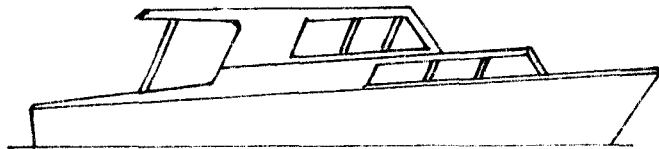


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TUNA TAGGING USING TAHITIAN BONITIER VESSELS



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MARCH 1985

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Introduction

In September 1984 the South Pacific Commission received a request from the Etablissement pour la Valorisation des Activites Aquacoles et Maritimes (EVAAM) of French Polynesia to assist in a tuna tagging programme. Both financial and technical assistance were solicited for a project to study the fish aggregation process around anchored rafts (FADs). The project proposal was based on the idea of tagging tuna from the small local boats, referred to as bonitiers. As little is known of the technical feasibility nor of the financial aspect of this type of tuna tagging, it was decided that a short pilot project be carried out to determine the suitability of bonitiers for tagging. This initial work took place in Tahiti from February 7 to March 8, 1985.

The Bonitier Fishery

In the early 1950s Tahitian fishermen began to use small motorized launches called "bonitiers" ("poti auhopu" in the Tahitian language) from which pearl shell lures were trolled. Through the years competition between these boats has encouraged an increase in propulsion power from the original 9 to 18 horsepower to the present average of about 225 hp. The typical bonitier of today (figure 1) is ten to eleven meters in length, nine tonnes in weight, and capable of speeds of up to 22 knots. In French Polynesia there are about 115 bonitiers, and 53 of these are based in Papeete. The average bonitier seriously engaged in fishing catches 22.7 tonnes of fish a year, of which 75% is skipjack and 14% is yellowfin. Average daily catches of the Papeete based fleet are given in figure 2.

Bonitiers from Papeete depart for fishing in the early morning usually with two or three crew aboard. Most fishing takes place within 30 miles of the port, although some vessels on occasion fish as far away as Makatea or Raiatea.

The fishermen search for aggregations of birds which usually indicate the presence of tuna at the surface. When in the immediate vicinity of a school the speed of the bonitier is slowed to three or four knots, trolling lines are streamed and two fishermen at stern ready their fishing poles. A selection of 10 to 25 poles, each having a slightly different type of lure, rests on the cabin. Most lures are of the pearl shell type (figure 1) and the choice of which lure to use is based on the type of bait on which the tuna are feeding, color of the water, movement of the school, and size and species of the tuna in the school. The operator of the bonitier attempts to manoeuvre the vessel to the constantly changing area of maximum fish activity, usually indicated by the birds. Fish are poled with considerable skill onto the afterdeck of the vessel by two or sometimes three fishermen, one of whom is simultaneously controlling the speed and direction of the boat.

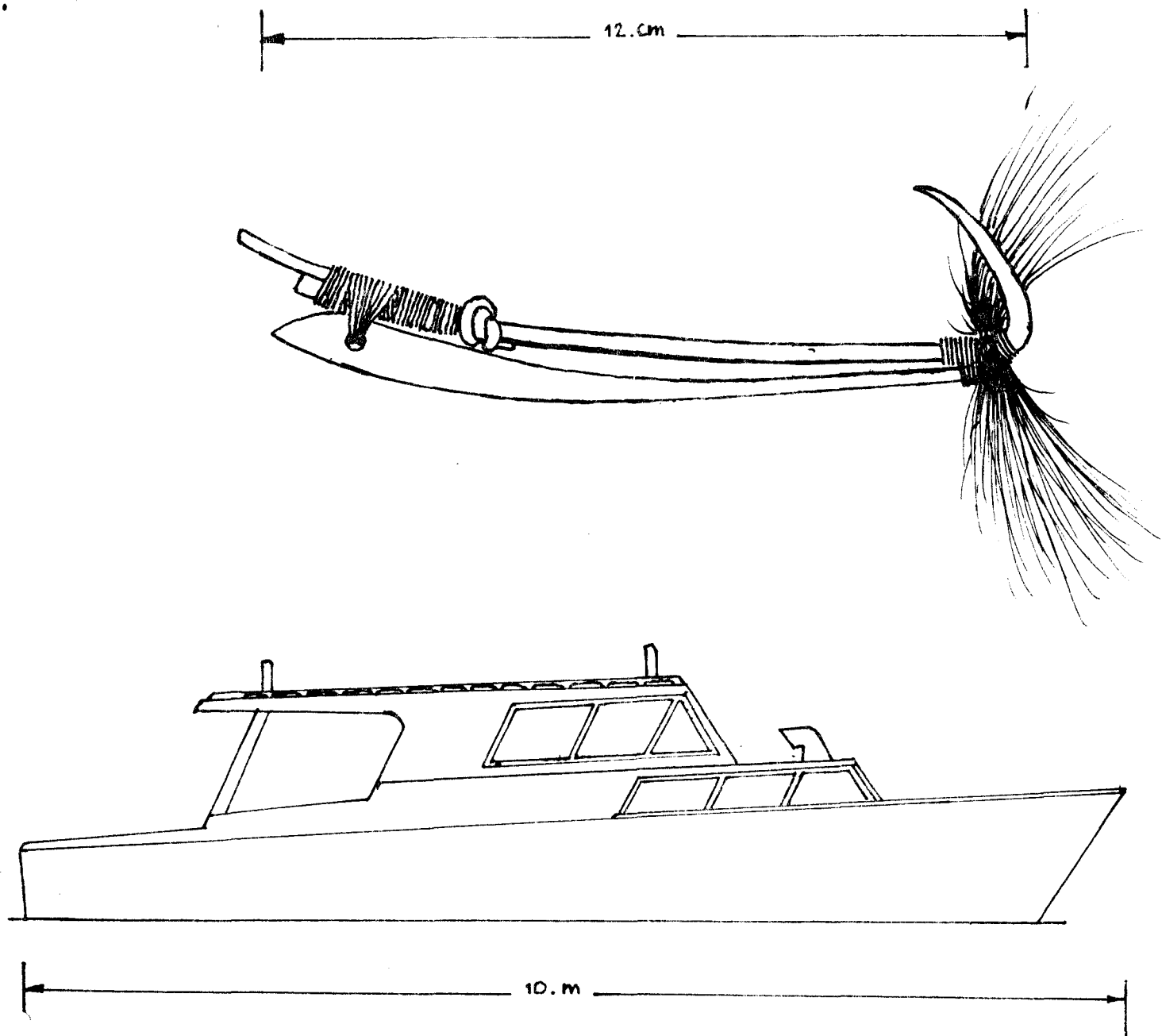
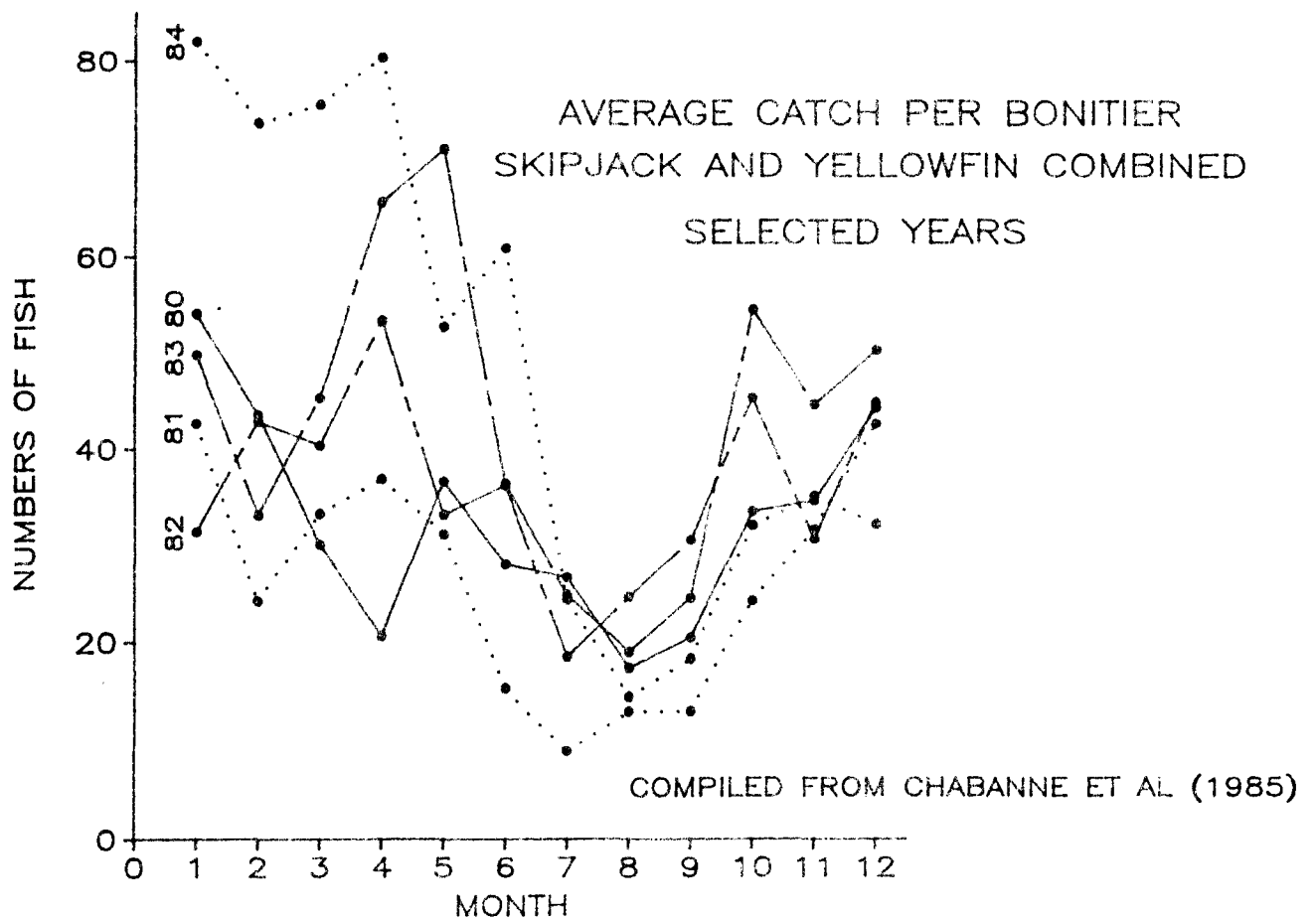
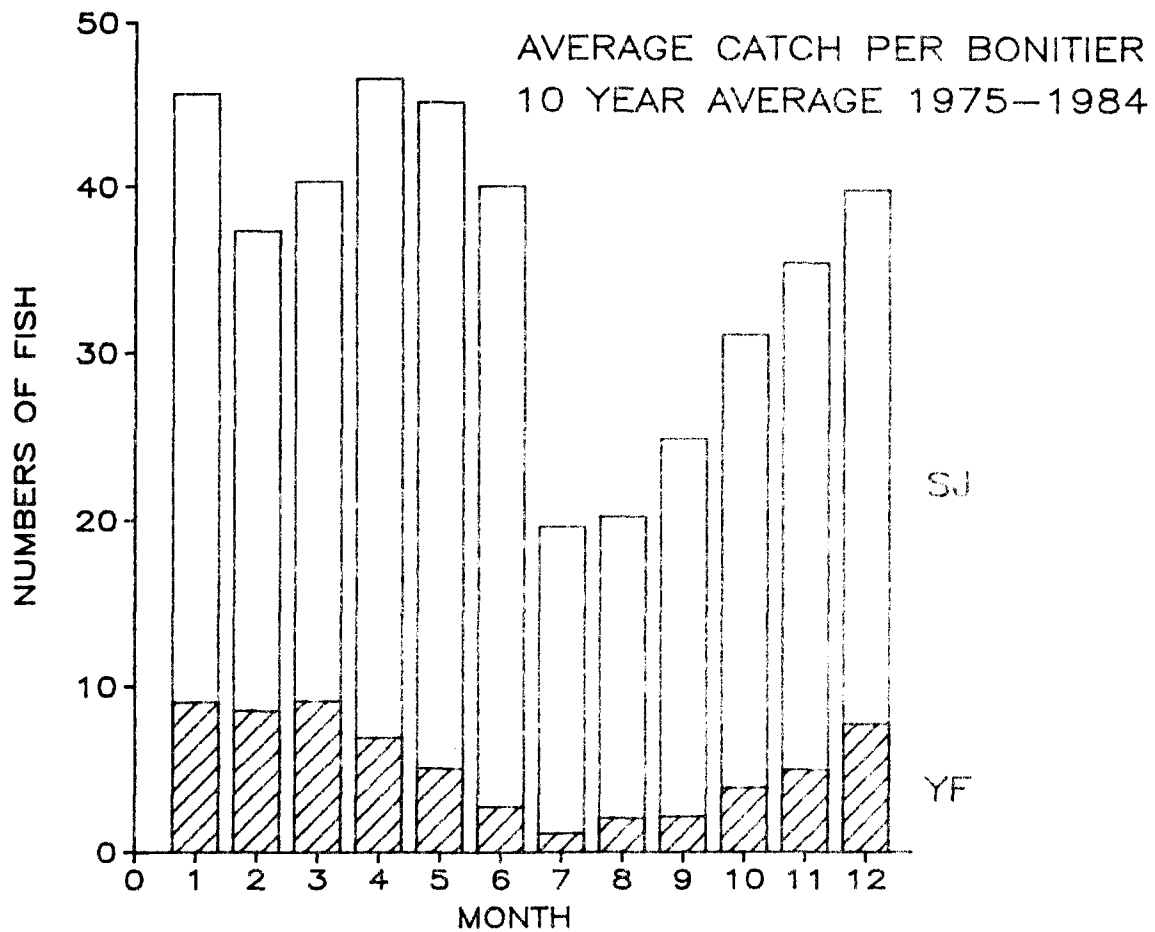


FIGURE 1
TAHITIAN PEARL SHELL LURE (TOP)
TYPICAL BONITIER (BOTTOM)

FIGURE 2. DAILY BONITIER CATCHES



The Project Vessel

A bonitier owned by EVAAM was made available to the project. Specifications of this vessel are as follows:

Name: Raitu
Length over all: 11.75 meters
Beam: 2.8 meters
Draft: 1.6 meters
Builder: Leon Lee, Tahiti
Date of construction: November 1984
Engine: 300 hp turbocharged Caterpillar
Maximum speed: 23.7 knots
Fuel consumption: 26 liters per hour
Fuel capacity: 800 liters

It was planned that five days be devoted to preparing the vessel, constructing the tagging cradle, and briefing the crew. Due to the very co-operative spirit of the crew these preparations were completed in three days. The tagging cradle was mounted in the covered area midway between the transom and the cabin bulkhead (see photo). The area available for the standard size cradle, lashings, tagging personnel, and two fishermen proved to be more than adequate.

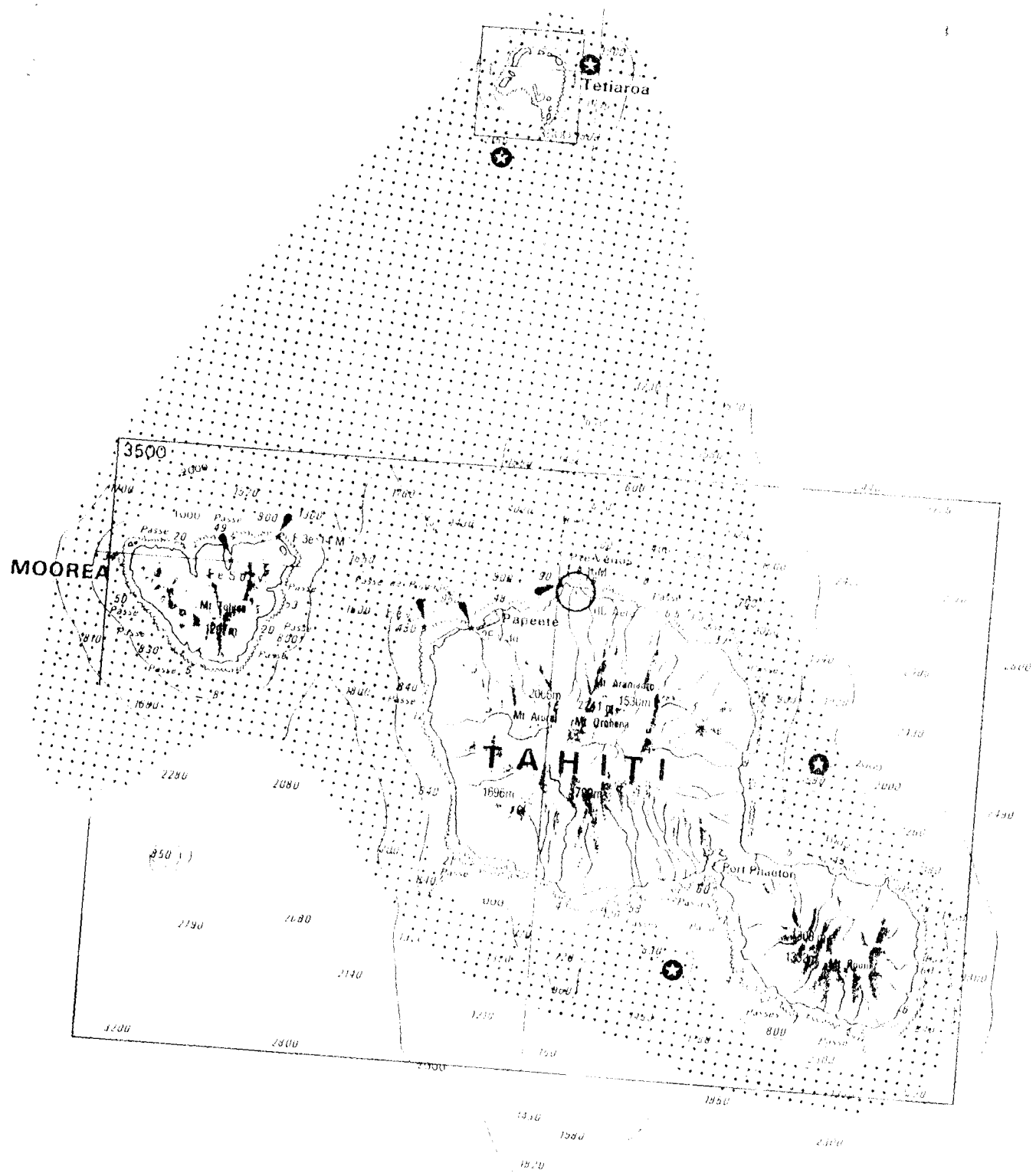
Fishing Activities

Fishing commenced on Friday February 12 on the west side of Tahiti in the area between Papeete, Paea, and Moorea. Skipjack schools were present, individual fish could be seen in the waves, but few fish could be enticed to bite. Four poled skipjack and one trolled skipjack were tagged. In addition, four trolled fish were retained aboard the vessel. The following day the area around the FAD near Vairao was fished. A school located about one-half mile from the raft initially did not respond to the lures. Afterwards, chumming small bits of chopped yellowfin helped to a small degree and four yellowfin were poled and tagged. About an equal number of fish were trolled, but due to their condition, were not tagged. Upon returning to Papeete it was learned that virtually the entire fleet had very poor catches and it was therefore decided that our fishing activity should be suspended until the catch rates of the other Papeete based bonitiers improved.

Reports of favorable numbers of schools on the east coast of Tahiti caused us to resume fishing on February 18 between Papeete, Tautira, and Tetiaroa. Although schools were spotted, no fish were poled or trolled. About 20 pilot whales (Globicephala macrorhynchus) were observed off Tetiaroa. The Tahitian fishermen stated that the presence of these whales indicate poor fishing in all areas regularly fished by Papeete bonitiers.

On February 22 in an attempt to overcome the problem of the biting response of the tuna schools, cultured milkfish (Chanos chanos) were shipped by air from Rangiroa to Tahiti for use aboard Raitu. Unfortunately, by the time the bait was available for use aboard the boat, all of it had died. As the use of dead bait is occasionally

FIGURE 3
PROJECT FISHING AREA



★ LOCATION OF FADs

pole-and-line fishing it is slightly more of a struggle for the fishermen to get the fish airborne after hooking. On the other hand, unhooking the fish on the tagging cradle is easier because the shank of the pearl shell lure forms a convenient handle. Overall, the trauma suffered by a tuna during the process of tagging appears to be about the same on a bonitier as on a Japanese style pole-and-line vessel.

Estimation of Tagging Rate

The poor fishing during the project period prevented any direct evaluation of the number of tuna which could be tagged per day from a bonitier. The historical data given in figure 1 combined with experience gained during the Skipjack Programme can, however, give some insight into the situation. For about one-half of the year the daily tuna catch of the average Papeete based bonitier is at least 40 fish. I estimate that the number of fish which could be tagged is about 75% of that which would normally be caught in a commercial operation; the reduction being due to the slower poling rate of fish combined with the rejection of injured fish. Therefore during the fishing season it would be reasonable to expect that about 30 fish per day could be tagged from an average bonitier based in Papeete.

It should be noted that the use of FADs may increase this rate. Information given in Marcille et al (1979) and Chabanne and Marcille (1980) indicate that bonitier catch rates in the Tuamotu Islands are between 70 and 400 percent better than those of Papeete.

Comparison to Other Types of Tuna Tagging

In the past, tuna tagging has been carried out in the French Polynesia from seven different vessels, but only the Mary K and the Hatsutori Maru No.1 have released significant numbers of fish in the Society Islands. Table 12 in Bayliff and Hunt (1981) in conjunction with table 22 in Gillett and Kearney (1983) show that the Mary K in March and April 1978 tagged 7.87 tuna per fishing hour (679 total) and the Hatsutori Maru No.1 tagged 10.63 tuna per fishing hour (1728 total). The Raitu tagged 9 fish in 73 fishing hours or .12 per hour. Considering an average Papeete bonitier could tag 30 tuna per day during a normal season, 3.15 tuna per fishing hour could probably be tagged assuming a 9.5 hour fishing day.

A comparison of cost per tagged fish for different types of tuna fishing operations is complicated by numerous factors such as whether to consider total charter days or only fishing days, wildly fluctuating exchange rates, and the value given to the expediency of tagging. As a rough estimate, the cost of one day of tagging from a bonitier is in the neighborhood of 15 percent of the cost a day of tagging from a 200-GT Japanese style pole-and-line vessel.¹ Therefore, if a bonitier tagging rate is 15 percent of that of a pole-and-line vessel, the cost per tag would be about equal. From the above calculations it appears that during

1. This includes the cost of the bonitier vessel charter and wages of the Tahitian fishermen for which this pilot project did not have to pay.

Appendix 1
Details of Tuna Tagged During the Project

TAG	POSITION	DATE	TIME	SPECIES	SIZE	COMMENT
E33301	1740S 14940W	840212	1100	SJ	52	
E33302	1740S 14940W	840212	1100	SJ	53	
E33303	1730S 15000W	840212	1500	SJ	51	
E33304	1750S 15000W	840212	1600	SJ	54	
E33305	1750S 15000W	840212	1600	SJ	51	TROLLED
E33306	1733S 14839W	840213	1026	SJ	47	
ESSS07	1746S 14932W	840213	1135	YF	47	
E33308	1747S 14921W	840213	1232	YF	49	NEAR FAD
E33309	1747S 14921W	840213	1232	YF	53	NEAR FAD

APPENDIX 2 ORSTOM CATCH SAMPLING QUAI MARINE, PAPEETE HARBOR FEBRUARY 1985

Jour	Effort	CPUE Bonite		CPUE Thon		CPUE Thonides	
		Moyenne	Ecart-type	Moyenne	Ecart-type	Moyenne	Ecart-type
1	14	23.8571	26.4544	11.2857	28.1487	35.1429	49.2919
2	1	70	0	0	0	70	0
4	5	50.4	72.4889	3.8	5.81034	54.2	70.1724
5	11	11.4545	12.9289	23.9091	46.3925	35.3636	56.1803
6	13	27.5385	30.3457	36.3846	53.6406	63.9231	69.5573
7	14	17.4286	18.1844	13.3571	24.8441	30.7857	35.5829
8	13	7.53846	12.1694	8	10.7917	15.5385	21.3023
9	6	12	17.3973	11.3333	20.4505	23.3333	23.5702
11	7	4	5.92814	5.28571	6.64862	9.28571	11.2848
12	13	9.69231	11.1864	11.6923	27.9378	21.3846	34.5689
13	8	6.875	11.6666	1.25	3.30719	8.125	11.3956
14	7	8.71429	18.5527	3.85714	4.73373	12.5714	17.5569
15	11	22.5455	26.4725	1.54545	1.72488	24.0909	27.2912
16	9	35.6667	36.2828	3.33333	7.11805	39	33.7738
18	6	7.5	10.5791	2.33333	5.21749	9.83333	12.2803
19	10	19.6	31.264	13	37.6723	32.6	51.2351
20	12	21.25	35.0598	7.75	16.8331	29	40.8126
21	10	39.5	40.6921	2.9	4.94874	42.4	40.7853
22	8	21.125	26.2271	7.625	20.1739	28.75	33.2895
23	3	58.3333	15.456	10	14.1421	68.3333	29.5334
25	2	.5	.5	1	1	1.5	1.5
26	9	56.1111	65.7849	6.55556	10.6574	62.6667	74.3027
27	9	39.7778	35.2697	.555556	.955814	40.3333	35.0777
28	6	23.6667	21.5613	14	26.3059	37.6667	43.9798



1. PART OF THE PAPERET MONITOR FLEET
2. TAGGING CRADLE MOUNTED ON "PAPER"
3. TAGGING A YELLOWED, IN THE CRADLE

