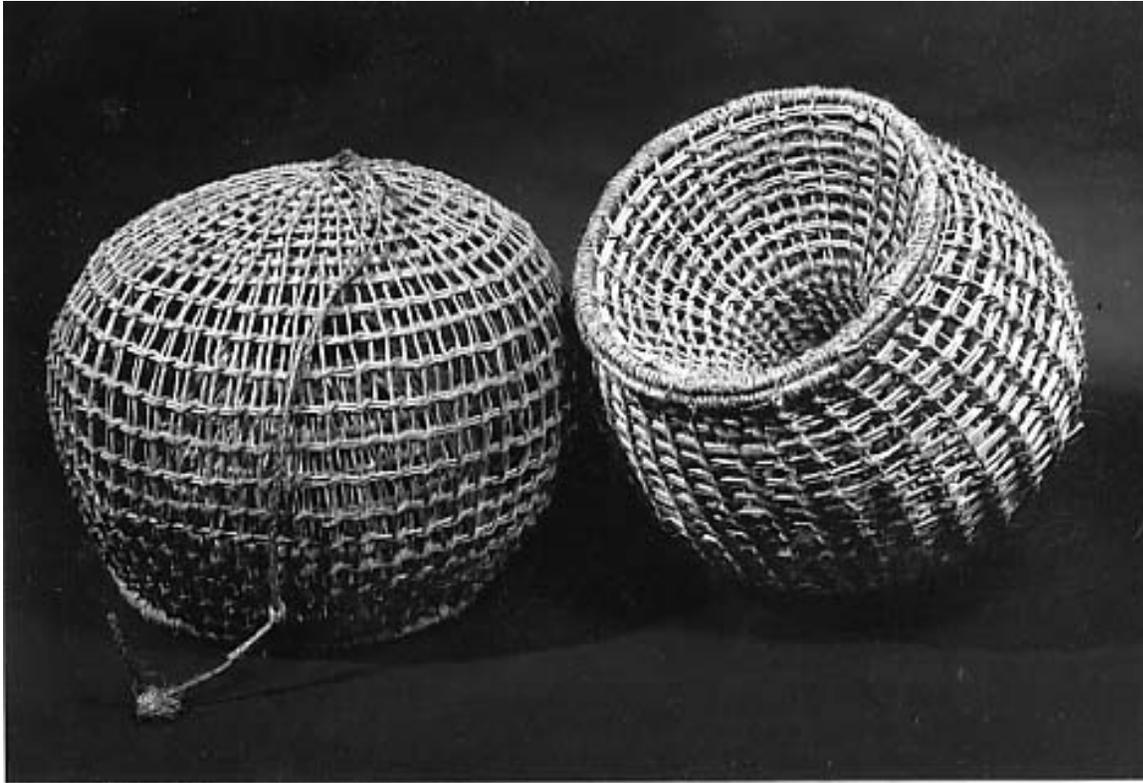


Plate 8. *Enu* (fish trap). Traditional fish trap woven with sennit; displayed at Jean P. Haydon Museum, Fagatoga, Tutuila Island, American Samoa (PH-M-08).



Plate 9. *Paopao* boat with fish nets in the background, circa 1929 (PH-VM-118-x).



Plate 10. *Paopao* boat and fishermen, circa 1940 (PH-WF-132-2).



Plate 11. Young Samoan boys spear fishing, Pago Pago Harbor, Tutuila Island, American Samoa, circa 1940 (PH-WF-132-9).

Recent Atule Rock Photographs

In addition to the photographs of the *atule* rocks in the Polynesian Photo Archives, Volk, et al., (1992) provide a photograph of a rock altar, presented below.



Plate 12. Fagasa *Atule* Rocks 1992 (Volk et al.) (Photo: D. Herdrich).

Evelyn Lilio: Atule Rock and Traditional Fishing Photographs

Furthermore, recent photographs (August 2007) of the *atule* rock ceremony and the traditional fishing practices used to catch the *atule* were obtained through the cooperation of High Chief Lilio Aliitai, Evelyn Lilio, and the Village Council (*fono*) of Fagasa. With regard to the *atule* rock photographs and photographs of traditional fishing in Fagasa, High Chief Lilio consulted with the Village Council of Fagasa, who consented to the release of the photographs for this report. A sample of the photographs, shot by Evelyn Lilio, is presented below.²³

²³ The Lilio photographs are presented with the understanding that they are to be used for educational purposes only and not for any commercial purposes. High Chief Lilio Aliitai and Evelyn Lilio expressed willingness to allow the photographs to be used also in the video documentary that is a part of the overall project.



Plate 13. L to R: Vasaoaiga Talalelei Lilio, Matiu Suani, Salevao La’auli Tua, and Epati Lilio stand behind *Atule* Rocks resting on rock altar, Fagasa, American Samoa, August 2007 (Photo E. Lilio).



Plate 14. An *atule* rock is taken into Fagasa Bay to undergo traditional ritual washing, August 2007 (Photo E. Lilio).



Plate 15. Fagasa villagers use a traditional *launiu* (coconut frond) weir to encircle and catch *atule*, August 2007 (Photo E. Lilio).

ANNOTATED BIBLIOGRAPHY

Anonymous.

- 1928 The Samoan division of time. *Journal of the Polynesian Society* 37: 228–240.
Information about fish and *palolo* seasons; months and moon for *palolo*.

Auapa'au, S.

- 1956 Fishing methods used by Samoans. *In: Laufasi Ola*. Vol. 1, No. 3: 1-6.
A good list of fishing methods in Samoan, with a short description in English; tells where the methods are practiced, although specific to Upolu and Savai'i, with no mention of locations in American Samoa; short description of spawning of Tilipia.

AusAid.

- 2000 “Increasing rural incomes: an evaluation of three rural sector projects in Samoa”.
Quality Assurance Series, No. 19, July. A description of the results of Australian-funded development projects related to fishing in independent Samoa.

Barradale, V. A.

1907. Pearls of the Pacific being sketches of missionary life and work in Samoa and other islands in the South Seas. London: London Missionary Society (Simpkin, Marshall, Hamilton, Kent & Co. Ltd.)

Beasley, H. G.

1921. Some Polynesian cuttlefish baits. *J. R. Anthropol. Inst. G. B. Irel.* Vol. 51:100-114.
Includes descriptions and drawings of Samoan octopus lures.

- 1980 [1928]. Fish hooks (Pacific Island Records). Facsimile Reprint, London: John Hewett.
Section on Samoan fishhooks, comparative data; drawings.

Becke, L.

1901. The Tanifa of Samoa. *In: By Rock and Pool: on an Austral Shore and Other Stories*.
London: T. Fisher Unwin, pp. 165-173. *Tanifa* is the Samoa term for a large man-eating shark; this provides a description of a unique way to kill sharks.

1909. The palolo worm of Samoa. *In: 'Neath Austral Skies*. London: John Milne, pp. 289-293. A basic description of harvesting the *palolo*.

Blackwell, E. M. Commander.

1948. Blackwell Genealogy. Richmond, Virginia: Old Dominion Press, Inc.
Blackwell was in Pago Pago with Commander Tilley in 1900; he has a description of a fish drive in Pago Harbor and also a description of the Skipjack Case.

Brown, G.

1910. Melanesians and Polynesians: their life-histories described and compared. London: MacMillan, 451 p.

Carpenter, K. E., M. Abrar, G. Aeby, R. B. Aronson, S. Banks, A. Bruckner, A. Chiriboga, J. Cortes, J. C. Delbeek, L. DeVantier, G. J. Edgar, A. J. Edwards, D. Fenner, H. M. Guzman, B. W. Hoeksema, G. Hodgson, O. Johan, W. Y. Licuanan, S. R. Livingstone, E. R. Lovell, J. A. Moore, D. O. Obura, D. Ochavillo, B. A. Polidoro, W. F. Precht, M. C. Quibilan, C. Reboton, Z. T. Richards, A. D. Rogers, J. Sanciangco, A. Sheppard, C. Sheppard, J. Smith, S. Stuart, E. Turak, J. E. N. Veron, C. Wallace, E. Weil, and E. Wood.

2008. One-third of reef-building corals face elevated extinction risk from climate change and local impacts. *Science* 321(5888): 560-563.

Caspers, H.

1984. Spawning periodicity and habitat of the palolo worm *Eunice viridis* (Polychaete: Eunicidae) in the Samoan Islands. *Mar. Biol.* 79:229–236. A biologist's description of the *palolo*; describes the relationship between the moon and tides and the appearance of the worm; includes a good historic chart of the known dates of the appearance of the worm.

Christie, P.

2004. Marine protected areas as biological successes and social failures in Southeast Asia. *Am. Fish. Soc. Symp.* 42:155–164.

Cinner, J., and S. Aswani.

2007. Integrating customary management into marine conservation. *Biol. Conserv.* 140: 201-216.

Churchill, L. P.

1902. Samoa 'uma: where life is different. New York: Forest and Stream Publishing.

Churchward, W. B.

1971 [1887]. My Consulate in Samoa: a record of four years' sojourn in the Navigators Islands, with personal experience of King Malietoa Laupepa, his country and his men. Folkstone: Dawsons (The Colonial History Series).

Clark, J. T.

1980. Historic preservation in American Samoa: program evaluation and archaeological site inventory. Report on file, American Samoa Historic Preservation Office, Pago Pago, American Samoa. A basic inventory of archaeological sites, some of which relate to traditional fishing practices on Tutuila and Manu'a.

Clark, J. T., and J. E. Landrum III.

n.d. The Va'oto Site: Excavations at a coastal site on Ofu Island, American Samoa.

- Cleghorn, P. L., W. Shapiro, J. Robins, and K. Latinis.
 2000. Archaeological data recovery report for the proposed Ta'ū Road reconstruction at Faga and Fitiuta, Ta'ū Island, Manu'a, American Samoa. Prepared for U.S. Army Corps of Engineers. Kailua, Hawaii: Pacific Legacy, Inc. Describes some fish and shellfish remains recovered at Faga prehistoric village on Ta'ū.
- Copp, J. D.
 1984 [1950]. *The Samoan Dance of Life: an anthropological narrative*. Westport, Connecticut: Greenwood Press. A first-hand account of bonito and shark fishing, eastern Tutuila; good descriptions of dividing the catch.
- Coulter, J. W.
 1941. Land utilization in American Samoa. *Bishop Museum Bulletin* 170. Describes fishing based on 1937 field research; comments on rods and lines, spears and nets, traps, poison, types of fish caught, *palolo*, and the increased consumption of tinned fish.
 1957. *The Pacific dependencies of the United States*. New York: The Macmillan Company, pp. 66-126 (Chapters on American Samoa). Descriptions of fishing and fishing methods in American Samoa such as net throwing, poisoning, and trolling.
- Cox, P.
 1979. The use of indigenous plants as fish poisons in Samoa. *Econ. Bot.* Vol. 33, No. 4: 397-399.
- Craig, P., A. Green, and F. Tuilagi.
 2008. Subsistence harvest of coral reef resources in the outer islands of American Samoa: modern, historic and prehistoric catches. *Fish. Res.* 89: 230-240. Compares modern and prehistoric fish catches and concludes that there is continuity in practices; based on archaeological data from the Toaga site, Ofu Island, and modern surveys of annual harvests.
- Demandt, E.
 1913. *Die Fischerei Der Samoaner; Eine Zusammenstellung Der Bekanntesten Methoden Des Fanges Der Seetiere Bei Den Eingeborenen; Im Anhang: Die Samoanischen Und Zoologischen Namen Der Seetiere*. Hamburg: L. Grafe&Sillem. Compilation of Samoan fishing methods, cited by Hiroa.
 1914. *Seefauna und Fischerei in Samoa*. *Mitt. Deutsch. Seefisch.* Vol. 30, No. 3: 106-117. Types of marine animals and the fishing practices of the Samoans; cited by Hiroa.
- Des Rochers, K. and F. Tuilagi
 1993. American Samoa subsistence fishing survey. Technical report, Department of Marine and Wildlife Resources, American Samoa.

Dye, T. S., and T. R. Graham.

2004. Review of archaeological and historical data concerning reef fishing in Hawaii and American Samoa. On file American Samoa Historic Preservation Office.

<http://www.tsdye2.com/reports/028/report.pdf> A basic review of sources; can be used as a reference for other research but not very descriptive about American Samoa.

Eisler, D.

1995. Fagaitua Bay Phase II Research Project: final report on the American Samoa Power Authority waterline project from Alega to Alofau. Apia, American Samoa: American Samoa Power Authority.

Enright, J., S. Ortquist, and R. LaTour.

n.d. Fa'atautaiga: Traditional Samoan fishing methods. Pago Pago: American Samoa Council on Culture, Arts & Humanities. A popular description of fishing methods with drawings; a small booklet.

Fa'asili, U., and F. Sauafea.

2001. Technical input into the Community Fisheries Management Program of American Samoa. Secretariat of the Pacific Community Field Report No. 5.

Firth, R.

1965. Primitive Polynesian Economy. NY: Norton. This is a comparative work, based on Firth's data from fieldwork in Tikopia in the 1920s and 1930s; it gives a comparative picture of the use of traditional fishing resources in Polynesia.

1975 (original 1939). Primitive Polynesian Economy. NY: Norton. This is a comparative work, based on Firth's data from fieldwork in Tikopia in the 1920s and 1930s; it gives a comparative picture of the use of traditional fishing resources in Polynesia.

Gray, J. A. C.

1960. Amerika Samoa: A history of American Samoa and its United States Naval Administration. Annapolis, Maryland: U.S. Naval Institute. This contains a description of the conflict between traditional practices related to fishing and the U.S. Naval Administration, in particular the Skipjack Case on Tutuila.

Green, R., and J. Davidson.

1969. Archaeology in Western Samoa, Vol. 1. Bull. Auckl. Inst. Mus., Auckland.

Halpern, B. S., S. Walbridge, K. A. Selkoe, C. V. Kappel, F. Micheli, C. D'Agrosa, J. F. Bruno, K. S. Casey, C. Ebert, H. E. Fox, r. Fujita, D. Heinemann, H. S. Lenihan, E. M. P. Madin, M. t. Perry, e. R. Selig, M. D. Spalding, R. S. Steneck, and R. Watson.

2008. A global map of human impact on marine ecosystems. Science 319: 948-952.

Hart, J. W.

1996. Samoan culture. Ati's Samoan Print Shop, Apia. Revised edition, originally published 1966. A popular description of Samoan fishing methods, with drawings.

Herdrich, D. J.

1991. Towards an understanding of Samoan star mounds. *Journal of the Polynesian Society* Vol. 100 (4): 381-435. This is a description of the star mounds and how they were used for catching pigeons; the method of catching pigeons can be compared to the method for catching mullet with nets.

Herdrich, D., J. R. Moore, N. Kilzer, and J. Kennedy.

1996. A Cultural Resource Evaluation Phase I and II for a Portion of Road 1b, Phase 1 of the Ta'u Road Reconstruction, Ta'u Island, Manu'a, American Samoa. Prepared for McConnel Dowell. Hale'iwa, Hawaii: Archaeological Consultants of the Pacific, Inc. Report describing fish and shell remains excavated on Ta'u.

Herman, B.

1970 [1955]. *Tales of ancient Samoa*. The Book Shop, Samoan Church, Pago Pago, 118 pages; Contains myths and legends, some of which are related to beliefs about fish and fishing practices; describes the legend of the dolphins at Fagasa.

Hill, H. B.

1978. The use of near shore marine life as a food resource by American Samoans. *Miscellaneous Work Papers 1, Pacific Islands Program, University of Hawaii, Honolulu*. MA thesis: contains data and charts on the frequent and basic fishing techniques found in eastern Tutuila during the fieldwork period of 8 months in 1975-76; a focus on three villages – Faga'itua, Lau'i'ifou, and Aua – and their use of the reefs, based on observations and interviews with local fishermen.

Hiroa, T. R. (Peter Buck).

1930. *Samoan material culture*. Bernice P. Bishop Museum Bulletin 75. Honolulu: Bishop Museum Press. The section on fishing methods pages 418-522: Detailed descriptions of traditional Samoan fishing methods, including drawings, figures and photographs; this is the most comprehensive text for traditional Samoan fishing methods, based on fieldwork in 1927; he covers techniques on Tutuila and Manu'a, in addition to Upolu and Savai'i.

1935. Material representatives of Tongan and Samoan gods. *Journal of the Polynesian Society* 44: no. 173 (48-53), no. 174 (85-96), no. 175 (153-162). This is an explanation of the ways in which Tongans and Samoans made contact with their inanimate gods prior to their conversion to Christianity.

Holmes, L.

1974. *Samoan village*. *Case Studies in Cultural Anthropology*, Stanford University, 108 pages. He describes the variety of fishing methods for Fitiuta, for both men and women; also claims that people were not fishing so much – but eating tinned fish (during 1950s); has some data about taboos and restrictions on Ta'u; comments on the work of Margaret Mead.

Hornell, J.

1950. *Fishing in many waters*. University Press, Cambridge.

Johannes, R. E.

1978. Traditional marine conservation methods in Oceania and their demise. *Ann. Rev. Ecol. Syst.* Vol. 9: 349-364. An overview of methods in Oceania; stresses the importance of village level restrictions on rights to fish the adjacent waters; gives an example from Samoa about how a 'sa' (restriction) was put on the area where sea turtles lay their eggs so that villagers would not take them; makes the argument that Oceania has a different approach to fishing than Western society and that a market economy changes traditional practices of conservation.

1982. Reef and lagoon resource management in Western Samoa. Report to the Government of Western Samoa and the South Pacific, 22 pages.

1984. Marine conservation in relation to traditional life-styles of tropical artisanal fishermen. *The Environmentalist* Vol. 4 (Supp. 7): 30-35. This is a shorter version of the 1978 article, making much the same argument.

2002. Did indigenous conservation ethic exist? *SPC Traditional Management Bulletin* 14: 3-7.

Jordan, D. S., and A. Seale.

1906. The fishes of Samoa: description of the species found in the archipelago, with a provisional checklist to the fishes of Oceania. *Bulletin of the Bureau of Fisheries* 25 (December 15): 173-455. Includes Samoan and scientific names of fish based primarily on fieldwork conducted between February and May, 1888.

Keesing, F.

1934. *Modern Samoa: its government and changing life*. Stanford: Stanford University Press. Keesing, an anthropologist, compares developments in Western Samoa and American Samoa based on field research in 1930; he has good descriptions of the social structure and how Samoan cultural practices continue under two separate governments.

Keighley E. D., S. T. McGarvey, C. Quested, C. McCuddin, S. Viali, and U. Maga.

2007. Nutrition and health in modernizing Samoans: temporal trends and adaptive perspectives. *In: Ohtsuka R. and Ulijaszek S. J. (editors), Health Change in the Asia-Pacific Region*. New York: Cambridge University Press. pp. 147-91.

Kikuchi, W. K.

1963. Archaeological surface ruins in American Samoa. Unpublished M.A. thesis. University of Hawaii. On file, the American Samoa Historic Preservation Office, Pago Pago, American Samoa. A description of fishing stone heaps on Tutuila; legendary sites in Fagasa related to Sina; bait cups on Manu'a.

King, M., and U. Faasili.

1999. Community-based management of subsistence fisheries in Samoa. *Fish. Manag. Ecol.* 6: 133-144. This article reports on the successful community-owned Fisheries Management Plan instigated in independent Samoa during the 1990s. The project depends on the fact that fishing communities are repositories of valuable traditional knowledge and have a high awareness of the marine environment. Within the first two years of the project, 44 villages produced Village Fisheries Management Plans and 38 of these villages established community-owned Marine Protection Areas.

Kirch, P. V.

1985. Feathered gods and fishhooks: an introduction to Hawaiian archaeology and prehistory. Honolulu: University of Hawaii Press. Contains comparative data, drawings and photos of fishhooks and fishing shrines.

Kirch, P.V., and R. C. Green.

2001. *Hawaiki, ancestral Polynesia: an essay in historical anthropology*. Cambridge: Cambridge University Press. Using archaeological, ethnographic and linguistic data, the authors construct a model of ancestral Polynesian subsistence patterns, material culture, social and political organization, and gods, seasons, and rituals.

Kirch, P. V., and T. L. Hunt. (Eds.)

1993. The To'aga Site: three millennia of Polynesian occupation in the Manu'a Islands, American Samoa. Number 51 in *Contributions of the University of California Archaeological Research Facility*, University of California, Berkeley, CA. A detailed description and analysis of shellfish and fish remains from a large sample; descriptions of prehistoric fishhooks, shell rings, beads, shell bead abraders, coral abraders, sea-urchin spine abraders, and a drilled shark's tooth; this is a major archaeological site in American Samoa; it is the data set that Craig et al., were using in their study.

Krämer, A.

1994 and 1995. *The Samoa Islands: an outline of a monograph with particular consideration of German Samoa*. Vol. I (1994; orig. 1901) and Vol. II (1995; orig. 1903). Honolulu: University of Hawai'i Press. Contains a section on fishing, pages 196-233, and boat building, pages 281-308; based on field research circa 1900 throughout the Samoan islands, with detailed descriptions of fishing methods, including drawings and photographs; also has various legends related to fishing including the Fagasa legend of the dolphins; often cited by Hiroa and others following.

La Perouse, J.-F. d. G.

1799. *A Voyage Round the World, Performed in the Years 1785, 1786, 1787, and 1788*. London: A. Hamilton. Includes descriptions of fishing methods; this was the ill-fated trip where they were attacked at Aasu; he notes fishing methods such as line, hooks, nets and spears; also a description of outrigger canoes.

Latinis, K., J. R. Moore, and J. Kennedy.

1996. A cultural resources evaluation Phases I and II for the Ta'ū Secondary Road located on Ta'ū Island, American Samoa. Prepared for American Samoa Disaster Recovery Office. Hale'iwa, Hawaii: Archaeological Consultants of the Pacific, Inc. This contains a description of a small sample of fish and shell remains, Ta'ū.

Levine, A., and F. Sauafea-Leau.

n.d. Traditional knowledge of marine resource use and management in American Samoa; based on interviews with elder fishermen (2007-2008). Elder fishermen from Tutuila and Manu'a islands were interviewed regarding changes in marine resource use and abundance over time, traditional fishing techniques, traditional management methods (historical and contemporary), legends related to fishing, and other aspects of traditional knowledge.

Lewthwaite, G. R.

1962. Land, life, and agriculture to mid-century. *In: Western Samoa: land, life and agriculture*. Christchurch, New Zealand: Whitcombe & Tombs Ltd. pp. 130-176.

Linnekin, J., T. Hunt, L. Lang, and T. McCormick.

2006. Ethnographic assessment and overview, National Park of American Samoa. *DRAFT*. 203 pp mimeo. Cooperative Parks Study Unit. UH Manoa.

<http://www.botany.hawaii.edu/basch/uhnpscesu/pdfs/LinneknRptdraft.pdf>

Review of fishing methods, legends, and restrictions applying to the National Park areas around Vatia and in Manu'a; they used the "free list data" method where they asked people to name the most important fish and marine species in order to assess local cultural knowledge.

Lockwood, B.

1970. Economic statistics of Samoan village households. Canberra: Research School of Pacific Studies, Department of Economics, Australian National University.

1971. Samoan village economy. New York, London: Oxford University Press.

Based on field research in the 1960s, a study of 4 village economies in Western Samoa and the transition to a market economy; looks at the source of cash and the dependence on traditional forms of subsistence; not particularly focused on fishing but some data on fishing methods and contribution of fishing to household economy.

Lundie, G. A.

1846. Missionary Life in Samoa, as Exhibited in the Journals of the Late George Archibald Lundie During the Revival in Tutuila in 1840-41, edited by his mother, Mary Lundie Duncan. Edinburgh: William Oliphant and Sons. This contains early descriptions by a missionary of Leone village, American Samoa; food presented at feasts.

Matagaluega o le Autalavavou, Taaloga and Aganuu

[1990?]. O le mafuala o upu o le faigafaiva: O le Tusi Faamatala Upu o le Gagana Samoa. 96 p. A Samoan language dictionary of fishing terms that has been produced by the church groups in the villages of Taaloga and Aganuu, independent Samoa.

Maruyama, K.

2001. The abstracts of the excavations in the village of Utumea, Eastern Tutuila, American Samoa, June and July 2001. This is an unpublished report on file in the American Samoa Historic Preservation Office, Pago Pago, American Samoa. A small sample of fish and shellfish remains are noted.

Mauss, M. (in collaboration with H. Beuchat).

1979 [1950] *Seasonal Variations of the Eskimo: A Study in Social Morphology*. Translated with a Foreword by J. J. Fox. London: Routledge and Kegan Paul. This is an early analysis of the relation of culture and natural systems.

McGerty, L., R. L. Spear, P. L. Cleghorn, and W. A. Shapiro.

2002. Archaeological data recovery of a trail feature within the Faga Village site (AS11-1), Ta'u Island, Manu'a Island Group, American Samoa. Prepared for U. S. Army Corps of Engineers, Honolulu District. Honolulu: SCS/CRMS.

Mead, M.

1930. Social organization of Manu'a. Bishop Museum Bulletin 76, Honolulu, Hawaii. A description of Manu'a social organization and restrictions surrounding fishing, distribution of fish; fishing methods; bonito fishing; legends; dreams.

Milner, G. B.

1961. The Samoan vocabulary of respect. *J. R. Anthropol. Inst. G. B. Irel.* Vol. 91, No. 2 (Jul. – Dec.): 296-317. A description of the respect language used for chiefs; shows how language is related to the system of hierarchy and social structure.

1966. *Samoan dictionary*. London: Oxford University Press. Excellent dictionary of Samoan/English; many terms regarding fish and fishing techniques; also proverbs related to fishing.

Moore, C. (Director).

1972. *Vea: Tufuga Samoa*. KZVK-TV, Pago Pago, American Samoa. (29-minute video) On file, American Historic Preservation Office, Pago Pago, American Samoa. An educational video produced in 1972 that features the construction of a traditional *va'alo*, or bonito boat, on Ta'u, using traditional construction techniques.

Moore, J. R., and J. Kennedy.

1996a. Archaeological resources on Lau'age Ridge: A Phase II cultural resource evaluation of site AS-21-100, the Lau'age Ridge Quarry for Phase III of the Onenoa Road Project located in East Vaifanua County, Tutuila Island, American Samoa. Prepared for Samoa Maritime Company. Hale'iwa, Hawaii: Archaeological Consultants of Hawaii, Inc.

1996b. A cultural resource evaluation Phase I and II for the Ofu-Olosega Road Improvement Project, Phases I and II, located on Ofu and Olosega Islands, Manu'a, American Samoa. Prepared for American Samoa Power Authority. Hale'iwa, Hawaii: Archaeological Consultants of the Pacific, Inc. 82.

1999. Results of an archaeological cultural resource evaluation Phases I and II for the Tafuna Plains Sewer System, Phase IIa, located in Tualauta County, Tutuila Island, American Samoa. Prepared for American Samoa Power Authority. Hale'iwa, Hawaii: Archaeological Consultants of the Pacific, Inc.

Moyle, R.

1984. The Samoan journals of John Williams 1830 and 1832. Pacific History Series No. 11, Australian National University Press, Canberra. Describes a fish gorge with float, notes nets, shell hooks, spears, fish drives, poisoning and the use of a stick; verifies the flying fish float technique; also notes they use the shell of the turtle to make rings, fish hooks, neck and ear ornaments.

Neich, R.

1985. Material culture of Western Samoa - persistence and change. Bulletin No. 23, National Museum of New Zealand. Description of canoes and fishing.

Ofisa, S., and C. Ripley.

1976. Loa Mailei ma Moi Falelua. FaaSamoa Pea Vol. 1, No. 3: 62-82. This contains the story of the fishing rock at Fagamalo, American Samoa.

Olsen, F. H.

1976. The Navy and the white man's burden: Naval Administration of Samoa. Ph.D. dissertation. Department of History, Washington University, St. Louis Missouri. A review of the history of American Samoa based mainly on documents from the Naval Administration in the National Archives; includes mention of the Skipjack Case.

O'Meara, J. Tim.

1990. Samoan planters: tradition and economic development in Polynesia. Fort Worth: Holt, Rinehart and Winston, Inc. Case Studies in Cultural Anthropology. He discusses traditional fishing methods and some quantitative data from a three-week fishing survey during fieldwork in the early 1980s in Western Samoa; nothing about American Samoa.

Pearl, F., and W. Sauck.

2007. Paper presented at the 2007 Annual Meeting of the Society for American Archaeology. On file, American Samoa Historic Preservation Office, Pago Pago, American Samoa. Contains a discussion of fishhooks and harvested sea urchins found in an archaeological context.

Ponwith, B.

1992. The shoreline fishery of American Samoa: A 12-year comparison. DMWR Biological Report Series 22, Department of Marine and Wildlife Resources, Pago Pago, American Samoa.

Powell, T.

1877. On the nature and mode of use of the vegetable poisons employed by the Samoan Islanders. *Linnean Society Journal of Botany* Vol. 16: 55-60.

Pratt, Reverend George

1893. A grammar and dictionary of the Samoan language, with English and Samoan vocabulary (3rd and Revised Edition), First Published by the London Missionary Society, London. An older dictionary of Samoan terms than Milner, useful as a cross-reference and for dating terms and techniques; used by Hiroa in his research in order to judge continuity in certain practices or to verify stories about what had been done in the past.

Pritchard, W. T.

1985 [1866]. *Polynesian reminiscences, or life in the South Sea Islands*. With a preface by Dr. Seeman. Papakura, N.Z.: Southern Reprints.

Richards, R.

1988. Samoa's forgotten whaling heritage: American whaling in Samoan Waters 1824-1878, a chronological selection of extracts from primary sources, mainly whaling logbooks, journals and contemporary news items. Wellington, New Zealand: Lithographic Services, Ltd. Notes on what was being traded with the Samoans by the whaling fleets; the Samoans were interested in metal fishhooks, muskets; they provide fish, turtle shell, and different kinds of shells.

Roggeveen, J.

1970. *The Journal of Jacob Roggeveen*. Edited by Andrew Sharp. Oxford: Clarendon Press. Describes the first European contact with the Samoan group; observations of bonito canoe at Ta'u and Ofu; trade of flying fish for glass beads.

Safford, W. E.

1906. Glossary of principal words composing native names of Samoan fishes. U.S. Department of Commerce and Labor Bulletin.

Saipele, Nuuiali'i Mulipola Ma'ilo.

1990. Proverbs of Samoa. Wellington, New Zealand: Snap Printing Ltd. Contains 25 Samoan language proverbs related to fishing.

Saucerman, S.

1994. The inshore fishery of American Samoa, 1991 to 1993. DMWR Biological Report Series 55, Department of Marine and Wildlife Resources, Pago Pago, American Samoa.

1995. The inshore fishery of American Samoa, 1991 to 1994. DMWR Biological Report Series 77, Department of Marine and Wildlife Resources, Pago Pago, American Samoa.

Severance, C. J., and R. Franco.

1989. Justification and Design of Limited Entry Alternatives for the Offshore Fisheries of American Samoa, and an examination of preferential fishing rights for native people of American Samoa within a limited entry context. Final Report, Western Pacific Regional Fishery Management Council, Honolulu. Reviews historical fishing techniques and documents practices up to 1980, focusing on proverbs, the importance of bonito fishing, ceremonial cuts and distribution of certain fish; asked informants their opinions about restricted fishing.

Schultz, E.

1994. Samoan proverbial expressions. Auckland, New Zealand: Polynesian Press. Contains proverbial expressions related to fishing.

Shapiro, W. A., and P. L. Cleghorn.

1999. Archaeological Monitoring for the Construction of the Ta'ū Road, Fagā and Fitiuta, Ta'ū Island, Manu'a, American Samoa. Prepared for U.S. Army Corps of Engineers. Honolulu: Pacific Legacy.

Solomon, K. H., J. A. Beck, and P. Cleghorn.

2005. Data Recovery Fatumafuti Village, Tutuila Island, American Samoa. Report prepared for Fulton Hogan, Ltd. On file, American Samoa Historic Preservation Office, Pago Pago, American Samoa.

Stair, J. B.

1897. *Palolo*, a sea worm eaten by Samoans. *Journal of the Polynesian Society* 6:141–144. Notes small funnel-shaped baskets, beautifully made, to catch *palolo*; remarks about the distinctive name of the day; small fish said to appear just before *palolo*.

1983 [1897]. Old Samoa, or flotsam and jetsam from the Pacific Ocean. Papakura, New Zealand: R. McMillan. Descriptions of canoes and fishing methods; can be compared with others, like Krämer.

Stokes, J. F. G.

1921. Fish poisoning in the Hawaiian Islands, with notes on the custom in Southern Polynesia. B.P. Bishop Museum Occasional Papers 7 (10): 219-33. Describes fish poisoning method on Tutuila; notes other methods used in Samoa generally.

Thilenius, G.

1900. Bonito und Haifang in Alt-Samoa. Globus Vol. 78: 127-129. About bonito and shark fishing in traditional Samoa; the bonito sections are much like Hiroa; the shark-hunting adds some different details about the head fisherman on shore.

Tuiteleleapaga, Chief, N. A.

1980. Samoa yesterday, today and tomorrow. Great Neck, New York: Todd & Honeywell, Inc. Brief discussion of taboos on fish and turtles and sharks; story of shark fishing in Leone.

Turner, G.

1861. Nineteen years in Polynesia: missionary life, travels and researches in the islands of the Pacific. Includes a lot about Samoa: discussion of fish taboos, canoes, fishing nets and fish hooks.

1989 [1884]. Samoa: a hundred years ago and long before. Suva, Fiji: Institute of Pacific Studies, University of the South Pacific. Discussion of fish prohibitions and the manufacture of various types of fishing gear.

Turner, P.

Jan 1, 1836 – June 11, 1839 Journal Book 4 and 5. A missionary's descriptions of distributions of fish and food, large exchanges and quantities.

1837. Journal of Peter Turner, Book 5, Wenesday July 19, 1837. Books 4 and 5, covering the period January 1, 1836-June 11, 1839, contain a missionary's descriptions of distributions of fish and food, large exchanges and quantities.

Underwood, E.B. Commander.

1903. Governor's annual report for fiscal year ending June 30, 1903. This annual report, as was the custom, was sent to the Assistant Secretary of the Navy, Naval Department, Washington D.C.

Van Pel, H.

1959. Fisheries in American Samoa, Fiji, and New Caledonia. South Pac. Bull. 9(3): 26-27.

Veitayaki, J. and V. Ram-Bidesi, E. Matthews, L. Gibson, and V. Vuki.

1995. Overview of destructive fishing practices in the Pacific Islands Region. Suva, Fiji: University of the South Pacific. Summary of destructive fishing methods used in the Pacific islands region, including American Samoa; good chart.

- Verdcourt, B.
1979. A manual of New Guinea legumes. Office of Forests, Lae, Papua New Guinea.
- Volk, R. D., P. A. Knudsen, K. D. Kluge, and D. J. Herdrich.
1992. Towards a territorial conservation strategy and the establishment of a conservation areas system for American Samoa. Pago Pago: Le Vaomatua, Inc. On file, American Samoa Historic Preservation Office, Pago Pago, American Samoa. Contains photographs of a turtle petroglyph and Fagasa *atule* rocks.
- von Bulow, W.
1902. Fishing rights of the natives of German Samoa." *Globus* 82: 40–41.
- von Kotzebue, O.
1967 [1830]. A new voyage round the world in the years 1823-1826. New York: Da Capo Press.
- Walsh, W. J., I. D. Williams, R. E. Schroeder, A. M. Friedlander, B. L. Richards, and K. A. Stamoulis.
2008. Assessing the importance of fishing impacts on Hawaiian coral reef fish assemblages along regional-scale human population gradients. *Environ. Conserv.* 35: 261-272.
- Wass, R. C.
1980. The shoreline fishery of American Samoa – past and present. *In: Marine and coastal processes in the Pacific: ecological aspects of coastal zone management; Papers Presented at a Unesco Seminar Held at Motupore Island Research Centre. University of Papua New Guinea, 14-17 July 1980, pp 51-83. Jakarta: Regional Office for Science and Technology for Southeast Asia, United Nations Educational, Scientific and Cultural Organization.*
- Watters, R. F.
1958a. Culture and environment in Old Samoa. *Studies of man and environment in the western Pacific.* Pages 41-70. Includes a discussion of sea resources; a brief description of the importance of fish resources for the Samoan diet.

1958b. Cultivation in Old Samoa. *Economic Geography* Vol. 34, No. 4 (Oct.): 338-351. Much the same points as Watters 1958a.
- Whistler, W. A.
2000. Plants in Samoan culture: The Ethnobotany of Samoa. Honolulu: Isle Botanica. Descriptions of fish poisons and fish traps.
- White, A. T., A. Salamanca, and C. A. Courtney.
2002. Experience with marine protected area planning and management in the Philippines. *Coastal Management* 30:1-26.

Wilkes, Charles

1844. U.S. Exploring Expedition, 1838-42, Vol. II. Philadelphia: C. Sherman. The expedition visited Tutuila in 1839; includes a description of fishhooks and fishing; the La Perouse affair, and Rev. Murray's activities with the London Missionary Society on Tutuila.

Willis, L.

1889. The story of Lauili, daughter of Samoa. Edited by W. H. Barnes. San Francisco: Jos. Winterburn & Co. A discussion of reef fishing, including gathering shellfish, fish poisoning, groping and nets; *palolo*; fish drives.

Unpublished Sources

Bougainville, L. De

1772. A voyage round the world, in the years 1766, 1767, 1768, and 1769. Translated from the French by John Reinhold Forster. London: printed by J. Nourse, Bookseller to His Majesty; reprinted in 1967 by the Gregg Press, Inc., Ridgewood NJ.

Cartwright, B.

September 1927 Field Notebooks I and II, Bishop Museum Archives, Honolulu, Hawaii. Extensive notes about the Bishop expedition in 1927, in the company of Alfred Judd and Te Rangi Hiroa (Peter Buck); good personal observations; some drawings and descriptions about fishing; fishing shrines; places visited on Tutuila.

Cartwright, B.

1939. My Samoa; manuscript (typescript) in Pacific Collection, Hamilton Library, University of Hawaii. This documents his visit in 1927; a more polished form of the field notebooks.

Drees, F. J.

n.d. Samoa and her people: A group of anecdotes about my travels by longboat and trail over a large part of the Islands of Samoa. Personal copy of Charles Myers, Honolulu, Hawaii. Covers period around 1935 when Drees was Superintendent, Department of Education, American Samoa; good photos; some notes about fish eaten and exchanged; canoes.

Edwards, E.

1915. Voyage of the H.M.S. 'Pandora': dispatched to arrest the mutineers of the 'Bounty' in the South Seas, 1790-91. Being the narratives of Captain Edward Edwards, the commander, and George Hamilton, the surgeon, with an Introduction and Notes by Basil Thomson. London: Francis Edwards.

Ellittott, J. L.

1839. Journals of J. L. Ellittott, a member of the Wilkes Expedition, Microfilm, University of Hawaii Hamilton Library. Describes how Samoans worship *aitu* (spirits) of fish and others; travels around Tutuila.

Hudson, Captain W.

1839. Fieldnotes; unpublished journal notes taken during the Wilkes Expedition; Microfilm, University of Hawaii Hamilton Library. Describes how Samoans move around according to food availability.

Judd, A.

1926. Expanded notes on the ethnology of American Samoa. Bishop Museum Archives, Honolulu, Hawaii. Some observations about fishing and canoes, based on a 1926 field trip.

Wright, J.

n.d. The Skipjack Case, 1900. Unpublished Manuscript, Territorial Archives, American Samoa. Wright was the Territorial Archivist and wrote this description of the Skipjack Case based on three sources in the Territorial Archives; describes the problem caused when a man took a *malauli* home rather than giving it to the high chief, according to custom; much of the debate surrounded the size of the fish because only at the stage when it is *malauli* does it have to be presented to the chief; larger or smaller fish are not affected by this custom; Western District, Tutuila.

APPENDIX A: TRADITIONAL FISHING CHRONOLOGY

- 1722 (June) **Roggeveen and Bouman**: At Ta'ū and Ofu they see canoes that are likely bonito canoes (i.e. they have plank construction, are “neat and fast” and have “three paddles”). At Ofu they trade beads for a mat and flying fish (Roggeveen 1970: 151-153).
- 1768 (May) **De Bougainville**: Between Ta'ū and Ofu-Olosega; traded, some of the items received were fishhooks made of fish bone and “some pieces of very fine shell.” Described what are likely to be bonito canoes with outriggers and line of white shells on pegs on the back and fore deck. “They did not choose to have any iron: they preferred little bits of red stuffs (cloth) to nails, knives, and earrings, which we had had so great a success at Taiti” (De Bougainville 1772: 280-281).
- 1787 (December) **La Perouse**: At Tutuila describes canoes, notes fishing with line and hooks, hooks made of “tortoise” (turtle) shell and “inclosed in a sort of case of mother-of-pearl, or white shell, skillfully wrought in the resemblance of a flying fish..” La Perouse traded for “tunny, bonetfish, or dorado.” Says the largest fish would be traded for a few beads. Observed “arrows” that he thinks are likely small spears for spearing fish. Also notes the use of sweep net and types of fish caught, also observed “greatly ornamented” canoes (La Perouse 1799: 110, 112-113).
- 1791 (June) **Edwards** HMS *Pandora*: At Tutuila notes that islanders have canoes. No explicit mention of fish or fishing; saw canoes and traded. Also that, “Natives have blue, mulberry and other coloured beads about their necks, and we understood they got them from Captain Cook at Tongataboo.” Also notes some natives covered in turmeric (Edwards 1915: 55-56).
- 1824 (April) **Von Kotzebue**: “Our visitors proved to be merry fishermen, for their carefully constructed little canoes adorned with inlaid muscle-shells, were amply provided with large angling hooks made of mother-of-pearl, attached to long fine lines, and various kinds of implements for fishing, and contained an abundance of fine live fish of the mackerel kind” (Von Kotzebue 1967: 268).
- “An expression of openness and confidence sat on the countenances of this people. Our purchases were carried on with much gaiety and laughter on both sides. They gave us their fish, waited quietly for what we gave them in return, and were perfectly satisfied with their barter” (Von Kotzebue 1967: 268-69).
- 1824 **Captain Richard Macy** in the *Maro* says that “natives fond of blue beads” (Richards 1988: 20).
- 1826 (December) **William Plasket**: Traded for shell clubs with blue and green beads (Richards 1988: 22).

- 1827 (January) **William Plasket**: During trading obtained “shells of different kinds” (Richards 1988: 22).
- 1827 (September) **Captain Benjamin Vanderford** in the Clay traded three hundred pounds of sennit for “the value of twenty cents in beads, hooks, etc.” (Richards 1988: 20).
- 1830 **John Williams**: Notes that various fish, such as *Anae* (grey mullet *Velamugil* sp), shells, and eels were held sacred as gods. He also notes that fish were presented along with pigs in ceremonial exchanges which involved reciprocal gifts of tapa cloth (*siapo*) and fine mats (Moyle 1984: 126 and 133).
- 1832 **John Williams**: Describes gorge fishing device with floats and fish bones for the gorges. Also notes the use of fishing nets, pearl and turtle shell hooks, spears, and the coconut leaves for fish drives as well as the use of the *futu* seeds for fish poisoning. He also notes that there are water snakes and that these are “held sacred by some particular Chiefs being the object in which the Spirit of his god resides and is called his *Etu*” (Moyle 1984: 227).
- 1835 (June) Salem Trader ship *Emerald* at Savaii: “Canoes came off with coconuts and a white man came off, he says there is no *shell* which is our object in stopping here.” They note about shell “Thirty to 40 head of shell may be picked up here in the months of April, May, and June at the rate of a musket a head. (Shell averaged at the rate of 2 1/4 pounds per head.) Thirteen pieces of shell of one Turtle or head” (Richards 1988: 44 and 46).
- Also, Upolu: “Our principal object was Hogs and Turtleshell;” “we traded for about 70 grunTERS and three turtles. We gave them one musket for ten good sized hogs and one musket for one turtleshell” (Richards 1988: 47).
- “Told the natives to bring all their shell this am as we intended to leave this noon. Canoes came along side loaded with hogs for the most of which we traded with bayonets giving one bayonet for a small sized pig. This am we bought all the turtleshell they had which amounted to 8 lbs” (Richards 1988: 48).
- 1836 **Turner, P.**: Notes that fish are an important part of exchange ceremonies and feasts. For example: opening of a “leaders house.” “It is 28 feet by 57 and very handsomely wrapped.” (Elsewhere he claims it is the largest house in Samoa.) “After a sermon we distributed a large feast prepared by the teachers and some of the people. Pigs 260, baskets of tarro 1,900, fish 600, bananas 60 bunches” (Turner 1836-1839: 66).
- 1839 **Wilkes** at Ofu: Gives fishhooks as presents. At Tutuila, notes that at Fagasa Chief Toa had fresh water eels as his *aitu* (spirit god). He said with regard to the eels that he “constantly fed [them] in the brook near the village. I visited it, and requested him to catch one, which he attempted to do; but after a long search, turning over large stones, and examining holes, he was unsuccessful. He said there were many in it formerly, and quite tame; but since he had embraced Christianity, they had all been caught and

destroyed; on farther questioning him, he told me that he had himself eaten them; that formerly if any one had touched, disturbed, or attempted to catch one, he should have killed him immediately” (Wilkes 1844: 72-73, 81).

Fishing is described as a great employment. Wilkes has a detailed description of a fish drive in Savaii with the use of nets and coconut leaves. Says that, “About a canoe load was caught, comprising thirty different kinds of fish, some of which were six or eight pounds in weight, but the majority were smaller. The haul was considered an unsuccessful one, which was attributed to some misunderstanding and mismanagement among the natives, by which a large stone fell on the net, and allowed many of the fish to escape” (Wilkes 1844: 84).

In addition, the cast net is also used. He notes that fish and taro are the principle food, mullet being usually caught, and that they also eat shellfish and a large kind of worm. Also describes a fish drive in waters off Savaii that caught 30 different kinds of fish (Wilkes 1844: 84, 87, 117).

Ellittott: Notes that animate and inanimate objects were deified including birds, fish, stones. He says that, “The fisherman the farmer and the voyager had each their Gods who were deified for the skill they had evinced in those products.” Has a brief description of plank built canoes. Notes the use of nets with floats and stone sinkers. Notes that crabs and lobsters are found among the rocks. Describes processing of arrowroot with the use of a coral grater. Provides human population numbers: “The population of the Samoan Islands is about 50,000 of whom about 40,000 are on the islands of Savaii, Upolu, Apolima, and Manono. The remainder are distributed on Tutuila, Olosenga and Ofu.” Also, “This Island [Upolu] contains nearly 30000 inhabitants” (Ellittott 1839).

Hudson: Interesting discussion of the reasons for *malaga* trips, including scarcity of food and the fact that virtually the entire village would go on a three-month trip. Provides population numbers for Upolu: 20,000 are Christian, and 5,000 “heathen” (Hudson 1839: 333 and 335).

1840 **Lundie:** Fish are part of exchange ceremonies. Notes that Samoans pay “religions honors” to fish and birds. And that they would worship wood and stones. He also noted the great pleasure Samoans express in receiving a fishhook (presumably metal). He says, “The ecstatic joy they experienced on receiving a fish-hook, was expressed by shouting and whooping at the highest pitch of their voices” (Lundie 1846: 109, 145, and 232).

1841-1860 **Turner, G.:** Turner reports on an extensive number of Samoan gods that were “incarnate in” various fish and sea creatures, prohibitions against consuming them, sanctions against violators, and prohibitions on using lagoons during festivals related to the deities (Turner 1861).

After 1840 there are extensive descriptions of fishing and fishing related activities in Turner (1861), Stair (1897), (Krämer 1994, 1995) and Hiroa (1930).

APPENDIX B: FISH TERMS AND SIZE

This appendix provides two descriptions of Samoan fish terms. The first is organized alphabetically, by terms used in this paper. The second are terms taken from Milner (1966) and are grouped by genus and/or species and size. Note that there is some variation related to terms that refer to more than one genus and terms that are also related to genus by location and other characteristics. Some descriptions from Milner are not consistent with current fish terms in use today.

Samoan fish terms (organized alphabetically):

‘anae: mullet, 20-40cm length (family: Mugilidae)
‘ata’ata – large grouper (family: Serranidae)
atu (aku): bonito (family: Scombridae)
atule: big eye scad (*Selar crumenophthalmus*)
āua: young mullet, 8 – 12cm length (family: Mugilidae)
i’asa – turtle
i’asina: juvenile goat fish (family: Mullidae)
fe’e – octopus
fo: cardinalfish (genus: *Apogon*)
fuga: parrotfish (family: Scaridae)
galo: parrotfish, greater than 50cm length (family: Scaridae)
gatala – small grouper (family: Serranidae)
laea: parrotfish, 20-50cm length (family: Scaridae)
lō: rabbitfish (family: Siganidae)
lupo: jack/travally smaller than 8cm length (family: Carangidae)
malai – snapper (family: Lutjanidae)
malau – squirrelfish (genus: *Myripristis*)
malauli – jacks/trevally, 20-50cm length (family: Carangidae)
malie: shark (family: Carcharhinidae)
mali’o: common crab (*Sesarma rotundata*)
malolo – flying fish (family: Exocoetidae)
matamu – bigeye emperor (*Monotaxis grandoculus*)
naiufi: shark (family: Carcharhinidae)
nefu: anchovy (*Encrasicholina devisi*)
palagi: surgeonfish, larger size (genus: *Acanthurus*)
palai’a: striped bristletooth (*Ctenochaetus striatus*)
palolo: marine worm (*Eunice viridis*)
patagaloa – wrasse (*Thalassoma purpureum*)
pone: striped bristletooth (*Ctenochaetus striatus*)
sugale – wrasses (family: Labridae)
tupa – land crab
tu’u’u – angelfish (family: Chaetodontidae)
ulua – jack/trevally, 50-80cm length (family: Carangidae)
umiumia – threadfins (genus: *Polydactylus*)

Fish terms from Milner (1966)

Abudefduf

- filimana** n. Fish (*Abudefduf* sp.). p. 65
i'usamasama n. Fish (*Abudefduf* sp.) p. 89
mutu² n. Fish (*Abudefduf* sp.). p. 153
pipi³ n. Fish (*Abudefduf* sp.). p. 184
tāupou² n. Name given to certain fishes (*Pomacentrus* sp. & *Abudefduf* sp. (pcw tapou1.) p. 255
vaiuli n. Fish (*Pomacentrus* sp.) (also *Abudefduf* sp.). p. 311

Acanthurus

- afinamea** n. Fish (*Acanthurus* sp.) p. 6
alogo n. Fish (*Acanthurus* sp.) when full grown. p. 17
'iliū n. Name given to certain fishes of genera *Zebbrasoma* and *Acanthurus*, the skin of which is said to be poisonous. p. 84
i'usina n. Fish (*Pomacentrus* sp.; also *Acanthurus* sp.) p. 89
logouli n. Whitebait of certain surgeon fishes (*Acanthurus* & *Ctenochaetus*). p. 110
māmāpalagi n. Fish (*Acanthurus* sp.) known as *i'usina* when small. p. 128
manini n. Fish (*Acanthurus* sp.) when full-grown. p. 129
maomao n. Whitefishbait of fish belonging to genera *Acanthurus* and *Ctenochaetus*, when very small. p. 131
maono n. Small fish (*Acanthurus* sp.) p.131
palagi n. Name given to certain fishes of genus *Acanthurus* (surgeon fishes) when about 1 ft long. p. 173
pala'ia n. Name given to whitebait of fishes of genera *Acanthurus* and *Ctenochaetus* (surgeon-fishes) when it is large. p. 173
pe'ape'a² n. Small fish; name given to two species of genus *Acanthurus* when 2-3 inches long. p. 179
pone² n. Name given to certain surgeon fishes (genus *Acanthurus*) when about 6 inches long. p. 188
ponepone n. Name given when about 2-3 inches long. [see above] p. 188
pone i'umūmū n. Fish (*Acanthurus* sp.). p. 188
'unavau n. Kind of poisonous fish (*Acanthurus* sp.) or perhaps a morbid condition of fishes of genus *Sardinella*. 'Ua 'o se ~ (pv. 520: He is like a ~ (i.e. he is a dangerous person). p. 301

Caranx

- atugaloa** n. Name given to two species of fish of genus *Caranx* when about 2 ft long. p. 29
lālāfutu n. Fish (*Caranx* sp.) (also *alaalafutu*). p. 96
lupo n. Name given to certain fishes of genus *Caranx* when 2 to 3 inches long. p. 116
lupolago n. Name given to whitebait of certain species of genus *Caranx*. p. 116
lupotā n. Name given to certain fishes of genus *Caranx* when about 6 inches long. (s. also malauli.) p. 116

malauli n. Name given to certain fishes of the genus *Caranx* (considered to be fit for chiefs) when about 1 ft. long (s. also *lupo* and *ulua*.) p. 123

sapo'anae n. Name given to certain species of fish genus *Caranx* when they are more than 3 ft. long (s. also *ulua*.) [note *sapo* is v. to catch.] p. 201

ulua n. Name given to two species of fish of genus *Caranx* when about 3 ft. long, and considered to be a present fit for a chief. (s. also *malauli* and *sapo'anae*.) p. 300

Centropodus

toto² n. Name given to a fish (*Centropodus* sp.) when immature. (s. also *valevale*.) p. 277

valevale² n. Name given to a fish of genus *Centropodus* when fully grown. (s. also *toto*².) p. 312

Cheilinus

lalafi² n. name given to fishes of genus *Cheilinus* when between 6 in. and 1 ft. long. p. 96

tagafa² n. Name given to fishes of genus *Cheilinus* when 3 ft. long or more (also *tanafa*). p. 227

Chromis

i'a lanumoana n. Fish (*Chromis* sp.); ~ *mai moana* (po.): Bonito. p. 81-82

teatea n. Fish (*Chromis* sp.). p. 260

tu'u'u n. Name given to certain small and queer fishes of genus *Abudefduf*, *Pomacentrus*, and *Chromis*. *E otagia fo'i le* ~ (fs): Even the ~ can be eaten raw (i.e. everybody has his qualities, it takes all kinds to make a world, said when s.o. comments adversely on a person's appearance, the *tu'u'u* being regarded as an ugly fish) (cf. proverbial saying concerning *sugale*). p. 293

Epinephelus

gatala n. Name given to certain fishes (sea-basses or groupers) belonging to genus *Epinephelus*, when about 6 inches long. (s. also *'ata'ata*.) p. 77

mata'ele n. Fish (*Epinephelus* sp.) p. 135

papa³ n. Fish (*Epinephelus* sp.). p. 175

tinaelega n. Fish (*Epinephelus* sp.). p. 265

tonu² n. Name given to fishes of genus *Epinephelus* when about 3 ft. long or more. 9s. also *gatala*.) p. 276

'uo'uo n. Fish (? *Epinephelus* sp.). p. 302

Equula

lufi² n. Fish (*Equula* sp.). (s. also *mumu*².) p. 114

mumu² n. Name given to a fish (*lufi*²; *Equula* sp.) when small. p. 152

Gerres

matu n. Fish (*Gerres* sp.) when about 6 inches long. p. 138

matuloa n. Name given to the last [i.e. *matu*] when fully grown. p. 138

Holocentrus

malau¹ n. Name given to red squirrel-fishes belonging to the genera *Holocentrus* & *Myripristis* and of which many species are distinguished by name. p.123

tāmalau n. Name given to certain fishes of genus *Holocentrus* when full-grown, i.e. about 1 ft. in length. (s. also *malau*¹.) p. 240

Katsuwonu

atu³ n. Fish. (*Katsuwonus* sp.), the bonito. p. 28

'aui¹ cp. Classifying particle used with numerals in reference to bonito (in tens). *E lua* ~.: Twenty bonito; *e toluga*~.: Thirty bonito; *e sefulu*~.: One hundred bonito. (N.B. this particle is prefixed to numerals from two to ten and is used mainly in Upolu and American Samoa; s. also *tino*³.) p. 34

tino³ cp. Classifying particle used with numerals in reference to bonito (in tens). *E ~ tasi*: Ten bonito (also *'atoa*); *'ua ~tolu le va'a*: The bonito-boat has caught thirty bonito; *e ~selau*: One hundred bonito. (N.B. This particle is used mainly in Savaii; s. also *'au*¹.) p. 266

inafo n. Shoal of bonito. p. 86

ta'uo n. Kind of large bonito caught by trawling from cutters. p. 255

tavatava n. Name give to bonito when about 1 ft. long. p. 259

Kuhlia

'inato n. Freshwater fish (*Kuhlia* sp.) when full-grown (i.e. about 1 ft. long). p. 86

safole n. Fish (*Kuhlia* sp.). p. 196

salele n. Fish (*Kuhlia* sp.). p. 198

sesele n. Name given to a freshwater fish (*inato*, *Kuhlia* sp.) when immature. p. 207

Lethrinus

filoa n. Name given to fishes of genera *Lethrinus* and *Lethrinella* when fully grown (i.e. about 2 ft. long); ~ *va'a* n. Name given to one species when about 3 ft. long. p. 65

i'ufiloa n. Name given to one of the stages of growth of *filoa*. p. 89

mata'ele'ele n. Name given to certain fishes of genus *Lethrinus* when about 1 ft. long. p. 135

mūmū³ n. Name given to certain fishes of genus *Lethrinus* when about 6 inches long. (s. also *mu*¹.) p. 152

Lutjanus

mala'i n. Name given to a fish the genus *Lutjanus* when about 1 ft, long. (s. also *taiva*.) p. 123

mūmea n. Fish (*Lutjanus* sp.) which is said to be poisonous in certain districts. p. 152

nanue n. Name given to certain fishes (? of genus *Lutjanus*). p. 154

savane n. Name given to a fish of genus *Lutjanus* when about 1 ft. long p. 203

tāiva n. Name given to a fish of genus *Lutjanus* when about 2 ft. long. (s. also *mala'i*.) p. 231

tamala¹ n. Name given to certain fishes of genus *Lutjanus* when not above 1 ft. in length (also tagau1). (s. also 'a'a2.) p. 240

uiui n. Fish (*Lutjanus* sp.). p. 297

Mulloichthys

i'asina n. Fish (name given to small fry of genus *Mulloichthys*). p. 82

vete² n. Fish (*Mulloichthys* sp.). p. 316

Mulloides

memea² n. 1. Name given to *afinemea* (a fish) before it is fully grown. 2. Fish (*Mulloides* sp.). p. 144

Myripristi

mānifinifi² n. Fish (*Myripristis* sp.). p. 129

Naso

'ili'ilia² n. Name given to fishes of genus *Naso* when about 2 to 3 inches long. p. 84

ume n. Name given to mature fishes of genus *Naso* when about 1 ft. long and over. p. 300

umelei n. Name given to ume when about 6 inches long. (s. also 'ili'ilia.) p. 300

Pempheris

foa'ao n. Fish (*Pempheris* sp.). p. 67

manifi² n. Fish (*Pempheris* sp.). p. 129

pula³ n. Fish (*Pempheris* sp.). p. 191

Pomacentrus

alamu¹ n. Name given to certain fishes of genera *Pomacentrus*, *Halacanthus*, and *Pygoplites*. p. 14

i'usina n. Fish (*Pomacentrus* sp.; also *Acanthurus* sp.) p. 89

tāupou² n. Name given to certain fishes (*Pomacentrus* sp. & *Abudefduf* sp. (pcw tāpou1.) p. 255

tu'u'u n. Name given to certain small and queer fishes of genus *Abudefduf*, *Pomacentrus*, and *Chromis*. *E otagia fo'i le ~ (fs)*: Even the ~ can be eaten raw (i.e. everybody has his qualities, it takes all kinds to make a world, said when s.o. comments adversely on a person's appearance, the *tu'u'u* being regarded as an ugly fish) (cf. proverbial saying concerning *sugale*). p. 293

vaiuli n. Fish (*Pomacentrus* sp.) (also *Abudefduf* sp.). p. 311

Pseudupeneus

matūlau n. Fish (*Pseudupeneus* sp.). p. 139

moana³ n. Name given to certain fishes of genus *Pseudupeneus*. p. 146

ta'uleia n. Name given to two fishes of genus *Pseudupeneus*, both edible and which has barbels. p. 254

Scarus

fuga² n. General name given to fishes of genus *Scarus* (parrot-fishes) when about 1 ft. long (also *fugafuga*). **fugamea** n. Reddish-brown species. **fugausi** n. Greeny-blue species (s. also *galo*², *laea*, *mamanu*, *ulapo*, and *usiusi*.) p. 72

galo² n. Name given to parrot-fishes of genus *Scarus* when about 3 ft. long and over. p. 75

laea n. Name given to a green and blue species of genus *Scarus* (parrot-fishes) when it is about 2 ft. long. (s. also *fuga*.) p. 93

mamanu² n. Name given to reddish-brown species of genus *Scarus* (parrot-fishes when about 1 1/2 –2 ft long. (s. also *fuga*².) p. 128

ulapo n. Name given to the lighter-coloured species of genus *Scarus* (parrot-fishes) when about 6 inches long. (s. also *fuga*².) p. 298

usiusi n. Name given to dark-colored species of genus *Scarus* (parrot-fishes) when about 6 inches long. (s. also *fuga*².) p. 303

Siganus

lō³ n. Name given to fishes of genus *Siganus*. p. 109

pa'u'ulu n. Name given to a fish of genus *Siganus*. (s. also *la*³.) p. 179

tito n. Name given to a fish of genus *Siganus* when fully-grown (i.e. 1 ft. long). (s. also *lō*³.) p. 267

Trachurops

atule n. Fish (*Trachurops* sp.), the horse mackerel, caught mainly in March and April. p. 29

Velamugil

afomatua n. Name given to grey mullet (*'anae*) when 2 ft. long and above. p. 6

'ana'anālagi n. Name given to adult grey mullet when found in fresh water. p. 20

'anae n. Fish (*Velamugil* sp.), the grey mullet. p. 20

āua n. Name given to grey mullet (*'anae*) when about 2-3 inches in length. *'A lamo i le 'anae, 'o lona ta'u 'o le ~*: When mullet is small it is called ~. po. Word used (instead of *'anae*) for grey mullet in Falelatai. p. 32

matapona n. Name given to grey mullet (*'anae*) when about 6 inches long. p. 135

poi² n. Kind of fish, said to be an immature stage of *'anae*. *E tele 'au~*: There are many shoals of ~. (s. also *poi*³.) p. 186

poi³ n. Whitebait of grey mullet (*'anae*). (s. also *poi*².) p. 186

Zebrasoma

‘iliū n. Name given to certain fishes of genera *Zebrasoma* and *Acanthurus*, the skin of which is said to be poisonous. p. 84

samasama n. Fish (*Zebrasoma* sp.). p. 199

(This page is intentionally left blank.)

APPENDIX C: DICTIONARY OF SAMOAN TERMS USED IN THIS DOCUMENT

- ‘aiga** n. Family
alangamea n. Mullet hand net
aualuma n. Sons of the matai of a village
aumaga n. Young men’s group in the village
ava n. Prepared kava root; An opening in the reef
‘ava niukini n. Poison root used for fishing (*Derris trifoliata*)
avasā n. Fish poison
ele ‘ele n. Earth, dirt
enu n. Traditional fishing basket
fale n. House
faleali’i n. House of the village chief
fau v. To build
fono n. A meeting, council
gatogiā n. First bonito caught in the season
i’a n. Fish or marine creature
lauloa n. Method of fishing involving using coconut leaves/branches as sweeps
malaga v. To travel/journey; n. Travelling party from one village visiting another village
masina n. The moon; Month
masina motusaga n. The first real appearance of the palolo
masina tatelega n. The great scooping up of palolo
masina usunoa n. The first day of the appearance of the palolo
mata-liki n. The pleiades
matai n. Head of family group; Person holding family title
mua adj. First
muli adj. Last
ola n. Fishing basket
pa n. Wall; Fish hook
pa i’a n. Fish weir made of coral stone
palusami n. Traditional dish of taro leaves cooked in coconut cream
pangi n. Bait for flying fish
paopao n. Outrigger canoe
pua palolo n. The smell of the reef during palolo season
pule n. Authority, power
sa adj. Sacred; forbidden
safunua n. Fishing method performed by a group of women in Samoa
sasa’e n. Fishing method performed by women in Samoa
tai n. Tide
taivale n. Poor season when fish are scarce
taova’a n. Shark spear
tapu v. Forbid; Make off limits (kapu, tabu)
tausaga n. Year
tautai n. Fishing expert (master fisherman) of a village
tolo matu n. Long net
tufuga n. Skilled person (often carpenter, tattoo artist)
tulāgogo n. Dorsal fin

tutui (or **tuinga**) n. Fishing method performed by women in Samoa
umusā n. Sacred meal
‘upega n. A net
‘upenga malie n. Shark net
uto n. Float used for fishing
va’a n. Canoe
va’aalo n. Bonito boat
vaipalolo n. Wet season
vili n. Drill

AVAILABILITY OF NOAA TECHNICAL MEMORANDUM NMFS

Copies of this and other documents in the NOAA Technical Memorandum NMFS series issued by the Pacific Islands Fisheries Science Center are available online at the PIFSC Web site <http://www.pifsc.noaa.gov> in PDF format. In addition, this series and a wide range of other NOAA documents are available in various formats from the National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161, U.S.A. [Tel: (703)-605-6000]; URL: <http://www.ntis.gov>. A fee may be charged.

Recent issues of NOAA Technical Memorandum NMFS–PIFSC are listed below:

- NOAA-TM-NMFS-PIFSC-18 Clinical observations of ocular disease in Hawaiian monk seals.
M. T. HANSON, A. A. AGUIRRE, and R. C. BRAUN
(March 2009)
- 19 American Samoa as a fishing community.
A. LEVINE, and S. ALLEN
(March 2009)
- 20 Demand for Hawaii bottomfish revisited: incorporating economics into total allowable catch management.
J. HOSPITAL, and M. PAN
(September 2009)
- 21 Shark predation on Hawaiian monk seals: Workshop II & post-workshop developments, November 5-6, 2008.
K. S. GOBUSH
(June 2010)
- 22 Status review of Hawaiian insular false killer whales (*Pseudorca crassidens*) under the Endangered Species Act.
E. M. OLESON, C. H. BOGGS, K. A. FORNEY, M. B. HANSON, D. R. KOBAYASHI, B. L. TAYLOR, P. R. WADE, and G. M. YLITALO
(July 2010)
- 23 Hawaiian monk seals and their prey: assessing characteristics of prey species fatty acid signatures and consequences for estimating monk seal diets using quantitative fatty acid signature analysis.
S. IVERSON, J. PICHÉ, and W. BLANCHARD
(March 2011)