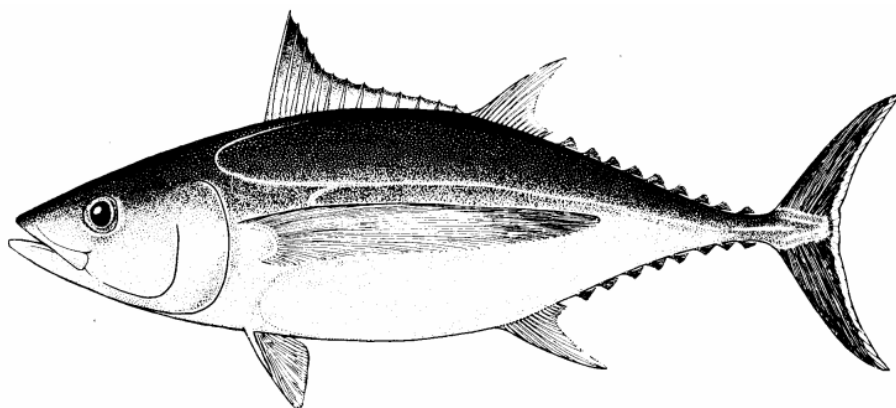


SCTB17 Working Paper

## **NFR-8**

### **Tuna fisheries in French Polynesia in 2003**



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Tahiti, French Polynesia

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**(Translated by SPC Translation-Interpretation Section)**

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### Artisanal coastal fishery

#### *Brief description of the fleet*

The coastal fishery comprises two types of boat (Table 1): the *poti marara*, (literally ‘flying-fish boats’) 235-strong in 2003, which are small boats, 6-8 m in length, made from wood or FRP and suitable for many different fishing techniques (trolling, vertical longlining or harpooning, in both the lagoon and reef environments) and the *bonitiers* (‘skipjack boats’), a 54-strong fleet in 2003, which are 10-to-12 m long boats made from wood or FRP, most of which target skipjack using pole-and-line gear (they are much less versatile than the *poti marara*).

#### *Trends in total yields*

Total landings by *poti marara* had been steadily rising up to 2002 but they recorded a net decrease in 2003 (-23%). In 1990, production was 400 metric tons and rose to 1,233 t in 2003. Mean annual production per boat went from 4.0 t perboat in 1990 to 5.3 t in 2003.

The overall production figures for *bonitiers* were more uneven. Along with a decrease in the size of the fleet, the overall trend was downwards since the fleet produced 1,167 t in 1990 with 118 boats, as compared to 646 t in 2003 with just 54 boats.

Total production by the combined fleet has increased by nearly 20% in 13 years, rising from 1,567 t in 1990 to 1,879 t in 2003.

#### *The difficulties met by this fishery*

A study carried out in 2002 highlighted this sector’s weak points. Coastal fishers’ greatest concern is finding outlets for catches while making their activity viable. Today, markets overlap, competition is fierce and prices are falling; the longline fishery has pulled down the local ex-vessel fish prices. The boats need to change their marketing strategies and spend more time at sea than trying to sell fish.

#### *Action by the Fisheries Department*

- Maintenance of a network of FADs.

In order to support coastal fisheries, the Fisheries Department maintains a permanent network of 30 FADs around the Windward Group (Tahiti, Moorea, Tetiaroa and Maiao) and approximately 10 FADs in the Leeward Group. Some devices are also scheduled to be set in the more distant island groups, in particular near those islands and groups of islands where the potential toxicity of lagoon fish has been demonstrated. In 2003, about 20% of the landings from *poti marara* came from FAD fishing, thus confirming the importance of this fishing aid. It should be noted that 95% of the *bonitiers* do not fish around FADs.

- Development of fish market complexes in islands distant from Tahiti

Two fish marketing centre construction projects are under preparation. A first centre, which has already been built on Raiatea in the Leeward Islands, is supposed to be contracted out for management over the next few months. A second centre, in the Marquesas Islands, is supposed to be built around 2006. These marketing centres have a twofold objective: firstly, they will make it possible to organise the collection of the catches from coastal fishing boats and organize marketing on the island concerned and throughout the group. Also, they will give certain fishing boat owners a chance to base their fresh tuna boats in these outlying island groups, because each centre will have an ice production unit and cold storage facilities for

bait and will be able to absorb production and possibly export to Tahiti. These centres will be used as forward bases for some tuna boats.

- Fish auctions at the Papeete fishing base

In terms of marketing, incentives are being introduced to encourage coastal fishers to sell their catches at the Papeete fishing port and in this way enter the wholesale marketing system. At the same time, ice machines have been installed in the main municipal districts of Tahiti and training about fish handling and quality is offered to these fishers. The Fisheries Department also encourages fishers to form cooperatives in order to facilitate management of the refrigerating facilities and to centralize sales areas.

- Strict control over fishing licenses

With regard to small-scale coastal fishing, increased control of fishing activities is being conducted in the field. This has made it possible to withdraw some licences from fishers for whom this is not their main activity and, in that way, better monitor this sector.

### **Longline fishery situation**

#### *Brief description of the fleet*

The offshore longline fleet is formed of four kinds of vessel (Appendix 1):

- Longlining *bonitiers*, 5 strong in 2003, which are skipjack boats converted to drifting longlining;
- fresh fish longliners, 37 strong in 2003, which comprise boats 13-to-20 m in length made of aluminium or FRP;
- mixed longliners, 4 strong in 2003, which are 21 m steel boats;
- freezer longliners, 18 strong in 2003: 25-26 m steel vessels.

#### *Development policy*

The Government of French Polynesia has set itself a tuna fishery development goal of achieving an annual production of 30,000 t by the end of the forthcoming four to five year period, for approximately 150 active longliners and 300 smaller artisanal coastal fishing boats. These estimates forecast that coastal production will level off at around 2,500 t annually. Of the 30,000 t production target to be achieved five years hence, 8,000 t should be consumed by the local market and 22,000 t exported.

#### *Port infrastructure*

The whole of the longline fleet is based at the fishing base of Papeete on the island of Tahiti. This fishing port has the infrastructures needed to service approximately 100 tuna boats:

- 450 linear m of dock (with floating pontoons);
- 2 ice towers with a total capacity of 50 t every 24 hours;
- 2 fresh fish marketing buildings, one for the local market and one for the export market, with the latter being able to process up to 8,000 t of fish per year and also comprising 2 auction rooms;
- 1 frozen tuna loin packaging plant with a capacity of up to 5,000 t of loins (10,000 t of fish) annually;
- 1 two-ton per day freezing tunnel to freeze loins on land.

After completion of the development process set out by the Government, these infrastructures will be inadequate for servicing 150 tuna boats and their production. A second port will have to be developed over the medium term on Tahiti. This facility would be able to service part of the fishing fleet and would also be able to service foreign fleets.

#### *Action taken by the Fisheries Department*

- Establishing a monitoring unit

The Fisheries Department is currently setting up a monitoring unit whose role will be to monitor changes in a range of biological, economic and social indicators in the offshore and coastal fisheries sectors, the lagoon fishing area and the aquaculture sphere. The purpose of this unit is to be able to provide decision-makers with almost real-time information about the state of the industry and, in the long run, identify trends for these sectors.

- Increased control over production

Closer checking of landings at the Papeete fishing port is under way. Since the introduction of the new export trade complex, which houses the six main local fresh fish marketing ventures, weighing is mandatory for all products offloaded within the fishing port.

The observer programme introduced in September 2002 also allows us to keep a closer eye on production trends, in particular, those concerning by-catch. These observer positions will be taken over in 2005 by the Fisheries Department who will thus give the programme continuity.

- Providing commercial fishers with oceanographic surface data

Some time during the final quarter of 2004, the Fisheries Department is supposed to acquire a station to receive satellite data so as to provide fishers with precise, almost real-time oceanographic data. This project is being carried out in collaboration with IRD.

### **Fishing effort by the two fleets in 2003**

#### *Coastal fleet*

##### *Poti marara*

- 235 boats in 2003;
- a total of 23,265 days at sea, an average of 99 days at sea per year;
- average distance of 15.7 NM offshore;
- about 20% of fish caught around FADs.

##### *Bonitiers*

- 54 boats in 2003;
- a total of 5,184 days at sea, an average of 96 days at sea per year;
- average distance of 30 NM offshore and up to 55 NM;
- 95% do not fish around FADs.

#### *The offshore fleet (Tables 1 and 2)*

##### *Longline bonitiers*

The number of longlining *bonitiers* has steadily declined over the past few years (80% since 1993). These boats have a very limited range and low yields. Their low profitability is partly explained by the low number of lines set in comparison to the days spent at sea and the low number of hooks set (610 on average). These boats do not have lineshooters and set their lines in the top 100 m of the water column. In 2003, two longlining *bonitiers* began working again but this did not compensate for the departure of three other boats. Overall, working boats increased the average length of their trips (+16%) and reduced the distances (-5%) so as to set more lines (+26%). Technical stoppages also decreased noticeably.

##### *Fresh tuna boats*

These boats go for a maximum of 10 days, partly due to the limited they can store the fish as it is kept on ice as well as their limited range. For that reason, their scope of action is limited to about 350 NM. The travel

time needed to arrive at the fishing site is, then, relatively high (2.5 days round trip) in comparison to the number of lines set each trip (5.6 on average). They mainly operated north of Tahiti, in a latitudinal band comprised between 14°S and 17°S. In 2003, these boats decreased their number of trips (-12%) without noticeably increasing the average length of trips (-2%). Given the poor yields this year, the boats directed their efforts towards decreasing operating costs by reducing travel times (and related fuel costs) and used this gain in time to increase the number of lines set (+21%).

#### Mixed tuna boats

Mixed tuna boats are intermediate between freezer tuna and fresh tuna boats. They can stay at sea for one month and are capable of filleting and freezing their catches and/or putting them on ice. They were among the most active vessels in 2003 because they were built less than two years ago. They operated in the same zones as the freezer vessels for one month trips or in fresh tuna boat areas for two week trips. In 2003, these boats also considerably reduced their travel times (-17%) and, on average, set more hooks per line.

#### Freezer tuna boats

These boats can remain at sea for 1 1/2 to 2 months and have freezer capacity; however, the final sets target fresh-fish that is kept on ice or in slurry. One advantage of this greater time at sea is the gain in the number of days at sea over the number of fishing days. The boats mainly operated in the northern Tuamotu islands between 12°S and 15°S. In 2003, due to the decrease in albacore yields, their target species, these boats conducted fewer freezer trips in order to engage in fresh tuna fishing, thereby reducing their travel time (-17%) and the number of lines set per trip (-20%).

*Table 1 – Overall characteristics of the various fishing strategies in 2003 and changes in comparison to 2002*

2003	Trips		Days at sea		Lines set		Hooks	
	Total	Mean	Total	Mean	Total	Mean	Total	Mean
<b>Longlining bonitiers</b>	<b>103</b>	<b>21</b>	<b>525</b>	<b>105</b>	<b>441</b>	<b>88</b>	<b>241 560</b>	<b>48 312</b>
	- 20 %	- 3 %	- 3 %	+ 16 %	+ 4 %	+ 25 %	- 13 %	+ 4 %
<b>Fresh tuna boats</b>	<b>844</b>	<b>23</b>	<b>6 785</b>	<b>183</b>	<b>4 682</b>	<b>127</b>	<b>8 946 084</b>	<b>248 502</b>
	+ 9 %	- 12 %	+ 21 %	- 2 %	+ 34 %	+ 9 %	+ 42 %	+ 18 %
<b>Mixed tuna boats</b>	<b>56</b>	<b>14</b>	<b>889</b>	<b>222</b>	<b>694</b>	<b>173</b>	<b>1 849 454</b>	<b>462 364</b>
	+ 107 %	+ 4 %	+ 89 %	- 5 %	+ 94 %	- 3 %	+ 101 %	0 %
<b>Freezer tuna boats</b>	<b>147</b>	<b>8</b>	<b>3 453</b>	<b>192</b>	<b>2 581</b>	<b>143</b>	<b>6 836 261</b>	<b>379 792</b>
	+ 18 %	+ 5 %	+ 7 %	- 5 %	+ 6 %	- 6 %	+ 6 %	- 6 %
<b>Total fleet</b>	<b>1 150</b>	<b>18</b>	<b>11 652</b>	<b>182</b>	<b>8 398</b>	<b>131</b>	<b>17 873 359</b>	<b>283 704</b>
	+ 9 %	- 8 %	+ 18 %	0 %	+ 25 %	+ 6 %	+ 28 %	+ 10 %

Table 2 – Mean values by fleet of the principal fishing strategy indexes in 2003 and changes since 2002

Mean 2003	Number of lines set/trips		Number of hooks/line set		Travel time/trip (days)		Dock time (days)	
	Mean	Change	Mean	Change	Mean	Change	Mean	Change
<b>Longlining bonitiers</b>	4.3	+ 26 %	610	- 9 %	0.8	- 5 %	14.0	- 67 %
<b>Fresh tuna boats</b>	5.6	+ 21 %	1 845	+ 6 %	2.5	- 11 %	12.6	+ 8 %
<b>Mixed tuna boats</b>	15.1	- 2 %	2 667	+ 3 %	3.7	- 17 %	11.6	+ 11 %
<b>Freezer tuna boats</b>	21.9	- 20 %	2 599	+ 1 %	6.8	- 17 %	43.6	+ 9 %
<b>Fleet</b>	<b>10.7</b>	<b>- 8 %</b>	<b>2 016</b>	<b>+ 6 %</b>	<b>3.7</b>	<b>- 14 %</b>	<b>21.4</b>	<b>- 9 %</b>

### Total catches in 2003

Total catches in French Polynesia's exclusive economic zone fell by 13% in 2003 to 8,409 t. White tuna catches, which had reached record levels for the longline fleet in 2002 rising over the 4,500 tons, dropped by nearly 16%. (Appendix 2)

*By type of boat*

*Coastal fleet*

Table 3: coastal fleet production (in tons) (NB: (%) = % of total production)

PRODUCTION (in t)	Total	Main species			
		Skipjack	Mahi mahi	Yellowfin	Albacore
<i>Poti marara</i>	1 233	435 (35%)	270 (22%)	211 (17%)	79 (6%)
<i>Bonitiers</i>	646	511 (79%)	29 (4%)	99 (14%)	5 (< 1%)
<b>TOTAL</b>	<b>1 879</b>	<b>946</b>	<b>299</b>	<b>310</b>	<b>84</b>

The production figures clearly show how much more versatile *poti marara* are as compared to *bonitiers* (Table 4). Skipjack was, however, the main species caught by both types of boats.

The mean overall yield for *poti mararas* was 53 kg/boat/fishing day, i.e. a decrease of 10% from 2002. Mahi-mahi yields fell most (- 21%) along with yellowfin (- 20%). On the other hand, skipjack yields only decreased slightly (- 2%). This decrease in production was also the result of decreased fishing effort. Given the drop in yields, boats tended to decrease their activity and so the mean number of fishing days was down 13%.

With a mean daily yield of 125 kg/boat/fishing day, *bonitiers* were less affected by the decrease in yields (- 4%). Yellowfish tuna yields dropped by 26% and mahi-mahi by 15%. Skipjack yields, the boats' target species, did, however, increase this year (+ 6%). The fishing effort of *bonitiers* changed little (- 5%).

*The offshore fleet**Table 4: Production (in t) of the offshore fleet in 2003*

PRODUCTION (in t)	Total	Main species							
		Albacore		Bigeye tuna		Yellowfin		Billfish	
		Tons (%) <sup>1</sup>	yield <sup>2</sup>	Tons (%)	yield	Tons (%)	yield	Tons (%)	yield
<b>Longline bonitiers</b>	81	33,6	28 (35%)	11,7	3 (4%)	1,3	10 (12%)	4,1	16 (19%)
<b>Fresh tuna boats</b>	3 167	35,4	1 633 (57%)	18,3	260 (10%)	2,9	360 (8%)	4,0	272 (6%)
<b>Mixed tuna boats</b>	853	46,1	587 (69%)	31,8	27 (3%)	1,5	52 (6%)	2,8	71 (8%)
<b>Freezer tuna boats</b>	2 429	35,5	1 597 (66%)	23,4	149 (6%)	2,2	199 (8%)	2,9	181 (7%)
<b>TOTAL</b>	<b>6 530</b>	<b>36,5</b>	<b>3 846 (59%)</b>	<b>21,5</b>	<b>439 (7%)</b>	<b>2,5</b>	<b>621 (10%)</b>	<b>3,5</b>	<b>541 (8%)</b>

1: NB: % = % of total production

2: yields are expressed in kilograms per 100 hooks

The 2003 fishing season was marked by a strong drop in overall yields, mainly due to the drop in albacore (-31%) and bigeye tuna yields (-36%). Yellowfin tuna and billfish yields stayed relatively stable (respectively -3% and +1%). Fresh tuna boats were most affected by this drop in yields (-35%: -41% for albacore, -47% for bigeye tuna and -4% for yellowfin tuna) as well as freezer tuna boat that traditionally target albacore (-32%: -30% for albacore; -45% for bigeye tuna; -9% for yellowfin tuna). This decrease was less noticeable for mixed tuna boats (-20%: -25% for albacore; -50% for bigeye tuna and 0% for yellowfin tuna). Longlining *bonitiers*, which fish very close to the coast, more or less succeeded in maintaining their yields (-9%: -40% for albacore; -53% for bigeye tuna and +24% for yellowfin tuna).

*Catches per species (Appendices 3 and 4)***White tuna**

- Target species of the French Polynesian fleet (58%);
- Total white tuna catches for all fleets were 3,830 t, 98% of which was accounted for by the longliners;
- The best yields were obtained between 12-15°S and 143-145°W.

**Bigeye tuna**

- By-catch not generally targeted by longliners given its great swimming depths in the EEZ;
- Total catches down 32% from 2002;
- Often caught around seamounts;
- The highest yields are observed between 12 and 14°S; at these latitudes, the bigeye tuna habitat would appear more accessible to longline fishing depths;
- This species seems to be more abundant in the Marquesas area between May and August.

**Yellowfin tuna**

- After a very mediocre year in 2002, catches increased 23% but mainly due to the increased fishing effort. Yields stabilised at a very low level for longliners and decreased for the coastal fleet;
- Yellowfin tuna under 12 kilograms form the main catch for the Marquesas Islands coastal fishery all year round.

**Marketing: export and the local market***Table 5: export volumes (in t 'whole-weight equivalent')*

<b>Year</b>	<b>Fresh</b>	<b>Frozen</b>	<b>TOTAL</b>
<b>1997</b>	346	956	<b>1 302</b>
<b>1998</b>	186	1 101	<b>1 287</b>
<b>1999</b>	52	1 256	<b>1 308</b>
<b>2000</b>	296	2 197	<b>2 493</b>
<b>2001</b>	803	2 625	<b>3 428</b>
<b>2002</b>	944	1 881	<b>2 825</b>
<b>2003</b>	495	1 271	<b>1 766</b>

In 2003, exports amounted to 1,766 t w.w.e., i.e. a 37% drop from 2002 (Table 5). At the same time as the drop in landings from freezer tuna boats, whole frozen tuna exports dropped 32% and the increase in frozen whole fish exports (+ 48%) did not compensate for the drop in frozen fillet exports (- 33%). Limited by the decrease in production and handicapped by a very lucrative domestic market and a low dollar, the export fresh fish market also dropped 48%. In particular, vacuum-sealed fresh fillet exports, that had gotten underway in 2002, were suspended in 2003 and whole fresh fish exports dropped some 44%.



### Appendices

*Appendix 1: Composition of tuna fleets since 1997*

Year	Bonitiers	Poti marara	Longliners				Total
			Longline bonitiers	Fresh tuna boats	Mixed tuna boats	Freezer tuna boats	
1997	70	166	15	30	0	15	60
1998	72	207	14	28	0	12	54
1999	74	242	14	24	0	19	57
2000	63	280	11	30	0	16	57
2001	60	250	10	34	2	13	57
2002	55	237	6	30	2	16	54
2003	54	235	6	37	4	18	64

*Appendix 2: Nominal total catches (in t), for all species, in French Polynesia's EEZ since 1997*

Year	Bonitiers	Poti marara	Longliners	40°S	Korean	TOTAL
1997	934	678	4 636	24	1 737	8 009
1998	992	1 200	5 282	0	2 307	9 781
1999	826	1 206	5 304	0	2 688	10 024
2000	633	1 397	6 891	0	2 044	10 965
2001	891	1 615	7 811	0	0	10 317
2002	711	1 590	7 401	0	0	9 702
2003	646	1 233	6 530	0	0	8 409

*NB: No fishing access agreements since 2001*

Appendix 3 : Details of landings (in t) by offshore and coastal fleets for 2003

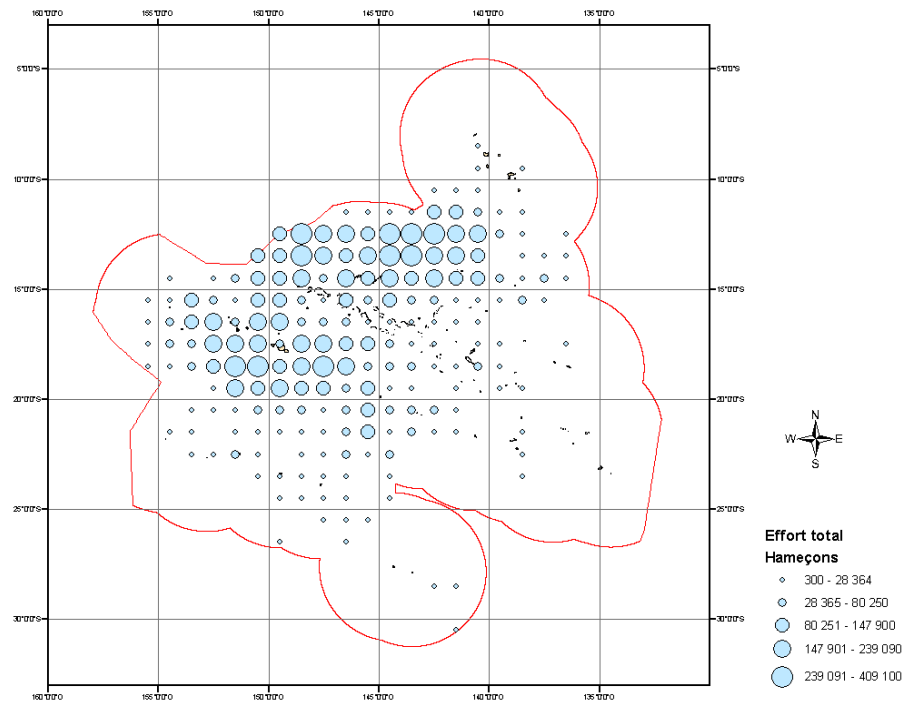
	Poti marara	Conventional bonitiers	Longline bonitiers	Fresh tuna boats	Mixed tuna boats	Freezer tuna boats	Total	%
<i>Number of vessels</i>	235	54	5	37	4	18	64	
<i>Trips</i>			103	844	56	147	1 150	
<i>Days at sea</i>			525	6 785	889	3 453	11 652	
<i>Fishing days</i>			441	4 682	694	2 581		
<i>Hooks ('000)</i>			242	8 946	1 849	6 836	17 873	
Albacore	79	5	28	1 633	587	1 597	3 929	47%
Skipjack	435	511	1	22	12	22	1003	12%
Yellowfin	211	69	10	360	52	199	901	11%
Bigeye	2	0	3	260	27	149	441	5%
Mahimahi	270	29	8	119	14	31	471	6%
Billfish	104	21	16	272	71	181	665	8%
Spanish mackerel	32	4	2	103	19	31	191	2%
Deep sea fish	15	3	0	0	0	0	18	0%
Other commercial species	86	4	4	129	25	47	295	4%
Sharks	0	0	7	188	25	60	280	3%
Other non-commercial	0	0	2	81	21	112	216	3%
<b>Total fleets</b>	<b>1 233</b>	<b>646</b>	<b>81</b>	<b>3 167</b>	<b>853</b>	<b>2 429</b>	<b>8 409</b>	
<b>%</b>	<b>15 %</b>	<b>8 %</b>	<b>1 %</b>	<b>38 %</b>	<b>10 %</b>	<b>29 %</b>		
<b>Total sectors</b>	<b>1 879</b>		<b>6 530</b>					
<b>%</b>	<b>22 %</b>		<b>78 %</b>					
<i>2002 (for comparison)</i>	<i>1 590</i>	<i>711</i>	<i>102</i>	<i>3 409</i>	<i>533</i>	<i>3 357</i>	<i>9 702</i>	
	<i>2 301</i>		<i>7 401</i>					

Appendix 4: Total catches (in t) from fleets operating in the EEZ of French Polynesia since 1997

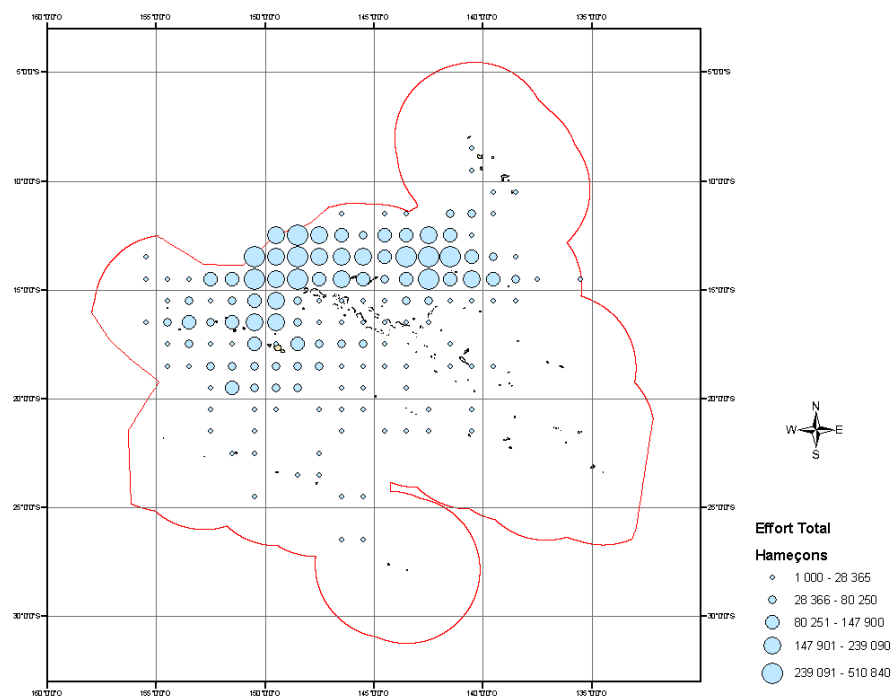
Year		Fleet	Domestic Fleet									Foreign Fleet							
			Active vessels	Tuna				Billfish		Miscellaneous		Total	Days fished	Tuna				Others	Total
				Skipjack	Yellowfin	Bigeye	Albacore	Marlins	Swordfish	Sharks	Others			Skipjack	Yellowfin	Bigeye	Albacore		
1997	Bonitiers	70	698	142	-	9	15	0	0	70	934								
	Poti marara	166	176	99	2	69	32	0	-	300	678								
	Albacore trollers	1				24					24								
	Longliners	60	22	420	308	2 595	521	56	367	347	4 636								1598
Total 1997		294	296	896	661	310	2 697	568	56	367	717	6 272	1598	-	428	1 078	49	182	
1998	Bonitiers	72	784	118	-	8	17	0	0	65	992								
	Poti marara	207	474	190	1	30	52	0	0	453	1 200								
	Albacore trollers	0									0								
	Longliners	54	34	480	402	3 189	431	58	348	342	5 282								1817
Total 1998		296	327	1 292	788	403	3 227	500	58	348	860	7 474	1817	-	583	1 018	330	376	
1999	Bonitiers	74	526	160	0	38	21	0	0	81	826								
	Poti marara	242	479	257	2	23	72	0	0	373	1 206								
	Albacore trollers	0									0								
	Longliners	57	103	756	276	2 580	590	66	427	506	5 304								3228
Total 1999		327	359	1 108	1 173	278	2 641	683	66	427	960	7 336	3228	-	641	1 500	74	310	
2000	Bonitiers	63	440	110	0	8	27	2	0	46	633								
	Poti marara	280	377	350	1	89	110	0	0	470	1 397								
	Albacore trollers	0									0								
	Longliners	57	72	1 202	711	3 473	355	47	556	480	6 896								2454
Total 2000		359	400	889	1 662	712	3 570	492	49	556	996	8 926	2454	-	638	1 207	6	193	
2001	Bonitiers	60	688	84	0	8	21	0	0	90	891								
	Poti marara	250	477	264	1	147	82	0	0	644	1 615								
	Albacore trollers	0									0								
	Longliners	57	91	967	745	4 261	418	79	747	503	7 811								
Total 2001		400	367	1 256	1 315	746	4 416	521	79	747	1 237	10 317	0	0	0	0	0	0	
2002	Bonitiers	55	513	99	0	7	21	0	0	71	711								
	Poti marara	237	515	307	2	99	94	0	0	573	1 590								
	Albacore trollers	0									0								
	Longliners	54	93	507	649	4 557	347	70	525	653	7 401								
Total 2002		367	346	1 121	913	651	4 663	532	0	525	1 297	9 702	0	0	0	0	0	0	

2003	Bonitiers	54	511	69	0	5	21	0	0	40	646						
	Poti marara	235	435	211	2	79	104	0	0	402	1 233						
	Albacore trollers	0															
	Longliners	64	55	621	439	3 846	424	117	280	748	6 530						0
Total 2003		346	353	1 001	901	441	3 930	530	117	280	1 190	8 409	0	0	0	0	0

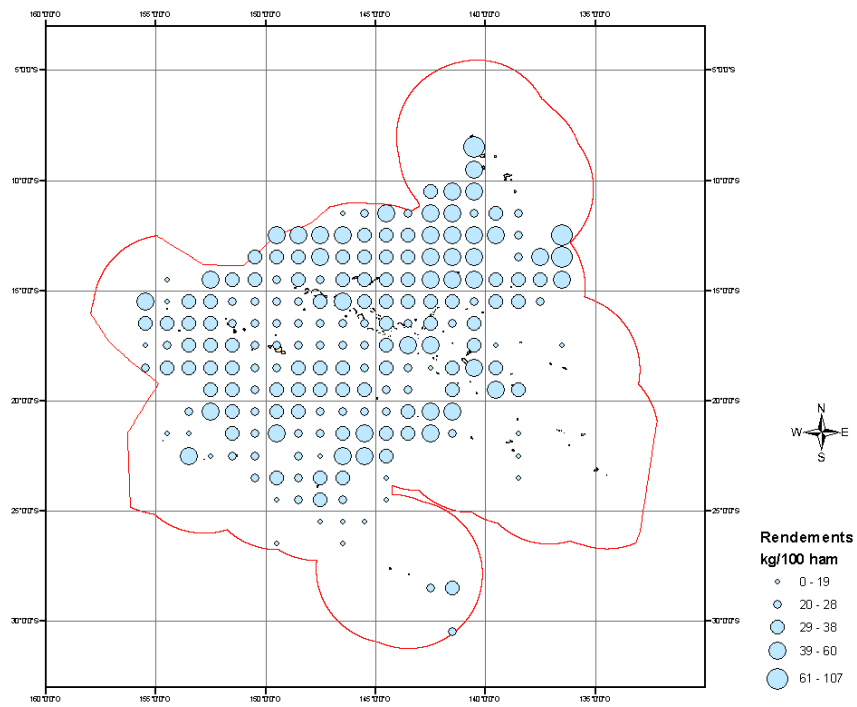
### Appendix 5 – Map of offshore fleet fishing effort in 2003



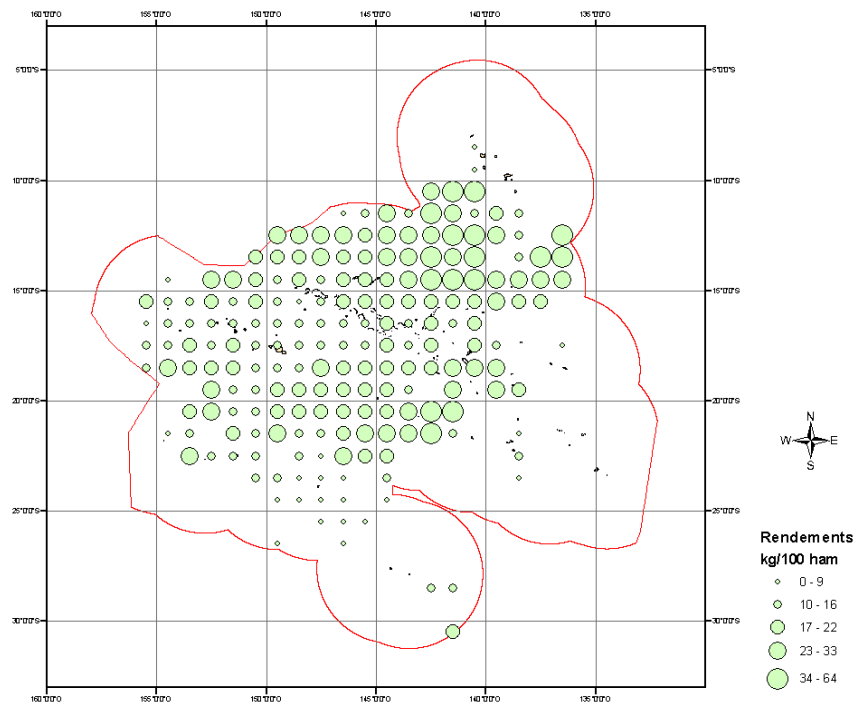
### Appendix 6 – Map of offshore fleet fishing effort in 2002



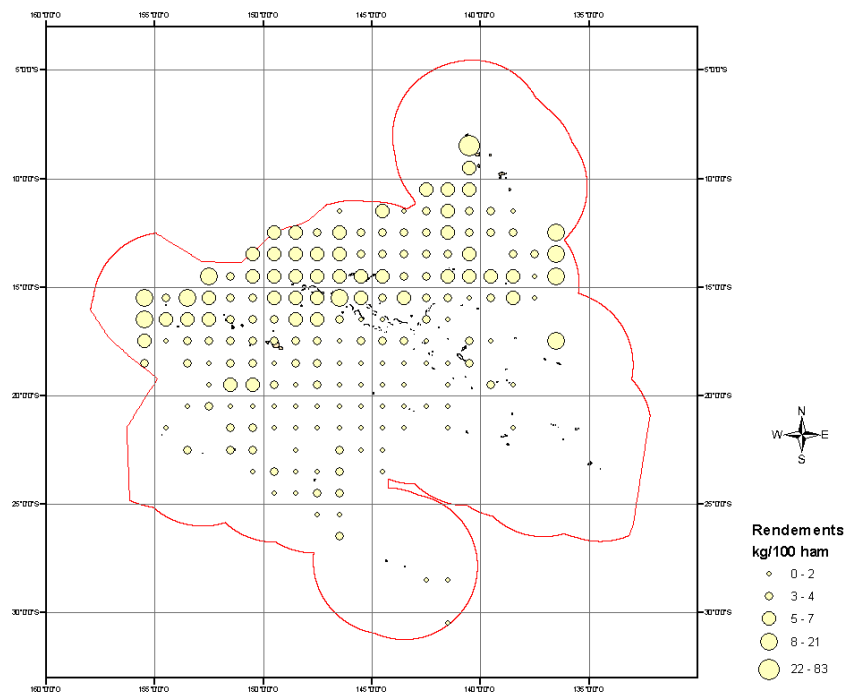
**Appendix 7: Map of overall offshore fleet yields in 2003**



**Appendix 8: Map of offshore fleet albacore yields in 2003**



*Appendix 9: Map of offshore fleet yellowfin tuna yields in 2003*



*Appendix 10: Map of offshore fleet bigeye tuna yields in 2003*

