

STATIC FISHING AROUND FISH AGGREGATING DEVICES (FADS) AND OFFSHORE BANKS IN AMERICAN SAMOA

by

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Experimental static handline fishing around FADs was first attempted in American Samoa in 1978-9 by Pat Brian who was associated with the first generation of FADs to be deployed here. No formal reports or records were made describing the gear, techniques or catch, but word-of-mouth reports indicate that this work was mildly successful. The most recent generation of FADs was deployed in late 1984 following a period of over a year where there were no buoys at all. During this period trolling had become nearly unprofitable due to rising fuel costs and the increasing scarcity of fish, often attributed to the influx of tuna superseiners to this area. Now the buoys have brought the fish but trolling can still be uneconomical when the fish are either not feeding on the surface or not biting on artificial lures, which is often the case in very calm weather or during mid-day hours. The purpose of this programme was to investigate the feasibility of static fishing for the pelagic species usually caught by trolling around FADs and offshore banks e.g. yellowfin tuna (*Thunnus albacares*), bigeye tuna (*Thunnus obesus*), skipjack (*Katsuwonus pelamis*), wahoo (*Acanthocybium solandri*) and dolphin fish (*Coryphaena hippurus*).

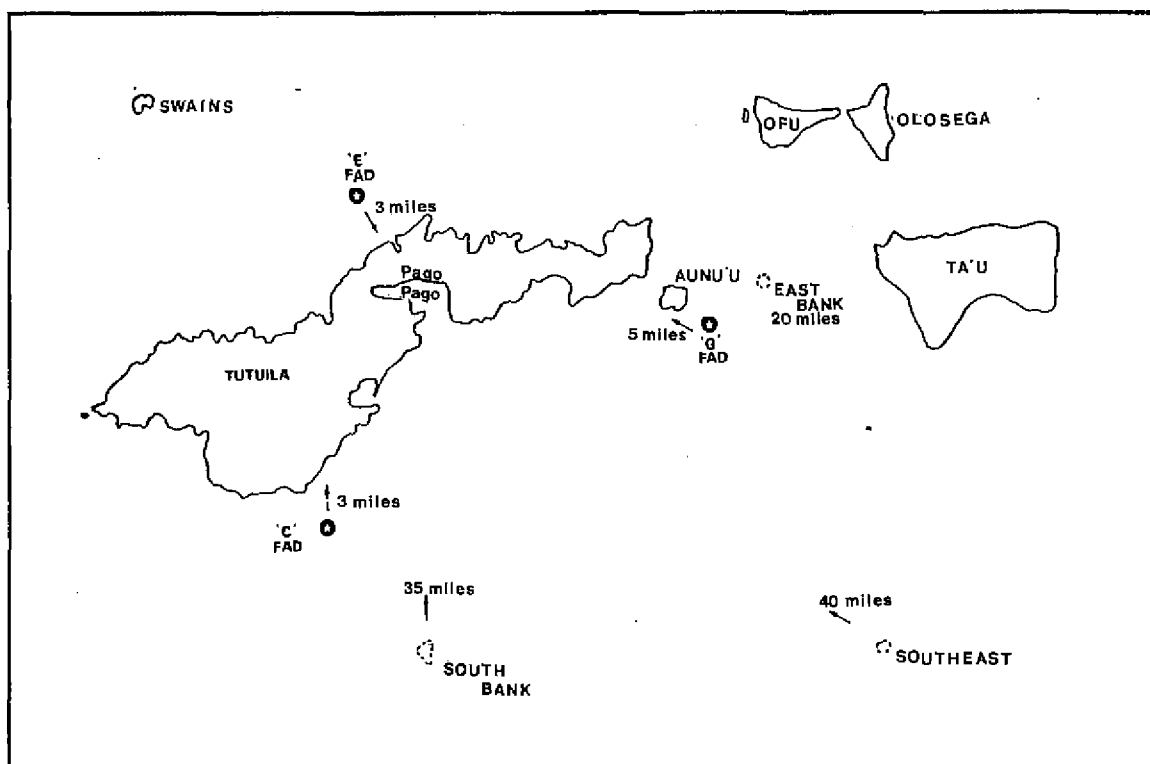


Figure 1: Tutuila Island, American Samoa, showing FAD position and areas fished

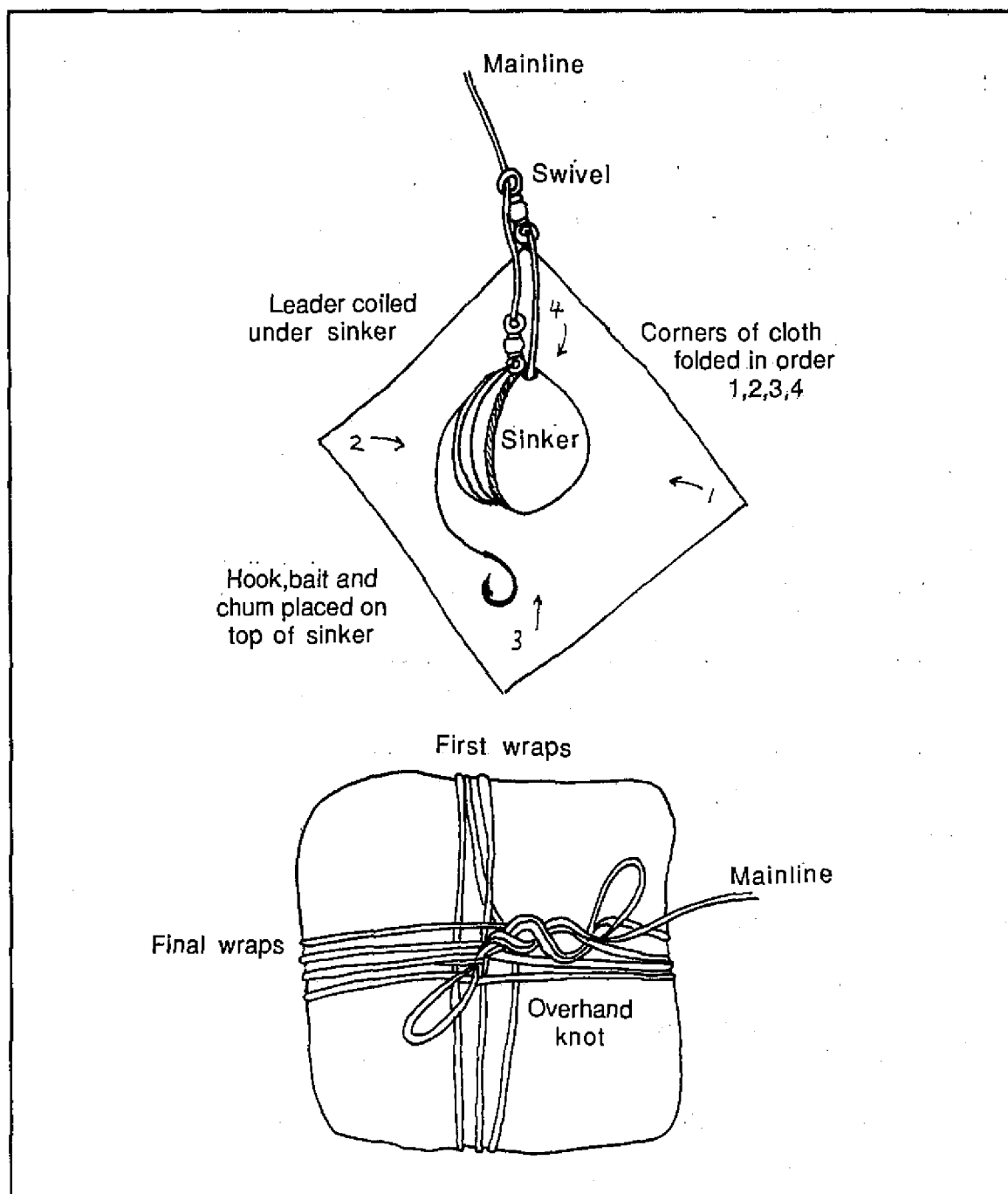
Methods (and materials) OF STATIC FISHING AROUND FISH AGGREGATING DEVICES (FADs) IN AMERICAN SAMOA

The sixteen trips made between December 1984 and April 1985 were aboard the 40 ft. diesel powered *Leilani* and were made irrespective of moon phase or time of day. The initial trips were mainly to FAD C and also to G and E (Figure 1) and were unsuccessful. These buoys had only recently been deployed at this time and there was no evidence of fish on the surface or marks on the recording fathometer (echo sounder). By early February a school of small yellowfin tuna moved in on FAD C and soon thereafter both C and G had resident tuna schools in their respective areas.

Hawaiian fisherman Mr Alike Cooper was contracted to assist us with the static fishing and the gear he brought with him was for a technique known in Hawaii as 'palu ahi'. Chumming is essential for static hook and line types of fishing and the advantage of the palu ahi gear is that it lets the fishermen chum at the precise depth he wants to present his bait. The entire handline gear consisted of 100 fathoms of braided dacron line of approximately 300 lb breaking strength. This line was marked by tying in swivels every 10 fathoms for the first 50 fathoms and stored in a large bucket or basket. The carefully marked lines allow different lines to be fished at the same depth once the fish are located. Mr Cooper indicated that all lines were to be always set at the same depth so that the chumming effect would be cumulative rather than dispersed over differing depths. Terminal gear consists of a flattened lead weight of 1.5-3 lb. tied to a swivel. The line connecting the weight to the swivel has one corner of a 10 in square of heavy cloth lashed to it (Figure 2). The mainline is passed through the swivel and tied to a final swivel, and another swivel is tied to the end, to which the monofilament leader is attached. This allows the lead and 'handkerchief' to slide freely along the mainline. In this way, a hooked fish which suddenly takes off again once near the boat will not pull the lead back with it. This avoids possible injury to the fisherman, damage to the vessel or the breaking of the line. All leaders were of monofilament, either 250 lb or 400 lb breaking strength depending on the size of the fish. Monofilament saves time when sharks are hooked (as they usually bite through the monofilament). Leader length was usually set at 2 fathoms. Hooks used were either BKN #34 to #40 or Mustad tuna circle hooks #6 - #3. When smaller fish such as rainbow runner (*Elegatis bipinnulata*) were the primary catch, leaders as light as 150 lb with a #26 BKN hook were used.

Use of the gear is as follows:

- With the 'handkerchief' spread on a flat surface, coil the leader and place it in the centre, then put the lead on top.
- Place a handful of chum (chopped skipjack, squid, etc.) on top of the lead.
- Fold the corners over the chum with the connected corner being last.
- Wrap the mainline around the bundle 3 times, then turn the bundle 90° and wrap 3 more times at right angles to the first wraps. On the third wrap loop the line around the index finger and go back 3 wraps in the opposite direction.
- Do a double overhand knot with the index finger loop and the main line.



Palu ahi gear arrangement

The bundle is then dropped overboard and *must* fall freely until the desired depth is reached (by counting swivels). A sharp pull at this time will cause the knot to slip, unravelling the bundle and dispersing both the chum and the baited hook.

The gear for night fishing is somewhat different than that just described. Chumming was not recommended for night use by Mr Cooper. Instead a waterproofed 25-50 watt light was lowered 1-2 fathoms below the boat to attract squid and other baitfish, which were supposed in turn to attract larger fish. The flat lead and handkerchief were replaced with a 'banana' sinker made from a 12 in length of copper tubing (1/2 in diameter) filled with lead, with a length of 400 lb wire running through it with heavy stainless swivels at both ends. The banana shape of the sinkers is to keep them from rolling on the deck.

Baitfish most often attracted to the light were 'akule' (*Selar crumenophthalmus*). These were easily caught on standard akule gear, which comprised about 10 fathoms of 25 lb monofilament wound on a small reel with a 2 oz. sinker tied to the end, and rigged with 3 to 6 akule flies on branch loops spaced at 8 in to 12 in intervals, starting at 8 in above the weight. Hooked live, through the back, these fish are considered prime bait for the large tunas. Other baits used were skipjack tuna, frozen squid and Japanese longline bait (saury).

An additional surface line consisting of a 6-10 ft leader (250 lb) buoyed by a small float and attached to 1/4 in polypropylene cord, was allowed to drift 50 or more yards from the boat then tied off with 50 lb monofilament which would break away when the main line was struck.

For the FAD trips, the boat was tied directly to the FAD if the fish were observed to be staying close to it near the surface or if the fathometer marked them close to it at depth. A sea-anchor was deployed if they were located farther off. When a fish was hooked and boated it was immediately killed by a blow to the head and then bled, by tearing loose the gills if small (under 25 lb), or by an incision between the pectoral fin and lateral line if larger.

Results and discussion

Information and data concerning fishing dates, locations fished, fishing depths, bait used etc. are given in the table.

Trip date	Location	Bait	Depths fished Fathoms (m)	Time	Species Caught/ Weight
1/22/85	C FAD	Skipjack Sama	20-30 fathoms	0800-1500	6 Yellowfin - 120 lbs
1/23	C FAD	Skipjack Sama Live trevally	40 (77) 40 (77) 10 (18)	1700-1900 1700-1900 1900-0700	2 Sharks 2 sharks 1 Shark 1 Yellowfin - 20 lbs
1/29	Rose Atoll	Skipjack	40-50 (72-90)	0700-1000	4 Yellowfin - 12-23 lbs 2 Dogtooth Tuna - 20 & 85 lbs
2/7	C FAD	Skipjack Live akule	40 (72) 10 (18)	1630-1900 1900-0100	2 Sharks 2 Yellowfin - 35 & 46 lbs No catch recorded
2/15	C FAD	Skipjack	40 (72)	0800-1500	2 Sharks 2 Yellowfin - 37 & 42 lbs
2/24	East Bank	Skipjack	40 (72) 10 (18)	1400-1900 1900-0000	1 Dogtooth Tuna - 155 lbs 1 Shark 2 Sharks
3/5&6	South-east Bank	Skipjack Frozen squid	20-40 (36-72) 20-40 (36-72)		7 Shark 7 sharks
3/21	South-east Bank	Skipjack	30-40 (36-72) 10 (18)	1500-1900 1900-0100	5 Yellowfin - 110 lbs 2 Rainbow Runners - 6 lbs 1 Shark
4/8	South-east Bank	Skipjack &	10-30 (18-54) 10 (18)	1400-1900 1900-2300	12 Rainbow Runners - 80 lbs 5 Triggerfish - 9 lbs 1 Shark
4/21	South Bank	Akule	30 (54)	0800-1800	5 Yellowfin - 12 lbs 3 Dogtooth Tuna - 59 lbs 2 Sharks
4/25	C FAD	Akule	30 (54)	1200-1700	3 Rainbow Runners - 35 lbs 2 Yellowfin - 20 lbs
5/1	C FAD	Akule	10-40 (18-72)	1000-1400	1 Skipjack - 6 lbs

The first basic conclusion that can be drawn from the data is that this type of fishing was only slightly successful here as catch per trip rarely exceeded 200 lb. A major problem whether fishing at the FADs or off the banks is that of sharks. The extent of this problem is not always reflected in the data because sharks lost by biting through leaders are not counted. Sharks quickly learn to associate the presence of boats with a free meal; large amounts of chum in the water increase the problem many times over. It was our repeated experience to begin fishing and strike a couple of fish, only to have sharks move into the area, disperse the fish and ruin the fishing. With the market value of shark being nearly zero, as well as the market value of tuna falling due to the number of boats trolling the FADs, it is not feasible to embark on a shark extermination programme unless many boats are participating. The problem here is that most of the boats fishing the FADs are trolling and are not troubled by sharks, since they are continually moving around the area striking their fish at different spots, and of course not chumming. When sharks are a problem while trolling, they can be dealt with quickly and cheaply by using a disposable 1 gallon plastic container with a wire leader and hook, several of which can be tossed overboard when sharks are taking hooked fish on the surface.

However, the main problem with developing a static fishery further is the market potential of the catch. At this time trolling boats are landing a surplus of yellowfin and skipjack tuna. In the past months average wholesale/retail prices for yellowfin have dropped from US\$ 1.50 per pound to US\$ 0.90-1.00/lb. With a limited retail market (mainly due to large amounts of 'black market' fish coming from the local tuna canneries and only one restaurant that buys fresh sashimi quality tuna) there is little room for this fishery to expand. Early in the programme we were hopeful of being able to export fresh tuna to the United Fishing Agency (UFA) auction block in Hawaii, as some of us have been successfully doing with bottom fish for nearly three years now. The problem here has been that UFA reps have strongly advised us to set 60 lb as a minimum size for fish we export; smaller fish will have a lower oil/fat content in their flesh and thus bring a low price. Another problem with exporting tuna is the problem of 'burning', a discolouration and loss of texture in the meat of some tuna caused by metabolic body heat generated during capture, resulting in a very low market value. At present we have no way of testing a fish for 'burn' until it is quartered for sale on the auction block.

With these considerations in mind we shifted the emphasis of our static fishing to offshore banks where tuna, wahoo and other species are frequently seen in the areas we normally bottom fish. We found that setting our palu ahi lines at 10-40 fathoms while we bottom fished for snapper in 100-150 fathoms was productive in two ways. Firstly, it enhanced our bottom catch with a variety of miscellaneous fish, including some not usually caught around the FADs, such as rainbow runner and dogtooth tuna (*Gymnosarda unicolor*). Secondly, the lines serve as 'alarms' for the presence of sharks under the boat, before we start losing valuable bottom fish to them.

The data also indicate that night-time fishing efforts were unsuccessful. It was finally concluded that the fish were leaving the vicinity of the FAD at night. On three of the trips fish were either caught or observed near the FAD in the evening, while subsequent fishing at night brought only sharks, with no marks being recorded on the fathometer. Large schools of akule came to the light on these occasions and made excellent live bait, yet brought no strikes other than sharks. Efforts to locate schools on the fathometer in the vicinity of the FAD were also unsuccessful.

the fishery is open to all and the fish are sold at a low price. This is a very important point.

Conclusions

Although the trials of the palu-ahi method of fishing for tuna and other species indicates that it can be more productive or economical than trolling, it should not be concluded that this is always the way to approach fishing the FADs. This is evidenced by our final trip where 2 hours of trolling around FAD C produced nearly 350 lb of dolphinfish and yellowfin while the 3.5 hrs of static fishing produced one 5 lb skipjack. Along with the problems discussed previously, especially that of marketing, I feel that at present in American Samoa palu-ahi fishing around the FADs is a useful but limited alternative to trolling, and one which can also enhance bottomfish catches while anchored on offshore banks.

It is hoped that the results of the trials will be used to develop a more comprehensive study of the palu-ahi method of fishing for tuna and other species around the FADs. This study should include the following: (1) a comparison of the palu-ahi method with trolling; (2) a study of the economics of the palu-ahi method; (3) a study of the ecology of the FADs; and (4) a study of the impact of the FADs on the fishery.

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