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Republic of Mauritius

Ministry of Fisheries and Rodrigues

Annual Report 2010

Fisheries Division

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Foreword

I am pleased to present the Annual Report of the Fisheries Division of the Ministry of Fisheries and Rodrigues for the year 2010. It contains information on the activities of the Albion Fisheries Research Centre, the Fisheries Training and Extension Centre and the Fisheries Protection Services and the various divisions operating under their purview namely the Fisheries Research, Fisheries Planning, Fisheries Management, Marine Science, Marine Conservation, Aquaculture, Fisheries Training, Extension and Development and Protection Service.

2010 has been a particularly eventful year. The Fisheries Division fell under the purview of the Ministry of Agro-Industry and Food Security with Hon. S.V. Faugoo as Minister until May 2010. I was appointed the Minister of Fisheries and Rodrigues from 11 May 2010.

Mr. M.Munbodh, the Director of Fisheries, who headed the fisheries technical services from 1981 went on retirement on 31 October, 2010. He was replaced by Mr. A. Venkatasami as Director of Fisheries from 01 November, 2010.

2010 witnessed the launching of the Mauritius National Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing, (NPOA-IUU), thus consolidating the measures already taken and shows the commitment of Mauritius to combat IUU fishing.

Other major events concerned the training of skippers for fishing boats including those from Rodrigues under assistance from the Overseas Cooperation Foundation of Japan, the introduction of the sea bass, (*Dicentrarchus labrax*), for culture purposes and the receipt of the final report of the inventory of the Balaclava Marine Park.

The Annual Report includes information which will serve as a valuable reference for all stakeholders, the fishing industry, scientists and the public at large concerned with fisheries research, management, planning, protection and training, marine science and conservation and aquaculture.

I wish to express my sincere appreciation to the staff of the Fisheries Division particularly the editing team for their dedicated effort in the preparation of this annual report.

Louis Joseph Von-Mally
Minister of Fisheries and Rodrigues

Vision

To be an economic pillar of Mauritius with due regard to sustainability of aquatic resources and social development for the benefit of all stakeholders.

Mission

To provide an enabling environment for the promotion of sustainable development of the Fisheries Sector and to ensure continued economic growth and social development within the framework of good governance.

Objectives

- Establish a conducive environment in which the fishing industry can develop.
- Contribute towards the development of Mauritius in a world class seafood hub and derive optimal benefits from marine living resources.
- Promote and regulate the optimal long-term sustainable utilisation of living marine resources.
- Carry out and promote applied research, development and management of aquatic living resources.
- Ensure that all fisheries activities allow for the conservation of vital marine ecosystems.
- Foster the interest of Mauritius within the international fisheries community, including encouraging the international trade of fish commodities within the framework of international law and conventions.
- Provide professional, responsive and customer friendly services.
- Deliver our services efficiently and effectively providing value for money.
- Continuously invest in human resource development.
- Promote the social welfare status of fishermen.

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EXECUTIVE SUMMARY

Fresh fish production estimates from the coastal fisheries increased slightly to 831 tonnes, as compared to 820 tonnes in 2009, comprising 515 tonnes from the lagoon and 316 tonnes from off-lagoon areas with an average catch per fisherman day of 6.5 kg as compared to 6.4 kg in 2009. There were 2256 registered fishermen in 2010 as compared to 2 303 fishermen in 2009 and 2476 boats operating in the artisanal sector in 2010 as compared to 2525 boats in 2009.

A total of 1 478 tonnes of frozen fish was landed as compared to 2 232 tonnes in 2009 of mainly lethrinids from the shallow water fishing banks. The decrease of 34% in the total catch was attributed to a lower fishing effort as only 7 vessels were active in 2010 as compared to 10 in 2009. In addition, 250 tonnes of chilled fish were landed by 8 semi-industrial boats and 8 carrier boats. The produce from the St. Brandon fishery amounted to 367 tonnes of chilled, salted and frozen fish, including frozen octopus and lobster. A total of 152 tonnes of chilled fish and 250 tonnes of frozen fish were landed from the drop-off fishery.

Seed production of berri rouge, fresh water ornamental fish and the giant freshwater prawn were pursued. 43 persons were trained on reproduction and rearing of fry of ornamental fish.

A pilot project on "Post Larval Capture and Culture" (PCC) of marine ornamental fish was undertaken by a private promoter. The collection of the post-larvae was carried out using Eco-friendly Devices: "CAREs" (Collect by Artificial Reef Eco-friendly Devices). A first consignment of sea bass, (*Dicentrarchus labrax*), eggs was imported from France for culture purposes by the Ferme Marine de Mahebourg.

Total fish production from the marine fish farm amounted to 457 tonnes whilst production from the freshwater fish farm was 50 tonnes.

The long term monitoring of the coral reef ecosystem and seawater quality was continued at the established sites around the island. In general, a decrease has been noted in the percentage of live coral cover in all stations. This may be due to multiple factors that are affecting the lagoon such as coral bleaching and algal blooms. Significant coral bleaching occurred in 2003, 2004 and 2009 in Mauritius.

Marked mortality of corals at sites such as Ile aux Benitiers, Albion, Poudre d'Or and Pointe aux Sables has been noted. At Anse la Raie (shore reef) and Poudre d'Or (site 2), all corals died due to occurrence of algal blooms in 2009 and the recuperation is slow. Sites like Belle Mare, Bambous Virieux and Baie du Tombeau had shown resilience to coral bleaching and had about 50 % coral cover.

Officers of the AFRC are collaborating with the Ministry of Environment and Sustainable Development (MoE & SD) for the development of a Lagoon Water Quality Index (WQI) to be used as an environmental performance indicator to assess the effectiveness of the implementation of the National Sewerage Project in Mauritius.

Long term monitoring of the two marine parks was continued. 421 permits were issued for the various activities at the Blue Bay Marine Park and Rs. 934 400.00 were collected as fees. The office of the Blue Bay Marine Park Patrol & Visitors' Centre was relocated to the Mahebourg Fisheries Post as from 22 February 2010 as the building had become unsafe for use. Action for the renting of a building for the Centre in the Blue Bay area was initiated.

In November 2010, a decision was taken to limit the number of glass bottom boats operating in the Blue Bay Marine Park and that "Pole and Line Fishing" permits from the shore will be reduced by 50 every year so that by year 2013, pole and line fishing will be phased out in the Marine Park.

The final report of the inventory of the Balaclava Marine Park carried out by the French/Reunion Consultancy firm PARETO-ARVAM in collaboration with officers of AFRC in 2009 and funded under the NMPA-IOC Project was submitted to the Ministry.

Forty-four (44) EIA applications were assessed and recommendations were made to the Ministry of Environment and National Development Unit.

The fifth and last steering committee for the project "Marine Protected Areas Network of the Indian Ocean Commission Countries" was held in Madagascar for stock taking of all activities that had been carried out under the purview of the project.

Thirty two fishermen including 7 from Rodrigues followed the "Training Course for Skippers of Fishing Boats less than 24 metres" organised with the collaboration of the Overseas Fishery Cooperation Foundation of Japan. 308 fishmongers followed the training course on fish handling, preservation and marketing making a total of 577 who benefited from the training course since the start of the training programme.

Thirty-four sea trips were carried out for the deployment and maintenance of FADs. Nine FADs were replaced and 25 maintenance sea trips effected. An average of twenty FADs was kept active around the island. Total fish production from FADs was estimated to be 319 tonnes for 2009 using a new software.

225 fishing licences were issued to foreign vessels to operate in Mauritius waters while 29 licensed Mauritian vessels were involved in different fishing activities. A total of 592 fishing vessels called at Port Louis for transshipment, bunkering, dry docking, supply of provisions and changing of crew. 237 fishing vessels, comprising 29 local and 208 foreign vessels, reported to the Fisheries Monitoring Centre.

A total of 32 224 tonnes of tuna and tuna-like species was transshipped at Port Louis by tuna fishing vessels and carriers. The amount of toothfish transshipped was 1 543 tonnes.

Licence fees obtained from foreign fishing vessels amounted to US$ 1 684 000 or Rs. 48.8 million.

The Mauritius National Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing, (NPOA-IUU), was launched thus consolidating the measures already taken to combat IUU fishing.

1. FISHERIES RESEARCH

1.1 Coastal (artisanal) fishery

Data from the artisanal fishery were collected monthly from 25 fish landing stations selected randomly from the 60 existing ones around the island to estimate the catch and effort by fish species and gear. During the year, 3 337 landings were thus recorded.

1.1.1 Catch, effort and catch per fisherman day

The production of fresh fish was estimated at 831 tonnes and comprised 515 tonnes from the lagoon and 316 tonnes from off-lagoon. Compared to 2009, an increase of 1.3% was noted due to an increase in catch from the large net fishery. The average catch per fisherman-day (CPFD) was 6.5kg. Table 1.1 and figures 1.1 and 1.2 show the catch, number of fisherman-days and CPFD.

Table 1.1: Catch, fisherman-days and CPFD

Year	Catch (t)			Fisherman-days			CPFD (kg)		
	L	OL	Total	L	OL	Total	L	OL	M
2006	579	371	950	145 089	68 961	214 050	4.0	5.4	4.4
2007	354	286	640	93 261	51 622	144 883	3.8	5.5	4.4
2008	367	315	682	77 719	44 248	121 967	4.7	7.1	5.6
2009	496	324	820	83 880	43 463	127 343	5.9	7.5	6.4
2010	515	316	831	88 167	40 587	128 754	5.8	7.8	6.5

L=lagoon, OL= off-lagoon, M= mean, CPFD= catch per fisherman-day

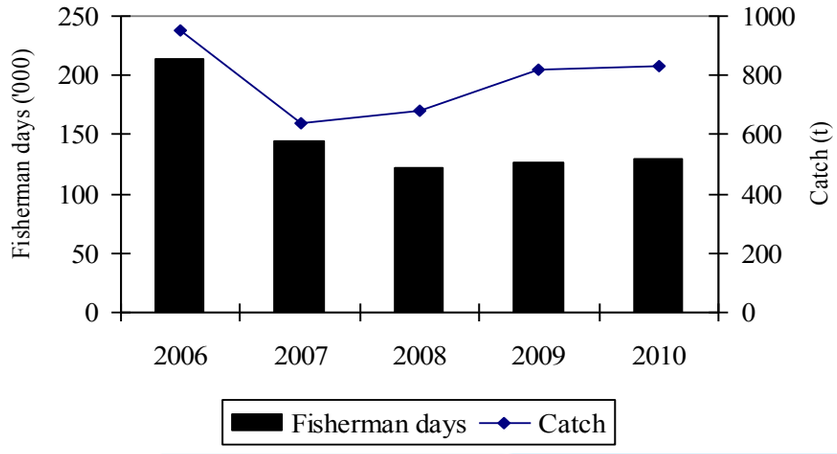


Figure 1.1: Fisherman-days and total catch

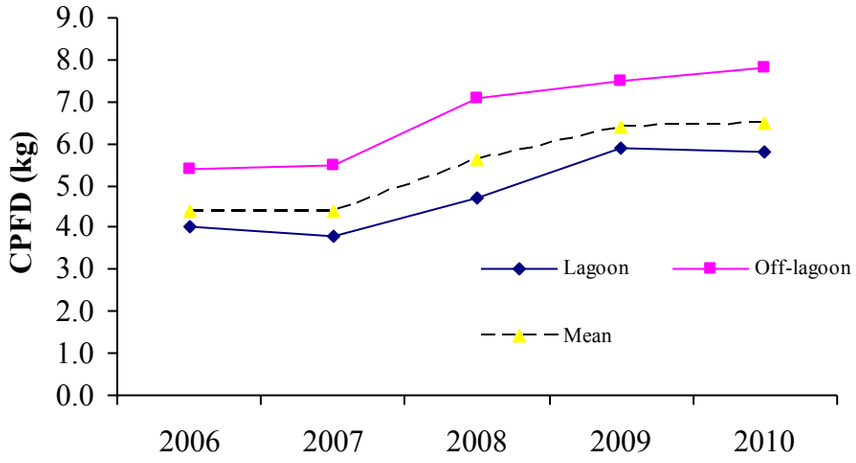


Figure 1.2: Catch per fisherman-day

1.1.2 Monthly landings

The monthly production of fresh fish from the lagoon and off-lagoon, value of catch, effort and CPFD are presented in table 1.2. Peak landing was recorded in March with a catch of 120 tonnes. (12 tonnes of "cordonnier" and 12 tonnes of "licorne" were caught in the lagoon and offlagoon in March 2010).

Table 1.2: Monthly catch with value, effort and CPFD

Month	Catch (t)			Value (M. Rs)	Fisherman days	CPFD (kg)		
	L	OL	Total			L	OL	Mean
January	22	33	55	9.7	8 431	4.9	8.3	6.5
February	22	19	41	6.3	7 538	4.6	6.9	5.5
March	84	36	120	19.1	16 168	7.2	7.9	7.4
April	49	31	80	14.1	12 578	5.7	7.8	6.4
May	77	28	104	17.9	12 433	8.8	9.5	9.0
June	44	21	65	10.5	10 551	5.6	7.8	6.2
July	32	6	38	6	8 056	4.4	6.4	4.7
August	22	7	29	4.7	5 872	5.0	4.9	5.0
September	46	11	57	8.8	9 798	5.9	5.1	5.8
October	58	35	92	15.3	12 850	6.5	8.7	7.2
November	22	30	53	10.5	8 528	4.5	8.5	6.2
December	37	61	98	18.8	15 951	4.6	7.8	6.1
Total	**515**	**316**	**831**	**141.7**	128 754	5.8	7.8	6.5

M.Rs = million rupees; L=lagoon; OL= off-lagoon

1.1.3 Catch by gear

Sixteen large nets and five gill nets were in operation during the year. Catches were recorded according to the following fishing methods: hooks and lines, basket traps, basket traps/lines, large nets, gill nets and harpoons/on foot. The catch by fishing gear is presented in table 1.3.

Table 1.3: Annual catch (kg) by gear

Year	Line	BT	BTL	LN	GN	H/OF	Total
2006	303 675	343 794	19 608	201 122	11 298	70 501	**949 998**
2007	169 963	251 233	16 227	132 656	7 565	62 426	**640 070**
2008	178 656	270 923	13 920	143 644	6 669	68 171	**681 983**
2009	227 186	257 849	18 342	222 870	11 303	82 824	**820 374**
2010	226 675	266 504	27 990	213 502	7 602	89 093	**831 366**

BT = basket trap; BT/L = basket trap and line; LN = large net; GN = gill net; H = harpoon, OF= on foot

1.1.4 Fishermen

A total of 1 770 active fishermen were involved in fishing activities. The number of fishermen by gear type for the past five years is presented in table 1.4.

Table 1.4: Number of fishermen by gear type

Year	BT	L/H/OF	BT/L	LN	GN	Total
2006	275	764	1 111	149	13	**2 312**
2007	283	770	876	137	12	**2 078**
2008	275	795	807	138	13	**2 028**
2009	279	733	862	133	13	**2 303**
2010	246	594	790	127	13	**1 770**

BT = basket trap; L/H/OF= line, harpoon/ on foot; BT/L = basket trap and line, LN = large net; GN = gill net

1.1.5 Price of fish

Table 1.5 shows the yearly average price of fresh fish.

Table 1.5: Yearly average retail price of fresh fish (Rs/kg)

Fish	2006	2007	2008	2009	2010
Homard	550	600	680	690	750
Crabe & crevette	275	320	320	355	365
Vieille rouge	230	255	275	290	300
Vacoas, sacréchien	175	175	210	245	260
Capitaine	170	180	200	220	235
Dame berri	170	170	190	210	230
Octopus	130	135	150	160	170
Carangue	120	130	150	155	165
Cordonnier	115	120	140	145	155
Rouget	110	115	135	150	160
Tuna	110	115	135	150	160
Mullet voilé	100	105	130	140	145
Bordemar	90	110	135	140	150
Licorne	115	125	150	160	165
Cateau	85	90	105	110	120
Shark	50	50	50	60	65
Other fish	65	75	80	90	90

1.2 Banks fishery

Seven vessels were engaged in fishing activities on the shallow water banks of the Saya de Malha and Nazareth banks and carried out fourteen trips. Particulars of the fleet are given in table 1.6.

Table 1.6: Particulars of the fishing fleet

Vessel	LOA (m)	GRT (t)	Hold (t)	Crew	Fishermen	Joined in	Flag
Silver Star 2	51	300	200	18	54	1992	Mauritius
Shandrani	55	398	300	35	60	1994	Mauritius
Shandrani 2	42	449	130	30	45	2002	Mauritius
Diego Star	54	388	190	16	50	2005	Madagascar
Shandrani 3	49	652	239	12	83	2009	Mauritius
Hoi Siong 8	35	315	145	19	26	2009	Mauritius
Glory No. 1	51	299	154	16	58	2009	Mauritius

LOA: Length overall; GRT: Gross registered tonnage

1.2.1 Production of frozen fish

A total of 1 478 tonnes of frozen fish was landed which comprised lethrinids (91.7 %), snappers/groupers (8.2 %) and tuna/others (0.1 %). Compared to 2009, the total catch decreased by 33.8 %. During the year, no fishing trip was carried out on the Albatross fishing bank and the Chagos Archipelago. The catch per fisherman day on the Nazareth bank was 91.5 kg and that on the Saya de Malha bank was 86.2 kg. Table 1.7 and figure 1.3 illustrate the annual catch from the different fishing areas.

Table 1.7: Annual catch (t) of frozen fish by fishing banks

Year	No. of vessels	Catch (t)				Total catch
		Saya de Malha	Nazareth	Chagos	Albatross	
2006	10	1 645	777	136	54	**2 612**
2007	7	1 481	506	130	10	**2 127**
2008	7	966	722	0	6	**1 694**
2009	10	1 835	237	161	0	**2 233**
2010	7	737	741	0	0	**1 478**

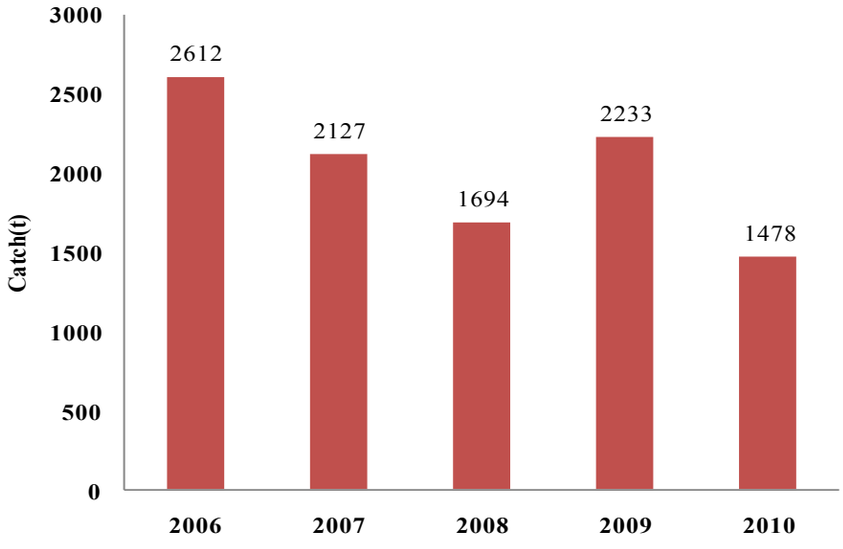


Figure 1.3: Trends in catch for the banks fishery

Details of the fishing effort, catch and CPFD from the different fishing areas are shown in table 1.8.

Table 1.8: Fishing effort, catch (t) and catch per fisherman day (kg) by fishing areas

Fishing areas	Fishing days	Bad weather days	Fisherman days	Catch (t)	CPFD (kg)	Total catch %
Saya de Malha bank	186	85	8 558	737	86.2	49.9
Nazareth bank	179	43	8 092	741	91.5	50.1
Total	**365**	**128**	**16 650**	**1 478**	**-**	**100.0**

1.2.2 Trends in catch, effort and CPFD for the Nazareth and Saya de Malha banks

The effort, catch and CPFD for the Nazareth and Saya de Malha banks are given in the table 1.9.

Table 1.9: Catch (t), effort (fdays) and CPFD (kg) for the Nazareth and Saya de Malha banks

Year	Nazareth bank			Saya de Malha bank		
	Effort	Catch	CPFD	Effort	Catch	CPFD
2006	9 627	777	80.7	23 233	1 645	70.8
2007	5 262	506	96.2	19 473	1 481	76.1
2008	8 405	722	85.9	12 759	966	75.7
2009	3 367	237	70.4	22 625	1 835	81.1
2010	8 092	741	91.5	8 553	737	86.2

The trend in CPFD from the two banks is shown in figure 1.4.

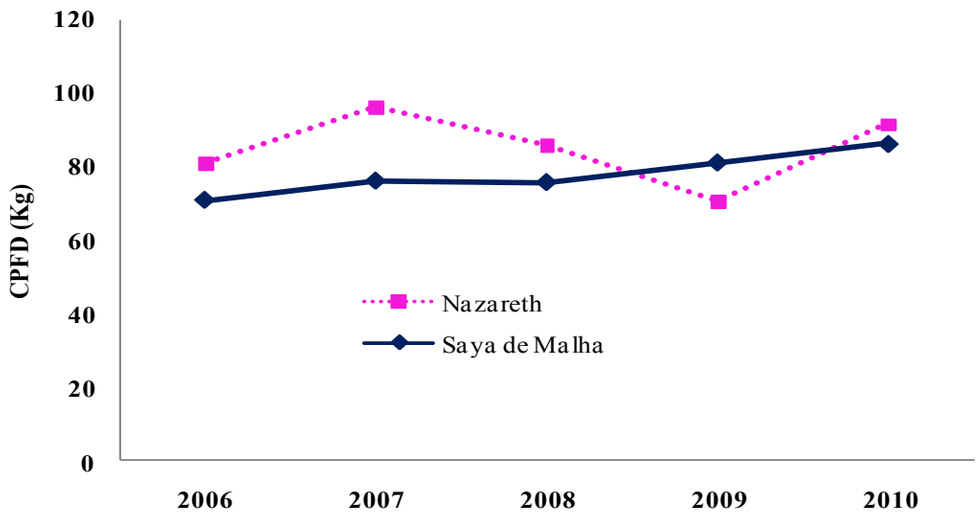


Figure 1.4: Trends in CPFD for the Nazareth and the Saya de Malha banks 2005-2010

1.2.3 Length frequency distribution of *Lethrinus mahsena*

No fish was sampled from the Nazareth and Saya de Malha banks during 2010.

1.2.4 Fishing in the waters of the Chagos Archipelago

No fishing trips were carried out in the waters of the Chagos Archipelago in 2010. Details of the catch and effort during the past five years are given in table 1.10.

Table 1.10: Details on fishing activities in the waters of the Chagos Archipelago

Year	No. of trips	No. of vessels	Fishing days	Bad weather days	Catch (t)	Fisherman days	CPFD (kg)
2006	1	1	34	10	136	1 802	75.5
2007	1	1	44	6	130	2 376	54.5
2008	nil	nil	nil	nil	nil	nil	nil
2009	3	2	72	9	161	1 872	85.8
2010	0	0	0	0	0	0	0

1.3 St. Brandon inshore fishery

Eight carrier boats, namely *Eliza*, *Etretat*, *La Derive, Mahi Mahi, Marie Charlotte*, *St. Rita, Shandrani (FIT*), *Vimaya*, operated in the St. Brandon fishery, undertaking 62 trips. About 30 contractual fishermen and about twenty fibreglass boats were active in the fishery. A total amount of 366.6 tonnes of fish including octopus and lobster was landed. Fish were caught using hand-lines, octopus using harpoon and lobster were handpicked. The catch was frozen or chilled and some were salted. The different products landed from the St. Brandon fishery from 2006 to 2010 are given in table 1.11.

Table 1.11: St. Brandon inshore fishery production (t)

Year	Trips	Frozen fish	Chilled fish	Salted fish	Frozen octopus	Frozen lobster	Total
2006	29	116.8	59.2	45.2	2.1	1.1	**224.5**
2007	14	98.4	21.9	16.4	3.6	0.0	**140.2**
2008	33	313.0	90.9	41.2	6.1	2.8	**454.1**
2009	64	4.5	337.0	45.8	1.8	0.8	**389.9**
2010	62	86.4	238.6	36.5	1.8	3.3	**366.6**

The catch consisted mainly of white fish (lethrinids) and other species, namely *Plectropomus maculatus* ('babonne'), *Variola spp*. ('croissants'), *Siganus sutor* ('cordonnier'), *Naso unicornis* ('licorne'), and *Scarus spp.* ('cateau').

1.3.1 Sampling of fish from St. Brandon

Sampling of the main fish species, *Lethrinus mahsena,* was carried out at the fishing port during the unloading of fishing vessels from St. Brandon. Length-weight data of 1 113 specimens were collected. The lengths of the fish varied between 290 and 560mm while the weight ranged from 430 to 2 930g. Figures 1.5 and 1.6 show the length/weight relationship and the length frequency distribution of fish from the inshore area of St. Brandon.

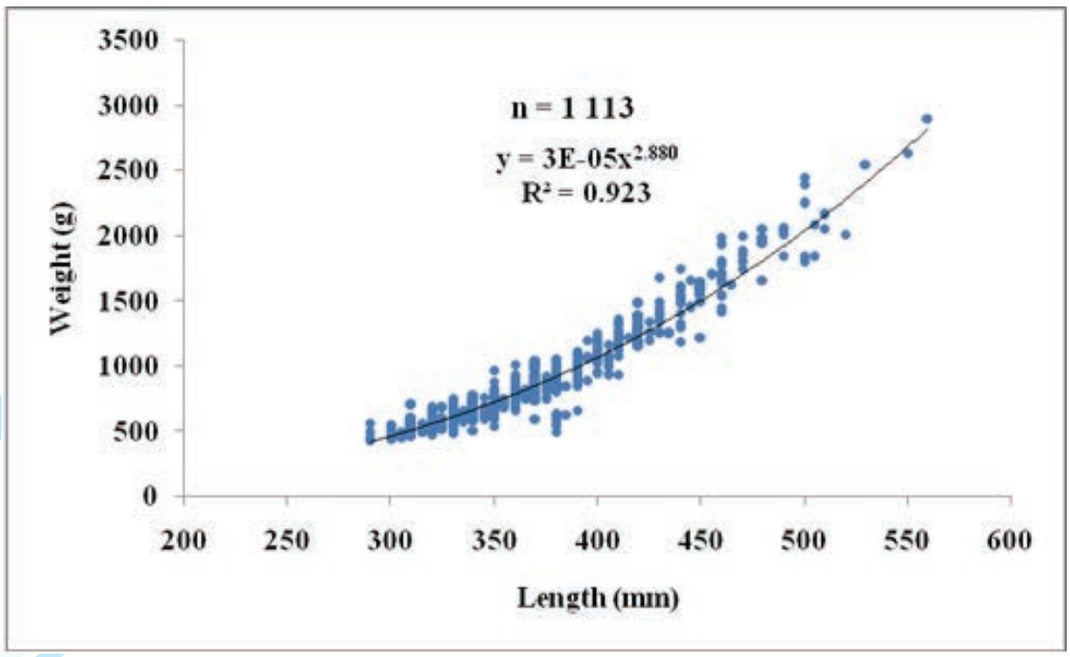


Figure 1.5: Length/weight relationship of *Lethrinus mahsena* from St. Brandon

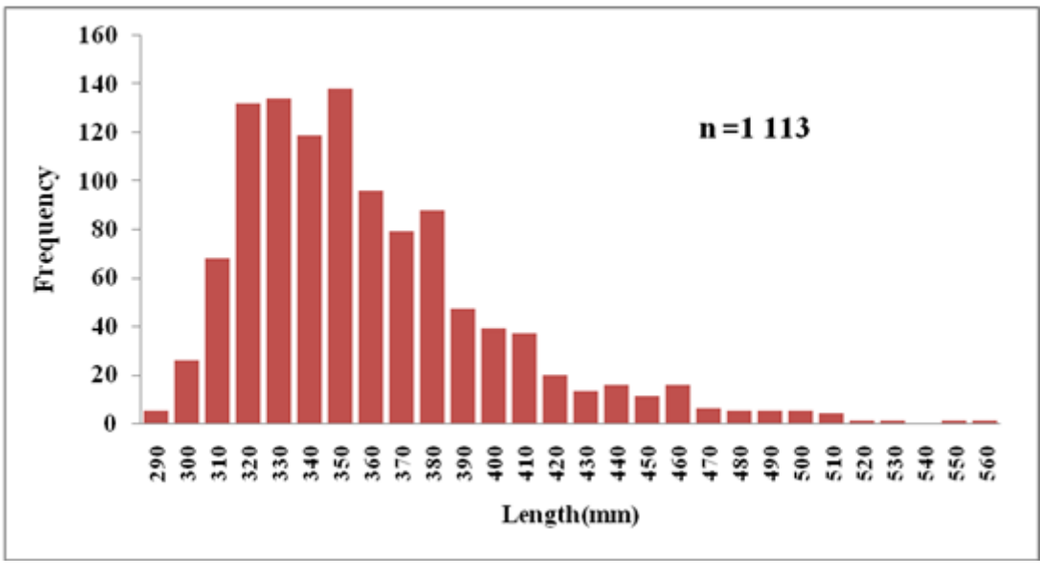


Figure 1.6: Length frequency distribution of *Lethrinus mahsena* from St. Brandon

1.4 The semi-industrial fishery

Eight fishing boats operated on the Soudan, Albatross, Nazareth and Saya de Malha banks undertaking 109 trips with an average duration of 12 days each. A total of 249.7 tonnes of chilled fish were landed during the year. The catch per fisherman day was 64.4 kg, 31.4 kg, 21.0 kg and 20.0 kg on the Albatross, Nazareth , Saya de Malha and Soudan banks respectively. A total of 6 898 fisherman days were recorded.

The main species caught were "dame berri" (*Lethrinus mahsena*), "capitaine" (*Lethrinus nebulosus*), "vieille rouge" (*Epinephelus fasciatus*), "caya" (*Lethrinus rubrioperculatus*), "vacoas" (*Aprion virescens*), "croissant" (*Variolan louti*) and "babonne" (*Plectropomus maculatus*). Table 1.12 gives the details of the boats operating in the semi-industrial fishery while the species composition of the catch by banks is given in the table 1.13.

Table 1.12: Details of boats operating in the semi-industrial fishery

Fishing boat	LOA (m)	GRT (t)	Fish hold (t)	Crew	No of F/men	Joined in
La Derive*	17.0	58.4	9.0	12	-	1995
Makaira	17.0	14.5	5.5	2	10	1996
Vimaya*	22.0	49.0	15.0	2	10	2000
Mahi-Mahi*	15.0	24.0	6.0	2	4	2002
Dai Fah1	17.0	14.0	14.0	2	4	2002
Vivano	13.1	11.0	3.5	2	3	2005
Sainte Rita*	34.0	222.0	100.0	7	9	2006
Sea Treasure	19.9	75.0	35.0	4	14	2007
Etelis	33.6	394.0	100.0	8	5	2007
Marie Charlotte*	22.8	66.5	15.0	2	4	2008
Etretat*	22.0	99.4	80.0	1	6	2008
Snapper	16.3	14.0	10.0	3	10	2008
Sea Tiger	23.9	77.8	25.0	5	18	2008
Ouvea	20.3	97.4	25.0	2	6	2009
Eliza*	18.8	36.7	7.7	4	16	2005
Shandrani (**FIT)	55	398	300	35	60	1994

***Carrier boat/vessel**
****The Fishermen Investment Trust chartered " Shandrani" for trial fishing with collapsible traps**

Table 1.13: Catch (kg) by species and fishing area

Fishing area	Catch chilled			Total chilled
	Lethrinids	Snapper/grouper	Tuna and others	
Albatross bank	78 169	19 645	151	97 965
Nazareth bank	15 089	102 505	0	117 594
Saya de Malha bank	6	34 047	0	34 053
Soudan bank	120	0	0	120
Total	**93 384**	**156 196**	**151**	**249 732**

The catch, effort and catch per fisherman-day (CPFD) in the different areas are presented in table 1.14.

Table 1.14: Catch, effort and CPFD in the fishery

Fishing area	Catch (kg)	Fishing days	Fisherman-days	CPFD (kg)
Albatross bank	97 965	2240	1 521	64.4
Nazareth bank	117 594	444	3 749	31.4
Saya de Malha bank	34 053	196	1 622	21.0
Soudan bank	120	1	6	20.0
Total	**249 732**	**881**	**6 898**	

Sampling of 802 specimens of *Lethrinus mahsena* from Albatross bank was carried out upon arrival of the fishing boats and vessels. The length ranged from 240 to 550mm while the weight from 240 to 2860g. Figure 1.7 and 1.8 illustrate the length-frequency distribution and the length-weight relationship of the fish landed.

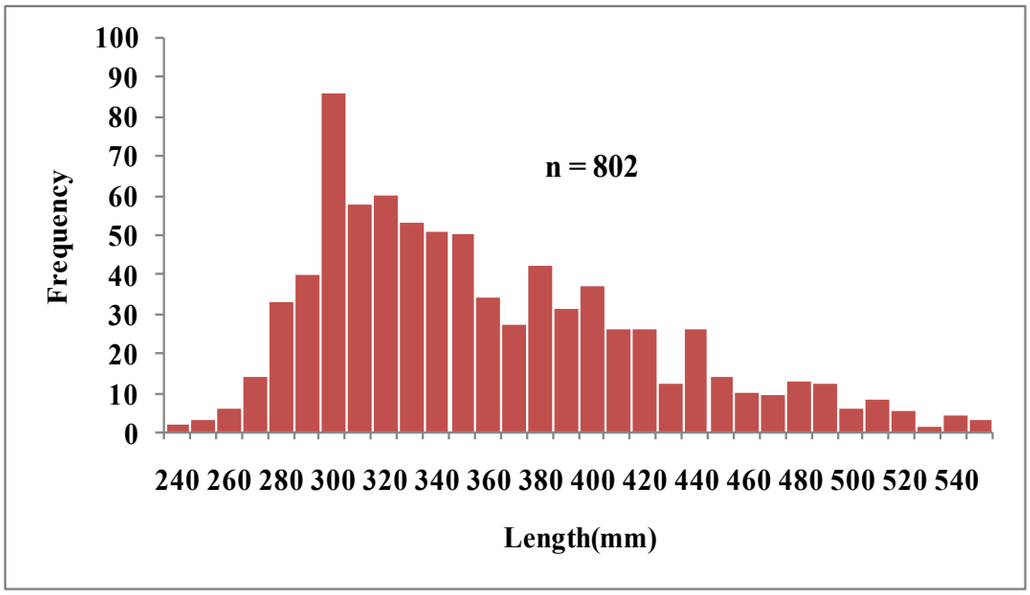


Figure 1.7: Length frequency of *Lethrinus mahsena* from the Albatross bank

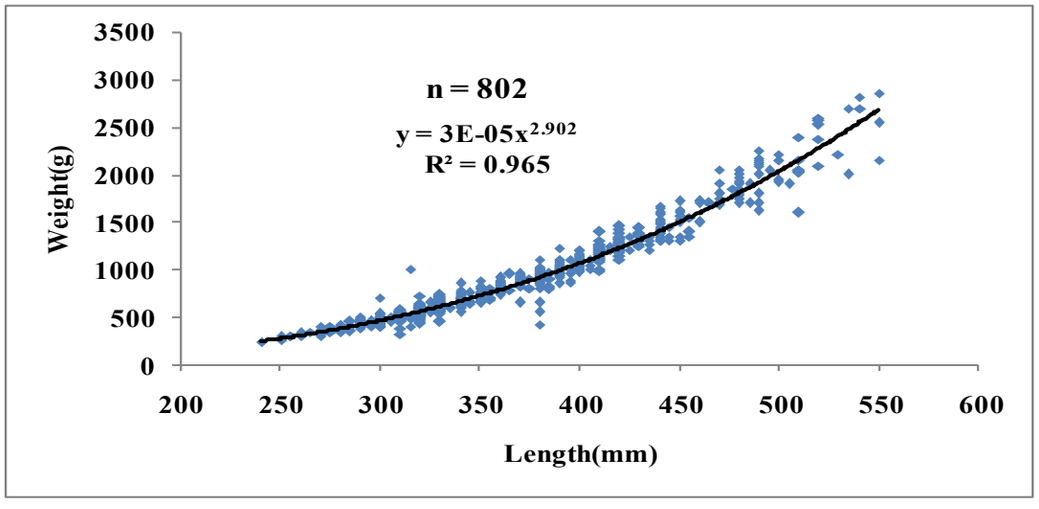


Figure 1.8: Length-weight relationship of *Lethrinus mahsena* from Albatross bank

1.5 The fishery on the drop-off of banks

Eight fishing vessels were active in the fishery on the drop-off of the St. Brandon, Albatross, Nazareth and the Saya de Malha banks targeting snappers and groupers. A total of 249.6 tonnes of frozen fish and 151.6 tonnes of chilled fish were landed. The main species caught were "sacre-chien" (*Etelis coruscans*, *Etelis Carbunculus*, *Pristipomoides filamentosus*, *Pristipomoides auricilla*), "gueule pave dore" (*Polysteganus baissaci*) and "vieille laboue" (*Epinephelus morrhua*). The details of the catch are given in the table 1.15.

Table 1.15: Catch by species and fishing location from drop-off fishery of the banks

Fishing area	Catch chilled (kg)			Total chilled	Catch frozen (kg)			Total frozen
	SCH*	GPD*	VLB*		SCH*	GPD*	VLB*	
Nazareth bank	33 751	52 714	13 196	**99 661**	45 610	97 714	10 692	**154 016**
Saya de Malha bank	27 126	5 645	1 266	**34 037**	82 141	9 153	4 259	**95 553**
St. Brandon bank	937	0	335	**1 272**	0	0	0	**0**
Albatross bank	12 485	1 469	2 652	**16 606**	0	0	0	**0**
Total	**74 299**	**59 828**	**17 449**	**151 576**	**127 751**	**106 867**	**14 951**	**249 569**

***SCH-sacre-chien, *GPD-guele pave doree, *VLB- vieille laboue**

Most of the catch was from the Nazareth bank (63.1%), followed by the Saya de Malha bank (33.0%), Albatross (3.7%) and St. Brandon (0.3%). Figure 1.9 gives the percentage representation by banks.

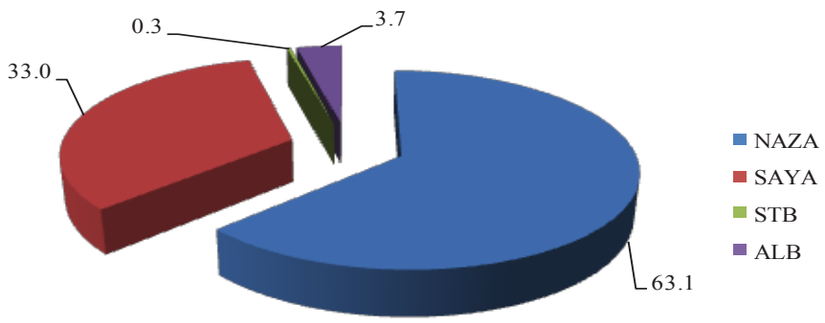


Figure 1.9: Percentage representation of catch by bank

The breakdown of the catch of the snapper/grouper consisting of sacré-chien, gueule pave doré and vieille laboue is given in figure 1.10.

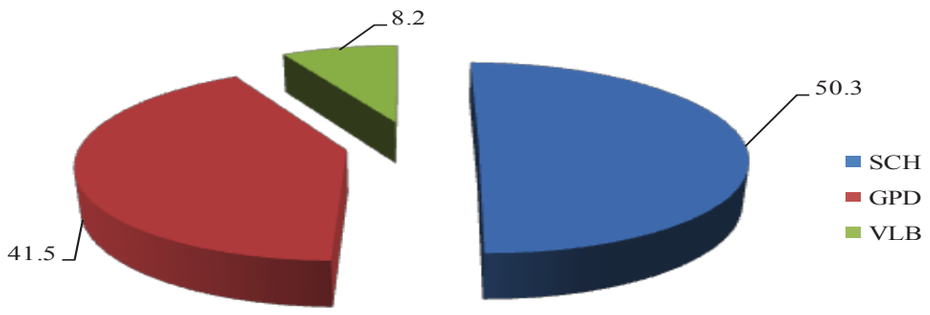


Figure 1.10: Percentage representation of the deep-water snapper and grouper fishery by species (SCH-sacre-chien, GPD-guele pave doree, VLB- vieille laboue)

A total of 314 specimens of *Polysteganus baissaci* ("gueule pavée doré") were sampled for length and weight distribution. The length frequency distribution showed two prominent peaks at length range 300-590 mm and the weight ranged from 550 to 3 300 g. The highest length frequency was observed at 370 mm. Results are shown in figure 1.11.

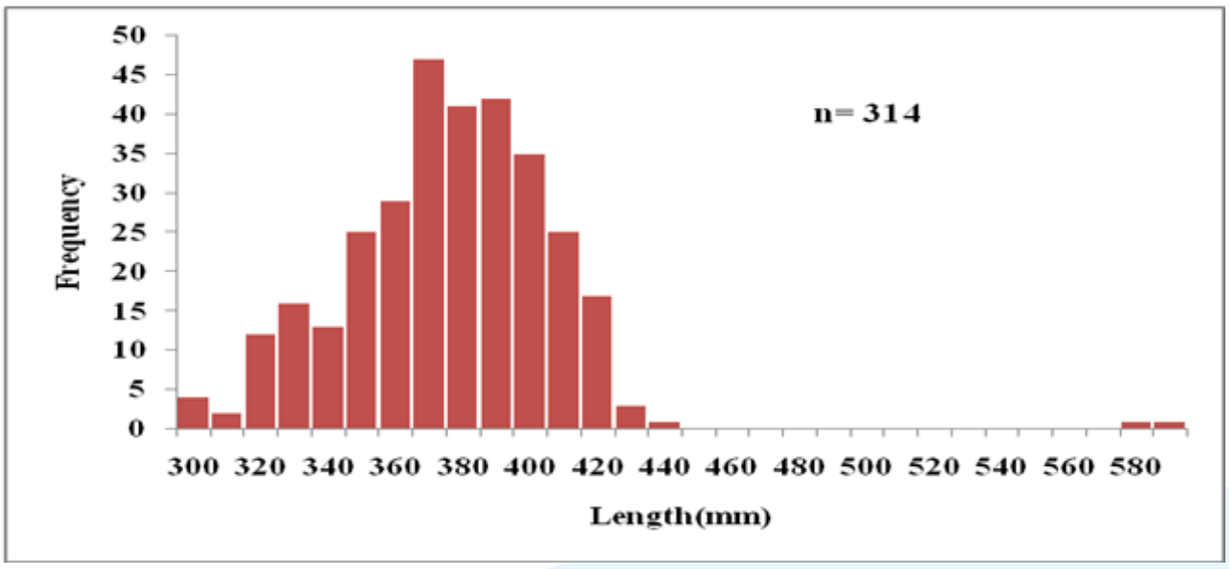


Figure 1.11: Length frequency of *Polysteganus baissaci* (gueule pavée doré) from the Nazareth Bank.

1.6 Ecotoxicology

1.6.1 Fish toxicity tests

During the year, fish toxicity tests were mainly carried on an *ad hoc* basis as the Fish Toxicity Laboratory was being renovated following accreditation process under ISO 17025 norms.

Toxicity tests for the presence of ciguatoxin were conducted through the mongoose bioassay method on eight fish samples. Seven samples were fishes caught during the Hydroacoustic survey carried out from 15 to 25 September at St Brandon and Nazareth bank and one sample was brought by the Ministry of Health and Quality of life. The fish sample from the banks comprised Bourgeois - *Lutjanus sebae* (3), Vieille - *Epinephelus multinotatus* (2), Carangue - *Carangoides fulvogutattus* (2) and the sample brought by Ministry of Health and Quality of life was Dame berri - *Lethrinus mahsena*. One carangue - *Carangoides fulvogutattus*, was found to be toxic. The other seven fish samples were not toxic.

Three fish samples comprising one sample of sardines received from the Consumer Protection Unit, one sample of cooked cordonnier fish and a whole gutted cordonnier fish from the Ministry of Health and Quality of Life were tested through the mouse bioassay for the presence of ciguatoxin. Two sets of three mice, each mouse weighing between 19 and 20g, were used. Test results showed that the cooked fish sample was slightly toxic whereas the sardines and the whole cordonnier were not toxic.

1.6.2 Harmful marine microalgae

Sampling of harmful marine microalgae was continued at the four established sites namely, Albion, Blue Bay, Le Morne and Trou aux Biches. The sites were sampled on a quarterly basis for the presence and density of harmful marine microalgae.

Macroalgae samples were collected at three different sampling stations within the sites. The samples were processed and dinoflagellates species identified. The main species of dinoflagellates recorded were *Prorocentrum* spp. and Ostreopsis sp with a cell count of 0.008/g, 0.001/g respectively. Dinoflagellates of *coolia* and *Amphidinium* spp. were not observed. Diatoms such as *Chaetoceros*, *Navicula*, *Nitzschia* and *Licmophora* spp. were observed in large numbers at all the sites.

1.7 Identification of fish specimens

Fifty-nine fishes, two sea cucumbers, one slipper lobster, one squid, one conger eel, one crayfish and one crab species were identified from 460 specimens brought in by officers of the Fisheries Protection

Service, National Coast Guard, Ministry of Health and Quality of Life, Police, and Consumer Protection Unit. Five fish samples could not be identified as samples were in curry, fillets, pieces and in dried state.

1.8 Sea cucumber fishery

A two-year moratorium period was adopted from 1st October 2009 to 30th September 2011 for the conservation of sea cucumbers. Authorisation was not granted for the collection sea cucumbers from the sea. However, one case of poaching for sea cucumbers was reported and the specimens seized were identified as *Actinopyga echinites* (19) and *Actinopyga mauritiana* (1).

1.9 South West Indian Ocean Fisheries Project (SWIOFP) – Components 1 and 3

Mauritius participated in SWIOFP training workshops under the Component-1, *Data atlas and information technology* (StatBase) and Component-3 *Assessment and sustainable use of demersal fishes*.

The inventory of datasets and statistical tables under Component-1, *Data atlas and information technology* (StatBase) were reviewed and partly transferred to the StatBase website. The inventory comprised data relating to artisanal fisheries, industrial fisheries and semi-industrial fishery.

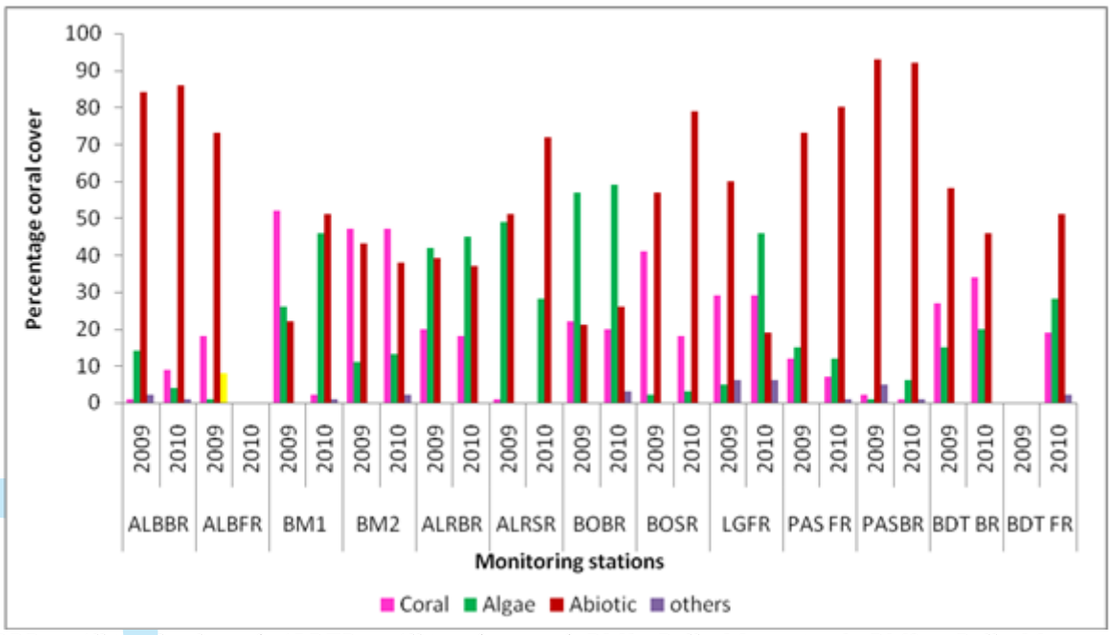
The SWIOFP held its Observer Training Course in Durban, South Africa. The objective of the course was to train Fisheries Observers with the purpose of collecting accurate fisheries and biological data from SWIOFP Components 2, 3, 4 and 5 respectively. Specific knowledge of sampling methodology, fish biology, fishing technology, ecosystems and statistical sampling strategies was imparted. The observers would be deployed onto commercial fishing vessels at sea. The Fisheries Observer would work unsupervised and would require a broad range of competencies to function efficiently in such environment. Four officers from Mauritius and one officer from Rodrigues attended the Training Course.

2. MARINE SCIENCE

2.1 Coastal ecosystem research

2.1.1 Long-term monitoring of the coral reef ecosystem

The long-term monitoring of the coral reefs was continued at the established sites *viz*: Albion, Le Goulet, Pointe aux Sables, Baie du Tombeau, Trou aux Biches, Anse la Raie, Poudre d'Or, Belle Mare, Trou d'Eau Douce, Bambous Virieux, Bel Ombre and Ile aux Benitiers. Data on substrate cover were collected using the Line Intercept Transect (LIT) method. The data were processed by the COREMO software and the average percentage cover of substrate is shown in figure 2.1 and table 2.1. The abundance of fish, sea urchins and sea cucumbers is given in table 2.2.



ALBBR – Albion back reef, ALBFR – Albion fore reef, BM1- Belle Mare site 1, BM2 – Belle Mare site 2, ALRBR – Anse la Raie back reef, ALRSR – Anse la Raie shore reef, BOBR – Bel Ombre back reef, BOSR – Bel Ombre shore reef, LGFR- Le Goulet fore reef, PASFR- Pte aux Sables fore reef, PASBR- Pte aux Sables back reef, BDTBR-Baie du tombeau back reef, BDTFR- Baie du tombeau fore reef

Figure 2.1: Percentage of substrate cover at monitoring stations

Table 2.1: Average percentage cover of substrate at monitoring stations

Site	Stations	Year	Coral	Algae	Abiotic	Others
Albion	fore reef	2009	18	1	73	8
		2010	NM			
	back reef	2009	1	14	84	2
		2010	9	4	86	1
Le Goulet	Fore reef	2009	29	5	60	6
		2010	29	46	19	6
Pointe aux Sables	fore reef	2009	12	16	73	*
		2010	7	12	80	1
	back reef	2009	2	< 1	93	5
		2010	1	6	92	1
Baie du Tombeau	back reef	2009	27	15	58	*
		2010	34	20	46	*
Trou aux Biches	fore reef	2009	NM	NM	NM	NM
		2010	19	28	51	2
	back reef	2009	31	4	65	*
		2010	21	14	65	
Anse la Raie	back reef	2009	20	42	39	*
		2010	18	45	37	
	shore reef	2009	< 1	49	51	*
		2010	0	28	72	
Poudre d'Or	site 1	2009	7	50	43	*
		2010	2	46	51	1
	site 2	2009	< 1	< 1	100	*
		2010	0	6	94	
Belle Mare	site 1	2009	52	26	22	*
		2010	56	26	18	
	site 2	2009	47	11	43	*
		2010	47	13	38	2
Trou d'Eau Douce	back reef	2009	10	40	49	1
		2010	20	49	31	
	shore reef	2009	30	16	53	1
		2010	13	24	63	
Bambous Virieux	back reef	2009	55	22	22	1
		2010	51	4	44	1
	shore reef	2009	26	36	37	1
		2010	26	49	24	1
Bel Ombre	back reef	2009	22	57	21	*
		2010	20	59	26	3
	shore reef	2009	41	2	57	*
		2010	18	3	79	
Ile aux Benitiers	fore reef	2009	13	3	82	2
		2010	17	2	79	2
	back reef	2009	3	12	85	*
		2010	1	5	94	
	shore reef	2009	< 1	46	54	*
		2010	1	72	27	

Coral cover: Monitoring of the three reef zones namely the back reef, shore reef and fore reef was continued at the above sites. In general, a decrease has been noted in the percentage of live coral cover in all stations. This may be due to multiple factors that are affecting the lagoon *such as coral bleaching and algal blooms*. Coral bleaching is a phenomenon that is frequently occurring due to global warming and climate change Marked coral bleaching occurred in 2003, 2004 and 2009 in Mauritius. Algal blooms that occur due to sudden rises in the SST also cause much damage to coral reefs and it may take years for recuperation of these reefs.

At most of the back reef and shore reef stations, the percentage of live coral cover has decreased considerably. One site that has witnessed the scars of coral mortality due to bleaching is Ile aux Benitiers. The control station in the back reef of IAB was covered with beautiful tabular corals and had about 61 % live coral cover in 2000. After the bleaching events in 2003/2004 and 2009, the percentage of coral cover has gradually decreased to 1%. At Anse la Raie (shore reef) and Poudre d'Or (site 2), all corals died due to occurrence of algal blooms in 2009 and the recuperation is slow.

Sites like Belle Mare, Bambous Virieux, Baie du Tombeau have shown resilience to coral bleaching and still have about 50 % coral cover.

At the fore reef stations, the average percentage coral cover is about 20%. The depth profile in the fore reef helps the corals from bleaching effects when there is a rise in sea surface temperature and mortality is less compared to that in the shallow lagoons. Many juvenile recruits are also observed *at these stations*.

Table 2.2: Abundance of fish, sea urchins and sea cucumber

SITE	Type of reef	Year	Pomacentridae & Chaetodontidae	Acanthuridae	Labridae	Scaridae	Sea cucumber	Sea urchins
Albion	fore reef	2009	X	XX	XX	X	*	XXXX
		2010	NM					
	back reef	2009	*	*	X	X	X	XXXX
		2010					X	XX
Le Goulet	fore reef	2009	XXX	XX	X	XX	X	*
		2010	XXXX	X	X	XXX	X	0
Pointe aux Sables	back reef	2009	*	*	*	X	*	XXXX
		2010		X				
	fore reef	2009	X	X	XX	X	*	XXXX
		2010	X	XX	XX	XX	0	XXX
Baie du Tombeau	back reef	2009	XXXX	*	*	*	*	XX
		2010	XXXX	X	X	XX	0	0
Trou aux Biches	fore reef	2009	NM	NM	NM	NM	NM	NM
		2010	XXXX	XX	XXX		0	XX
	back reef	2009	XXXX	XXX	X	XX	*	*
		2010	XXXX	XXXX	X	XX	0	0
Anse La Raie	back reef	2009	XXXX	XX	X	XX	*	*
		2010	XXXX	XX	X	XX	0	0
	shore reef	2009	XXXX	*	*	*	*	*
		2010	XXXX	X	0	X	0	0
Belle Mare (Site I)	back reef	2009	XXXX	XX	*	X	*	XX
		2010	XXXX	XXX	X	X	0	0
Belle Mare (Site II)	back reef	2009	XXXX	XX	*	X	*	XX
		2010	XXXX	XXXX	X	X	0	0
Trou d'Eau Douce	back reef	2009	XXXX	XX	X	X	*	X
		2010	XXXX	X	X	X	0	0
	shore reef	2009	XXXX	XX	X	XX	X	*
		2010	XXX	XXX	X	XXXX	X	0
Bambous Virieux	back reef	2009	XXXX	*	*	X	X	XXXX
		2010	XXXX		XX	XX	X	XXXX
	shore reef	2009	XXX	XX	X	X	*	X
		2010	XXX	XXXX	XX	XX	0	0
Bel Ombre	back reef	2009	XXXX	*	X	X	X	XX
		2010	XXXX	X	X	X	X	XX
	shore reef	2009	XX	*	X	X	*	X
		2010	XXX	XX	X	X	X	0
Ile aux Benitiers	back reef	2009	XXXX	XXX	X	XX	*	*
		2010	XXX	XX	X	XX	0	X
	shore reef	2009	X	X	*	*	*	*
		2010	XX		X	X	X	X
	fore reef	2009	XX	XX	X	X	*	XXXX
		2010	X	XX	XX	X	X	XX

*** Not observed, - not monitored, X – 0-10, XX- 10-50, XXX – 50-100, XXXX - >100**

Fish: Fish visual censuses were carried out and the abundance and distribution of fish species were recorded. The fish fauna found associated with the coral reefs were mainly from the families Pomacentridae, Chaetodontidae, Acanthuridae, Labridae, Scaridae and Serranidae.

Pomacentrids (damsel fish) were abundantly recorded at both back and fore reef stations. The damsel fish are territorial and aggressive to new species and to intruders and have a significant impact on coral community structure and algal assemblages. The most common species of damsel fish recorded were *Stegastes lividus, Stegastes limbatus, Dascyllus aruanus, Chrysiptera unimaculata* and *Chromis viridis*. Acanthurids (surgeon fish) was represented by *Ctenochaetus striatus* and *Acanthurus xanthopterus*. Schools of acanthurids, *Ancanthurus triostegus,* resident of the area, were always encountered at the two stations in Belle Mare. Chaetodontids (butterfly fish) which are indicators of a healthy reef were recorded in few numbers and represented by *Chaetodon trifasciatus*, *Chaetodon trifascialis.C.vagabundus, C.lunula and C.lineatus.* The family Labridae (wrasses) was represented by *Halichoeres hortulanus, alassoma hardwicke*, and *Thalassoma genivittatum*. The family Scaridae was represented by *Scarus ghobban*, *S.scaber* and *Chlorurus sordidus*. The balistidae (trigger fish) was the least represented and predators such as fish from the families Serranidae and Lethrinidae were absent.

High densities of sea urchins was observed at some stations indicating degradation of the habitat. Sea cucumbers were observed in areas having sand as substrate as they are detritus feeders.

2.1.2 Coral farming

The Coral Farming Project was started in 2008 and the main objective of the project was to farm corals in ocean based nurseries. Five tables were placed in the lagoon of Albion in 2008 and coral fragments were fixed to the tables. The coral fragments continued to grow under normal conditions and an artificial reef was created with increase in the abundance of fish in the region. Due to the success of the project and the importance for conservation and protection of this fragile ecosystem, the ministry will continue the coral farming project in the future in different parts of the lagoon.

The growth of the species, *Galaxea fascicularis,* has been depicted from 2008- 2010 in figure 2.2 and figure 3.3 respectively.

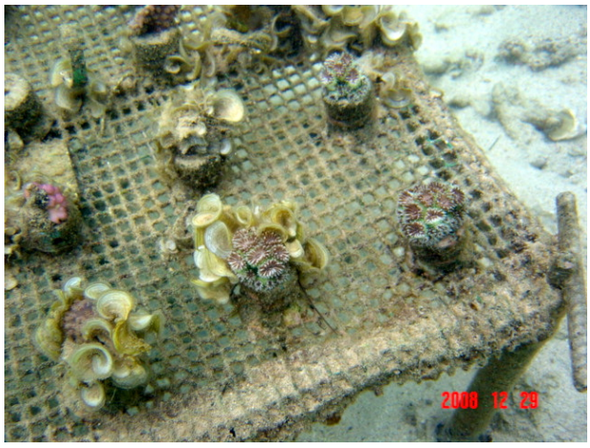


Figure 2.2: *Galaxea fascicularis* species in 2008

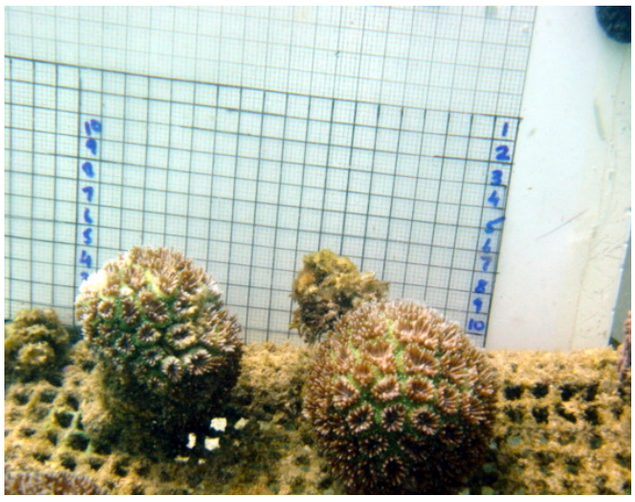


Figure 2.3: *Galaxea fascicularis* species in 2010

2.1.3 *Ad-hoc* ecological surveys

2.1.3.1 Monitoring of ex-sand mining sites

During monitoring of ex-sand mining sites it was observed that the seabed was colonised by seagrass and new coral recruits were encountered and an increase in fish abundance was noted.

2.1.3.2 Monitoring of Ferme Marine de Mahebourg Ltd

A general ecological survey carried out on 05 February around and below the fish cages showed no negative impacts due to the aquaculture activity. The sea bottom consisted mainly of homogenous fine sand covered with a fine layer of silt. Neither live nor dead corals were observed in the area of survey.

No fish was observed outside the cages at the time of survey and the floating cages observed were in good condition. No damage by sharks or other predators was observed. No abnormality in terms of algal proliferation was observed at the sea bottom.

2.1.3.3 Proposed dredging of a boat passage at La Passe Moulin, Palmar

A survey was conducted in connection with dredging of a boat passage on the request of fishermen of the region. The request was not recommended as the proposed site was rich in marine biodiversity and dredging could cause changes in the current pattern.

2.1.3.4 Ecological survey at Baie du Tombeau near sewage outfall

An ecological survey was carried out in the vicinity of the BDT sewage outfall following complaints from fishermen in connection with alleged pollution in the area. The survey showed no abnormalities in and around the sewage outfall.

2.1.3.5 Sea cucumber survey in Mauritius

Due to the exploitation of the sea cucumber fishery, a moratorium was imposed for two years from October 2010. Surveys were conducted at 8 sites around the island to assess the species abundance and distribution of sea cucumbers.

2.1.3.6 General survey in the lagoon of Bain Boeuf

A general survey was carried out in the lagoon at Bain Boeuf to gather information in conection with the accumulation of macro algae on shoreline. The survey showed excessive growth of algae that might be due to leaching of nutrients into the lagoon. No other abnormalities were observed.

2.1.3.7 Placement of concrete modules at Flic en Flac

The Ministry of Environment & SD requested a survey for the placement of concrete modules in the Flic en Flac lagoon. The concrete modules would attenuate the power of the waves thus protecting the shore against erosion and act as a hard substrate for the settling of coral larvae thereby enhancing coral recruitment. A survey was carried out and two sites in the lagoon were identified. 60 concrete modules were placed by a contractor in the lagoon at two sites under the supervision of officers of the ministry.

2.1.3.8 Survey at Black River Bay

Under the WIO Lab Project, a survey was carried out to observe siltation in the bay and no sedimentation was observed.

2.1.3.9 Coral Coring Project

Dr. Jens Zinke from the Royal Netherlands Institute of Sea Research (RNISR) in collaboration with the MOI and AFRC carried out a Coral Coring Project. The main aim of the above project was to examine the spatial and temporal environmental changes affecting coral reefs in the WIO and also to study the effect of ocean acidification on coral growth. This involved drilling coral cores from living massive *Porites sp*. and *Diploastrea sp*. from reef complexes situated in different zones near river bays around Mauritius and Rodrigues. During the project, coral cores were drilled at La Preneuse Bay, Tamarin Bay, Baie du Tombeau and Petite Riviere Noire Bay.

2.1.4 Mangrove propagation

About 10,000 mangrove seedlings were propagated at Bassin Leon, Le Morne, from February to July 2009 and were monitored for growth and survival rate. The plants have reached about 1m height with a survival rate of almost 100%. Measures have been initiated to extend the mangrove propagation programme at Le Morne.

2.1.5 BIOPS (Biodiversité des Milieux Pélagiques marins de l'ocean indien)

Project BIOPS started in 2008 with training for the visual census of fish around FADs carried out by (IFREMER). Data for visual census of fish were collected around four designated fish aggregating devices (FADs) and the project was completed in December 2010. The data collected have been sent to Institute for Resaerch and development (IRD) for analysis resulting in a scientific paper.

2.1.6 Regional Coral Reef Monitoring Network (RCRMN)/ COREMO III software

A workshop was funded by COI-RECOMAP for the meeting of focal points of the RCRMN in Mauritius. Focal points from the region (Reunion, Madagascar, Seychelles and Comoros) who attended the workshop compiled the WIO Node's Annual Report for submission to the Global Coral Reef Monitoring Network (GCRMN). The presentation of the COREMO III software to the member countries of the COI was also carried out.

2.2 Coastal water quality

2.2.1 Monitoring of chemical parameters

Long term monitoring of water quality was continued at the 86 established stations of the twenty sites around the island namely: Ile aux Benitiers , Bel Ombre, Bambous Virieux, Trou d'Eau Douce, Anse La Raie, Trou aux Biches, Pointe aux Sables, Bain des Dames, Grand Baie, Baie du Tombeau, the harbour, Poudre d'Or, Balaclava**,** Blue Bay, Belle Mare, Albion, Flic en Flac, Palmar, the Terre Rouge Bird Sanctuary and Rivière Noire. Two hundred and five samples were analysed for nitrate-nitrogen(NO_3^--N), phosphate (PO_4^{3-}) and chemical oxygen demand (COD). Physical parameters recorded were temperature, sea state, weather conditions, conductivity and pH. The range of values for results of the analyses over the last three years is shown in table 2.3.

Table 2.3: Range of values for results of water analyses (2008-2010)

Site	Year	Nitrate-Nitrogen (mg/l)	Phosphate (mg/l)	Chemical Oxygen Demand (mg/l)
Ile aux Benitiers	2008	<0.1	<0.01 - 0.02	0.1 - 0.6
	2009	<0.1	0.01 - 0.05	0.3 - 0.6
	2010	<0.1	0.01 - 0.08	0.1 - 1.7
Bel Ombre	2008	<0.1	0.01 - 0.06	0.1 - 0.5
	2009	<0.1	0.01 - 0.08	0.1 - 0.7
	2010	<0.1	0.02 - 0.07	0.1 - 1.0
Bambous Virieux	2008	<0.1	0.02 - 0.08	<0.1 - 0.5
	2009	<0.1	0.01 - 0.04	0.3 - 0.5
	2010	<0.1	0.03 - 0.08	0.2 - 0.5
Trou d'Eau Douce	2008	<0.1	<0.01 - 0.05	0.1 - 0.8
	2009	<0.1	0.01 - 0.06	0.1 - 1.9
	2010	<0.1	0.07 - 0.09	0.1 - 0.2
Anse la Raie	2008	<0.1	0.02 - 0.08	0.1 - 1.5
	2009	<0.1	0.01 - 0.06	<0.1 - 0.6
	2010	<0.1	0.02 - 0.08	0.2 - 1.4
Trou aux Biches	2008	<0.1	0.01 - 0.07	0.2 - 2.1
	2009	<0.1	0.01 - 0.05	<0.1 - 1.2
	2010	<0.1	0.01 - 0.08	<0.1 - 0.9
Pointe aux Sables	2008	<0.1	<0.01 - 0.07	0.1 - 1.1
	2009	<0.1	0.02 - 0.07	0.1 - 1.4
	2010	<0.1	0.01 - 0.08	<0.1 - 0.9
Bain des Dames	2008	<0.1	0.01 - 0.07	0.2 - 1.0
	2009	<0.1	0.03 - 0.05	0.1 - 1.4
	2010	<0.1	0.01 - 0.08	0.1 - 1.2
Grand Baie	2008	<0.1	0.01 - 0.06	<0.1 - 1.4
	2009	<0.1	0.01 - 0.08	0.1 - 2.2
	2010	<0.1	0.01 - 0.07	0.1 - 1.2
Baie du Tombeau	2008	<0.1	0.01 - 0.08	0.1 - 1.7
	2009	<0.1	0.01 - 0.19	0.1 - 1.3
	2010	<0.1	0.02 - 0.08	<0.1 - 2.2
Harbour	2008	<0.1	0.01 - 0.13	0.1 - 1.7
	2009	<0.1	0.04 - 0.08	0.1 - 0.7
	2010	<0.1	0.03 - 0.09	0.1 - 1.0
Poudre d'Or	2008	<0.1 - 0.8	0.01 - 0.17	<0.1 - 3.8
	2009	<0.1 - 0.2	0.01 - 0.27	<0.1 - 3.7
	2010	<0.1	0.01 - 0.24	<0.1 - 1.9
Balaclava	2008	<0.1 - 0.9	0.01 - 0.15	0.4 - 1.8
	2009	<0.1	0.02 - 0.05	<0.1 - 0.3
	2010	<0.1	0.02 - 0.06	<0.1 - 0.8
Blue Bay	2008	<0.1	0.01 - 0.02	<0.1- 0.3
	2009	<0.1 - 1.8	<0.01 - 0.09	0.2 - 0.7
	2010	<0.1	0.04 - 0.08	<0.1 - 0.8
Belle Mare	2008	<0.1	0.01 - 0.06	<0.1- 0.6
	2009	<0.1	0.01 - 0.07	0.2 - 1.5
	2010	<0.1	<0.01 - 0.06	<0.1 - 1.3
Albion	2008	<0.1	0.01- 0.07	0.1 - 2.1
	2009	<0.1 - 1.8	0.03 - 0.06	0.1 - 1.2
	2010	<0.1	0.06 - 0.18	0.1 - 0.4
Flic en Flac	2008	<0.1	0.01 - 0.07	<0.1 - 0.5
	2009	<0.1	0.02 - 0.06	0.1 - 0.8
	2010	<0.1	0.31 - 0.07	0.1 - 0.4
Palmar	2008	<0.1	0.01 - 0.08	0.1 - 0.9
	2009	<0.1	0.01 - 0.08	0.1 - 1.0

	2010	<0.1	0.01 - 0.08	0.4 - 1.9
Bird Sanctuary	2008	<0.1	0.04 - 0.13	0.6 - 2.1
	2009	<0.1	0.01 - 0.19	<0.1 - 1.3
	2010	<0.1	0.03 - 0.22	0.3 - 1.5
Rivière Noire	2008	<0.1	0.06 - 0.11	0.2 - 1.9
	2009	<0.1	0.04 - 0.15	0.2 - 1.9
	2010	<0.1	0.01 - 0.20	0.2 - 0.6

Note: Detection limit for phosphate – 0.01 mg/l
Detection limit for nitrate-nitrogen – 0.1 mg/l
Coastal Water Quality Guideline limits (Conservation): Nitrate – nitrogen - 0.3mg/l, phosphate - 0.05 mg/l and COD - 3mg/l
Coastal Water Quality Guideline limits (Recreation): Nitrate – nitrogen - 0.8mg/l, phosphate - 0.08mg/l and COD - 5mg/l

The levels of nitrate were below 0.1 mg/l while those of phosphate were between <0.01 and 0.24 mg/l and COD between <0.1 and 2.2 mg/l. The results of the water quality analyses were within the *Guidelines for Coastal Water Quality Requirements for various categories Govt. Notice No. 620 of 1999 (CWQG)* except at one station at Albion, Balaclava, Poudre d'Or, Blue Bay and Rivière Noire and at two stations at Terre Rouge Bird Sanctuary where higher levels of phosphate were recorded. The high levels of phosphate recorded at these stations could be attributed to influx of fresh water from the nearby rivers.

2.2.2 Analysis for trace metals

Monitoring of the concentration of trace metals namely; lead and cadmium in water samples collected near river mouths at Grand River North West, Rivière Lataniers, Pointe Roches Noires, Grand River South East, Mahebourg, l'Escalier, Baie du Cap and Tamarin were continued on a bi-annual basis. The levels of these two trace metals recorded were below their detection limits in all of the samples analysed.

Note: Detection limit for lead – 0.013 mg/l
Detection limit for cadmium – 0.0028 mg/l

2.2.3 Fish mortality and alleged pollution

Site survey and analysis of seawater were carried out in relation to cases of alleged pollution and fish mortality. Details are given in table 2.4.

Table 2.4: Sites of alleged pollution and fish mortality

Date	Site	Event
03 March	Baie du Tombeau outfall	Alleged pollution
7 April	Rivulet Terre Rouge Bird Sanctuary	Fish mortality
13 May	Poste de Flacq	Alleged Pollution
5 June	St Geran	Fish mortality
8 June	St Geran	Fish mortality
29 June	Sable Noir	Alleged pollution
17 September	Bain Boeuf	Algal bloom
13 October	Roche Bois/RivuletTerre Rouge Bird Sanctuary	Pollution (wastewater discharged by slaughter house of MMA)
10 December	Bain des Negresses	Alleged pollution by Union Ducray sugar factory

2.2.4 Independent Environmental Audit on Wastewater Projects

The monitoring of seawater quality at Pointe Moyenne, Montagne Jacquot and Baie du Tombeau outfalls was on-going. The main objective of the monitoring is to have an impartial assessment of the overall impacts of the wastewater projects on the coastal and marine environment. Results of analyses of water samples were within the norms of the *Regulation for Effluent Discharge into the Ocean as per GN No 45 of 2003 of the Environment Protection Act 2002* as shown in table 2.5.

Table 2.5: Water quality at the three outfalls (2008 – 2010)

Site	Year	Nitrate-Nitrogen (mg/l)	Phosphate (mg/l)	Chemical Oxygen Demand (mg/l)
Pointe Moyenne	2008	<0.1	0.06 - 0.13	0.2 - 0.5
	2009	<0.1	0.02 - 0.08	0.1 - 1.0
	2010	<0.1	0.02 - 0.06	0.1 - 1.3
Montagne Jacquot	2008	<0.1	0.01 - 0.08	<0.1 - 0.6
	2009	<0.1	0.01 - 0.08	0.1 - 4.6
	2010	<0.1	0.06 - 0.09	0.1 - 0.8
Baie du Tombeau	2008	<0.1	0.01 - 0.08	0.2 - 1.7
	2009	<0.1	0.01 - 0.07	0.1 - 0.5
	2010	<0.1	0.05 - 0.09	<0.1 - 0.5
CWQG limit (Industrial)		**1.0**	**0.10**	**5.0**
Standards for Effluent Discharge into the Ocean		**-**	**-**	**750.0**

A report on the Independent Environment Audit on Wastewater Projects from September 2009 to September 2010 was prepared in collaboration with the Ministry of Environment & Sustainable

Development, Ministry of Renewable Energy and Public Utilities and Ministry of Health and Quality of Life (Environmental Health Engineering Unit). Water quality for physico-chemical parameters generally complied with the *CWQG* and *Regulation for Effluent Discharge into the Ocean.*

2.2.5 Monitoring of mercury level

The level of mercury in estuaries was monitored at eight sites namely, Rivière Lataniers, Grand River North West, Tamarin, Baie du Cap, l'Escalier, Mahebourg, Grand River South East and Pointe Roches Noires. Results of analyses indicated that levels of mercury in the water samples were below the detection limit.

Note: Detection limit for mercury – 0.03 µg/l

2.3 Accreditation of laboratory to ISO 17025

The Term of Reference for the recruitment of a Project Coordinator to start the accreditation process under the capacity building programme of the M/Finance has been finalised.

Under the EU-ACP, Strengthening Fishery Products (SFP) programme, a number of equipment were donated by the EU to the Chemistry and Fish Toxicity laboratories in order to undertake the testing of marine water, fish and fishery products for export to the EU market.

2.4 Lagoon Water Quality Index (LWQI)

The overall purpose of the wastewater projects in Mauritius is to prevent further degradation of the marine and coastal environment and in so doing, to improve the health and sanitary conditions of the population. Further to the study carried out through the Independent Environment Audit on Wastewater Project, it was proposed that a Water Quality index (WQI) for lagoons in Mauritius would be an appropriate environmental performance indicator to assess the effectiveness of the implementation of the National Sewerage Project in Mauritius. In this context, the Ministry of Environment and Sustainable Development (MoE & SD), with the assistance of the European Union (EU), hired the services of two consultants: namely a Marine Specialist and an IT/GIS expert, with a view to implement a LWQI for public beaches around Mauritius.

The objective of an index is to turn complex lagoon water quality data into information that is understandable and useable by the public. A lagoon water quality index evaluates and provides a snapshot of the water quality. It works by summarising vast amounts of scientific data (at least one year's data) into

a simple and clear way. The results of the LWQI is in the form of a grading system, ranking the beaches as "Excellent", "Good", "Sufficient", "Poor", and "Bad" as shown in the table 2.6.

Table 2.6: Ranking obtained from LWQI Calculator

LWQI ranking	Class
Excellent	1
Good	2
Sufficient	3
Poor	4
Bad	5

For the purpose of the LWQI, each beach is categorised on its use, i.e., agricultural, public, urban & industrial, fisheries and natural areas. Depending on the category, each beach is monitored for different quality elements, namely, physico-chemical, biological, bacteriological, heavy metals, and/or pesticides. For the generation of a reliable LWQI, a beach must be monitored frequently for at least 1 year.

The implementation of the LWQI project started in January 2010 under the aegis of the MoE & SD. The AFRC is one of the stakeholder involved in the monitoring of physico-chemical parameters of four public beaches namely; Trou aux Biches, Grand Baie, Pereybere and Mon Choisy. The bacteriological parameters were analysed by the National Environmental Laboratory. All parameters monitored were within the Coastal Water Quality Guideline Limits (GN 620 of 1999). The analytical results for both bacteriological and physico-chemical data were fed into the LWQI calculator which generated the LWQI for each beach. The water quality for each beach was ranked as sufficient for physico-chemical parameters.

2.5 Monitoring of coliform bacteria at public beaches

Monitoring of the levels of total coliform (TC) and faecal coliform (FC) in seawater at selected public beaches was continued on a monthly basis at 10 sites namely, Flic en Flac, Albion, Pointe aux Sables, Trou aux Biches, Mon Choisy, Baie du Tombeau/ Le Goulet, Grand Baie, Blue Bay, Pereybere and Belle Mare. The Blue Bay and Balaclava Marine Parks were sampled once during the year.

Results of water analyses showed that the levels of TC and FC at the selected beaches and the two marine parks were within the *CWQG* limits for primary contact (TC<1000 colonies/100ml and FC<200 colonies/100ml). Table 2.7 shows level of TC and FC at the various sites for the last three years.

Table 2.7: Results of coliform analysis at the monitoring sites

Beach	Station No.	Average colony count per 100ml							
		2007		2008		2009		2010	
		TC	FC	TC	FC	TC	FC	TC	FC
Flic en Flac	1	23	9	39	9	36	10	44	8
	2	36	8	55	15	48	13	55	11
	3	20	3	32	7	69	18	69	15
	4	42	14	71	21	76	20	100	23
	5	62	14	93	23	83	19	101	26
Trou aux Biches	1	33	10	36	7	42	13	139	32
	2	30	11	61	13	51	18	62	16
Mon Choisy	1	35	11	47	12	47	13	89	20
	2	27	7	26	7	44	16	55	15
	3	24	6	27	6	45	13	60	13
	4	32	8	39	10	53	15	51	13
Blue Bay	1	14	3	16	4	26	8	41	7
	2	20	6	27	6	29	8	53	10
	3	34	8	42	10	51	14	60	12
Albion	1	29	9	39	10	39	10	90	18
	2	83	24	172	36	71	36	227	48
Pointe aux Sables	1	763	148	624	117	853	172	805	175
	2	740	146	541	114	675	147	650	135
	3	25	7	101	24	67	20	249	56
	4	384	80	154	42	196	54	221	49
Grand Baie	1	21	5	55	20	45	12	76	22
	2	32	10	70	21	48	14	80	19
	3	14	4	54	14	50	14	115	27
	4	138	37	309	69	234	49	181	36
	5	298	67	332	72	189	38	148	30
Le Goulet	1	21	7	24	6	26	9	69	18
Belle Mare	1	34	8	35	10	75	18	45	15
	2	26	7	58	13	86	22	71	19
	3	21	6	50	12	77	22	65	16
	4	24	6	58	12	57	14	54	14
	5	16	4	65	15	122	32	83	23
Pereybere	1	27	8	26	7	47	13	36	9
	2	43	15	7	7	48	12	45	9
	3	126	29	55	12	60	18	45	9
	4	164	34	63	14	97	24	81	19
Blue Bay Marine Park	1	ND	ND	4	ND	6	2	41	7
	2	ND	ND	ND	ND	ND	ND	53	10
	3	ND	ND	2	ND	8	2	60	12
Balaclava Marine Park	2	ND	ND	16	3	4	ND	6	2
	3	ND	ND	10	3	16	3	12	4
	4	ND	ND	4	1	5	1	3	ND
	6	ND	ND	ND	ND	ND	ND	7	2
Coastal Water Quality Guideline limits (CWQG)		**TC:** 1000 CFU/100ml **FC:** 200 CFU/100ml							

ND: Not Detected

The data collected on the total and faecal coliforms are provided to the Ministry of Environment and NDU and to the Beach Authority for purposes such as, assessment of coastal development projects, public health aspects and issues related to pollution as shown below:

- Committee on Lagoonal Pollution in Port Louis Region (Ministry of Environment and NDU)
- 'Level of Coliform Bacteria at selected Public Beaches' (Beach Authority)

3. AQUACULTURE

Aquaculture activities were geared towards the seed production of the giant freshwater prawn, *Macrobrachium rosenbergii,* and berri rouge, *Oreochromis* sp. of the Malaysian variety. Asexual reproduction on the sea cucumber, *Holothuria leucospilota*, *Holothuria atra* and *Stichopus chloronotus,* was successfully achieved. Induced reproduction of *Holothuria leucospilota* was undertaken on a trial basis. Fingerlings of berri rouge and juveniles of *Macrobrachium rosenbergii* were supplied to fish farmers. Breeding of freshwater ornamental fish namely gold fish *(Carassius auratus),* platy (*Xiphophorus maculatus*) and molly (*Poecilia latipinna*) were also carried out.

3.1 Prawn (camaron) culture

The Albion Fisheries Research Centre (AFRC) has been involved in the production of the freshwater prawn, *Macrobrachium rosenbegii,* juveniles since 2002 to service small farmers. The prawn seed production cycle was undertaken from October to April. Berried females were procured from private farms and were conditioned in the hatchery for spawning. Larval rearing cycles were carried out in water of salinity of 12 ppt and the larvae were fed on brine shrimp nauplii, *Artemia* sp., and "egg cake". The culture period ranged between 25 - 45 days. A total of 108 580 prawn juveniles was produced and was sold to 17 prawn farmers for culture.

3.2 Berri rouge culture

The brood stock of berri rouge was maintained in concrete ponds. The fish were fed on red snapper pellets. Reproduction occurred naturally in the ponds all year round. A total of 29 479 fingerlings was collected out of which 3 779 were distributed free of charge to 87 small-scale farmers and 25 700 were sold to 19 large-scale farmers at Rs. 1.25/unit.

3.3 Training on breeding and seed production of freshwater ornamental fish

Mauritius imports more than one million of ornamental fish per year. With a view to reduce import of ornamental fish the Ministry of Fisheries is promoting their backyard farming.

In this context, a training course was developed in collaboration with the Human Resources Development Council (HRDC). 43 persons were trained on broodstock management, collection of eggs/fry, daily

monitoring of water quality, feeding and rearing of fry. The trainees were provided with fish to start the culture.

AFRC also carries out breeding and seed production of three species of freshwater ornamental fish, sailfin molly (*Poecilia latipinna*), platy (*Xiphophorus maculates)* and goldfish (*Carassius auratus)* to service small farmers. Table 3.1 gives the production of "berri rouge" fingerlings, camaron juveniles and freshwater ornamental fish.

Table 3.1: Production of "berri rouge" fingerlings, camaron juveniles and freshwater ornamental fish

Species	Production (units)
Berri rouge fingerlings	29 479
Camaron juveniles	108 580
Gold fish	295
Platy	110
Molly	115

3.4 Sea cucumber culture

Stock assessments on sea cucumbers in the lagoons of Mauritius and Rodrigues were carried out in 2007 and 2008. These studies have demonstrated that sea cucumbers were sparsely distributed and localized depletion due to overfishing had occurred in several regions. In order to rehabilitate the lagoon AFRC attempted the reproduction of baby sea cucumbers in captivity.

3.4.1 Asexual reproduction

Trials on asexual reproduction on three species of sea cucumber, namely, *Holothuria leucospilota, Bohadschia marmorata* and *Holothuria atra* were carried out. They were cut at about 45% from their anterior side. The cut pieces were stocked in an outdoor tank with a sandy substratum under a flow-through water system. After one month the cut pieces regenerated into sea cucumbers.

3.4.2 Induced spawning of *Holothuria leucospilota*

Twenty one specimens of *Holothuria leucospilota* of average weight and length 250 gm and 17.5 cm respectively were induced to spawn by the drying method followed by a powerful jet of water. As a result

the sea cucumbers showed swaying movements and the males released their sperm. This stimulated the females to release their eggs intermittently. The temperature of the water was maintained at 26 ºC. An estimated number of 100 000 eggs of diameter ranging between 160-200 micron were obtained. The eggs underwent developmental stages and reached the pentactula stage in seventeen days. Metamorphosis of larvae (pentactula) to baby sea cucumbers could not be achieved as all the larvae died. Mortality at the pentactula stage larvae could be due to inappropriate feed as only *Nannochloropsis* sp. was used to feed the larvae. More research work is required on seed production to achieve the baby sea cucumber stage.

In this connection, a project proposal for "Technology transfer for sea cucumber culture" was worked out and submitted for funding under the Africa Adaptation Programme (AAP).

3.5 Aquaculture extension service

The extension service of the Aquaculture Division provides information such as site selection, water quality, pond construction and management, feeding, precautionary measures against diseases and harvesting and handling of produce. Technical advice was provided to ninety two persons on aquaculture. Site visits were undertaken to assist and provide technical assistance to potential fish farmers.

3.6 Commercial aquaculture production

The Ministry encourages aquaculture to cut down on imports of fish, diversifying from capture fisheries and ensuring a constant supply of fresh fish on the local market and promoting exports. The Aquaculture Division carries out regular monitoring of the fish farms to ensure best practices for sustainable aquaculture development.

3.6.1 Ferme Marine de Mahebourg Ltd (FMML)

The Ferme Marine de Mahebourg Ltd is involved in the culture of red drum and sea bass in floating cages in the lagoon. The farm operates in the southeast lagoon of the island and employs 92 people living in the region. A first consignment of sea bass (*Dicentrarchus labrax*) was imported from France for culture purposes. The activities of the farm and growth of sea bass were monitored as per the conditions set by the Ministry.

The production of red drum for the local market was reported to be 188.9 tonnes. A total of 267.7 tonnes (Whole Fish Equivalent) of chilled red drum was exported mainly to France, South Africa, USA, Germany, Spain, Italy, United Kingdom, the Netherlands and Singapore.

3.6.2 Valfarms Ltd.

Valfams Ltd (ex La Ferme fish farm) is involved in freshwater aquaculture producing mainly berri rouge and ornamental fish (platties and guppies). Monthly site visits were carried out to the farm. A production of 45 tons of berri rouge was reported and 5 000 units of ornamental fish were sold to local pet shops.

Table 3.2 gives the aquaculture production in tonnes.

Table 3.2: Aquaculture production

Fish	Quantity (Tonnes)
Berri rouge	62.1
Freshwater prawn	3.0
Marine fish (barachois)*	1.0
Mangrove crab (barachois)*	1.0
Red drum (floating cages)	498.4
Total	565.5
Oyster *	90 000 units

**** =Estimate***

3.6.3 Pilot Project on "Post-Larval Capture and Culture" of Marine Ornamental Fish

More than 95% of mortality takes place within a week during reef settlement of post-larvae (PL) of fish. Thus, capturing a small % of PL before settlement has a negligible impact on future fish stocks.

A pilot project on the "Post Larval Capture and Culture" (PCC) of marine ornamental fish was undertaken by a private promoter. The collection of the post-larvae was done using Eco-friendly Devices; "CAREs" (Collect by Artificial Reef Eco-friendly Devices) that were set in the fore-reef of the Albion lagoon during the evening and hauled early in the morning on the next day. The captured ornamental post larvae were cultured in an inland re-circulating system at Albion for a period of two months. The results were encouraging and 93 fish were exported to France, 40 were sold locally and 112 were displayed in the Ecological Observation Room at AFRC. The promoters intend to undertake the project on a commercial basis at Pointe aux Sables.

4. MARINE CONSERVATION

The Marine Conservation Division is responsible for the management of the eight Marine Protected Areas including the two Marine Parks. The Division is also involved in the review of Environmental Impact Assessment (EIA) reports and Preliminary Environmental Reports (PER), the assessment of coastal and tourism related development projects and participates in post EIA monitoring for coastal development projects.

4.1 Blue Bay Marine Park (BBMP)

4.1.1 Management

The management of the BBMP involved the monitoring, control and surveillance of permissible activities therein. The permissible activities were, amongst others, glass bottom boating, snorkelling, diving, fishing, water skiing, swimming and non-motorised boating. Seven (7) picked up cases of illegal fishing implements were recorded, comprising prohibited fishing gear such as basket traps (3), underwater fishing equipment (2), line and hooks (1) and fishing nets (1). Twelve (12) contraventions were established, which included access to the park without a permit (6) and illegal fishing (6).

4.1.2 Permit fees

During the year a total sum of Rs. 940 000 was collected against the delivery of 427 permits. 83 permits were delivered free of charge as they were issued to registered artisanal fishermen. Details on the charge for each permit, monthly permits issued with revenue collected and new and renewed permits are given in table 4.1.

Table 4.1: Return of permits

Permit	Charge per permit	New Issue	Renewal	No charge*	Total	Amount (Rs)
Boat Vessel (B/V)	Rs. 5000 Yearly/Renewal Rs. 100 weekly No charge for registered fishermen	56	97 Out of the 97 3 (renewed for 2 weeks) & 4 (renewed for 1 week)	53	153	**466 000**
Commercial (COM)	Rs. 5000 Yearly/Renewal	6	44	Nil	50	**250 000**
Line Fishing (L/F)	Rs. 200 Yearly/Renewal No charge for registered fishermen	3	114	17	117	**20 000**
Recreational (REC)	Rs. 1000 Yearly/renewal	3	83	Nil	86	**86 000**
Temporary Interference (T/INT)	Rs 7 000 per month or part thereof	Nil	6	Nil	6	**42 000**
Permanent Interference (INT)	Rs 75 000 one time off and Rs 7 000 yearly for renewal	1	Nil	Nil	1	**75 000**
Basket trap (BTR)	Rs. 1000 Yearly/renewal for non-registered fishermen No charge for registered fishermen	2	12	13	14	**1 000**
TOTAL		**71**	**356**	**83**	**427**	**940 000**

*: No charge for registered fishermen

4.1.3 Steering Committee for the management of the BBMP

The Steering Committee for the management of the BBMP met on three occasions and discussed amongst other issues the maintenance and replacement of demarcation buoys in the park, the proposed upgrading

works for emergency rescue facilities in front of the National Coast Guard by Airport of Mauritius Limited (AML) and the proposed mechanism for the forthcoming introduction of fees for daily permissible activities.

4.1.4 Control on permissible activities

With a view to control increasing permissible activities in the park a decision was taken by the Ministry in November 2010 to limit the number of glass bottom boats operating in the Blue Bay Marine Park to 16. Concurrently, it was also decided that the number of "Pole and Line " permits for fishing from the shore will be reduced by 50 every year, so that, by year 2013, pole and line fishing from the shore will be completely phased out in the Blue Bay Marine Park.

4.1.5 The Blue Bay Marine Park Patrol and Visitors' Centre

The concrete ceiling of the Blue Bay Marine Park Patrol and Visitors' Centre (BBMPPVC) collapsed on 20 February 2010. The representatives of the Ministry of Public Infrastructure, Shipping and Land Transport who carried out a survey of the building recommended immediate vacation of the premises for safety reasons. The office of the Blue Bay Marine Park Patrol & Visitors' Centre was, hence, re-located on 22 February 2010 at the Mahebourg Fisheries Post. Appropriate action was also initiated for the renting of a building to be used as an office in the vicinity of the Blue Bay Marine Park. The public and hotel and boat operators carrying out activities in the Blue Bay Marine Park were informed of the re-location of the office at the Mahebourg Fisheries Post through a Press Communiqué and on the web site of the Ministry.

4.1.6 Coral reef ecosystem monitoring at the BBMP

The monitoring of the five permanent stations was continued. Data on corals, macro-algae, marine invertebrates and fish were collected. Tabular corals were the dominant species in the park (Table 4.2). The dominant fish species belonged to families of Acanthuridae, Labridae, Scaridae, Chaetodontidae and Pomacentridae (Table 4.3).

Table 4.2: Percentage substrate cover in the Blue Bay Marine Park

Life form categories	Station 1		Station 2		Station 3		Station 4		Station 5	
	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010
Acropora branching	5.2	7.6	16.2	12.5	26.4	27.2	<0.1	<0.1	<0.1	<0.1
Acropora digitate	2.0	3.1	2.3	1.5	0.6	0.8	<0.1	<0.1	<0.1	<0.1
Acropora tabular	0.1	0.1	42.6	21.4	3.0	3.5	<0.1	<0.1	<0.1	<0.1
Coral foliose	<0.1	<0.1	19.2	9.3	2.2	2.0	<0.1	<0.1	<0.1	<0.1
Coral massive	0.3	0.6	5.3	7.3	0.9	1.8	<0.1	<0.1	<0.1	<0.1
Coral submassive	0.2	0.5	11	9.7	0.1	0.5	<0.1	<0.1	<0.1	<0.1
Mushroom coral	<0.1	<0.1	0.2	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Coral encrusting	<0.1	0.1	<0.1	<0.1	2.6	2.3	<0.1	<0.1	<0.1	<0.1
Total live coral cover	**7.8**	**12**	**96.8**	**61.9**	**35.8**	**38.1**	**<0.1**	**<0.1**	**<0.1**	**<0.1**
Sand	13.5	14.0	0.9	1.9	3.5	3.2	97.3	96.8	22.5	20.1
Rock	27.0	25.5	<0.1	<0.1	5.2	5.3	2.7	2.5	38.0	37.4
Rubble	29.9	29.5	<0.1	<0.1	2.1	3.0	<0.1	<0.1	12.5	10.9
Dead coral	18.5	18.2	2.1	35..8	34.0	31.2	<0.1	<0.1	<0.1	<0.1
Macroalgae	2.9	3.2	<0.1	<0.1	9.8	9.4	<0.1	<0.1	27.0	25.9
Coralline algae	0.2	0.3	0.2	0.4	9.6	8.9	<0.1	<0.1	<0.1	<0.1
Sea grass	0.2	0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Zoanthid	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

Table 4.3: Number of fish/100 m^2 in the Blue Bay Marine Park

Family	Station 1	Station 2	Station 3	Station 4	Station 5
Fast fish					
Acanthuridae	39	58	16	n.o	18
Aulostomidae	n.o	n.o	4	n.o	n.o
Balistidae	n.o	n.o	n.o	n.o	n.o
Blenniidae	n.o	n.o	n.o	n.o	n.o
Chaetodontidae	15	10	19	n.o	19
Gobidae	n.o	n.o	n.o	n.o	n.o
Labridae	52	15	34	n.o	21
Lethrinidae	n.o	n.o	20	n.o	n.o
Monacanthidae	n.o	n.o	n.o	n.o	n.o
Mugilidae	8	28	n.o	n.o	10
Mullidae	n.o	n.o	n.o	n.o	n.o
Scaridae	42	42	37	n.o	13
Serranidae	n.o	n.o	n.o	n.o	n.o
Siganidae	n.o	n.o	32	n.o	15
Sparidae	n.o	n.o	n.o	n.o	18
Zanclidae	n.o	n.o	16	n.o	n.o
Total	**156**	**153**	**178**	**-**	**114**
Sedentary fish					
Plotosidae	n.o	n.o	n.o.	29	n.o.
Pomacentridae	35	62	201	n.o.	63
Total	**191**	**153**	**379**	**29**	**177**

n.o: not observed

4.2 Balaclava Marine Park (BMP)

4.2.1 Management

Information on the MPA Regulations and the conservation of the marine ecosystems were disseminated to registered and amateur fishers, pleasure craft and private boat owners and skippers, the public and tourists by the enforcement staff posted at the BMP.

One Hundred (100) boats of all categories operated in the park. Seven (7) boathouses were engaged in recreational activities using glass-bottom boats (7), parasails (2), pedalos (28), kayaks (55), lasers (21), hobbie cats (9), windsurfs (32) snorkelling (146 sets), sport/big game fishing (7), speedboats (18) and security/rescue boats (7).

Fishing activities observed within the park area were mainly with pole and lines and basket traps.

4.2.2 Construction of the BMP Centre (BMPC)

A new portion of land bordering the lagoon of the BMP at Pointe aux Piments was vested in this Ministry, in May 2010, for the construction of the Balaclava Marine Park Centre. The Ministry of Housing and Lands (M/HL) was to draw a new lease agreement between M/HL and the hotel promoter who was to fund the construction of the Marine Park Centre.

4.2.3 Demarcation of the BMP

Twenty (20) buoys to demarcate the conservation and mooring zones of the BMP were manufactured through funding under the Indian Ocean Commission (IOC) Project "Network of Marine Protected Areas of the IOC Countries – (NMPA-IOC)". However, the implementation of the demarcation of the conservation zone at 100m off the reef, through the installation of the buoys, was kept on hold as fishermen of the region of Balaclava were of the view that their fishing activities would be affected as a result of the zoning of the area.

4.2.4 Biological Inventory of the BMP

The final report of the inventory of the BMP carried out by the French/Reunion Consultancy firm PARETO-ARVAM in collaboration with officers of AFRC in 2009 and funded under the NMPA-IOC Project was submitted to the Ministry. A one-day Workshop was organised on 17 November 2010 at the Albion Fisheries Research Centre to present the findings of the inventory. Results showed that over the 17 stations surveyed 275 species of fish, 118 species of hard corals and 219 species of molluscs had been identified.

4.2.5 Coral reef ecosystem monitoring at the BMP

Long-term monitoring was carried out at all the seven (7) established stations of the BMP. The LIT (Line Intercept Transect) methodology was used to collect data on fish and on the sea-bottom substrate in terms of coral cover, macro-algae, marine invertebrates. The coral reef ecosystem at most of the stations were in a fair state of health except for station 6 (located in the narrow lagoon facing the Fish Landing Station) which showed significant signs of coral degradation, most probably due to anthropogenic activities (anchoring, poling and trampling) by the lagoon users. Details of results in terms of percentage of substrate cover are given in table 4.4.

Table 4.4: Percentage of substrate cover in the Balaclava Marine Park

	Station 1		Station 2		Station 3		Station 4		Station 5		Station 6		Station 7	
Lifeform categories	**2009**	**2010**	**2009**	**2010**	**2009**	**2010**	**2009**	**2010**	**2009**	**2010**	**2009**	**2010**	**2009**	**2010**
Acropora branching	29.0	28.2	0.3	2.0	19.5	18.2	50.0	48.0	<0.1	<0.1	1.5	1.7	3.2	0.0
Acropora digitate	3.5	3.1	15.5	18.3	4.0	3.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.0
Acropora tabular	3.9	4.2	0.2	0.0	1.7	1.3	5.2	5.3	<0.1	<0.1	<0.1	<0.1	<0.1	0.0
Coral encrusting	4.2	4.0	6.8	0.0	3.6	3.3	0.2	0.1	3.5	3.2	<0.1	<0.1	8.3	11.7
Coral foliose	1.1	2.0	0.3	0.2	0.6	1.2	8.3	7.0	<0.1	<0.1	<0.1	<0.1	<0.1	0.0
Coral massive	5.2	6.8	22.0	17.2	12.8	11.2	0.1	<0.1	24.5	27.3	<0.1	<0.1	16.8	11.1
Coral submassive	1.1	2.3	14.6	11.6	3.2	3.3	2.5	1.0	1.8	2.1	4.0	5.5	<0.1	1.3
Mushroom Coral (solitary coral)	1.5	1.2	0.5	0.0	1.1	1.0	1.4	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.0
Millepora (fire coral)	<0.1	<0.1	<0.1	0.0	0.7	<0.1	1.2	2.2	<0.1	<0.1	<0.1	<0.1	<0.1	0.0
Soft coral	<0.1	<0.1	<0.1	0.0	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.8
Total live coral cover	**49.5**	**51.8**	**60.1**	**49.3**	**47.2**	**42.7**	**68.9**	**63.6**	**29.8**	**32.6**	**5.5**	**7.2**	**28.3**	**24.9**
Rubble	2.2	2.6	5.3	4.4	6.4	5.9	0.7	0.5	6.5	6.8	9.5	10.2	14.5	1.4
Rock	5.3	4.2	9.8	6.9	8.5	7.6	<0.1	<0.1	19.0	17.7	<0.1	<0.1	47.8	67.9
Sand	3.6	3.5	5.2	6.1	5.5	5.0	<0.1	<0.1	8.3	7.4	<0.1	<0.1	2.3	2.1
Turf algae	1.1	1.3	0.8	12.5	0.1	<0.1	7.3	7.2	<0.1	<0.1	<0.1	<0.1	<0.1	0.0
Macroalgae	1.2	1.2	3.3	2.0	3.6	3.3	0.2	0.1	32.5	30.0	<0.1	<0.1	5.5	2.6
Coralline algae	4.7	4.2	<0.1	0.5	3.3	3.5	5.9	6.2	4.0	5.5	<0.1	<0.1	1.8	0.0
Dead coral	32.3	31.2	16.0	18.3	26.0	32.0	17.0	22.4	<0.1	<0.1	85.0	82.6	<0.1	1.0

nm: Not monitored

The fish counts show that the families Acanthuridae, and Pomacentridae were more abundant as compared to the families Labridae, Chaetodontidae and Scaridae. The fish count per family at the different stations is presented in table 4.5.

Table 4.5: Number of fish/100m^2 in the Balaclava Marine Park

Family **Fast fish**	Station 1	Station 2	Station 3	Station 4	Station 5	Station 6	Station 7
Acanthuridae	402	32	40	162	101	209	79
Chaetodontidae	18	49	31	18	5	17	81
Labridae	29	27	20	58	40	91	59
Scaridae	37	34	21	42	26	21	35
Serranidae	20	19	34	10	18	81	24
Siganidae	36	10	14	17	10	78	30
Total	**542**	**171**	**160**	**307**	**200**	**497**	**308**
Sedentary fish							
Holocentridae	n.o	n.o	n.o	n.o	n.o	n.o	n.o
Pomacentridae	290	301	62	347	28	91	32
Pomacanthidae	n.o	n.o	28	n.o	n.o	n.o	n.o
Haemilidae	n.o	n.o	n.o	n.o	n.o	n.o	n.o
Fistulariidae	n.o	18	n.o	n.o	n.o	n.o	n.o
Zanclidae	n.o	n.o	n.o	n.o	n.o	n.o	n.o
Total	**290**	**319**	**90**	**347**	**28**	**91**	**32**

n.o: not observed

4.3 Permits/Clearances

4.3.1 Interference Permits within MPAs

Twelve (12) temporary interference permits were issued against payment of Rs 84 000 as overall fees for firework displays in MPAs in the lagoon around the island, while one permanent interference permit was issued for a swimming zone at the Black River Fishing Reserve against payment of a sum of Rs 75, 000.

4.4 Environmental Impact Assessment (EIA) Reports Assessed

Forty-one (41) new EIA applications were assessed and recommendations were made to the Ministry of Environment and National Development Unit (Appendix 8).

4.5 Underwater surveys in connection with coastal development projects

Eighteen (18) underwater ecological surveys were carried out in the lagoon at various sites around Mauritius in connection with coastal development projects (Appendix 9).

4.6 Monitoring of ex-sand mining sites

Monitoring of the marine ecosystem was carried out at two ex-sand mining sites, namely at Mahebourg and Grand River South East where it was generally observed that there was a constant process of natural recuperation with thriving live coral colonies, sea grass beds harbouring marine invertebrates and diverse fish species.

4.7 Sea Cucumber Survey

Surveys for assessing the abundance and distribution of sea cucumbers were carried out at 6 sites in the lagoon around Mauritius (Albion, Le Bouchon, Baie du Tombeau, Post Lafayette, Grand Sable, Palmar). Data obtained from the surveys were submitted to the Marine Science Division for a consolidated report.

4.8 Partnerships for Marine Protected Areas (MPAs) in Mauritius and Rodrigues

The co-funded UNDP/GEF/GOM Project "Partnerships for Marine Protected Areas in Mauritius and Rodrigues", which started in 2005, with the aim of improving the management and conservation practices for Marine Protected Areas (MPAs) within the Republic of Mauritius including Rodrigues including the equitable sharing of benefits to the local communities and economic operators on a sustainable basis, was in its sixth year of implementation.

In November, processes for the following were finalised:-

(a) recruitment of a Management Planner to develop a Management Plan for the South East Marine Protected Area (SEMPA) of Rodrigues and review and update the Management Plans of the Blue Bay and Balaclava Marine Park;

(b) constitution of working groups for the development and review of the management plans; and

(c) conduct of a gap review of the policy and legal framework in terms of participatory practices and best practices for MPAs within the Republic of Mauritius.

4.9 Marine Protected Areas Network of the Indian Ocean Commission Countries (MPA-IOC)

The fifth and last steering committee for the project "Marine Protected Areas Network of the Indian Ocean Commission Countries" was held on 23 and 24 June 2010 at Antananarivo.

5. FISHERIES TRAINING, DEVELOPMENT AND EXTENSION

5.1 Training

5.1.1 Training of fishermen

Thirty two fishermen including 7 from Rodrigues followed the "Training Course for Skippers of Fishing Boats less than 24 metres". The training course was organised with the collaboration of the Overseas Fishery Cooperation Foundation of Japan.

A total of 519 fishermen benefited from the various training courses from 2004 to 2010. A summary of the training courses is given in Table 5.1.

Table 5.1: Summary of training courses and number of fishermen trained from 2004 to 2010

Training course	Year	No. trained
FAD Fishery	2004-2006	68
General Course for Fisher	2004-2006	173
FAD fishery	2007	152
General Course for Fisher	2008-2009	94
Training of Skippers for Fishing boats less than 12m	2010	32
Total		**519**

5.1.2 Training in Fish handling, preservation and marketing for fishmongers

The "Fish Handling, Preservation and Marketing Training Course for Fishmongers" was carried out for another 10 batches. 308 fishmongers followed the training course making a total of 577 who benefited from the training course since the start of the training programme.

5.2 Fish Aggregating Devices (FADs) Fishery

5.2.1 FAD deployment and maintenance

Sixty-seven sea trips were effected by the two research boats, "Sphyrna II" and "Maustral", for training of fishermen, fishing trials, the tagging experiment and deployment, verification and maintenance of FADs. Details of sea trips carried out are given in table 5.2.

Table 5.2: Details of sea trips

Activity	Number of sea trips
Training at sea (OFCF)	14
Longline fishing trial (NORAD)	4
Tagging Experiment (SWIOFP)	15
FAD Development	34
Total	**67**

Thirty-four sea trips were carried out for the deployment and maintenance of FADs. Nine FADs were replaced and 25 maintenance sea trips effected. An average of twenty FADs was kept active around the island. Table 5.3 gives the particulars of the FADs around the island and figure 5.1 illustrate their locations.

Table 5.3: Location of FADs

Name	Mooring depth (m)	Distance from coast (nm)	Latitude°S	Longitude°E
Pointe aux Sables	300	1.2	20° 09' 562	57° 25' 086
Albion	1 370	2.5	20° 09' 412	57° 23' 251
Port Louis I	3 560	12.2	20° 02' 117	57° 16' 116
Baie du Tombeau	1 050	2.6	20° 04' 413	57° 27' 890
Trou aux Biches I	2 020	4.6	19° 59' 670	57° 27' 950
Trou aux Biches II	2 686	6.7	20° 01' 330	57° 24' 487
Poudre d'Or II	240	4.2	20° 02' 275	57° 46' 075
Trou d'Eau Douce	992	2.8	20° 13' 884	57° 51' 561
Grand Carreau	260	8.2	20° 21' 622	57° 55' 339
Souillac	1 001	2.1	20° 33' 676	57° 31' 058
Rivière Noire I	914	4.5	20° 23' 596	57° 16' 771
Rivière Noire II	490	2.2	20° 21' 69	57° 19' 780
Rivière Noire III	3 090	9.0	20° 17' 849	57° 12' 118
Tamarin	445	2.2	20° 19' 445	57° 19' 483
Flic en Flac	1 200	2.5	20° 15' 99	57° 19' 39
Medine	2 510	5.2	20° 12' 765	57° 17' 627
La Preneuse	2 500	5.2	20° 17' 724	57° 16' 098
Grand River North West (GRNW)	3 050	7.7	20° 07' 592	57° 17' 447
Mon Choisy	600	1.7	20° 01' 422	57° 30' 348
Maritime	410	1.43	20° 04' 210	57° 29' 218

Figure 5.1: FADs around Mauritius

5.2.2 FAD fishery monitoring

Daily catch and related information on the FAD fishery, under the sample based data collection programme, were collected at the fish landing stations. Sustainable Resource Management Ltd carried out a comprehensive training on the use of SPSS software for the processing and analysis of catch data on the FAD Fishery. The workshop started on the 11th October and ended on the 3rd November 2010. Training was dispensed to a total of 11 officers - 8 from FiTEC and 3 from AFRC. Data for year 2009 were validated for quality, completeness and coverage. The techniques for graph production, computation, editing and formatting using the SPSS software were demonstrated. FAD catch statistics for year 2009 are given in table 5.4.

Table 5.4: FAD catch statistics for year 2009

Month	Monthly catch (kg)	Monthly effort (number of fishers)	CPFD (kg)
Jan	39 823	1 210	32.9
Feb	17 383	447	38.9
Mar	58 217	1 413	41.2
Apr	7 755	395	19.6
May	17 554	904	19.4
Jun	13 592	772	17.5
Jul	5 094	333	15.3
Aug	9 329	610	15.2
Sep	8 395	632	13.2
Oct	19 536	378	51.6
Nov	55 179	1 600	34.4
Dec	67 010	1 403	47.7
Total	**318 867**	**10 097**	**31.5**

5.2.3 IFAD/MARS programme under the Rural Diversification Programme

Two IFAD/MARS supervision missions were held in June and September 2010 to review progress achieved in the FAD fishery.

5.2.4 Fish Tagging Experiment under SWIOFP (Component 4)

A tagging experiment on pelagic fish species that aggregate around FADs in Mauritius was carried out in year 2 of project implementation. The aims of the study were to study the migration patterns and residence time of tunas and other pelagic fish around FADs. The experiment required placing of listening stations under several FADs and tagging of pelagic fish aggregating around these FADs. The fish tagging experiment, undertaken by FITEC under SWIOFP and assisted by officers of the AFRC, was held from 27 September to 8 October 2010. In September 2010, ten FADs on the western coast of Mauritius were each equipped with one receiver (VR2W) to record the presence of any tagged fish within a radius of approximately 300 m. From 1-8 October 2010, 56 fishes were tagged, including skipjack tuna, yellowfin tuna, big eye tuna, wahoo and dolphin fish. A first retrieval of data was carried in November 2010; the data from the receivers were uploaded and sent to the Institut de Recherche pour le Développement (IRD), based in Seychelles, for analysis. Retrieval of data was carried out on a monthly basis.

5.2.5 Test fishing for big-eye tuna under NORAD

Under the NORAD Project (Norwegian Organisation for Research and Development) assistance scheme trial fishing were carried out to capture big-eye tuna using instrumented vertical and horizontal long lines. A report of the Test Fishing from the Norwegian Fisheries Expert is being awaited.

6. FISHERIES MANAGEMENT

6.1 Licensing of fishing vessels

6.1.1 Licences issued to foreign vessels under fishing agreements

Eight purse seine and fourteen longline fishing licences were issued to Seychelles-flagged fishing vessels under the Fishing Agreement with Seychelles. An extension of a licence was also granted to a longline fishing vessel. Three longline fishing licences were issued to Japan-flagged vessels under the Fishing Agreement between Mauritius and the Federation of Japan Tuna Fishing Cooperative Associations. Table 6.1 shows the number of licences issued under Fishing Agreement (by gear type).

Table 6.1: Licences issued to foreign fishing vessels under fishing agreements

Fishing agreement	Purse seine licences	Longline licences
Seychelles	8	14
FJTFCA	-	3

6.1.2 Other licences

144 longline licences were issued to vessels of various nationalities. In addition 104 extensions of licences were also granted to longline fishing vessels. 55 purse seine licences were issued to 26 European vessels and 5 bank-fishing licences were issued to 2 Mauritian-owned, foreign-flagged fishing vessels. Table 6.2 shows the number of licences issued by category and nationality.

Table 6.2: Licences issued to foreign fishing vessels not falling under fishing agreement

Nationality	Longline	Purse seine	Banks fishing
Belize	7	-	-
China	2	-	-
Indonesia	8	-	-
Korea	3		
Malaysia	11	-	-
Oman	5	-	-
Taiwan (Province of China)	108	-	-
France	-	27	-
Mayotte	-	8	-
Spain	-	20	-
Madagascar	-	-	1
Comoros	-	-	4
Total	**144**	**55**	**5**

6.1.3 Licence fees from foreign fishing vessels

Licence fees obtained from foreign fishing vessels amounted to US$ 1 684 000 (Rs. 48.8 million assuming the exchange rate for one US$ was an average of Rs. 29.00) and MUR 25 000.

6.1.4 Licensing of Mauritian fishing vessels

23 Mauritian boats/vessels were engaged in the semi-industrial fishery. These boats/vessels targeted mainly shallow-water demersal species on the Albatros and Nazareth banks. A few were also engaged in the deep-water demersal fishery on the slopes of the St Brandon bank and one boat was active in the shrimp fishery. Five vessels were active in the industrial banks fishing sector and operated on the Saya de Malha and Nazareth banks.

6.2 Port State Control

6.2.1 Monitoring of local fishing boats/vessels

140 clearances were issued to fishing boats/vessels involved in the demersal semi-industrial chilled/frozen fish fisheries, 22 to swordfish fishing vessels, 17 to boats involved in the deep water shrimp fishery, 48 to carrier vessels from St Brandon and 15 to banks fishing vessels**.**

6.2.2 Monitoring of foreign fishing vessels

600 foreign fishing vessels called at Port Louis for different activities. The majority of the vessels were tuna longliners coming from Asian countries for transshipment. The other activities included loading/unloading of fish and fish products, transshipment, bunkering, change of crew, provisions, repairs and other ancillary activities. The different types and nationalities are shown in tables 6.3 and 6.4.

Table 6.3: Details of calls of foreign fishing vessels

Type of vessel	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Reefers	4	4	5	4	7	6	8	7	7	5	5	3	**65**
Squid vessels	6	0	0	0	0	0	0	0	0	0	0	1	**7**
Trawlers	0	1	1	1	2	5	2	2	0	2	2	1	**19**
Purse seiners	0	2	1	1	3	2	1	1	1	4	2	2	**20**
Tuna longliners	49	65	41	8	18	15	16	35	104	20	40	58	**469**
Longliners for Patagonian toothfish	1	1	2	0	2	3	2	2	2	1	0	2	**18**
Basket Trap	0	1	0	0	0	0	0	1	0	0	0	0	**2**
Total	**60**	**74**	**50**	**14**	**32**	**31**	**29**	**48**	**114**	**32**	**49**	**67**	**600**

Table 6.4: Details of fishing vessels calling at Port Louis

Type of vessel	Flag country	Number of calls
Reefer	Taiwan (Province of China)	13
	Malaysia	12
	Netherland Antilles	10
	Panama	8
	Mauritius	8
	Indonesia	7
	Vanuatu	3
	Thailand	2
	Bahamas	1
	Malta	1
Squids	Taiwan(Province of China)	7
Trawler	Japan	7
	Cooks Islands	5
	Australia	3
	China	4
Purse seiners	France	18
	Seychelles	1
	Spain	1
Tuna longliners	Taiwan (Province of China)	286
	Malaysia	38
	Indonesia	38
	Seychelles	17
	French	15
	Japan	11
	Belize	13
	China	9
	Spain	9
	Korea	6
	Oman	6
	Mauritius	5
	Britain	4
	Korea	4
	Philippines	4
	Portugal	2
	Thailand	2
Longliners for patagonian toothfish	Australia	7
	France	11
Basket Trap	France	2
TOTAL		**600**

6.2.3 Monitoring of patagonian toothfish fishing vessels

A total of fourteen calls of patagonian toothfish fishing vessels were recorded at Port Louis out of which six were under Australian flag. The remaining was of French nationality. They called at Port Louis for different activities such as transhipment, unloading, bunkering, change of crew, provisions, dry docking and repairs. The amount of toothfish unloaded was 1 543 tonnes. The quantity of toothfish transhipped (t) during the past five years is presented in table 6.5.

Table 6.5: Transshipment of patagonian toothfish

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
2006	0	46	0	0	18	0	177	0	0	0	0	0	**241**
2007	0	0	0	0	551	0	213	556	0	0	595	0	**1 914**
2008	0	0	0	0	527	0	218	200	136	0	0	684	**1 764**
2009	0	0	9	0	483	0	152	0	0	197	435	0	**1 276**
2010	0	0	435	0	307	178	0	430	193	0	613	0	**1 543**

6.2.4 Calls and transshipment of deep-sea trawlers

There were 15 calls by trawlers in the port including 10 calls for transshipment. 3 318 tonnes of deep-sea demersal fishes were transshipped. The main species were alfonsino, cardinal, orange roughy, blue nose, spiky dory, smooth dory, butter fish, boar fish, black dory, black barracuda, icefish, trevally, armour head, ribaldo and grouper. The amount of fish transshipped for the past five years is given at table 6.6.

Table 6.6: Transshipment by trawlers (tonnes)

Year	Amount transshipped
2006	3 883
2007	1 826
2008	1 901
2009	3 931
2010	3 318

6.3 Tuna fisheries

6.3.1 Sampling of catch from licensed purse seiners

A total of 3 286 tuna comprising 2 258 skipjack, 752 yellowfin and 276 bigeye were sampled for the collection of length frequency data.

6.3.1.1 Length frequency distribution of skipjack tuna (*Katsuwonus pelamis*)

The length frequency distribution of skipjack tuna is shown in figure 6.1. The length of the fish ranged from 38 to 71cm with the mode at around 49 cm.

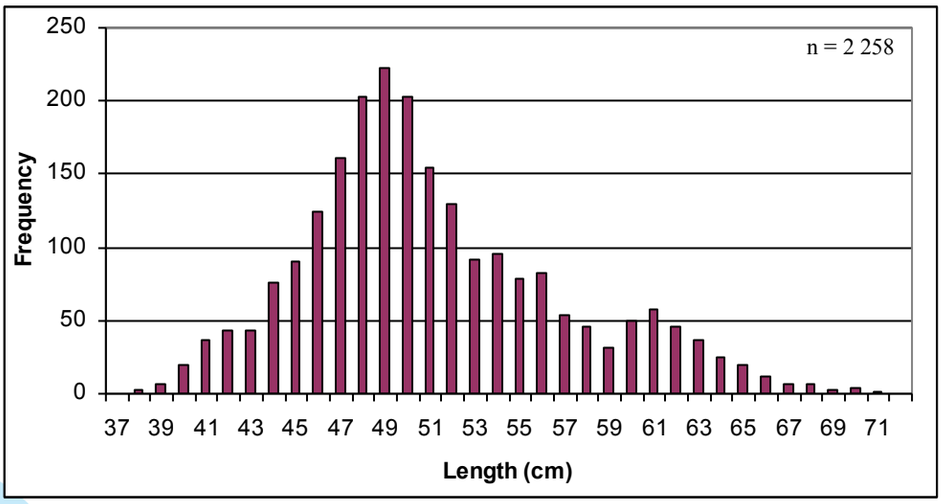


Figure 6.1: Length frequency distribution of skipjack tuna

6.3.1.2 Length frequency distribution of yellowfin tuna (*Thunnus albacares*)

The length frequency distribution of yellowfin tuna is presented in figure 6.2. The length of the yellowfin tuna ranged between 49 and 171 cm. Out of 722 yellowfin tuna sampled, 476 fish were below 104 cm representing fish which had not reached sexual maturity. The majority of the fish were mature and their lengths ranged between 114 cm and 142 cm.

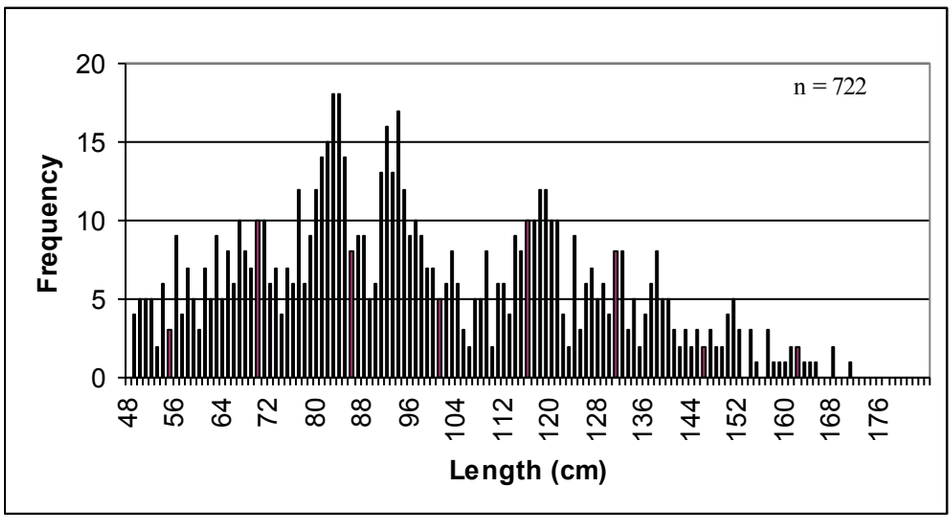


Figure 6.2: Length frequency distribution of yellowfin tuna

6.3.1.3 Length frequency distribution of bigeye tuna (*Thunnus obesus*)

The length of the bigeye tuna varied between 49 and 165cm as shown in fig. 6.3. The samples included 175 juvenile fish measuring less than a metre.

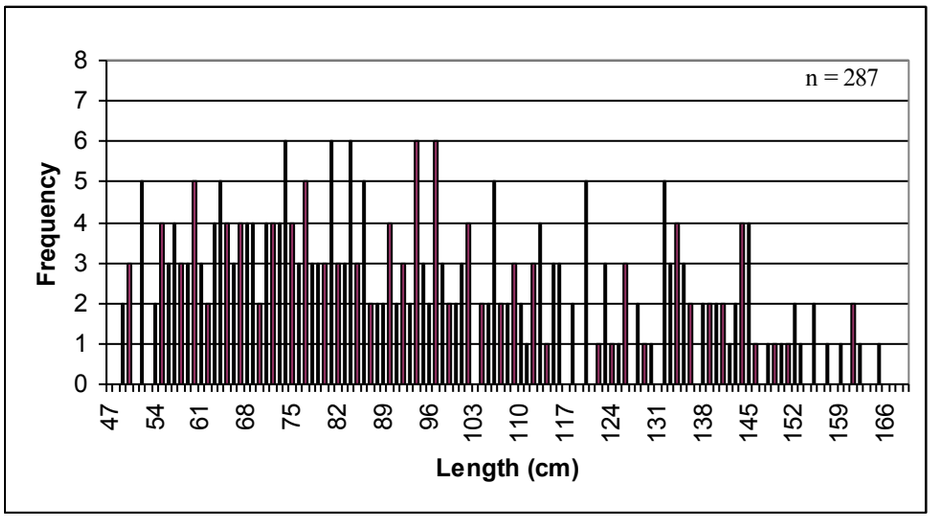


Figure 6.3: Length frequency distribution of bigeye tuna

6.3.1.4 Species composition

The catch was composed of 58% skipjack, 35.6% yellowfin, 5.7% bigeye and 0.7% miscellaneous fish. The species composition of the purse seine catch unloaded in Mauritius for the past five years is presented in table 6.7.

Table 6.7: Species composition of purse seiners catch (%)

Year	Species			
	Skipjack	Yellowfin	Bigeye	Miscellaneous
2006	63	33	3.5	0.5
2007	74	21	4	1
2008	54	38	7	1
2009	56	35	8.5	0.5
2010	58	35.6	5.7	0.7

6.3.2 Monitoring of the catch of licensed longliners

Logbook returns were collected from licensed vessels. These vessels transshipped 5 565.33 tonnes of tuna. The catch included 306 tonnes caught by one Mauritian flagged vessel. A total of 161 logbooks were received. The catch from the Mauritian EEZ based on the returns amounted to 4 187 tonnes of tuna.

6.3.3 Species composition of the catch of licensed longliner

The major part of the catch was composed of albacore tuna (60.2%) which was the target species of most of the Asian longliners. The volume of swordfish landed was low (4.2%) due to a decrease in the number of licensed European surface longliners which target mainly this species calling at Port Louis. The species composition of the catch of the licensed foreign longliners is shown in table 6.8.

Table 6.8: Species composition of the catch of licensed foreign longliners

Species	Scientific name	Catch (t)	%
Albacore	*Thunnus alalunga*	4 533	56.9
Yellowfin	*Thunnus albacares*	963	12.1
Others		1 027	12.9
Bigeye	*Thunnus obesus*	581	7.3
Swordfish	*Xyphias gladius*	262	3.3
Other billfishes		490	6.2
Sharks		107	1.3
	Total	**7 963**	**100**

6.3.4 Sampling of catch of licensed longliners

Length frequency data of the albacore tuna were obtained during samplings carried out on the catch of licensed longliners. A total of 2 201 albacore tuna was sampled. The length frequency distribution is shown in figure 6.4. The length ranged from 68 to 125 cm. 42 % of the catch consisted of fish in the length range of 96 to 103 cm.

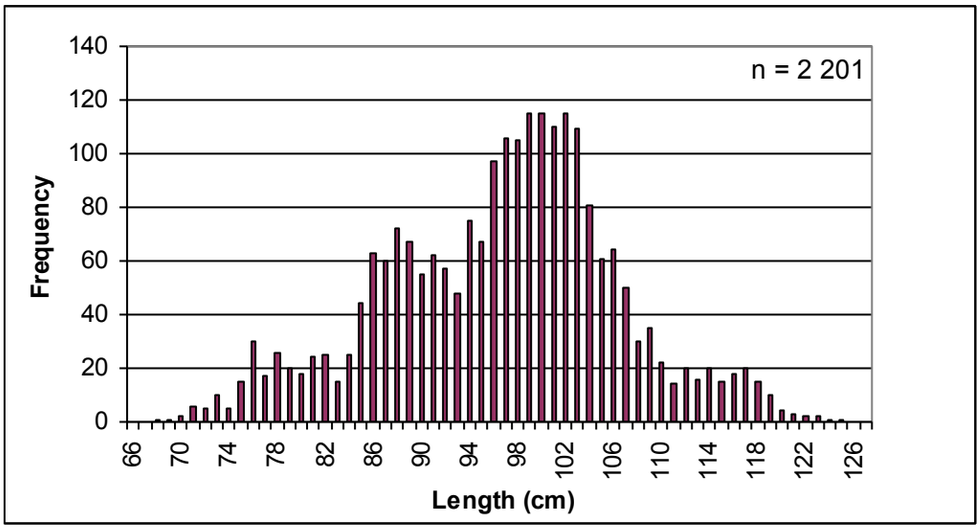


Figure 6.4: Length frequency distribution of albacore tuna

6.3.5 The local longline fishery

One Mauritian longliner, which targets swordfish, undertook 4 trips. The total catch unloaded amounted to 306 tonnes. 53% of the catch was composed of swordfish. The catch per unit effort was 0.96 kg per hook. The fishing area was spread between latitudes 18º S and 34º S and longitudes 44º E and 70º E. The species composition of the landings is shown in figure 6.5.

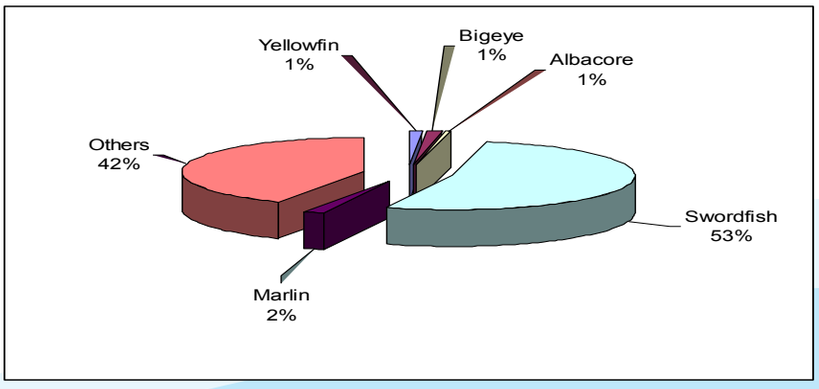


Figure 6.5: Catch composition of Mauritian longliners

6.3.6 Transshipment by tuna longliners and carriers

A total of 46 792 tonnes of tuna and tuna-like species was transhipped at Port Louis by tuna fishing vessels and carriers which effected 454 and 27 calls respectively. The volume of fish included 12 276 tonnes transhipped by carrier vessels and 5 560 tonnes by European purse seiners. The species composition of fish transhipped is shown in table 6.9. Albacore tuna constituted 51% of the total amount of fish transhipped. The species composition of the fish transhipped is shown in table 6.9. The percentage of the three main target species which were transhipped is shown in figure 6.6.

Table 6.9: Species composition of fish transhipped (t)

Year	Albacore	Yellowfin	Bigeye	Skipjack	Swordfish	Bluefin	Marlin	Sailfish	Shark	Misc.	Total
2005	4 947	3 887	1 413	-	3 357	-	318	35	2 473	1 237	**17 667**
2006	20 307	1 995	359	127	1 935	230	243	131	1 890	2 017	**29 234**
2007	12 182	3 281	494	134	2 305	8	67	486	1 881	3 110	**23 948**
2008	11 375	1 479	596	133	3 301	34	142	167	1 728	1 972	**20 927**
2009	21 627	2 003	574	2 363	2 111	11	203	147	1 328	4 721	**35 088**
2010	23 908	5 929	2 173	2 839	1 494	410	380	90	2 432	4 068	**43 723**

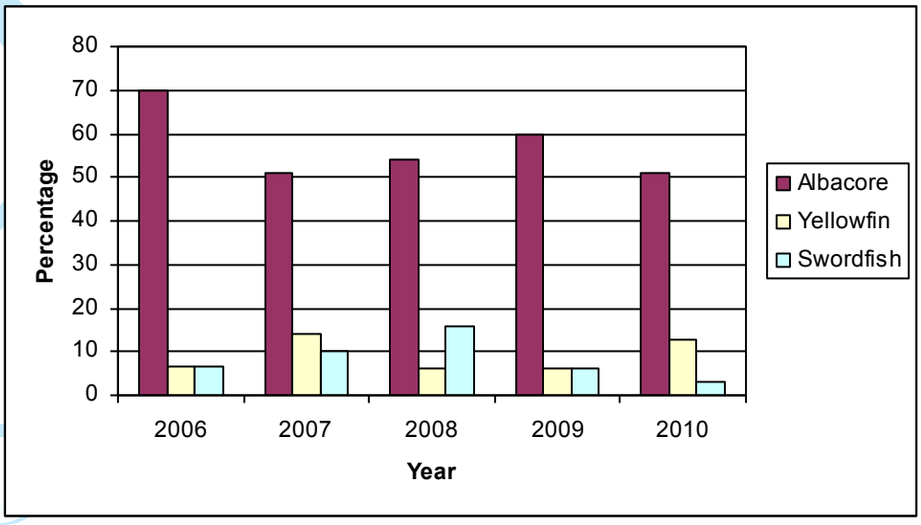


Figure 6.6: Percentage of the three main species transshipped by longliners

6.3.7 Semi-industrial chilled fish fishery

Two fishing vessels effected 19 trips and landed 32 224 kg of chilled fish. Most of the catch was composed of swordfish (52 %). The fishing areas were spread around Mauritius, between latitudes 19^0S and 20^0S and longitudes 57^0E and 20^0E. The catch and species composition are shown in table 6.10 and figure 6.7. No catch was recorded in 2009 as no fishing vessels operated in this fishery.

Table 6.10: Catch composition of the local swordfish fishing vessels (kg)

Year	Swordfish	Yellowfin	Bigeye	Albacore	Marlin	Shark	Sailfish	Misc.	Total
2006	74 157	102 632	15 444	40 840	6 508	1 212	1 590	4 873	**247 256**
2007	45 913	65 924	-	56 416	6 597	1 056	2 156	6 264	**184 326**
2008	8 858	14 076	-	14 570	2 183	67	163	1 462	**41 379**
2010	17 070	7 621	410	4 998	260	-	-	1 925	**32 224**

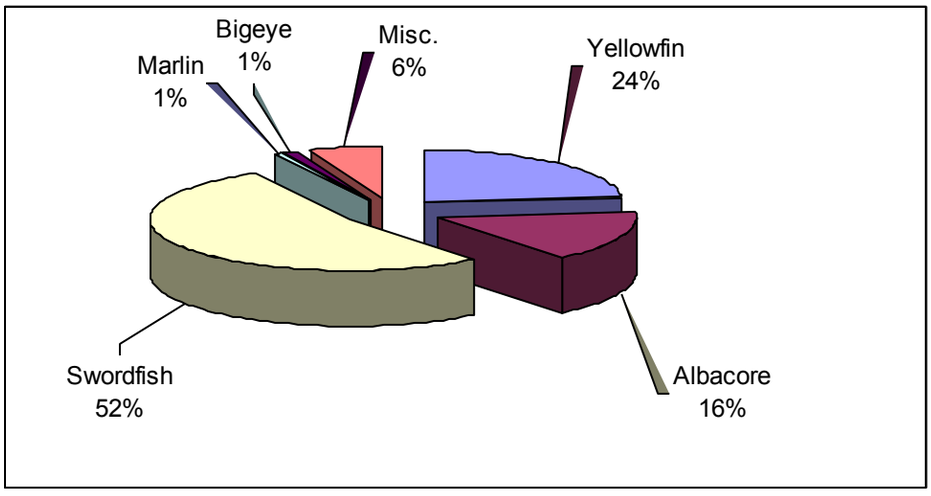


Figure 6.7: Percentage of catch composition of main species

6.4 Vessel Monitoring System

6.4.1 Reporting at FMC

A total of 237 fishing vessels reported to the Fisheries Monitoring Centre (FMC) and comprised 29 local and 208 foreign vessels. The main nationalities of the foreign vessels were Taiwanese (115), Malaysian (18), Seychellois (16) and Indonesian (10). 317 316 data reports were received through Inmarsat transponders. Table 6.11 shows a breakdown of the fishing vessels by nationality and transponder type.

Table 6.11: Vessels reporting to FMC

Vessel	Inmarsat	Argos	Total
Local	**25**	**4**	**29**
Foreign			
Taiwanese	55	60	115
Japanese	0	8	8
Malaysian	15	3	18
Indonesian	4	6	10
Malagasy (non tuna)	1	1	2
Belize	5	1	6
Seychelles	1	15	16
China	3	0	3
Thailand	1	0	1
Kiribati (non tuna)	1	0	1
Comores (non tuna)	2	0	2
Philippines	1	1	2
Oman	0	5	5
Korea	0	3	3
Sub Total	**89**	**103**	**192**
Total	**114**	**107**	**221**
EU **			
French	(3*)		9
Spanish			6
Portuguese			1
Total			**16**
Grand Total			**237**

6.4.2 Logbook verifications

A total of 371 logbooks comprising 204 local and 167 foreign fishing vessels were verified against data reports received by the FMC.

6.4.3 Project ''Plan Régional de Surveillance des Pêches dans le Sud Ouest de l'Océan Indien''

Under the Project 'Plan Régional de Surveillance des Pêches dans le Sud Ouest de L'Océan Indien four joint missions were held in the waters of the Commission de l'Océan Indien (COI) Member States. The FMC was the Mission Coordination Centre (MCC) and provided VMS data to the coordinating team. The patrol vessels "Osiris" (Reunion), "Maya Dugong" (Seychelles) and "Atsantsa" (Madagascar) were used during the missions.

6.5 Import and export of fish and fish products and fish processing

6.5.1 Import of fish and fish products

During the year, 2 088 permits were issued for the import of fish and fish products, including 25 permits for the import of fish samples and fish bait. Proceeds from permits amounted to Rs. 4 187 500. The import of fish and fish products for direct consumption amounted to 11 279 tonnes representing about 12.8% of the total imports for the year. The two main tuna processing plants imported 75 554 tonnes of raw materials. 1178 tonnes of frozen barracouta were imported from New Zealand, Namibia and South Africa for the production of salted snoek while tuna for the processing plants was obtained from French and Spanish vessels mainly transshipping in Seychelles and also from few direct unloading at Port Louis by purse seiners.

6.5.1.1 Imports for direct consumption

Fish and fish products imported for direct consumption have been classified into four categories, namely fish, crustacean, cephalopod and shellfish. Crustaceans consisted of prawn, shrimp, crab and lobster, that of cephalopods consisted of octopus, squid and cuttlefish while Shellfish comprised mussels, oysters, clams and scallop. Details are given in figure 6.8.

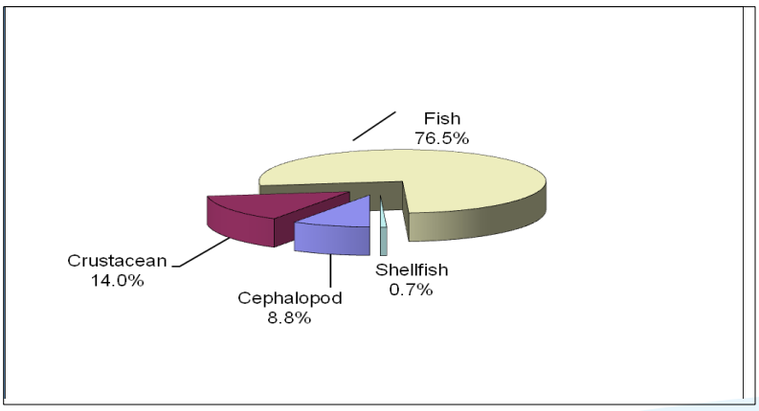


Figure 6.8: Imports per category

Fish and fish products were imported in different forms of preservation, namely, frozen, chilled, canned, dried, smoked and live crustaceans. Frozen and canned products constituted the main imports with 7 514 and 3 311 tonnes, respectively as shown in figure 6.9.

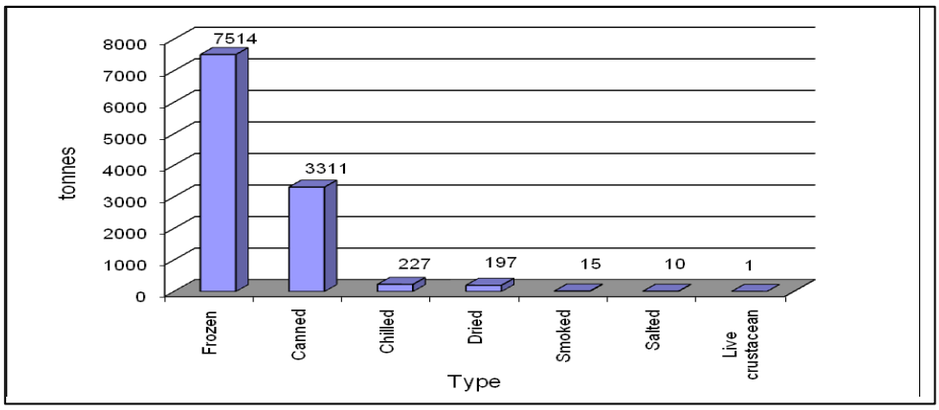


Figure 6.9: Categories of fish and fish products for direct consumption

Imports were mainly from India, China, South Africa, Madagascar, Thailand, Indonesia, Morocco, Chile, Singapore and the high seas / Freeport. Import of canned fish was mainly from Morocco and Chile while frozen fish was from India, South Africa, Madagascar, Thailand, Indonesia and the high seas/Freeport. Dried 'bombay duck' and dried prawn were mainly from India. Details on import of fishery products for consumption by origin are presented in figure 6.10.

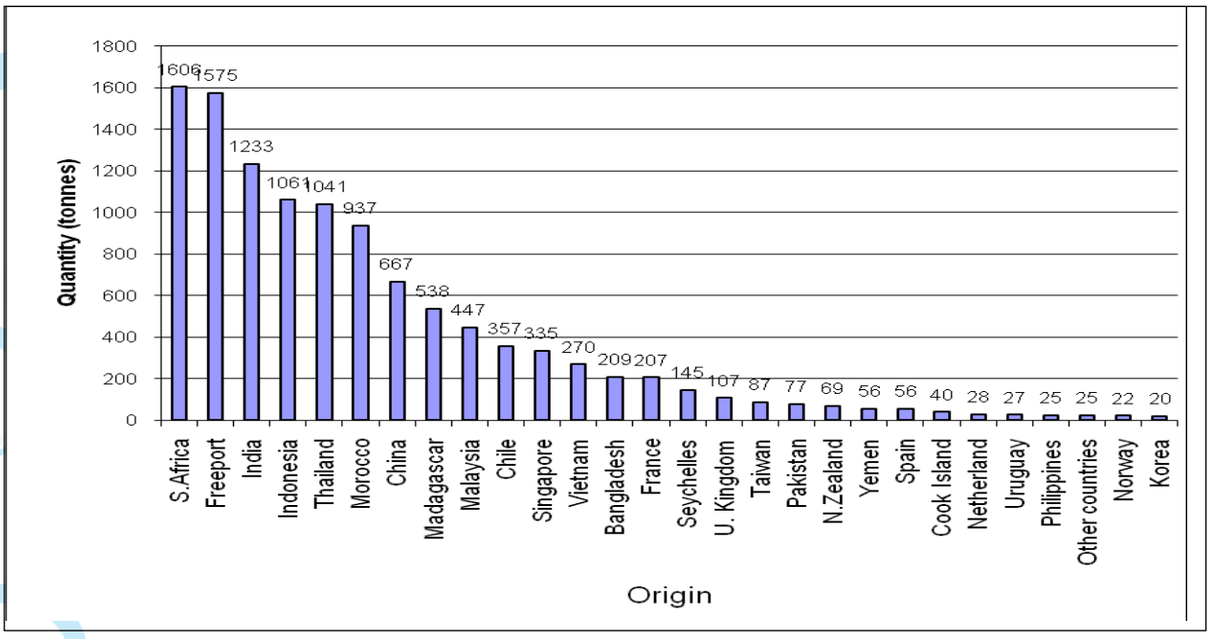


Figure 6.10: Import of fish and fish products by country of origin

6.5.1.2 Chilled fish and fish products

Chilled fish and fish products, amounting to 227 tonnes, were mainly imported from Seychelles, India, United Kingdom and France. A total of 44 tonnes of fish was imported from Seychelles and it comprised mainly 'capitaine', 'sacréchien', 'vacoas' and 'bourgeois'. 'Bourgeois' was imported for sale to hotels only. The imports from France amounted to 48 tonnes and consisted of 16 tonnes of salmon, 1 tonne of cooked shrimp, 948 kg of fish eggs, 23 tonnes of oysters, mussels and 'noix St. Jacques'. The other species were trout, turbot, sardine, 'dorade', 'bar', rollmops (herring), sole, 'encre de seiche', anchovy, 'miettes de crabe', mackerel and 'morue'. Details of the import of chilled fish and fish products as per categories are shown in table 6.12.

Table 6.12: Imports of chilled fish and fish products (tonnes)

Year	Fish	Crustacean	Shellfish	Total
2006	110	22	5	**137**
2007	79	11	8	**98**
2008	123	10	10	**143**
2009	166	8	7	**181**
2010	217	5	5	**227**

6.5.1.3 Frozen fish and fish products

Imported frozen fish and fish products amounted to 7 514 tonnes. These products were imported mainly from India, South Africa, Madagascar, Vietnam, Malaysia, Indonesia, the Freeport and fishing vessels calling at Port-Louis. Details of imports for the past five years are presented in table 6.13.

Table 6.13 : Imports of frozen fish and fish products (tonnes)

Year	Fish	Crustacean	Cephalopod	Shellfish	Total
2006	4 848	1 061	696	49	**6 654**
2007	4 473	1 298	907	42	**6 720**
2008	4 937	1 486	878	44	**7 345**
2009	5 428	1 131	1 008	63	**7 630**
2010	4 961	1 495	985	73	**7 514**

The species composition of frozen fish imported is shown in figure 6.11. Fish commonly imported were 'capitaine', 'parrot fish', moonfish, marlin, 'vieille', sailfish and tuna. By-catch from tuna longliners, purchased by the Agricultural Marketing Board and sold to fishermen cooperatives, amounted to 363

tonnes and comprised tuna, oil fish, sailfish, moonfish, marlin, becune, angelfish, shark and 'dorade'. Other fish included mainly swordfish, 'grenadier', 'goatfish', vacoas, gastero, croaker fish. Fish products mainly in the form of fish fingers, fish cakes and fish balls amounted to around 1 007 tonnes.

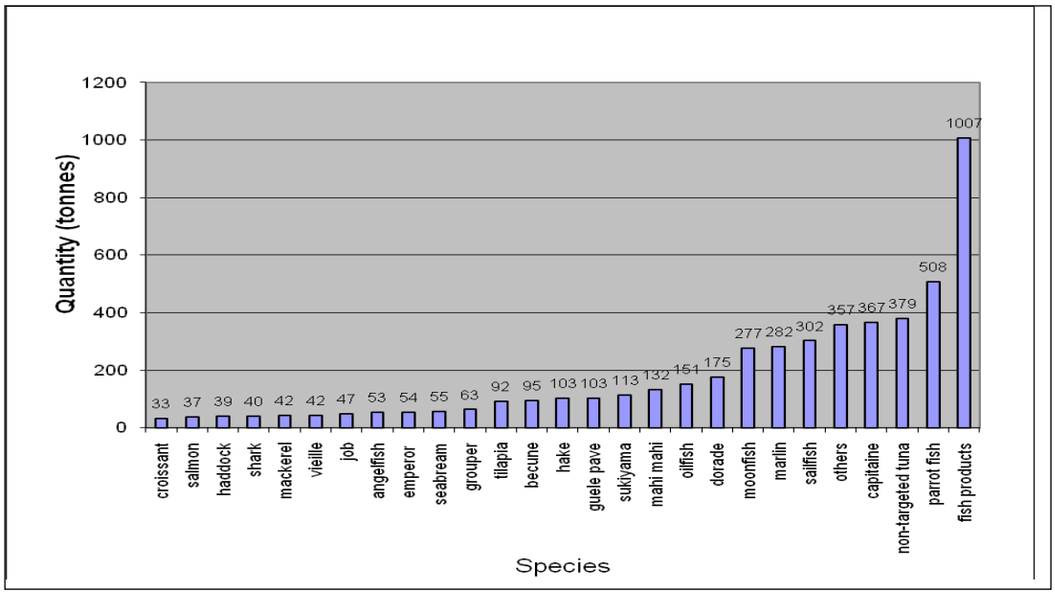


Figure 6.11: Import of frozen fish

6.5.1.4 Dried fish and fish products

Dried fish and fish products were imported mainly from India, Pakistan and Singapore. The total import amounted to 197 tonnes. Details are presented in table 6.14.

Table 6.14: Import of dried fish and fish products (tonnes)

Year	Fish	Bombay duck	Squid, cuttlefish	Prawn	Others	Total
2006	2	175	0	109	0	**286**
2007	2	104	0	93	0	**199**
2008	0	171	0	87	3	**261**
2009	0	106	1	95	1	**203**
2010	0	123	0	72	2	**197**

6.5.1.5 Smoked fish and fish products

Smoked fish and fish products were imported from France, Denmark, South Africa and the United Kingdom for supermarkets, hotels and restaurants. Smoked fish and fish products amounting to 15 tonnes, comprised herring, trout, salmon, haddock, surimi, shrimp and mackerel.

6.5.1.6 Canned fish and fish products

Canned fish and fish products such as sardines, mackerels, anchovy, 'foie de morue', salmon, tuna, crabmeat, prawn and mussels were imported from Morocco, Chile, Peru, South Africa, Thailand, Indonesia, India, Malaysia, China, France and the United Kingdom. With the exception of tuna, these products are not produced locally. The main country for the supply of sardines and mackerel were Morocco, South Africa and Chile respectively. A total of 3 311 tonnes of canned fish and fish products were imported during the year and details are presented in table 6.15.

Table 6.15: Import of canned fish (tonnes)

Year	Sardines	Pilchards	Mackerel	Tuna	Others	Total
2006	900	889	838	230	40	**2 897**
2007	630	967	1 166	171	12	**2 946**
2008	1 015	1 342	641	185	17	**3 200**
2009	726	1 216	1 171	178	23	**3 314**
2010	1 066	995	996	225	29	**3 311**

6.5.1.7 Live crustaceans

990 kg of live crab were imported from Madagascar.

6.5.1.8 Live ornamental fish

A total of 1 008 449 units of live fresh water ornamental fishes were imported from Singapore and Malaysia. Common aquarium fish include gold fish, koi, tetra, guppies, mollies, cichlids, arrowana, fresh water turtles and others.

6.5.1.9 Live fish / fish eggs for culture

200 000 units of sea bass, (*Dicentrarchus labrax*), eggs were imported from France for culture purposes.

6.5.1.10 Fishmeal

518 tonnes of dried fishmeal and 960 tonnes of fish waste were imported from France and the Freeport. These products were used in the manufacture of animal feed.

6.5.1.11 Pet food

236 tonnes of pet food was imported mainly from Thailand for sale on the local market.

6.5.1.12 Seashells

A total of 22 138 units of dried seashells were imported from Philippines.

6.5.2 Export of fish and fish products

6.5.2.1 Export of chilled fish

Two companies exported a total of 19 584 kg of chilled fish to Reunion. The species exported were 'vieille rouge' (*Epinephelus fasciatus*), 'croissant queue blanc' (*Variola albimarginata*), 'vieille maman rouge' (*Cephalopolis sonnerati*), 'vivano' (*Pristipomoides zonatus*) and 'cabot' (*Epinephelus multinotatus*).

6.5.2.2 Export of marine ornamental fish

Three operators exported live ornamental marine fish to USA, Hong Kong, United Kingdom, Germany, Israel, France and Spain. A total of 4 320 units were exported.

6.5.2.3 Re-export of freshwater ornamental fish

9 472 units of live freshwater ornamental fish imported from Singapore were sent to Rodrigues by a company.

6.5.3 Fish processing

6.5.3.1 Canned tuna

The local cannery imported 53, 199 tonnes of raw tuna from European vessels and produced 48 330 tonnes of canned tuna. 37 031 tonnes of canned tuna were exported to European countries and 1 066 tonnes were put on sale on the local market. Export and local sale of the produce for the past five years is presented in table 6.16.

Table 6.16: Export and local sale of canned tuna and pet food (tonnes)

Product / Year	2006		2007		2008		2009		2010	
	Local	Export	Local	Export	Local	Export	Local	Export	Local	Export
Canned tuna	1 278	34 463	1 131	32 575	935	32 977	983	32511	1 066	37 031

6.5.3.2 Tuna loin production

One processing plant, engaged in the production of tuna loins for export, imported 43 596 tonnes of raw frozen tuna. Some 21 580 tonnes were produced and exported to Spain, Italy, France, Greece, Portugal, Belgium, Israel, Denmark, Germany, Netherlands, South Africa, the United Kingdom and USA.

6.5.3.3 Salted fish

Two companies are engaged in the production of salted snoek from frozen barracouta (*Thyrsites atun*). A total of 541tonnes of salted snoek were sold on the local market while 121 tonnes were exported. Details of the import of raw materials, production of snoek and their sale for the past five years are presented in table 6.17.

Table 6.17: Import, production and sale of salted fish (tonnes)

Year	2006	2007	2008	2009	2010
Import of barracouta	962	1 066	956	776	1 126
Production of snoek	644	651	613	645	780
Local sale of snoek	486	491	516	543	541

6.5.3.4 Fish meal production

One company was involved in fishmeal production. The raw materials (tuna offal) were obtained from the fish processing factories. A total of 12 595 tonnes of fishmeal was produced during the year; 6 853 tonnes were sold on the local market and 5 368 tonnes were exported to Australia, S. Africa, Taiwan Indonesia, Reunion Island, Japan, Sri Lanka and Madagascar. The production for the last five years is given in table 6.18.

Table 6.18: Production of fish meal (tonnes)

Year	2006	2007	2008	2009	2010
Production	10 265	10 393	9 198	11 119	12 595

6.5.3.5 Re-export of canned products

Two companies were mainly involved in the import and re-export of canned products namely sardines, pilchards and mackerel. These products were imported from Morocco and Chile and re-exported mainly to Madagascar but to Seychelles and Comoros also. The total re-export for the year amounted to 78 tonnes.

6.6 Fish production, consumption and trade balance

6.6.1 Total fish production

The total annual production by different fisheries is given in the table 6.19.

Table 6.19: Total fish production (tonnes)

Sector	2006	2007	2008	2009	2010
Mauritius	950	640	682	820	831
Rodrigues	1 067	1 067	1 758	1 900	1 900
Agalega	30	30	30	30	30
Sports fishery	650	650	650	650	650
Amateur fishery	300	300	300	300	300
Barachois	4	2	2	0	0
Ponds (prawn & fish)	20	17	62	57	66
Marine aquaculture (cage)	447	550	181	366	498
FAD Fishery	214	164	167	390	330
Sub-total	**3 682**	**3 420**	**3 832**	**4 513**	**4 605**
Shallow water banks	3 112	2 848	2 428	2 685	2 137
Banks deep water snappers	0	0	285	627	452
St Brandon inshore	235	*54	*173	437	421
Semi-industrial chilled fish	311	171	173	459	446
Tuna fishery	1 380	803	475	246	306
Semi-industrial pelagic fish	247	184	41	8	27
Demersal trawlers	1 112	0	0	0	0
Sub-total	**6 397**	**4 060**	**3 402**	**4 462**	**3 789**
Grand Total	**10 079**	**7 480**	**7 234**	**8 975**	**8 394**

*=only chilled and salted

6.6.2 Per capita consumption of fish

The per capita consumption of fish is given in table 6.20.

Table 6.20: Per capita consumption of fish (kg)

Year	Quantity
2006	19.9
2007	18.3
2008	21.5
2009	21.1
2010	21.7

Source: Central Statistics Office

6.6.3 Trade balance in relation to total imports and exports

The import of fish and fish products and trade balance are given in table 6.21.

Table 6.21: Import and export of fish and fish products and trade balance

Year	Import		Export		Balance
	Qty(t)	Value(MR)	Qty(t)	Value(MR)	Value(MR)
2006	150 728	6 720.9	79 580	7 120.4	395.5
2007	129 085	7 068.0	86 170	8 172.8	1 104.8
2008	113 608	8 547.4	66 205	8 015.2	-532.2
2009	139 342	7 108.3	87 938	9 041.2	1 932.9
2010	155 000	7 810	104 740	10 118	2 308

Source: Central Statistics Office; MR* – Million rupees

6.7 Launching of the NPOA-IUU

The Mauritius National Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing, (NPOA-IUU), was launched on 2 September by the Honourable L. J. Von Mally, Minister of Fisheries and Rodrigues, thus consolidating the measures already taken to combat IUU fishing.

The Mauritius NPOA-IUU addresses, among others, the following:

a) All State responsibilities;

b) Flag State responsibilities including registration of vessels fishing boats and vessels, records of fishing boats and vessels and authorization to fish;

c) Coastal States responsibilities;

d) Port State Measures with emphasis on advance notification of vessels, denial of access, cooperation with other States and RFMOs and port inspections;

e) Trade related measures such as catch documentation, transparency of markets and information dissemination;

f) Conformity with measures taken by the Regional Fisheries Management Organisations which include party compliance and non-party compliance;

g) Special requirements of developing States; and

h) Several supporting action to enhance measures taken by Mauritius to combat IUU fishing.

7. FISHERIES PLANNING

7.1 Regional and International Cooperation

7.1.1 Cooperation with Norway

Implementation of the three-year programme under the Norwegian-assisted project for "Combating Illegal Fishing, Marine Resources Management and Strengthening of Quality Control of Fish Products" was continued. The main achievements include the launching of a National Plan of Action to Combat Illegal, Unreported and Unregulated Fishing (NPOA-IUU) and acoustic surveys of the deep-water fish stocks on the northern slopes of the Nazareth Bank on board the "R.V.F. Nansen".

The 3rd and 4th Steering Committee Meetings to monitor project implementation were held in Mauritius in February and September respectively. The Annual Work Plan and Budget designed for 2010 was approved during the 2nd Annual Meeting held through digital videoconference in April.

7.1.2 Cooperation with Greece

Construction of the Fish Auction Market with assistance from the Hellenic Republic began in May 2010 and the completion of the civil works was expected for early-2011. The installation of the cold room facilities will coincide with the completion of the building.

7.1.3 Cooperation with Japan

A new rehabilitation project was prepared for implementation entitled *"The Project of Rehabilitation of Fisheries Facilities for Fisheries Development in Mauritius"* of the Overseas Fishery Cooperation Foundation (OFCF) of Japan. Instructors, fishermen and mechanics in the fishing sector from Mauritius and Rodrigues were trained by OFCF experts and the fishing boat MEXA-1, property of the Fishermen Investment Trust, was rehabilitated through funds from the OFCF. The Japan Tuna Fisheries Cooperatives Association undertook a mission in Mauritius in connection with provision of a semi-industrial boats and upgrading of fish landing stations.

7.1.4 Cooperation with Mozambique

The Hon Louis Joseph Von Mally, Minister of Fisheries and Rodrigues, visited Mozambique in November for the assessment of the MOU on fisheries existing between the two countries. An Aide-memoire was signed for mutual collaboration in fisheries management, aquaculture, artisanal fisheries and port development.

7.2 Fisheries Project Appraisal

Eleven projects for investment in the fisheries sector were assessed for their technical and financial viabilities. One project was turned down due to missing information. Most of the projects involved the purchase of fishing boats to be engaged in the semi-industrial chilled fish fishery, tuna logline fishery, banks fishery and offshore and FADs fisheries. In addition, there was one fish landing site project, a project for the local construction of a fishing boat and others for purchase of equipment and borrowing of working capital for fishing campaigns. Recommendations were made for the issue of Letters of Intent to proceed with the implementation of feasible projects.

7.3 Projects under the Food Security Fund

Two projects financed under the Food Security Fund, namely: the setting up of a cold room/processing plant and training of 100 skippers/mechanics to operate fishing boats of less than 24m in length were started. Moreover, four projects, namely: two for the construction fishing boats and two for borrowing of working capital were financially appraised and submitted for funding to the Food Security Fund Implementation Unit for consideration.

7.4 IFAD/MARS Programme and Cooperation with the Government of Western Australia (GoWA)

The Annual Work Plan and Budget 2010 for the IFAD/MARS Programme to support the pro-poor reform agenda of the government for alleviation of poverty was prepared approved by IFAD in April 2010. A sum of three million rupees had been earmarked for the implementation of the following projects with technical assistance from GoWA :

(i) Development of lagoon and off-lagoon management plans
(ii) Support for conversion of off-lagoon fishing (purchase of FAD materials)

(iii) Assessment of the FAD programme and value chain analysis

7.5 Programme Based Budgeting and Fisheries Sector Strategy Plan 2010-2015

With the setting up of the new Cabinet in June, fisheries was placed under the line Ministry of Fisheries and Rodrigues and a fresh Fisheries Sector Strategy Plan 2010 – 2015 was formulated for the Programme Based Budgeting (PBB). To fulfil its mandate, the Ministry was restructured into three programmes under the PBB namely: Fisheries Policy *(751)*, Fisheries Development and Management *(487)* and Rodrigues Development *(311)*.

8. FISHERIES PROTECTION SERVICE

The main function of the Fisheries Protection Service (FPS) is to protect the marine resources and environment through the enforcement of the fisheries and other related legislations. The FPS also provides support to the AFRC, the FITEC, the Marine Parks and the seafood hub One Stop Shop.

8.1 Artisanal fishermen

As at end of December, 2,256 artisanal fishermen were registered compared to 2 303 in 2009. 5 new fishermen were registered and 52 deregistered. Details of registered fishermen as per gear category are given in table 8.1.

Table 8.1: Details of registered fishermen

Fisheries Post	Net	Basket trap	Line	Basket trap /line/ harpoon	Total
Port Louis	0	1	47	62	**110**
Tombeau Bay	0	11	57	76	**144**
Trou aux Biches	4	0	84	101	**189**
Grand Gaube	28	16	61	185	**290**
Poudre d'Or	0	12	1	131	**144**
Poste la Fayette	16	5	0	72	**93**
Trou d'Eau Douce	18	8	31	62	**119**
G.R.S.E	0	0	6	91	**97**
Bambous Virieux	0	15	18	178	**211**
Mahebourg	30	16	41	246	**333**
Riambel	6	3	4	75	**88**
Baie du Cap	3	7	20	59	**89**
Case Noyale	10	2	5	111	**128**
La Preneuse	18	2	49	76	**145**
Pointe aux Sables	12	2	33	29	**76**
Total	**145**	**100**	**457**	**1 554**	**2 256**

8.2 Registration of boats

59 new fishing boats were registered in the artisanal fishery, bringing the total to 2 476. Details are given in table 8.2.

Table 8.2: Registration of artisanal fishing boats

Fisheries Post	Landing Station	No of Fishermen	AF	Total
Port Louis	G. R. North West	11	15	42
	Port Louis		3	8
	Bain des Dames	99	108	166
	TOTAL	**110**	**126**	**216**
Tombeau Bay	Roches Bois	58	72	135
	Baie du Tombeau	86	106	290
	TOTAL	**144**	**178**	**425**
Trou aux Biches	Pointe aux Piments	17	31	120
	Trou aux Biches	52	66	181
	Pointe aux Cannonier	11	27	80
	Grand Bay	109	98	264
	TOTAL	**189**	**222**	**645**
Grand Gaube	Grand Gaube I	78	70	99
	Grand Gaube II	55	56	69
	Melville	33	45	58
	Missie Pitit	15	17	26
	St Francois	10	12	37
	Cap Malheureux	71	59	79
	Bain des Boeufs	28	41	57
	TOTAL	**290**	**300**	**425**
Poudre D'Or	Poudre d'Or	51	58	94
	Roche Noires	37	36	94
	Pointe des Lascars	36	51	94
	Bain de Rosnay	20	28	84
	TOTAL	**144**	**173**	**366**
Poste la Fayette	Poste la Fayette	15	15	59
	Poste de Flacq	57	62	107
	Belle Mare	21	36	78
	TOTAL	**93**	**113**	**244**
Trou D'eau Douce	Trou D'eau Douce	108	112	250
	Morcy	4	1	1
	Palmar	7	11	21
	TOTAL	**119**	**124**	**272**
G.R.S.E	G.R.S.E	8	11	20
	Camp des Pecheurs	44	72	116
	Deux Freres	12	30	64
	Quatre Soeurs	33	45	63
	TOTAL	**97**	**158**	**263**
Mahebourg	Mahebourg	174	155	236
	Ville Noire	35	51	97
	Grand Port I	19	28	53

	Grand Port II	34	44	64
	Blue Bay	26	24	142
	Pte D'Esny	30	74	162
	Le Bouchon	11	3	7
	Riv des Creoles	4	13	39
	TOTAL	**333**	**392**	**800**
Bambous Virieux	Anse Jonchée	12	19	37
	Bois des Amourettes	15	23	38
	Bambous Virieux	103	79	90
	Grand Sables	59	64	76
	Petit Sables	22	22	26
	TOTAL	**211**	**207**	**267**
Riambel	Souillac(Battelage)	38	26	28
	Riambel	20		0
	St Felix	30	7	10
	TOTAL	**88**	**33**	**38**
Baie du Cap	Baie du Cap 1	30	17	26
	Baie du Cap 2	18	24	38
	St Martin	30	36	61
	Baie du Jacotet	11	3	6
	TOTAL	**89**	**80**	**131**
Case Noyale	Le Morne	57	56	83
	La Gaulette	40	70	156
	Case Noyale	28	22	51
	Petite Riviere Noire	3	6	20
	TOTAL	**128**	**154**	**310**
La Preneuse	La Preneuse	32	31	138
	Tamarin	79	86	120
	Black River	34	31	132
	TOTAL	**145**	**148**	**390**
Pointe aux Sables	Flic en Flac	4	4	61
	Albion	18	19	72
	Pointe aux Sables I	35	25	68
	Pointe aux Sables II	19	20	54
	TOTAL	**76**	**68**	**255**
	GRAND TOTAL	**2,256**	**2,476**	**5,047**

8.3 Licences

The number of the different types of licences in the artisanal fishery is given in table 8.3

Table 8.3: Number of licences

Fisheries Post	Large net	Gill net	Bait gear
Port Louis	0	0	27
Tombeau Bay	0	0	39
Trou aux Biches	1	1	23
Grand Gaube	3	0	7
Poudre d'Or	0	0	3
Poste la Fayette	2	0	7
Trou d'Eau Douce	1	1	20
G.R.S.E	0	0	6
Bambous Virieux	0	0	23
Mahebourg	3	2	43
Riambel	1	0	10
Baie du Cap	0	1	10
Case Noyale	1	0	8
La Preneuse	3	0	48
Pointe aux Sables	1	0	11
Total	**16**	**5**	**285**

Records for the last three years for new and renewed fishmonger licences are detailed in table 8.4.

Table 8.4: Details of fishmongers' licences

Year	Local	Import	Total
2007	690	143	833
2008	664	177	841
2009	668	172	840
2010	851	160	1011

8.4 Illegal fishing

Details of interventions with respect to illegal fishing are given in table 8.5.

Table 8.5: Number of interventions

Year	Underwater fishing	Net fishing	Others	Length of illegal net seized (m)
2005	21	12	32	6 183
2006	105	146	83	12 033
2007	64	123	49	2 837
2008	154	96	47	6 809
2009	126	134	51	8 184
2010	132	186	43	6 320

8.5 Allowances to artisanal fishermen

8.5.1 Bad weather allowance

The number of beneficiaries for bad weather allowance ranged from 2039 to 2187 on a monthly basis during the year. The rate for a bad weather day was increased to RS 217 as from 1st January 2010. A total of Rs 56,446,271 was paid by the Ministry of Social Security, National Solidarity and Senior Citizens Welfare and Reform Institutions. Details are shown in tables 8.6 and 8.7.

Table 8.6: Payments of bad weather allowance

Year	No. of days	Rate (Rs)	Beneficiaries	Total (Rs)
2005	137	135 - 145	1 978 - 2 247	**41 597 895**
2006	zoning	145 - 155	1 054 - 2 257	**35 890 800**
2007	zoning	155 - 168	1 935 - 2 260	**47 380 770**
2008	zoning	168 - 200	2 048 - 2 208	**56 737 336**
2009	zoning	200 - 210	2 063 - 2 235	**53 601 880**
2010	zoning	217	2 039 – 2 187	**56 446 271**

Table 8.7: Bad weather days and number of beneficiaries

Year	Region		Total bad weather days	Beneficiaries	Total (Rs)
2006	Lagoon	Zone 1	61	1 054 – 2 257	35 890 800
		Zone 2	66		
		Zone 3	77		
		Zone 4	74		
	Off-lagoon	Area 1	106		
		Area 2	124		
2007	Lagoon	Zone 1	15	1 935 – 2 260	47 380 770
		Zone 2	22		
		Zone 3	50		
		Zone 4	45		
	Off-lagoon	Area	149		
2008	Lagoon	Zone 1	28	2 048 – 2 208	56 737 336
		Zone 2	35		
		Zone 3	48		
		Zone 4	47		
	Off-lagoon	Area	151		
2009	Lagoon	Zone 1	12	2 063 – 2 235	53 601 880
		Zone 2	19		
		Zone 3	27		
		Zone 4	17		
	Off-lagoon	Area	131		
2010	Lagoon	Zone 1	5	2 039 – 2 187	56 446 271
		Zone 2	8		
		Zone 3	11		
		Zone 4	7		
	Off-lagoon	Area	130		

8.5.2 Closed season allowance

During the closed season from 1st October to the last day of February of the following year, a net fisherman was entitled to a daily allowance of Rs 217. A total of Rs. 3 554 292 was paid and details are shown in table 8.8.

Table 8.8: Payments of closed season allowance

Year	No. of days	Rate (Rs)	Beneficiaries	Total (Rs)
2006	121	145-155	161-153	**2 852 125**
2007	112	155-168	153-146	**2 565 825**
2008	115	168-200	146-144	**3 121 216**
2009	114	200-210	146-145	**3 421 950**
2010	115	217	145-143	**3 554 292**

8.5.3 Sick leave allowance

Under the sickness allowance scheme, a registered artisanal fisherman is eligible to a financial assistance of 14 days when he is hospitalised for 14 consecutive days or more. The Fishermen Welfare Fund is responsible to provide such assistance to these fishermen. Such allowance paid is shown in table 8.9.

Table 8.9: Sick leave allowance

Year	Rate (Rs)	Total (Rs)
2006	145 - 155	**9 870**
2007	155-168	**10 710**
2008	168 - 200	**8 540**
2009	200 – 210	**4 800**
2010	210 - 217	**15 978**

8.6 Buy-back scheme for nets

The buy-back scheme introduced since 1996, for the reduction of the number of nets operating in the lagoon was continued. At the end of the year there were 16 large nets and 5 gill nets. One net fisherman gave up net fishing and were compensated accordingly. Details of payment effected are shown in table 8.10.

Table 8.10: Amounts paid (Rs) under net reduction scheme

Year	Individual		Cooperatives		Nets surrendered			Total amount paid (Rs.)
	No. of fishermen	Amount paid (Rs.)	No. of fishermen	Amount paid (Rs.)	Large net	Gill net	Amount paid (Rs.)	
2006	4	140 000	3	210 000	-	1	133 000	**483 000**
2007	1	35 000	3	210 000	-	-	-	**245 000**
2008	1	35 000	3	210 000	-	-	-	**245 000**
2009	-	-	4	280 000	-	-	-	**280 000**
2010			1	70 000				**70 000**

9. MISCELLANEOUS

9.1 Acquisition of new equipment

The procurement of two speed boats for the Fisheries Protection Service and the purchase of two double 4 X 4 pick ups were made for the value of Rs. 1,985,590 inclusive of VAT and Rs. 1,376,800.70 inclusive of VAT respectively.

9.2 Visits

During the year under review, 3377 persons visited the Albion Fisheries Research Centre. The majority of the visitors were students from primary and secondary schools.

A Namibian delegation, comprising of Miss Lucia Haufiku, the Deputy Director of Information Technology and Mr. Stanley Ndara, the Chairperson of the Vessel Monitoring System (VMS) Technical Committee visited the FMC from 13 to 15 October 2010. More information is given in Appendix 10.

9.3 Information Service

The Documentation Unit/Marine Information Centre continued to provide information and access to reference materials on fisheries and the marine environment to students, stakeholders and the public in general.

9.4 New library holdings

One hundred and sixty nine publications (local and foreign) and four CD-ROMs were received during the year. An acquisition list is produced on a monthly basis for circulation to staff.

9.5 Sales and distribution of publications

Total income from sales of publications including posters, charts, maps and books published by the Fisheries Division amounted to Rs. 17 660.

9.6 Reprints

Five hundred posters for both “Toxic Marine Organisms in Mauritius” and “Commercial Fishes of Mauritius” were re-printed.

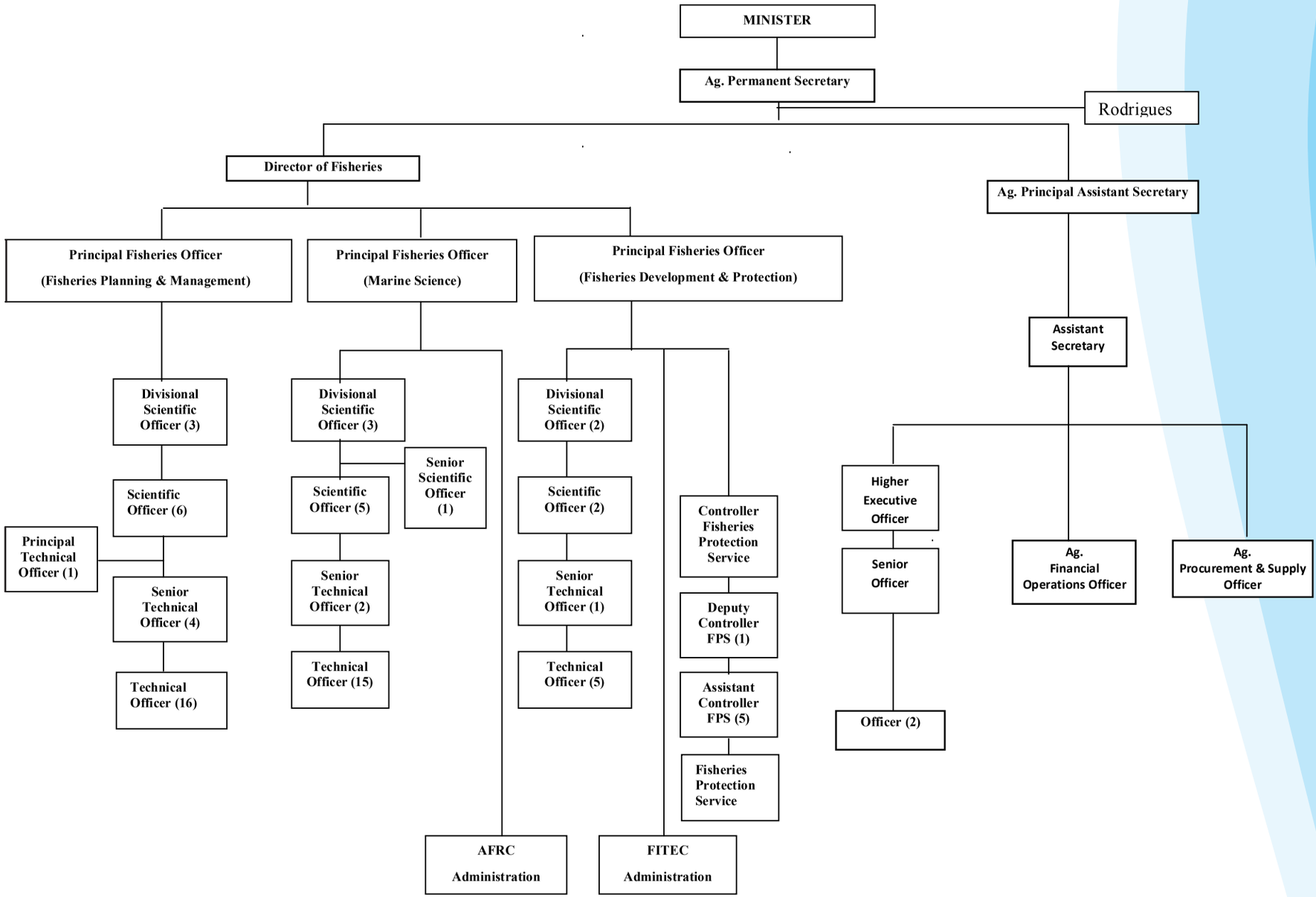
9.7 Staff matters

Miss D. Gopaul, Mrs. D. Dhurmea, Mr. V. Senedhun, Miss T. Ujoodha, Mrs. P.P. Seepual-Choolhun, Mrs. K. Sridat Ruhee, Miss L. Caussy, Miss D. Luchmanen and Mr. V. Kawol joined the fisheries technical services as technical officers between the period from May to October 2010.

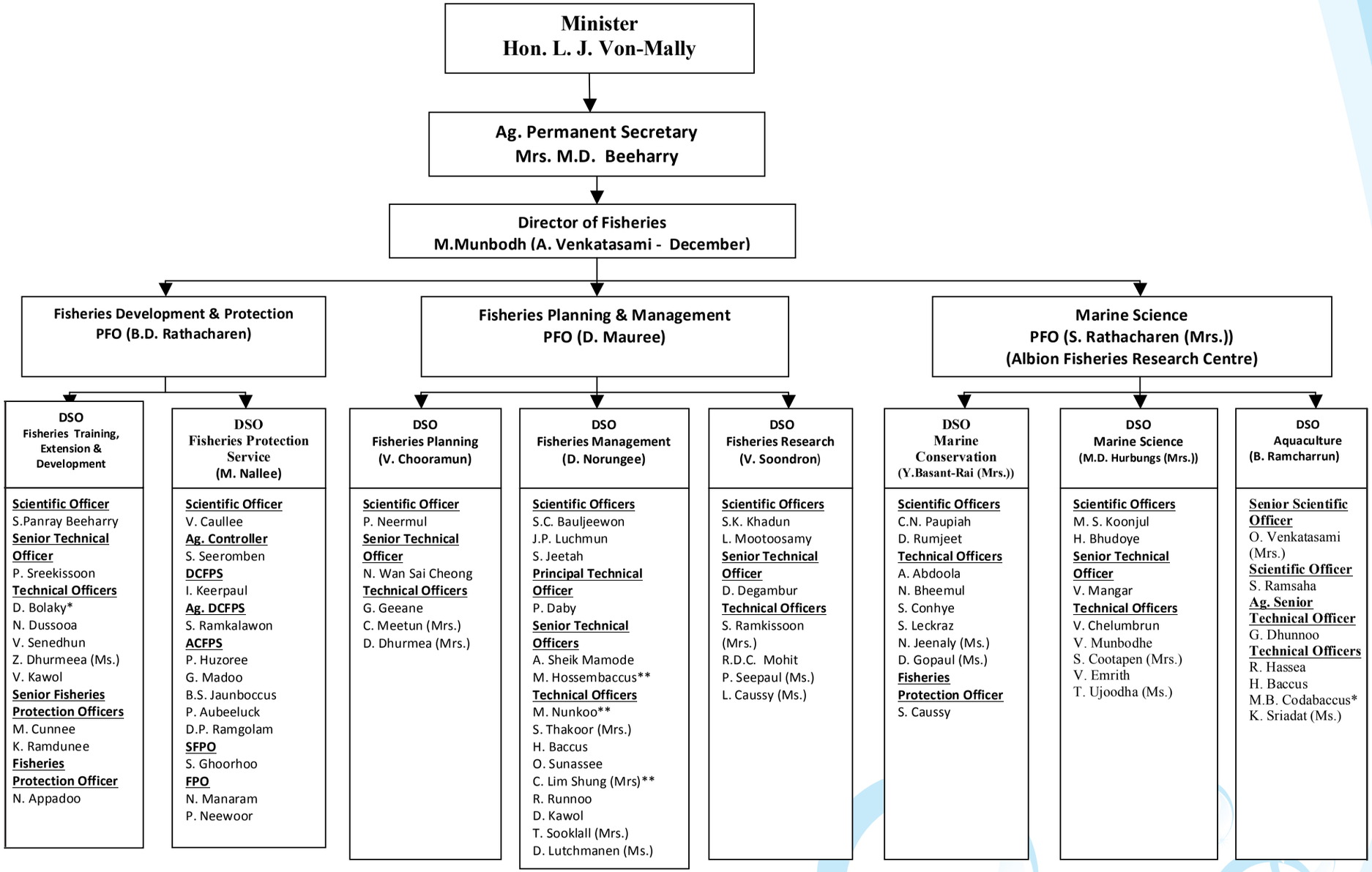
The following promotions were effected: Mr A. Venkatasami from Principal Fisheries Officer to Director of Fisheries.

Mr. M. Munbodh retired as Director of Fisheries on 30 November, 2010.Mr Munbodh joined the then Fisheries Division of the Ministry of Agriculture as Scientific Officer on 4 April. 1974. He acted as Divisional Scientific Officer from 1981 to 1986 when he was appointed Divisional Scientific Officer. He was appointed as Principal Fisheries Officer in 1990, Chief Fisheries Officer in 2001 and Director of Fisheries in July 2008. He also served as member of the boards of the Food and Agriculture Research Council (from 1996 to 2000 and 2006 to 2010) and the Mauritius Oceanography Institute (from 2004 to 2010).

Appendix 1: Organisational Chart of the Fisheries Division of the Ministry of Fisheries and Rodrigues



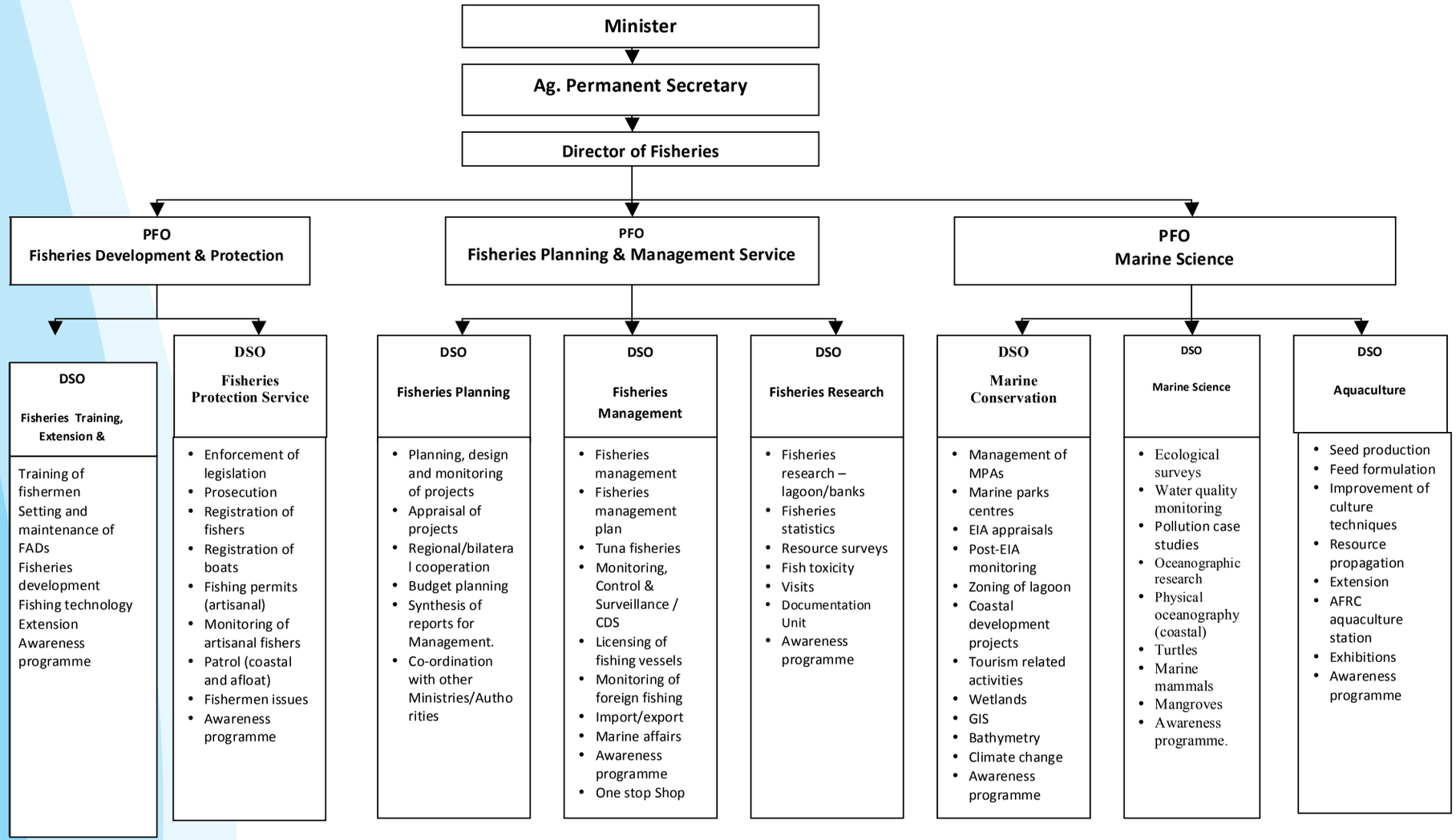
Appendix 2: Organisational Chart of the Fisheries Division



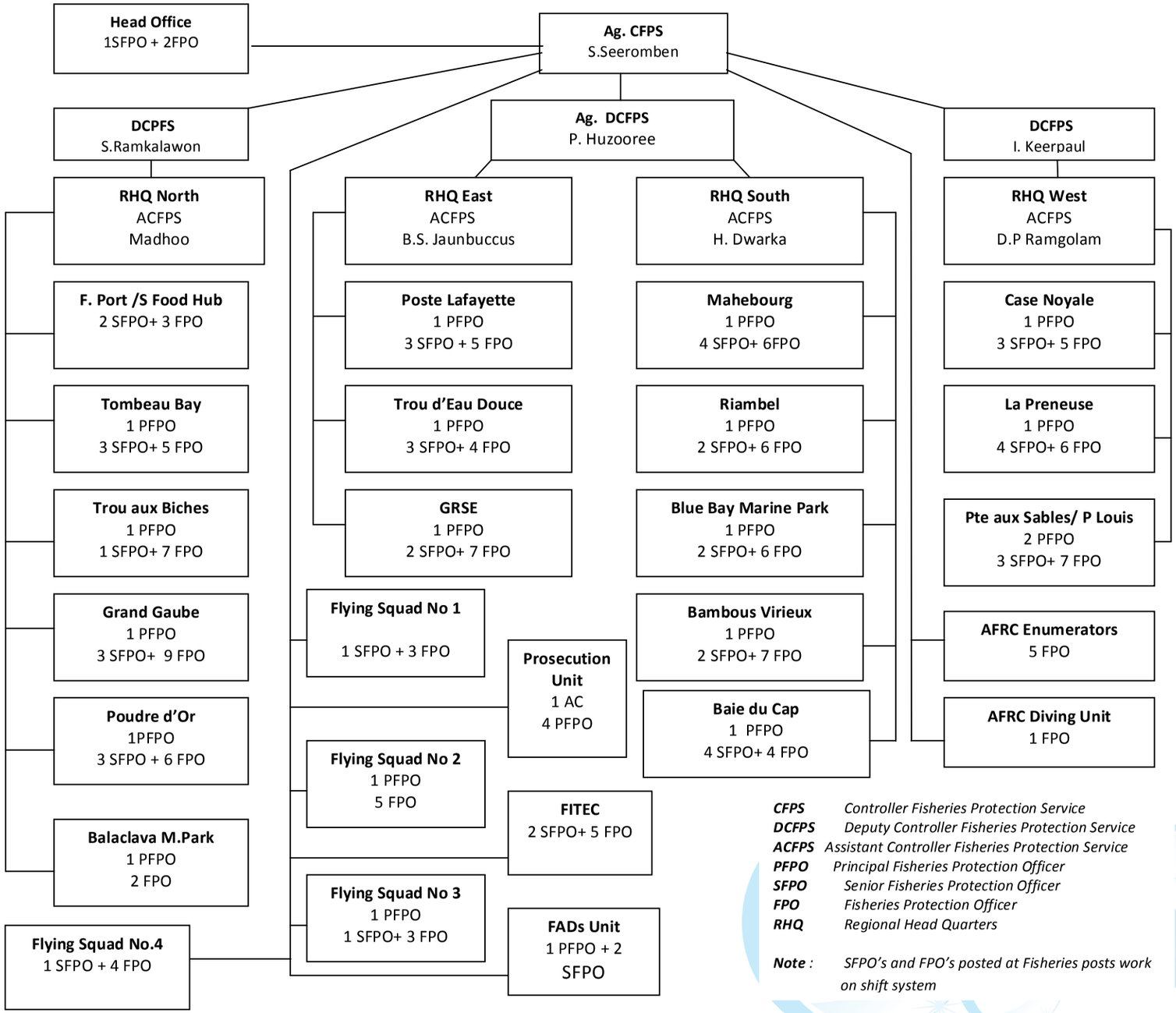
PFO: Principal Fisheries Officer
DSO: Divisional Scientific Officer
DCFPS: Deputy Controller, Fisheries Protection Service
ACFPS: Assistant Controller, Fisheries Protection Service

SFPO: Senior Fisheries Protection Officer, Fisheries Protection Service
FPO: Fisheries Protection Officer, Fisheries Protection Service
*: On study leave
** One Stop Shop

Appendix 3: Activities of the Fisheries Division (Technical Services)



Appendix 4: Organisation Chart for the Fisheries Protection Service



CFPS *Controller Fisheries Protection Service*
DCFPS *Deputy Controller Fisheries Protection Service*
ACFPS *Assistant Controller Fisheries Protection Service*
PFPO *Principal Fisheries Protection Officer*
SFPO *Senior Fisheries Protection Officer*
FPO *Fisheries Protection Officer*
RHQ *Regional Head Quarters*

Note : *SFPO's and FPO's posted at Fisheries posts work on shift system*

Appendix 5: List of projects and services

Fisheries Research Division

Project/services	Objective(s)	Main activities
Coastal fishery	• Maintain and update records of fishery statistics for estimation of fish landings	• Prepare sample survey programme • Collect and analyse data on coastal fish landings • Perform checks at landing stations
Bank fishery	• Maintain and update records of data on offshore demersal fishery for estimation of yields and for provision of advice on their management	• Collect, process and analyse log book data • Sampling of fish
Ecotoxicology	• Monitor toxic fish and harmful microalgae	• Bioassay tests with mouse • Collection & examination of microalgal samples
St. Brandon inshore fishery and semi-industrial chilled fish fishery	• Determine growth parameters estimates for fish at St. Brandon, Albatross, Soudan, Hawkins and small northern banks • Monitor the fishery	• Sampling programmes for length/weight frequency data analysis • Collect, verify, analyse and compile data from log books • Catch data entry, effort, fishing positions, species, fishing days and estimates of catch per fisherman day
Seacucumber fishery	• To assess the stock of seacucumber in the lagoon for its sustainable exploitation • To monitor the fishing activities related to the collection of seacucumbers	• Collect data on catch and effort • Carry out surveys at selected sites in the lagoon
South West Indian Ocean Fisheries Project	• To identify and assess fish stocks in the EEZ of the coastal states in the South West Indian Ocean region	• Setting up of a database on fishing resources in the region • Carry out resource surveys

Marine Science Division

Projects/Services	Objectives	Main activities
Coastal Ecosystem Research	• Long-term monitoring of the coastal ecosystem at selected sites	• Collect, process and analyse data on substrate cover, coral bleaching • Issues related to stranded mammals & fish mortality
Coral farming project	• Study coral farming in an ocean-based nursery	• Monitor growth of coral fragments
Coastal Environment Research	• Monitor coastal water quality and near sewage outfalls • Monitor coliform bacteria at selected public beaches • Long term monitoring of trace metals levels	• Collection and chemical analysis of sea water samples • Record of physicochemical parameters • Investigate cases of alleged marine pollution and fish mortality • Perform test for coliform bacteria • Perform test for trace metals • Accreditation of laboratories
Monitoring of ex-sand mining sites	• Study the regeneration of ex-sand mining sites	• Underwater surveys and collection of data on bottom substrate
Lagoon watch programme	• Monitor sea surface temperature in the lagoon	• Collect daily sea surface temperature at selected sites • Analysis of temperature data
Monitoring of environment at marine aquaculture sites	• Monitor the ecosystem and water quality	• Collect, process and analyse data on substrate cover • Collect and analyse seawater samples
Mangrove propagation	• To propagate mangroves in the coastal areas	• Provide technical know-how to private organisations/fishermen to propagate mangroves

Aquaculture

Project/services	Objective(s)	Main activities
Freshwater fish culture	• Freshwater aquaculture development • Production of freshwater prawn juveniles and red tilapia to service farmers	• Broodstock management of red tilapia and freshwater prawns • Advise fish farmers in freshwater aquaculture • Seed Production of red tilapia • Hatchery operation and management • Seed production of freshwater prawn • Pond management • Site visits
Ornamental fish culture	• Sharing of simple techniques on breeding and culture of fresh water ornamental fish with fish farmers	• Production and management of broodstock • Reproduction of ornamental fish • Pond management • Site visits
Appraisal of aquaculture projects	• Aquaculture development	• Views and recommendations on proposed projects
Marine /freshwater aquaculture projects	• Monitoring of marine/freshwater aquaculture projects	• Regular site visits at fish farms

Marine Conservation

Project/services	Objective(s)	Main activities
Establishment of Marine Parks	• Construction and setting up of the Blue Bay and Balaclava Marine Park Centres • Physical zoning of the Balaclava Marine Park. • Management of marine parks	• Co-ordination for the construction of marine park centres • Delimit the different zones in the Balaclava Marine Park • Monitor coral reef ecosystems at the two marine parks • Enforcement of MPA regulations • Issue Marine Protected Areas permits
Coastal zone management	• Ensure the development of coastal zone projects in a sustainable manner	• Assessment of EIA applications and PER • Participate in pre and post EIA monitoring programme • Carry out ecological underwater surveys for development projects

Fisheries Training, Development & Extension

Projects/Services	Objectives	Main activities
FAD fishery research and development	• Develop, support and maintain a FAD fishery • Encourage fishermen to move to off lagoon	• FAD design and construction • Set and maintain FADs • Monitor the FAD fishery • Operate and manage research boats
Off lagoon fishery development	• Promote and support the development of the off lagoon fishery • Develop fishing techniques	• Demonstrate fishing techniques • Promote good fish handling and preservation practices
Training of fishermen and other stake holders	• Improve knowledge and skills of fishermen to operate in the off lagoon • Provide training to enhance safety and security at sea • Improve enforcement capabilities of the Fisheries Protection Service • Improve fish handling practices	• Training of fishermen (General Course for Fisher) • Implement training programme for fishmongers

Fisheries Management

Project/services	Objective(s)	Main activities
Monitoring, Control and Surveillance	• Combat IUU fishing • Monitor movement and operation of fishing vessels • Licensing of fishing vessels • Monitor the position and movement of all licensed fishing vessels through the VMS • Certification of catch for export to EC	• Enforce licence conditions • Clearance for departures and arrivals • Monitor transhipment activities • Enforce Port State Measures • Issue licences to Mauritian and foreign fishing vessels • Monitor and record the position of licensed fishing vessels • Interface VMS information with the National Coast Guard • Participate in joint surveillance missions of the IOC • Validation of catch for export to EC
Fish imports and exports	• Provision of support for import and export of fish and fish products.	• Issue import/export permits • Inspect imported products • Advise importers/exporters/fish sellers on quality norms
Pelagic Fisheries	• Study stock structure, catch, trend, investigate fishing areas and distribution	• Collect and analyse data on catch, effort & landing • Data exchange with IOTC • Collection, processing and analysis of biological samples of licensed purse seiners
Banks Fisheries	• Sustainable management of fish stocks	• Allocate quota to fishing vessels and companies • Draw up list of banks fishermen

Fisheries Planning

Projects/Services	Objectives	Main activities
Project proposals	• Formulate new projects	• Identify needs for the fisheries sector • Prepare project write-up • Financial analysis of projects and reporting
National / Regional / Bilateral / Multilateral Cooperation	• Cooperation with local institutions • Coordinate matters relating to regional/bilateral/ multilateral issues	• Assist in evolving of fisheries policies with respect to EU, WTO, SADC, COMESA, NEPAD, IOR – ARC, SWIOFC, FAO, Norad, IFAD/MARS, OFCF, Hellenic Republic and Kuwait • Liaison and collaboration with other organisations
Project appraisals	• Appraise feasibility of project	• Assessment o f the economic viability of fisheries project

Appendix 6: Meetings, workshops, seminars and training courses attended

Subject	Venue	Date	Officer
Technical Meeting for Elaboration of a Conservation plan for migratory sharks	Manila, Philippines	8-12 February	Mr. D. Mauree - PFO
14th Session of the IOTC Commission meeting	Pusan, Korea	01 – 05 March	Mr. D. Mauree - PFO
20eme Reunion de la Cellule de Coordination Regionale (IOC MCS Project)	Antananarivo, Madagascar	07-07 March	Mr. A. Sheik Mamode - STO
1st Regional Conference of National ICZM Committee in the Western Indian Ocean (WIO) Region	Mombassa, Kenya	23 -24 March	Mr. D. Rumjeet - SO
Training on capacity building for Local Government for Sustainable Fishery Development	Japan	23 March – 29 June	Mrs. B. Meetun - TO
1st Stock taking meeting of the three Global Environment Facility Projects in the Western Indian Ocean	Kenya	29 March – 01 April	D. Mauree - PFO
Sixteenth "Cellule de Coordination Régionale" [CCR] meeting	Antananarivo, Madagascar	30 March - 01 April	Mr. S. C. Bauljeewon - DSO
Training on Aquaculture for Developing countries	Wuxi, China	20 April – 14 June	Mr. Noel Wan Sai Cheong - STO
Seminar on Fisheries Management and Development for Developing Countries	Wuxi, China	18 May - 07 June	Mr. N. Dussooa – TO Mr. N. Bheemul - T.O Mrs. C. Lim Shung – T.O
Meeting of Experts to share Best Practices on the provision of Scientific Advice	Barcelona, Spain	31 May – 02 June	Mr. D. Mauree - PFO
Workshop on improvement , harmonization and compatibilities of MCS	Barcelona, Spain	03 – 05 June	Mr. D.Mauree - PFO
Workshop on COREMO III software	Flic en Flac, Mauritius.	22 - 23 June	Mr S. Leckraz - TO
Fifth Steering Committee Meeting of the project " Network of Marine Protected Areas of the Countries of the	Antananarivo, Madagascar	23-24 June 2010	Mrs Y. Basant Rai - DSO

Indian Ocean Commission"			
Participation as panelists in the SWIOFP Interview	Kenya	15-16 July	D.Mauree - PFO
Workshop on "Illegal, Unreported and Unregulated Fishing	Cape Town, South Africa	03 - 06 August	Mr. R. Hossen bacus - STO
South West Indian Ocean Fisheries Project, SWIOFP Observer Programme	Durban, South Africa	16 August - 08 September	Mr. V.Munbodhe - TO M. M. Cunnee - SFPO
SWIOFP Workshop	Port Louis, Mauritius	18-19 August	Mrs. M.Hurbungs - DSO Mrs. M.S.Koonjul - SO
Training on Applications of Geographical Information System	Port Mathurin, Rodrigues	28 August – 04 September	Mr S. Leckraz - TO
Training course on marine turtle long term monitoring (SWIOFP)	Kelonia, Reunion Island	31 August- 02 September	Mrs. M.Hurbungs - DSO Mrs. M.S.Koonjul - SO Mr. V.Mangar - STO
Master Studies in Coastal and Marine Management Program	Isafjordur, Iceland	31 August 2009 – 27 August. 2010	Mr. D. Bolaky - TO
Meeting for Component 5 of SWIOFP (Sea turtle Training Course)	La Reunion	31 August – 02 September	Mrs M. Hurbungs – DSO Mrs V. Chelumbrun - TO
Invitation to the workshop for presentation and discussion of the Action Plan for Southern Africa, ACP Fish II Programme.	Maputo , Mozambique	31 August – 01 September	Mr. D.Mauree - PFO Mr. P.Nermul - SO
Invitation to the Third SWIOFP Budget and Planning meeting	Dar-es-Salaam, Tanzania	13 – 16 September	Mr. V.Chooramun - DSO
Observer Training Programme on RV Nansen under SWIOFP - Component 4	EEZ of Mauritius	16 – 25 September	Mr. V. Soondron – DSO Mr. S. Khadun – SO Mr. P. Daby – PTO Mr. G.Geeane - TO Mr. V. Munbodhe - TO Ms C. Luchmanen - TO Mr. V. Seeneedhun – TO Mr. M. Cunnee – SFPO Mr. V. Dabychurun - SFPO
Training Course on Quality Management Systems: MS 9001:2008	Moka, Mauritius	20 - 23 September	Mr S. Conhye - TO
Training Course on Quality Management Systems: MS 9001:2008	Moka, Mauritius	27 - 30 September	Ms. N. Jeenally - TO

SWIOFP – Fish Stock Assessment Training Course	Mombassa, Kenya	27 September – 08 October	Ms D.Gopaul - TO
Plan Regionale de Surveillance de Peche Briefing (IOC MCS Project)	Le Port, La Reunion	27 September	Mr. A. Sheik Mamode - STO
Workshop on Fisheries Stock-Assessment, Methods and Models	Mombasa, Kenya	27 September – 08 October	Mrs Sayageetah Seeburn - TO
SWIOFP Component 4 FAD and Longline Workshop	Mahé, Seychelles	30 September - 3 October	Mr. N. Dussooa – TO Mr. D. Kawol –T.O
Training on the management of MPAs	St Anne, Seychelles	04-05 October	Mr. C.N.Paupiah - SO
Negotiation Session on Fisheries Subsidies	Geneva	04 – 08 October	Mr. D. Mauree - PFO
SIDF /LHV/World Bank Workshop on " Public – Private Partnerships (PPPs) in support of Sanitary and Phytosanitary (SPS) capacity building	Netherlands	04 – 06 October	P. Nermul - SO
First Official Signatory State Meeting of the M.o.U on Conservation and Management of Dugongs and their Habitats	Abu Dhabi	04 - 06 October	Mr. H. Bhudoye - SO
Workshop on Sandwatch tools at Seychelles	Mahé, Seychelles	06 - 08 October	Mr C.N.Paupiah - SO
Workshop on analysis of FAD fishery data using Statistical Package for Social sciences (SPSS).	Fisheries Training & Extension Centre, Pte aux Sables	11 October - 3 November	Mr. P. Sreekeessoon - STO Mr. D. Deegamber - STO Mr. D. Bolaky - TO Mr. N. Dussooa - TO Mr. R. Runnoo - TO Mr. K. Ramduny - SFPO Mr. V. Seeneedhun - TO Mr. Z. Dhurmea - TO Mr. V. Kawol - TO Ms. L. Caussy - TO Mrs. S. Subhadu -
Tenth Meeting of the Conference of the Parties to the Convention on Biological Diversity	Nagoya, Japan	18-29 October	Mrs Y.Basant Rai - DSO
Training course on Scientific and Capacity	Grahamstown, South Africa	08- 15 November	Mr. V.Mangar - STO

Building			
Workshop on the Electronic submission of trade documents	Port Louis, Mauritius	18 November	Mrs. C. Lim Shung - TO
Regional Training Course in MPA Management	Mombassa, Kenya	22 November - 04 December	Mr. D.Rumjeet - SO
Second meeting of the ACP ministers in charge of fisheries	Seychelles	03 – 10 December	Mr. D.Mauree - PFO Principal Fisheries Officer
Survey on board Research vessel Dr F. Nansen (EAF Nanasen Project of FAO and SWIOFP)	EEZ of Mauritius	06-21 December	P. Sreekeessoon - STO Mrs P. Seepaul – Choolun - TO Mr V. Kawol - TO Z. Dhurmea - TO
Cetacean Workshop (COI)	Quatre Bornes, Mauritius	13-14 December	Mrs. M.Hurbungs - DSO Mrs. M.S.Koonjul - SO
Atelier régional sur la pêcherie thonière forum de discussion pour les pays de la commission de l'Océan indien	Antananarivo, Madagascar	14 – 16 December	Mr. S. C. Bauljeewon – DSO Mr. G. Geeane - TO

Appendix 7: Publications on Sale at the Documentation Unit

Title	Unit Price (Rs.)
Field Guide to Corals of Mauritius *Sale of a minimum of 10 copies at one purchase*	**250** **200**
Poisson Commerciaux du Sud-Ouest de l'Ocean Indien (Guide)	**110**
Bathymetric Charts: A. Ile Maurice B. Ile Maurice Nord I C. Ile Maurice Nord II (out of stock) D. Banc Soudan E. Banc Hawkins F. Rodrigues Ouest G. Ile Rodrigues	**50**
Posters **- Common Corals of Mauritius** **- Common Coral Reef Fishes of Mauritius** *Sale of a minimum of 25 units at one purchase*	 **80** **80** **55**
Field Guide to Coastal Fishes of Mauritius	**250**
Thematic Maps for coastal areas: - Format A4 - Format A3	 **55** **11**

Appendix 8: Environment Impact Assessment Reports Reviewed

1. Desalination plant for the Eco Rod bungalow project, St Francois Rodrigues
2. Operation of a Stone Crusher and Hot Mixed asphalt, Belle Mare
3. Construction of an Artisanal winery, Bonnefin Mare aux Vacoas
4. Construction of Wastewater treatment plant, Grand Baie
5. Setting up and Operation of Temporary asphalt plant within compound of UBP crushing plant, Forbach Pamplemousses
6. Construction of Bagatelle Dam, Bagatelle
7. Subdivision of land for Residential Purpose off Port Louis Rivière Noire A3 Road, Bambous
8. Construction of a Hotel, Tamarin
9. Clinker grinding plant Port Area, Port Louis
10. Incinerator Plant Facility for the safe disposal of ship generated quarantine works, Fort Georges Port Louis
11. Coastal protection works to coastal erosion in front of Terrain Bassant, Grand Gaube
12. Subdivision of land for residential and commercial purposes, Balaclava
13. Reconstruction and Extension of a small scale Hotel complex, Pte aux Canonniers
14. Construction of the 2nd carriageway of motorway from Pamplemousses to Sottise
15. Stone crushing plant at Beemanique, Nouvelle France
16. Subdivision of Land Mon Choisy
17. Construction of Wastewater treatment plant and Wastewater collection Network under Phase 2 of Grand Bay Sewage Project by WWMA
18. Implementation of the Mon Rose Integrated Resort Scheme in Hotel project, Baie du Cap
19. Residential complex, Trou aux Biches
20. Construction of Hotel complex, La Salette, Grand Baie
21. Hot mix asphalt plant, Plaine Magnien
22. Hotel Development by Insignia Resorts Ltd, Albion
23. Construction of Spa & Villas Resort at Palmar Dream Spa Resort, Palmar
24. Desalination plant at Mella Villas Boutique Hotel, Balaclava

25. Installation and Operations of CMS Evaporation plant, CMS Fertilizer Blending Plant, Beau Plan
26. Subdivision of land for Residential Purpose, Pte aux Piments
27. Subdivision of land for Residential purposes by Societé Rouillard Frere, at Chamoses Forbach
28. Proposed construction of Sunflower Hotel, Baladirou Rodrigues
29. Proposed setting up of a wind farm by Aerowatt, Plaine des Roches
30. Proposed Subdivision of land for mixed use Morcellement, Cote d'Or High
31. Monkey Breeding Farm by Prima Cyno Ltd, Mare D'Australia (Belle Vue)
32. Proposed Subdivision of a plot of lands, Pointe aux Sables
33. New Pipeline - Total Tromelin Terminal within Mauritius Ports Authority, Port Louis
34. Asphalt plant, Geoffroy Bambous
35. Extension of Suffren Hotel Marina, Caudan
36. Microbrewery project by Aeck Ltd Mall of Mauritius, Bagatelle
37. Subdivision of a plot of land for Residential Purpose, La Chaumière
38. Construction of a new HFD Tank Pipeline, Fort William
39. Construction and operation of a Cement Blending plant, Fort George
40. Construction of Port Louis ring Road from Montebello to Les Guibies
41. Improvement works along coastal frontage, Casuarina

Appendix 9: Underwater ecological surveys

1. Demarcation of a swimming zone at Maradiva Hotel, Flic en Flac
2. Lagoonal works at Grand Gaube
3. Construction of a jetty at Paladenia Hotel, Anse La Raie
4. Proposed site for sinking of boat off-lagoon at Belle Mare (MMCS)
5. Alleged pollution at the 'Ferme Marine de Mahebourg', Pointe aux Feuilles
6. Demarcation of a swimming zone at Marina Hotel, Anse la Raie
7. Identification of sites for installation of demarcation buoys in the Balaclava Marine Park
8. Demarcation of a swimming zone at Grand Mauritian Hotel, Balaclava
9. Surveys following complaints from fishermen in connection with alleged illegal dredging in the lagoon at Intercontinental Hotel, Balaclava
10. Proposed mooring site at Grand River South East
11. Proposed mooring platform at Vieux Grand Port
12. Demarcation of a swimming zone at Paul et Virginie Hotel, Grand Gaube
13. Proposed mooring of micro-platform at sea for wedding at Intercontinental Hotel, Balaclava
14. Proposed mooring of micro-platform at sea for Paradis Hotel, Le Morne
15. Demarcation of a swimming zone at Mella Villas Hotel, Le Goulet
16. Firework display at Shanti Maurice Hotel, Rivière des Galets
17. Demarcation of a swimming zone at Casuarina Hotel, Trou aux Biches
18. Demarcation of a swimming zone at Shanti Maurice Hotel, Rivière des Galets

Appendix 10: Missions, visits and attachment at AFRC

Name of visitor/s	Institution	Purpose	Date
Mr. T. Nemoto Mr. R. Morimitsu Mr. Y. Hara	Overseas Fisheries Cooperation Foundation, Japan	Formulation mission – "Rehabilitation of fisheries facilities for fisheries development in Mauritius project" – Third phase	17 – 27 July
Dr. L. Dagorne Mr. M. Soria Mr. F. Forget	Institut de Recherche pour le Development/ South West Indian Ocean Fisheries Project-Component 4	Fish Tagging Experiment around FADs	27 Sept. – 8 Oct.
Mr. Y. Hara Mr. R. Morimitsu	Overseas Fisheries Cooperation Foundation, Japan	Implementation – "Rehabilitation of fisheries facilities for fisheries development in Mauritius project" – Third phase	4 Oct. – 14 Dec.

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