

THE DEVELOPMENT OF SMALL-SCALE FISHERIES FOR BOTTOMFISH IN AMERICAN SAMOA (1961–1987)

This article has been written by David Itano, former Fisheries Research Scientist with the Oceanic Fisheries Programme of the South Pacific Commission. Due to its length, only part of the article will be presented in this issue. The second part, together with the bibliography, will be published in Fisheries Newsletter #77.

by David G. Itano,
Hawaii Institute of Marine
Biology
Kaneohe, Hawaii

INTRODUCTION

General

American Samoa consists of five high, volcanic islands and two atolls. The population centres are located on Tutuila and Aunu'u. They lie approximately 95 km to the west of Ofu, Olosega and Ta'u, which comprise the Manu'a Island group. Swain's and Rose Atoll are 280 and 360 km to the north and east of Tutuila respectively (see map on page 30). The country maintains a semi-independent status while enjoying the benefits of full territorial status of the United States.

The domestic commercial fisheries of American Samoa have evolved over the past 25 years through the efforts of several fisheries development and training programmes. These have included boat-building projects, low-interest boat-loan incentives, FAD programmes and training in small craft navigation, marine electronics and outboard engine repair. Specific

training and surveys with fishing techniques have included deep-water bottomfishing (Mead, 1978; Moana, 1988), skipjack live-bait pole-and-line fishing (Rodman, 1973; Bryan 1978), bouke ami lift-netting (Tuna Programme, 1984), lobster trapping (Chambers & Nunes, 1975), live-bait assisted trolling (Bryan & Lambert, 1979), ika shibi fishing, palu ahi hand-lining (Crook, 1985), PVC pipe bottomfish longlining (Makaiwi, 1984), deep-water shrimp trapping, dead-bait trolling, vertical longlining and flying-fish netting (Moana, 1988). This list is far from complete.

Some of these techniques were readily accepted by local fishermen but most were quickly forgotten. Training in bottom-fishing and the introduction of manually-operated bottomfish handreels have gained the widest acceptance with the local fleet. The handreels were also quickly utilised in the pelagic troll fishery for skipjack and yellowfin tuna.

The promotion of domestic bottomfishing in American Samoa has been so successful that some of the local bottomfish grounds have become signifi-

cantly depleted. Some of these fishery development programmes were active for periods of time adequate to note declines in catch vs effort and location and decreases in mean size of harvested fish.

As previously stated, American Samoa has experienced several fishery development programmes in the last quarter century. Many of these are identical to development programmes already in progress or proposed for other Pacific Island countries and territories.

This paper will attempt to recount the early development of the domestic bottomfishery in American Samoa as it relates to the development of sustained, economically viable artisanal fisheries. It is hoped that other countries of the region will find this exercise useful in planning the rational development and management of their domestic fisheries*.

Background

A visit in 1961 by John C. Marr, director of the Hawaii Area, Bureau of Commercial Fisheries (Marr, 1961), resulted in the following recommendations to increase local fishery production:

- fresh-water ponds for tilapia culture;
- salt-water ponds for mullet culture or rearing;
- nearshore fishing by trolling, handlines, set lines, lobster traps, tangle nets and fish traps;

* The Department of Marine and Wildlife Resources is currently conducting bottomfish assessment projects and studies on the biology of bottomfish species exploited in the Territory, to better manage these resources.

- tuna longlining and general tuna fishing development;
- pole-and-line tuna fishing;
- sport-fishing and charter-fishing industry development; and
- aquarium fish trade.

This article examines the development of the American Samoa commercial/artisanal fishery as it relates to the exploitation of bottomfish taken by hook and line.

FIRST-GENERATION FISHERY DEVELOPMENT

Initial status

At the time of Marr's visit to American Samoa, there were no local commercial fishing vessels or sport-fishing craft in the entire Territory. The concept of fishing to produce a marketable product for monetary gain is incompatible with traditional Samoan cultural values.

In a somewhat paradoxical sense, the erosion of other traditional values and the acceptance of a cash economy based on government jobs and tuna cannery employment resulted in a steadily decreasing level of traditional, subsistence fishing.

Cultural deterioration also led to the loss of a rich heritage of oceanic seafaring among the Samoan people. Marr estimated that there were only about 10 traditional outrigger canoes (**paopao**) regularly fishing around the main island of Tutuila.

Most fishing and seafood gathering activities in Samoa concentrate on shallow reef-flat areas between the outer fringing reef and the shoreline (Hill,

1977; Wass 1980a). Dependence on imported protein and the local sale of inexpensive frozen fish from the canneries further discouraged the start of a domestic fishing industry.

In 1961 alone, approximately 100 short tons of frozen fish (mostly wahoo) caught incidentally by the foreign longline fleet based on the Pago Pago canneries was sold locally at cost or slight profit for US\$ 0.12/lb (Marr, 1961) [1 lb = 0.454 kg]. This inexpensive source of fish remains a serious constraint on domestic fisheries development to this day.

The Marr report recommended the establishment of a government agency at the departmental level to guide and assist fisheries development, with priority given to the introduction of a suitable small craft for near-shore fisheries. The vessel Marr recommended would be outboard-driven, easily built and maintained, 4.9–7.0 m long and capable of utilising troll, hand-line, trap, gillnet, surround net, night lighting and longlining gear.

At the same time, he cautioned that training and appropriate technology were essential and that Samoan fishermen must be willing to resume and pursue a rigorous seafaring life for the fisheries development to succeed.

Bottomfish surveys—*Tautai A'e*

The Office of Marine Resources (OMR) was created by executive order of the Governor of American Samoa during the 1960s to deal with all fisheries-related matters, which included addressing the recommendations of the Marr report.

The major objectives of the office at this time were fisheries

development, marine resource identification and resource assessment.

OMR bottomfish surveys from 1967 to 1970 on the 10 m fibreglass vessel, *Tautai A'e*, indicated potential for a small-scale bottomfishery based in Pago Pago (Ralston, 1978).

A total of 125 bottomfish survey trips was made, and the catch results from 104 bottomfishing trips between September 1967 and March 1969 produced 14,411 kg of bottomfish for an average of 138.6 kg/trip at a mean rate of 3.5 kg/line-hour. Survey effort concentrated on shallow shelf areas around Tutuila Island to a depth of 55 m, resulting in a catch dominated by shallow-water emperors and snappers.

It was reported that 23.3 per cent of the catch was *Lethrinus miniatus*, 19.2 per cent *Lutjanus gibbus*, and that there was a large percentage of *L. bohar*, which were not included in Ralston's analysis as they are often ciguatoxic in Samoa and are not marketed.

The remainder of the catch was composed of *Lutjanus kasmira*, *Cephalopholis* spp., *Ephinephelus* spp. and the dogtooth tuna, *Gymnosarda unicolor*.

The best fishing areas for these species were on the relatively broad shelf areas around Tutuila near Aunu'u Island, Cape Taputapu and Cape Matatula (Figure 1). Catch rates in these areas ranged from 4.1 to 4.9 kg/line-hour. There were some indications that catch rates fell during the period of the surveys, although it is not certain if the cause was fishing pressure or seasonal variation in catchability.

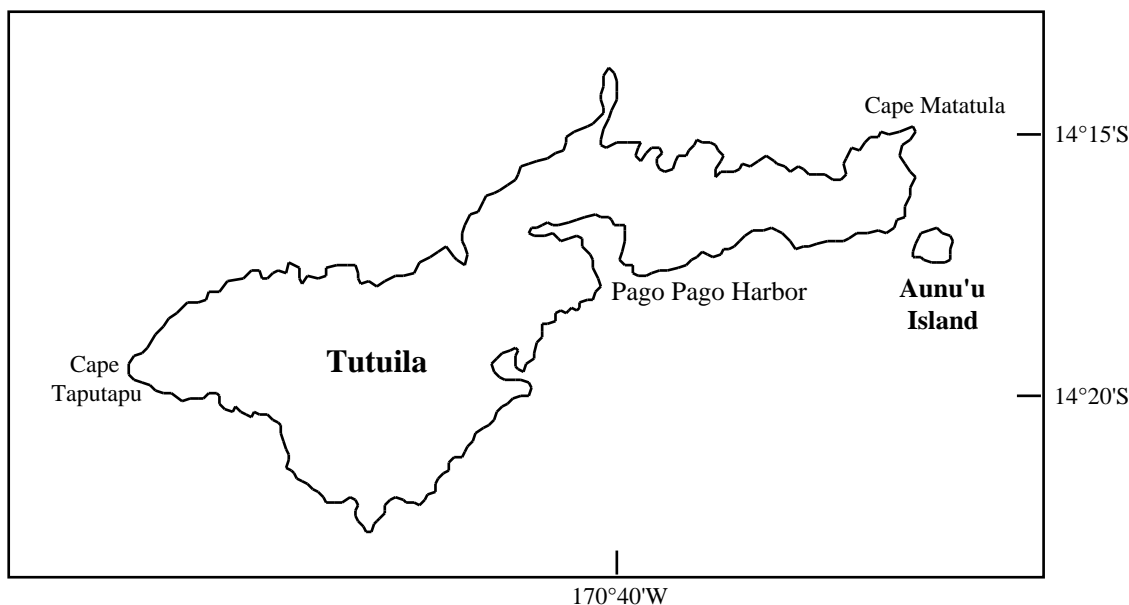


Figure 1: Shallow water bottomfish grounds surveyed by the Tautai A'e

However, it is likely that the drop in catch rate was a real consequence of the vessel fishing down virgin stocks of bottomfish.

Dory Project

In February 1972, the OMR Small Boat Project, funded by the American Samoa Office of Economic Opportunity (OEO), launched the first small-scale, commercial fishing vessel for American Samoa (Wass, 1973). The OMR developed a boat-building facility that eventually produced 23 vessels over a three-year period (Wass, 1975).

The vessels were patterned after the Oregon Dory, popular in the US Pacific north-west, designed for beach launching and used in the salmon troll and shallow-water groundfish fisheries. The Small Boat Project is commonly referred to as the Dory Project due to the choice of vessel design. The plywood hulls were 7.3 m long with a 2.4 m beam and small cuddy cabin forward. The early dories were supplied with petrol-driven engines and inboard/outboard (I/O) propeller drive

units. Six other dories were equipped with I/O jet drives in an attempt to avoid problems of propeller damage on shallow coral reefs during beach landings (Pedro, pers. comm.).

The jet drives were soon abandoned; later dories were equipped with 70 hp diesel engines with I/O propeller units (Hume & Eginton, 1976). A few dories were equipped with true inboard shaft and cutlass drives, but the I/O units were preferred (Yamasaki, pers comm.). The flat bottoms of some of the dories were removed and replaced with modified V hulls in response to complaints concerning the rough handling (Pedro, pers. comm.).

Completed dories were made available to local residents interested in commercial fishing on the understanding that the cost of materials and construction costs would be paid back to the government. The repayment and a low rate of interest would be generated from fish sales and re-enter an OEO revolving fund. Very little of the money was ever repaid.

Fishing captains were asked to report catches to the OMR on standardised trip report forms that contained information on area fished, fishing method, number of fishermen, number of hooks, weight of catch (total) and number and weight of predominant species (Wass, 1973). According to OMR records, 70 per cent of the dories engaged in some bottomfishing activities.

Almost all of the bottomfishing was conducted at night, and most of the fishing trips lasted for only a single night. Dories averaged three to four fishermen per trip. Most of the bottomfishing was conducted in relatively shallow waters, between 55 and 146 m. Fishing effort concentrated on the shallow shelf areas around Tutuila Island that had already been surveyed by the *Tautai A'e*. No mechanical means of line retrieval was employed, meaning that all bottomfishing and trolling was conducted with simple handlines kept in baskets or loose in the bottom of the dories.

The shallow fishing grounds and handlines produced a predictable catch of shallow- to mid-depth snappers, emperors and groupers. In 1974–1975, Dory Project vessel landings by weight included *Lutjanus kasmira* (30.9%), *Lethrinus* spp. (22.8%), *Lutjanus gibbus* (16.2%) and *Pristipomoides* spp. (9.5%). The remaining 9.5 per cent of the catch was a mixture of other snappers, groupers and jacks (Wass, 1975).

A wide range of mechanical problems beset several dory owners and many of the dories were out of service for extended periods of time while engines or drive units were changed or replaced. After the first few years, the lack of routine maintenance took a heavy toll on many of the dories. Some eventually became unserviceable and some were out of service due to repossession for failure to pay the vessel loans.

However, a few very dedicated and conscientious fishermen maintained their craft in a rough but serviceable condition into the 1980s (Mead, 1978). Figure 2 charts the progress of Dory Project boat-building efforts. It shows the number of vessels fishing every year in Tutuila and Manu'a and the number that were inactive, lost at sea or sold to Western Samoa.

The number of inactive vessels for 1978–1980 was not known at the time of preparation of this article. Vessels that were inactive generally had mechanical problems or were changing engine types.

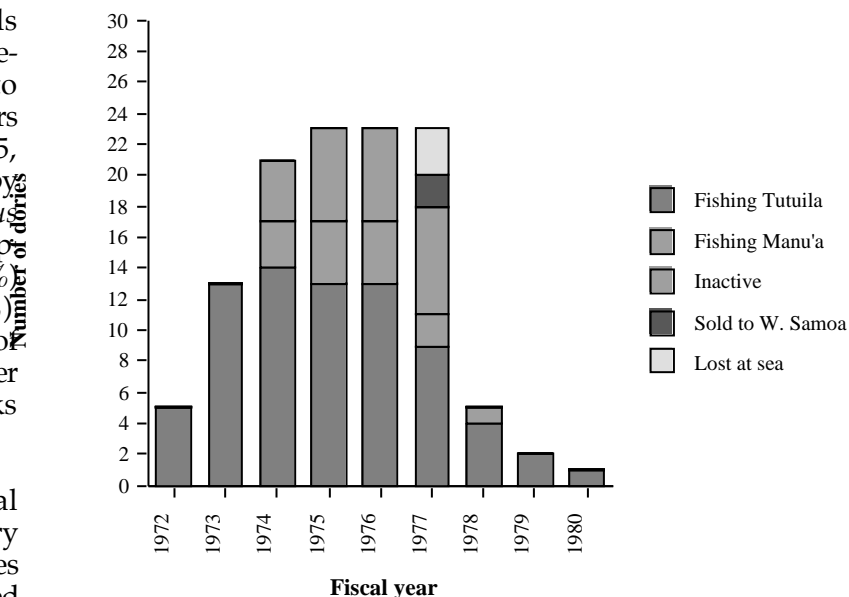
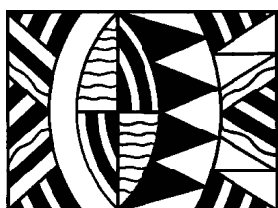


Figure 2: OMR Dory Project vessels, 1972–1980

VISTA fisheries development project

In the early 1970s, a group of around 20 Americans with fisheries training or expertise came to American Samoa as volunteer fisheries advisers to the OMR with the Volunteers in Service to America (VISTA) programme (Yamasaki, pers. comm.).

A diversity of backgrounds and skills was represented in the group, who ranged from university students to commercial fishermen from the US mainland and Hawaii. Several of the volunteers were attached to various aspects of the Dory Project or the OMR boat-building facility.

SPC Outer Reef Artisanal Fisheries Project (ORAFP)—Western Samoa, 1975

A five-member team from the South Pacific Commission ORAFP visited Western Samoa for seven months in 1975 to survey and assess bottomfish resources, assess the feasibility of commercial fisheries development and train local fisher-

men to use new gear and fishing techniques. The project concentrated on surveying bottomfish grounds and providing training in outer reef slope bottomfishing using electric and manually operated reels (Hume & Eginton, 1976).

A variety of vessels was used during the visit, including two Pago Pago-built Oregon dories. The significant aspect of this visit was the use of hand and electric reels for bottomfishing in Samoa; this was possibly the first time Samoan fishermen had been trained and given the opportunity to use anything other than handlines for bottom-fishing operations.

SPC Deep Sea Fisheries Development Project—American Samoa 1978

Three years later, the SPC Deep Sea Fisheries Development (DSFD) Project sent its masterfisherman Paul Mead to American Samoa. He remained in American Samoa from 28 March to 2 July 1978, with the objectives of introducing new fishing gear and methods to improve

bottomfishing efficiency, and encouraging the exploitation of unexploited outer reef slopes deeper than 120 m. The dory project had begun six years prior to Mead's visit and four dories were still in operation around Tutuila Island during this period.

When Mead first came to the Territory, local bottomfishing concentrated on the shallow-water snapper/emperor/grouper complex. Bottomfishing was conducted at night using hand-lines, with no mechanical means of retrieving the line.

Mead used two privately-owned dories for his bottomfishing surveys and equipped them with FAO-designed, Western Samoan-type wooden

handreels, each filled with 500 m of 113 kg monofilament line.

Ground tackle consisted of 350–730 m of polypropylene line, and a short section of 10 mm chain attached to a simple 12 mm steel grapnel hook anchor (Mead, 1978). A portable depth sounder was also used to assist in the location of suitable anchoring and fishing areas.

Instead of fishing on the shallow shelf areas around Tutuila, Mead concentrated on deeper areas by anchoring on the edge of the outer reef slope, and playing out anchor line to reach the desired depth.

The use of this technique with wooden hand-reels was soon

adopted by the American Samoan dory fleet. It opened up entirely new fishing grounds and brought the deep-water, high-value snappers under exploitation. The FAO-designed handreels were also quickly adopted for trolling operations, significantly increasing dory CPUE.

This project was the first to document the harvest in American Samoa of commercial quantities of high-value bottomfish, such as *Etelis coruscans*, *E. carbunculus*, *Aphareus rutilans* and *Pristipomoides* spp.

Lethrinids made up a large part of the catch by number, but the eteline snappers represented over 50 per cent of the catch by weight . . . *To be continued.*



© Copyright South Pacific Commission 1996

The South Pacific Commission authorises the reproduction of this material, whole or in part, in any form, provided appropriate acknowledgement is given.

Original text: English

South Pacific Commission, B.P. D5, 98848 Noumea Cedex, New Caledonia
Telephone: (687) 262000 - Telex: 3139NM SOPACOM - Fax: (687) 263818