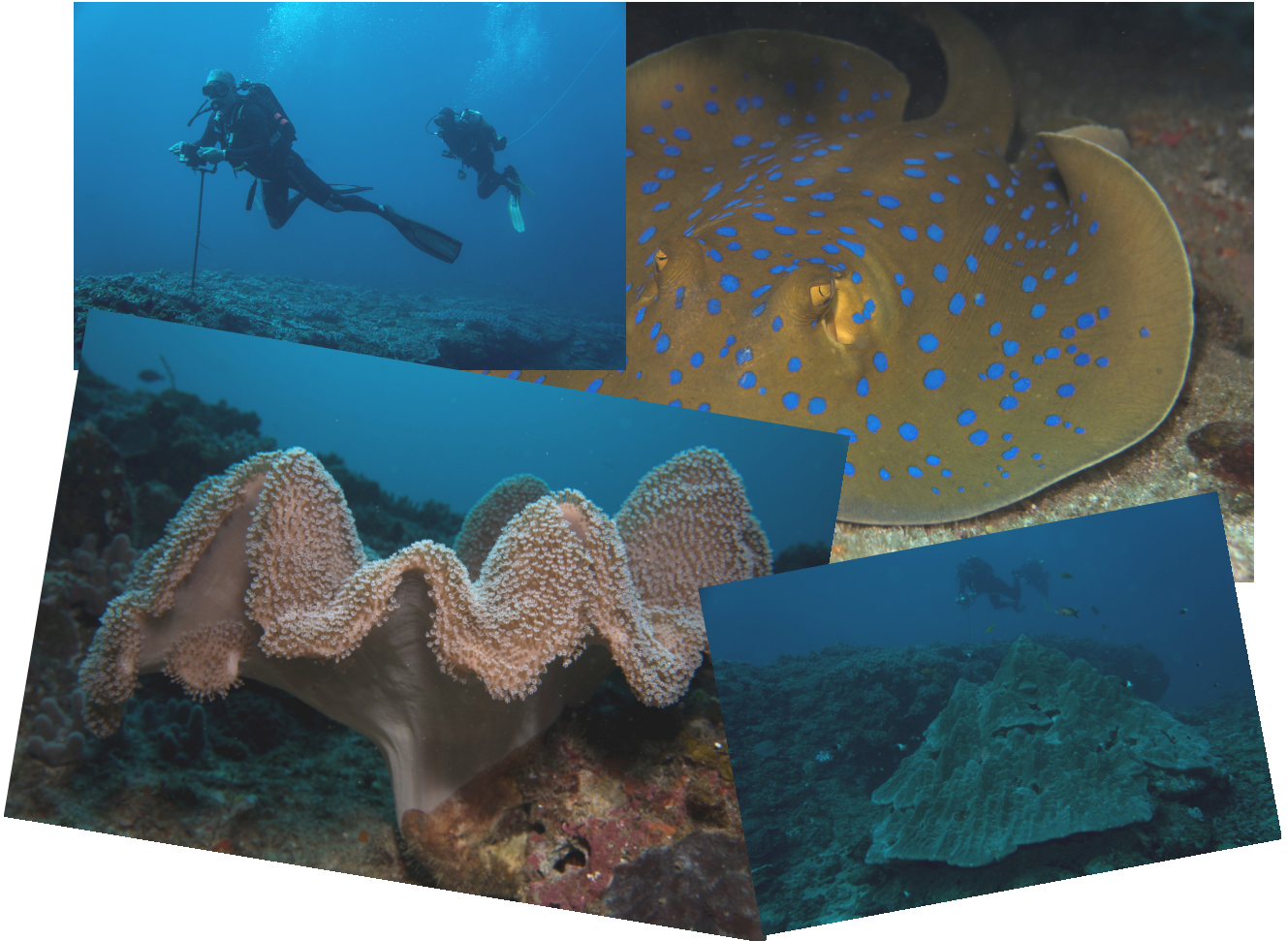




CENTRO TERRA VIVA
Estudos e Advocacia Ambiental

**REEF MONITORING IN THE
PONTA DO OURO PARTIAL MARINE RESERVE: 2018**



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Maputo, May 2019



Centro Terra Viva - Estudos e Advocacia Ambiental



Reserva Marinha Parcial da Ponta do Ouro

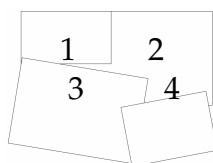
O Centro Terra Viva (CTV) e a Reserva Marinha Parcial da Ponta do Ouro (RMPPPO), assinaram em Setembro de 2013 um Memorando de Entendimento (MdE) relativo a monitoria e investigação de espécies e ecossistemas da reserva. Este MdE foi posteriormente reforçado por um segundo MdE assinado entre o Fundo Nacional de Desenvolvimento Sustentável (FNDS), a Administração Nacional para as Áreas de Conservação (ANAC) e o (CTV), em Julho de 2017 que visa o desenvolvimento das actividades mencionadas acima em outras áreas de conservação marinhas, promovendo a sua protecção e conservação. A presente publicação resulta de actividades desenvolvidas no âmbito destes MdEs.

Centro Terra Viva (CTV) and the Ponta do Ouro Partial Marine Reserve (POPMR) have established in September 2013 a Memorandum of Understanding (MoU) in order to develop several activities related to research and monitoring of species and ecosystems within the reserve. The MoU was strengthened further by a second MoU signed between the National Fund for Sustainable Development (FNDS), the National Administration for Conservation Areas (ANAC) and CTV, in July 2017, in order to develop the activities mentioned above in other marine conservation areas, promoting their protection and conservation. The present publication is a result of activities undertaken under these MoUs.

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Cover: All photos by Jenny Strömvoll.



- 1 – Team conducting reef surveys (Kev's Ledge)
- 2 – Blue-spotted ribbontail ray, *Taeniura lymma* (Kev's Ledge)
- 3 – Close-up of a mushroom coral, *Sarcophyton* sp. (Kev's Ledge)
- 4 – A large coral head, *Porites* sp. (Kev's Ledge)

Maputo, May 2019

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ABSTRACT

This report presents data collected during the May/June 2018 reef benthic and fish monitoring surveys at the southern section of the Ponta do Ouro Partial Marine Reserve (POPMR). Data were collected on the five reefs selected using standardized methodology. Additionally, data on recreational divers' underwater behaviour were also collected. Coral cover was highest at Texas (43.1%) and lowest at Techobanine 2 with 24.4%. A low percentage of hard coral cover was found (<15% at all reefs), with soft coral dominating the reef biota (mainly *Lobophytum* and to a lesser degree *Sinularia*). Conversely, the percentage cover of rock/algae, rubble and sand was particularly high (ranging between 47 and 57%). The reef fish community was composed of typical small to medium reef fish, namely Chaetodontidae, Pomacentridae, Pomacanthidae and Labridae. The presence of large shoals of surgeon fishes (Acanthuridae), especially in the sanctuary reefs and of medium to large Serranidae and Scaridae species are good indicators of the health of these reefs. Overall, recreational SCUBA divers were relatively experienced with an average of 336.1 logged dives (SD= 101.5). They made 5.6 (SD=6.9) contacts with the substrata per 35 minute dive. No coral breakage by divers was observed, but abrasion and sediment resuspension were recorded.

RESUMO

O presente relatório apresenta os dados da monitoria dos recifes, realizada em Maio/Junho de 2018, na secção sul da Reserva Marinha Parcial da Ponta do Ouro (RMPPPO). Os dados foram colectados nos cinco recifes previamente seleccionados, usando metodologia standardizada. Adicionalmente, dados sobre o comportamento dos mergulhadores recreativos debaixo de água foram também colectados. A cobertura de coral vivo foi maior no recife Texas (43.1%) e menor em Techobanine 2 com 24.4%. Uma baixa percentagem de coral duro foi observada (<15% em todos recifes), sendo corais moles a categoria bentónica dominante (principalmente *Lobophytum* e de um modo menos significativo *Sinularia*). Por outro lado, a percentagem de cobertura de alga/rocha, calhau e areia foi particularmente alta (variando entre 47 e 57%). A comunidade ictiológica foi tipicamente composta por peixes de tamanho pequeno a médio, nomeadamente das famílias Chaetodontidae, Pomacentridae, Pomacanthidae e Labridae. A presença de grandes cardumes de cirurgiões (família Acanthuridae), especialmente nos recifes do santuário de Techobanine, e de garoupas (Serranidae) e papagaios (Scaridae) de tamanho médio a grande, constitui um bom indicador do estado de saúde destes recifes. De um modo geral, os mergulhadores recreativos eram relativamente experientes, com uma média de 336.1 mergulhos registados (DP=101.5) e fizeram 5.6 (DP=6.9) contactos com o substrato por mergulho de 35 min. Não foi observada nenhuma quebra de coral pelos mergulhadores, apesar de abrasão e resuspensão de sedimento terem sido observados.

1. INTRODUCTION

A reef monitoring program was established in 2011 (Pereira & Videira, 2011), after the proclamation of the Ponta do Ouro Partial Marine Reserve in 2009, building upon reef surveys that were conducted in 1996 (Robertson *et al.*, 1995) and 2002 (Pereira, 2003). This report presents the results of the fourth monitoring exercise, which included surveys of recreational SCUBA divers' underwater behaviour. Semi-quantitative reef fish surveys were also conducted and included in the compilation of species lists.

2. MATERIALS AND METHODS

2.1. Study Area

The Ponta do Ouro Partial Marine Reserve is located in southern Mozambique at the border with South Africa. A detailed description of the study reefs and general area is presented in Robertson *et al.* (1996) and Pereira (2003).

The five reefs previously chosen for the monitoring program at the southern section of the reserve were surveyed in May and June 2018: three reefs are located near Ponta Malongane (Creche–Cr, Kev's Ledge–KL and Texas–Tx) and two sites along the reef located off Mount Matonde, near Ponta Techobanine (Techo 1–Te1 and Techo 2–Te2). Table 1 and Figure 1 show the location of the reefs and GPS coordinates.

Table 1. Location of selected reefs surveyed in 2016, at the POPMR.

Reef code	Reef Name	GPS Coordinates (WGS84)		Observations
Cr	Creche	S26° 48.371	E32° 53.622	Offshore, subtidal patch reef. Depth: 10-14 m. Very high diving pressure.
KL	Kev's Ledge	S26° 46.673	E32° 54.268	Offshore, subtidal patch reef. Depth: 18-24 m. High diving pressure.
Te1	Techobanine 1	S26° 37.770	E32° 54.736	Offshore, subtidal patch reef. Depth: 16-20 m. Negligible diving pressure.
Te2	Techobanine 2	S26° 37.806	E32° 54.873	Offshore, subtidal patch reef. Depth: 18-22 m. Negligible diving pressure.
Tx	Texas	S26° 46.275	E32° 54.105	Offshore, subtidal patch reef. Depth: 12-18 m. Low diving pressure.

2.2. Reef Benthic Communities

The benthic communities were documented by a SCUBA diver using high-resolution, underwater digital imagery. The photographs were taken while swimming with the camera held at right angles to the reef face at a distance of 93 cm, the latter being regulated by a spacer bar attached to the camera housing. The distance between each photograph was 2-4 m, this being dictated by a pause in the camera recording system (Nikon Coolpix 4800). The area photographed in each photo-quadrat was approximately 0.3 m² and the distance between each photo-transect was at least 10 metres. The path of the transects was tracked using a floating GPS (Garmin eTrex). Annex 1 shows the coordinates of the transects at each reef. Each transect was composed of approximately 30 to 50 photo-quadrats. A total of 25 transects were completed, incorporating 941 photo-quadrats (Table 2).



Figure 1. Schematic map of the study area showing approximate location of the reefs surveyed (adapted from GoogleEarth). CR=Creche; KL=Kev's Ledge; Tx=Texas; Te1= Techobanine 1 and Te2=Techobanine 2.

Table 2. Sampling effort for reef benthos monitoring at the POPMR during the 2018 survey.

Reef	Date Surveyed	Transects	Photo-quadrats	Data points
Creche	31 May 2018	5	188	1 504
Kev's Ledge	30 May 2018	4	167	1 336
Techobanine 1	21 June 2018	5	172	1 376
Techobanine 2	21 June 2018	6	217	1 736
Texas	30 May 2018	5	197	1 576
Total		25	941	7 528

The data were extracted from the photo-quadrats using the point-intercept technique, where the images in JPEG format were analysed through the software CPCe 4.1 (Kohler & Gill, 2006). Eight randomly located points were superimposed on each image and the benthic category underneath each point identified to lowest possible taxonomic level. The morphological categories proposed by English *et al.* (1994) were used. A total of 7 528 random data points were analysed (Table 2).

2.3. Reef Fish Communities

The reef fish communities were monitored through direct observation and photography, using a Go-Pro camera. The monitoring consists in assessing fish abundance, through the indicative grouping of fish species as present (0 to 5 individuals), common (5 to 10 individuals) and abundant (10 or more individuals) and size classes through the registering of small (<15 cm), medium (15 – 30 cm) and large (> 30 cm). Fish species identification was made with the support of relevant literature (Lieske & Myers, 1999; King & Fraser, 2014).

2.4. Recreational SCUBA Divers' Underwater Behaviour

Underwater divers' behaviour surveys were carried out to assess and quantify the damage caused by divers to the benthic communities during two recreational dives in two shallow reefs, Doodles and Steve's Ledge. The methodology followed that described in Pereira (2003) and Pereira & Videira (2011), in order to ensure consistency and comparability of the data. A total of 11 divers were monitored, including two instructors.

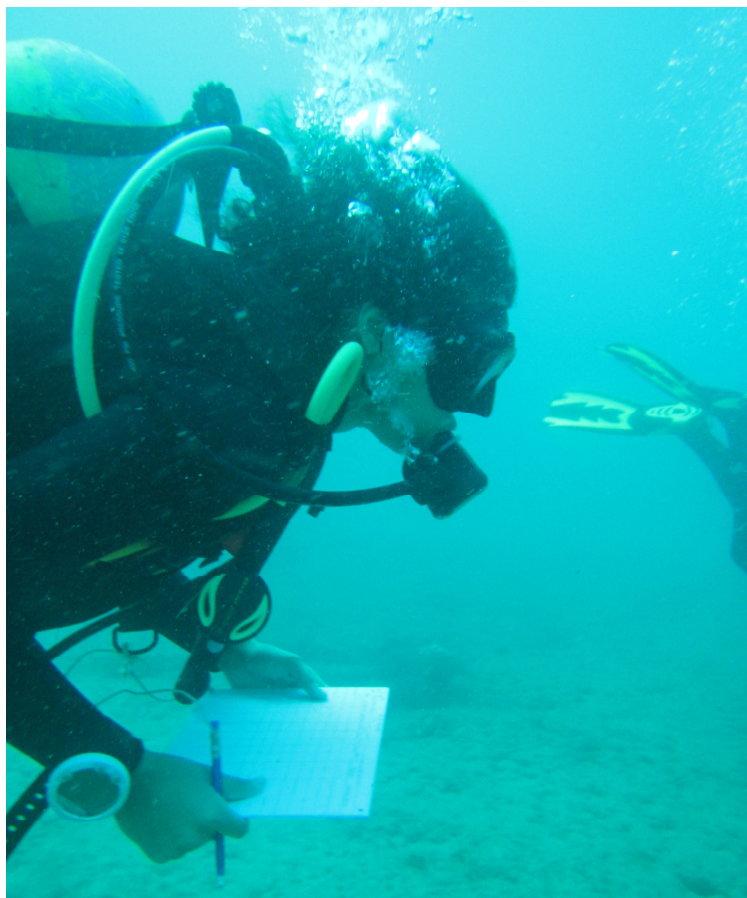


Figure 2. Diver collecting data on divers' behaviour. Photo: Raquel Fernandes.

3. RESULTS

3.1. Reef Benthic Communities

At all reefs, the percentage cover of the general coral category was above 30%, except for Techobanine 2, with 25.6% (Table 3). Overall, the dominant category was rock and algae which, along with sand and rubble, covered between 47 to 57%. Fleishy macroalgae were recorded at all locations with Kev's Ledge ($7.0 \pm 2.2\%$) and the two reefs at Techobanine (Techo 1 = $8.7 \pm 2.7\%$ and Techo 2 = 12.8 ± 7.1) showing the highest percentage cover. Another noteworthy aspect is the

significant presence of sponges (mainly encrusting) with 6.9% cover at Creche. While not very abundant, other invertebrates were seen commonly at all reefs and included both vasiform and encrusting sponges, sea stars (*Linkia* spp., *Culcita* spp.), sea cucumbers (*Stichopus* spp. and *Holothuria* spp.), and a vast array of molluscs. Not a single crown-of-thorns-starfish (CoTS; *Acanthaster mauritiensis*) or feeding scars were observed at any reef.

Table 3. Percentage cover \pm SD of the major reef benthic categories at the POPMR during the 2016 survey.

Category	Creche	Kev's Ledge	Techo 1	Techo 2	Texas
Coral	38.5 \pm 5.8	36.8 \pm 5.7	32.0 \pm 11.1	25.6 \pm 23.1	43.2 \pm 7.7
Macroalgae	1.4 \pm 1.1	7.0 \pm 2.2	8.7 \pm 2.7	12.8 \pm 7.1	3.7 \pm 0.9
Coralline algae	0.0 \pm 0.0	0.5 \pm 0.3	0.1 \pm 0.3	1.6 \pm 3.2	0.1 \pm 0.2
Molluscs	0.0 \pm 0.0	0.0 \pm 0.0	0.0 \pm 0.0	0.1 \pm 0.2	0.0 \pm 0.0
Ascidians	3.0 \pm 1.5	3.6 \pm 0.7	1.4 \pm 1.3	0.6 \pm 0.7	2.0 \pm 1.1
Other invertebrates	7.3 \pm 2.6	3.3 \pm 1.0	1.7 \pm 1.8	1.8 \pm 1.0	3.2 \pm 3.0
Sand, rock/algae, rubble	49.8 \pm 4.3	46.8 \pm 5.2	56.0 \pm 8.8	57.4 \pm 16.6	47.0 \pm 5.7

In terms of corals, Texas had the highest total live coral coverage (43.1%) while Techobanine 2, with 24.4%, had the lowest cover (Table 4). Soft corals (mainly *Lobophytum* and to a lesser degree *Sinularia*; Annex 2) were the dominant biota (percentage cover ranged from around 14.1% in Techo 2 to 37.0% in Texas), with hard corals showing low cover at all locations, with the highest cover observed at Kev's Ledge (14.6% mainly encrusting *Montipora*) and Techo 2 (10.0% chiefly branching *Acropora*).

Table 4. Percentage cover \pm SD of the major coral categories at the POPMR during the 2018 survey.

Category	Creche	Kev's Ledge	Techo 1	Techo 2	Texas
Branching hard coral	1.2 \pm 0.6	1.9 \pm 1.0	0.0 \pm 0.0	8.5 \pm 15.5	1.1 \pm 0.8
Digitate hard coral	0.0 \pm 0.0	0.0 \pm 0.0	0.0 \pm 0.0	0.0 \pm 0.0	0.0 \pm 0.0
Encrusting hard coral	1.0 \pm 0.9	6.7 \pm 1.4	0.5 \pm 0.8	0.5 \pm 0.6	1.8 \pm 1.4
Foliose hard coral	0.0 \pm 0.0	0.0 \pm 0.0	0.0 \pm 0.0	0.0 \pm 0.0	0.0 \pm 0.0
Free living coral	0.0 \pm 0.0	0.2 \pm 0.2	0.0 \pm 0.0	0.0 \pm 0.0	0.0 \pm 0.0
Massive hard coral	2.9 \pm 1.0	4.2 \pm 1.8	3.50 \pm 4.3	1.0 \pm 0.9	2.2 \pm 1.2
Submassive hard coral	0.1 \pm 0.2	0.0 \pm 0.0	0.0 \pm 0.0	0.0 \pm 0.0	0.7 \pm 1.5
Tabular hard coral	0.0 \pm 0.0	1.1 \pm 2.0	0.1 \pm 0.2	0.0 \pm 0.0	0.0 \pm 0.0
Total hard coral	5.2 \pm 1.9	14.6 \pm 5.0	4.1 \pm 4.1	10.0 \pm 16.0	5.8 \pm 1.8
Soft coral	32.8 \pm 3.9	23.8 \pm 7.5	27.5 \pm 13.6	14.1 \pm 11.0	37.0 \pm 8.7
Fire coral	0.0 \pm 0.0	0.0 \pm 0.0	0.0 \pm 0.0	0.0 \pm 0.0	0.0 \pm 0.0
Unidentified corals	0.4 \pm 0.3	0.6 \pm 0.2	0.1 \pm 0.3	0.3 \pm 0.3	0.3 \pm 0.5
Total live coral	38.5 \pm 5.8	38.0 \pm 6.2	31.8 \pm 11.1	24.4 \pm 21.2	43.1 \pm 7.8
Dead coral with algae	0.0 \pm 0.0	0.2 \pm 0.3	0.2 \pm 0.2	1.2 \pm 2.3	0.1 \pm 0.1
Recently dead coral	0.0 \pm 0.0	0.0 \pm 0.0	0.1 \pm 0.2	0.0 \pm 0.0	0.0 \pm 0.0

3.2. Reef Fish Communities

The reef fish species richness varied from 43 to 72 species, with the sanctuary reefs (i.e. Techobanine) presenting the least number of species (Table 5). This is probably the result of low coral cover and reef degradation which has been previously reported (Pereira, 2017). Nonetheless, continuous surveys need to be done to assess and monitor the fish communities on these reefs. The

cumulative species list for the POPMR is found in Annex 3. A total of 485 species (in 90 families) have been identified.

The fish communities of these reefs are represented by common coral reef species of small to medium size (e.g. Chaetodontidae, Labridae, Pomacentridae and Pomacanthidae). However, in all five reefs a common coral reef fish family Acanthuridae was observed in great numbers and with sizes ranging from small, medium to large. In the sanctuary reefs, medium to large individuals of *Acanthurus thompsoni* and *A. xanthopterus* were found in shoals. At Kev's Ledge, Creche and Texas large size individuals of parrotfishes (family Scaridae) were observed in abundant numbers, mainly *Scarus rubroviolaceus* e *S. scaber*. The rockcod family (Serranidae), was represented in all reefs. At Creche at least six species were identified, of which large individuals of *Varioula louti* and *Cephalopholis miniata* were also found in great numbers. At Kev's Ledge a shark was observed but identification to species level was not possible.

Table 5. Reef fish community diversity at the POPMR southern section reefs during the 2018 survey.

	Creche	Kev's Ledge	Techo 1	Techo 2	Texas
Families	18	21	21	14	18
Species	72	68	47	43	64
<i>Abundance (%)</i>					
Present (0-5 ind.)	33.3 (n=24)	64.7 (n=44)	51.1 (n=24)	55.8 (n=24)	62.5 (n=40)
Common (5 – 10 ind.)	12.5 (n=9)	13.0 (n=9)	27.7 (n=13)	18.6 (n=8)	14.1 (n=9)
Abundant (>10 ind.)	54.2 (n=39)	22.0 (n=15)	21.3 (n=10)	25.6 (n=11)	23.4 (n=15)

In Techo 2 and Creche, two large marine turtles were identified, a hawksbill (*Eretmochelys imbricata*) and a green turtle (*Chelonia mydas*), respectively.

3.3. Recreational SCUBA Divers' Underwater Behaviour

The majority of the divers were males (54.5%). Only one diver (9.0%) had a camera. Overall, divers were relatively experienced with an average of 336.1 logged dives. Less experienced divers with only five dives were also monitored (Table 6).

Table 6. Summary of surveyed divers at the POPMR, 2018. SD=standard deviation.

Level of instuction	Nr of divers	Number of dives		
		Average \pm SD	Min	Max
Advanced open water	4	72.0 \pm 46.5	18	120
Dive Master	1	316.0		
Instructor	2	+1 500.0		
Junior open water	1	5.0		
Open water	3	29.3 \pm 8.1	20	35
Total	11	336.1 \pm 582.0	5	1 500

Table 7 presents the results of the surveys on the underwater behaviour of recreational SCUBA divers. On average, divers got in contact 5.6 times (SD = 6.9) with the substract, per 35 min dive. Only one diver with a camera was surveyed and made one contact with the substract. Intentional contacts were made with hands (66.7%) on other benthos (mostly rock; 33.3%), but the same

number of contacts were observed in hard coral and sand substratum, and resulted mostly on abrasion (50.0%) and sediment resuspension (50.0%). As a result, no coral breakage was observed.

Table 7. Summary results of the underwater behavior of recreational SCUBA divers' surveys conducted from 2002 to 2018 at the POPMR.

Parameter	2002	2011	2014	2018
N Males	20	17	12	6
N Females	5	10	8	5
Average N dives \pm SD	128.5 \pm 230.5	202.0 \pm 535.1	160.1 \pm 342.5	336.1 \pm 582.0
Average contacts/35 min dive \pm SD	20.2 \pm 38.4	13.7 \pm 16.3	16.1 \pm 22.4	5.6 \pm 6.9
N divers with cameras (%)	2 (8)	8 (30)	3 (15)	1 (9)
N contacts: divers with cameras	54.3 \pm 76.7	20.1 \pm 14.7	22.2 \pm 31.4	7
N contacts: divers without cameras	15.7 \pm 30.1	11.1 \pm 16.6	15.2 \pm 19.8	4.9 \pm 6.3
Contact by hand (%)	32.1	21.6	43.5	66.7
Contact by knee (%)	4.5	3.9	6.5	16.7
Contact by gear (%)	53.9	72.5	50.0	16.7
Contact by other (%)	7.5	2.0	0	0
Contacts on hard coral (%)	11.2	1.9	4.3	33.3
Contacts on soft coral (%)	14.2	9.6	2.2	0
Contacts on other benthos (%)	34.3	34.6	47.8	33.3
Contacts on sand (%)	40.3	53.8	45.7	33.3
Contacts with breakage (%)	2.2	2.0	0.0	0.0
Contacts with abrasion (%)	97.8 *	37.3	52.2	50.0
Contacts with sediment resuspension (%)	*	60.8	47.8	50.0

* in 2002, "abrasion" included both abrasion and sediment resuspension.

4. CONCLUDING REMARKS

From the results of the 2018 monitoring survey, two aspects are worth mentioning:

Reef Recovery

The coral communities seem to be recovering from the degradation previously reported by Pereira & Fernandes (2014), although at different paces. This is very encouraging and warrants consistent and systematic monitoring.

Despite the low number of divers sampled, the results of the surveys on divers' underwater behaviour suggest that awareness of good dive practice seems to be increasing. This is indicated by the average number of contacts divers made with the substratum, in comparison to previous surveys (Pereira, 2003; Pereira & Videira, 2011; Pereira & Fernandes, 2014). Whilst it appears that the recreational SCUBA diving has minimal effect on the coral communities, management authorities are encouraged to continue to convey awareness about safe diving practices and to closely monitor the diving pressure on the reefs. Other factors, such as coral bleaching and the crown-of-thorns starfish (*Acanthaster mauritiensis*) should also merit attention. A close collaboration and liaison with the diving community should suffice in terms of providing early warning of these factors.

In order to gain a wider and deeper understanding of the biodiversity, distribution and condition of the reefs within the reserve, reef assessments in other areas are recommended. These will provide

invaluable insight into the overall status of reefs in the POPMR, which will be especially valuable in view of the proclamation of the reserve as a UNESCO World Heritage Site.

Fish Community

The diversity and biomass of the reef fish communities indicates that these reefs are in good condition, especially based on the presence, in large numbers and sizes, of critical families such as Acanthuridae, Scaridae and Serranidae in the majority of the reefs monitored. However, pelagic predators such as the king mackerel (*Scomberomorus comerson*), green jobfish (*Aprion virecens*) or even smaller specimens of tuna species were conspicuously absent. The surveys conducted were semi-quantitative in nature, and thus do not provide the true picture of the status of these fish communities. Therefore, rigorous monitoring of sport-fishing catches must continue in order to provide critical information on stocks as well as management recommendations.

5. ACKNOWLEDGMENTS

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ANNEX 1. GPS co-ordinates (WGS 84) of the photo-transects. Transects run either north or south depending on the prevailing current at the time of sampling.

Reef (reef code)	Transect #	Start	End
Creche (Cr)	Tr1	26° 48.748 S ; 32° 53.646 E	26° 48.716 S ; 32° 53.640 E
	Tr2	26° 48.711 S ; 32° 53.636 E	26° 48.728 S ; 32° 53.630 E
	Tr3	26° 48.731 S ; 32° 53.629 E	26° 48.745 S ; 32° 53.621 E
	Tr4	26° 48.752 S ; 32° 53.622 E	26° 48.736 S ; 32° 53.628 E
	Tr5	26° 48.733 S ; 32° 53.628 E	26° 48.717 S ; 32° 53.632 E
Kev's Ledge (KL)	Tr1	26° 46.731 S ; 32° 54.243 E	26° 46.710 S ; 32° 54.246 E
	Tr2	26° 46.705 S ; 32° 54.246 E	26° 46.712 S ; 32° 54.252 E
	Tr3	26° 46.720 S ; 32° 54.254 E	26° 46.720 S ; 32° 54.259 E
	Tr4	26° 46.712 S ; 32° 54.257 E	26° 46.698 S ; 32° 54.241 E
Techobanine 1 (Te1)	Tr1	26° 37.775 S ; 32° 54.695 E	26° 37.759 S ; 32° 54.690 E
	Tr2	26° 37.753 S ; 32° 54.689 E	26° 37.739 S ; 32° 54.681 E
	Tr3	26° 37.732 S ; 32° 54.678 E	26° 37.721 S ; 32° 54.696 E
	Tr4	26° 37.720 S ; 32° 54.702 E	26° 37.699 S ; 32° 54.707 E
	Tr5	26° 37.693 S ; 32° 54.703 E	26° 37.675 S ; 32° 54.699 E
Techobanine 2 (Te2)	Tr1	26° 37.825 S ; 32° 54.838 E	26° 37.825 S ; 32° 54.824 E
	Tr2	26° 37.829 S ; 32° 54.822 E	26° 37.836 S ; 32° 54.788 E
	Tr3	26° 37.829 S ; 32° 54.779 E	26° 37.794 S ; 32° 54.779 E
	Tr4	26° 37.793 S ; 32° 54.777 E	26° 37.782 S ; 32° 54.774 E
	Tr5	26° 37.777 S ; 32° 54.776 E	26° 37.763 S ; 32° 54.761 E
	Tr6	26° 37.741 S ; 32° 54.755 E	26° 37.712 S ; 32° 54.742 E
Texas (Tx)	Tr1	26° 46.335 S ; 32° 54.024 E	26° 46.350 S ; 32° 54.033 E
	Tr2	26° 46.354 S ; 32° 54.036 E	26° 46.372 S ; 32° 54.048 E
	Tr3	26° 46.372 S ; 32° 54.055 E	26° 46.401 S ; 32° 54.060 E
	Tr4	26° 46.407 S ; 32° 54.070 E	26° 46.433 S ; 32° 54.066 E
	Tr5	26° 46.448 S ; 32° 54.063 E	26° 46.475 S ; 32° 54.062 E

ANNEX 2. Percentage cover \pm SD of coral genera identified at the within POPMR during the 2018 survey. % trans = percentage of the genera within the transect; % coral = percentage of the genera within corals only. SD = standard deviation.

Genera	Creche				Kev's Ledge				Techo 1				Techo 2				Texas			
	% tran	SD	% coral	SD	% tran	SD	% coral	SD	% tran	SD	% coral	SD	% tran	SD	% coral	SD	% tran	SD	% coral	SD
<i>Acanthastrea</i>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<i>Acropora</i>	0.4	0.3	0.9	0.6	1.4	1.2	3.4	2.8	0.0	0.0	0.0	0.0	8.7	15.9	18.4	28.7	0.5	0.6	1.2	1.4
<i>Alveopora</i>	0.1	0.2	0.2	0.4	0.1	0.1	0.2	0.3	0.0	0.0	0.0	0.0	0.3	0.6	0.6	1.0	1.0	1.3	2.7	3.5
<i>Astreopora</i>	0.2	0.3	0.5	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.6	0.7	1.5
<i>Cespitularia</i>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<i>Cladiela</i>	1.2	1.3	2.8	2.9	0.0	0.0	0.0	0.0	0.2	0.2	0.8	1.1	0.0	0.0	0.0	0.0	0.3	0.7	0.8	1.8
<i>Dendronephthya</i>	0.1	0.2	0.2	0.4	1.8	1.5	4.9	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<i>Diploastrea</i>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<i>Dipsastraea</i>	0.3	0.3	0.7	0.7	1.6	1.1	4.2	2.4	0.1	0.2	0.4	1.0	0.1	0.1	3.3	8.2	0.5	0.3	1.2	0.8
<i>Echinopora</i>	0.6	1.0	1.3	2.1	1.0	1.1	3.0	3.7	0.0	0.0	0.0	0.0	0.1	0.2	0.4	0.9	0.6	0.9	1.3	1.8
<i>Favites</i>	1.5	0.6	3.8	1.6	1.5	0.6	3.7	1.1	0.5	0.9	2.3	4.7	0.1	0.2	0.3	0.5	0.4	0.3	0.9	0.8
<i>Fungiid</i>	0.0	0.0	0.0	0.0	0.2	0.2	0.4	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.2	0.5
<i>Galaxea</i>	0.3	0.2	0.9	0.6	0.1	0.1	0.2	0.3	0.2	0.3	1.1	1.6	0.0	0.0	0.0	0.0	0.1	0.2	0.2	0.5
<i>Gardineroseris</i>	0.2	0.4	0.5	1.1	0.2	0.3	0.6	0.8	0.0	0.0	0.0	0.0	0.1	0.1	3.3	8.2	0.0	0.0	0.0	0.0
<i>Goniastrea</i>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.4	0.0	0.0	0.0	0.0
<i>Goniopora</i>	0.1	0.2	0.3	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.4
<i>Gorgonian</i>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<i>Hydnophora</i>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<i>Leptoseris</i>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<i>Lobophyllia</i>	0.0	0.0	0.0	0.0	0.1	0.2	0.3	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<i>Lobophytum</i>	28.6	2.2	75.1	8.7	15.9	3.8	41.1	6.0	19.2	12.6	56.1	20.6	8.7	7.8	47.3	31.9	29.9	6.2	69.0	5.7
<i>Merulina</i>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<i>Montipora</i>	0.3	0.4	0.9	1.0	5.4	0.7	14.5	3.9	0.5	0.8	2.2	3.5	0.1	0.3	0.5	0.9	1.2	0.8	2.7	2.1
<i>Mycidium</i>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<i>Nephthiid</i>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<i>Oxypora</i>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<i>Pachyseris</i>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<i>Pavona</i>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<i>Platygyra</i>	0.4	0.5	1.1	1.2	0.5	0.4	1.1	1.0	1.4	2.1	4.9	7.2	0.4	0.6	4.6	7.9	0.4	0.5	1.0	1.4
<i>Plesiastrea</i>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<i>Pocillopora</i>	0.7	0.6	1.8	1.4	0.7	0.8	2.1	2.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.5	1.3	1.2
<i>Porites</i>	0.1	0.1	0.2	0.4	0.1	0.2	0.2	0.4	1.3	2.6	4.5	8.4	0.0	0.0	0.0	0.0	0.1	0.3	0.3	0.6

ANNEX 2. Cont.

Genera	Creche				Kev's Ledge				Techo 1				Techo 2				Texas			
	% tran	SD	% coral	SD	% tran	SD	% coral	SD	% tran	SD	% coral	SD	% tran	SD	% coral	SD	% tran	SD	% coral	SD
<i>Rhytisma</i>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<i>Rumphella</i>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.2	0.4	0.6	1.0	2.2	3.5	0.0	0.0	0.0	0.0
<i>Sarcophyton</i>	0.4	0.5	1.1	1.6	0.6	0.6	1.5	1.4	1.9	1.2	7.0	5.1	0.4	0.6	1.4	2.3	1.4	0.6	3.2	1.0
<i>Seriatopora</i>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<i>Sinularia</i>	2.6	2.6	6.2	5.2	5.3	3.6	13.1	8.1	6.1	3.4	18.3	5.5	4.3	4.3	13.9	15.9	5.2	2.8	11.7	4.2
<i>Stylophora</i>	0.1	0.2	0.3	0.4	0.1	0.2	0.3	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.2	0.5
<i>Tubipora</i>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.2	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<i>Turbinaria</i>	0.0	0.0	0.0	0.0	1.0	2.0	2.5	4.9	0.1	0.2	0.2	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<i>Xeniid</i>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Bleached coral	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Disease	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

ANNEX 3. Cumulative checklist of reef and litoral fish species identified at the POPMR. The species list was compiled from Pereira *et al.* (2004), Floros (2010), Pereira & Videira (2014) and Pereira (2016). *=species observed in 2018; (?)=to be confirmed.

Acanthuridae

Acanthurus auranticavus
*Acanthurus blochii**
*Acanthurus dussumieri**
*Acanthurus leucosternon**
Acanthurus lineatus
Acanthurus mata
*Acanthurus nigrofuscus**
*Acanthurus tennentii**
*Acanthurus thompsoni**
Acanthurus triostegus
*Acanthurus xanthopterus**
*Ctenochaetus binotatus**
*Ctenochaetus striatus**
*Ctenochaetus truncatus**
Naso brachycentron
Naso brevirostris
*Naso elegans**
Naso fageni
*Naso hexacanthus**
Naso unicornis
Paracanthurus hepatus
*Zebrassoma gemmatum**
*Zebrassoma scopas**

Antennariidae

Antennatus coccineus
Antennatus nummifer

Apogonidae

Apogon coccineus
Apogon semiornatus
Apogonichthys ocellatus
Cheilodipterus artus
Cheilodipterus macrodon
Gymnapogon africanus
Neamia octospina
Ostorhinchus angustatus
Ostorhinchus apogonides
Ostorhinchus aureus
Ostorhinchus taeniophorus
Pristiapogon fraenatus
Pristiapogon kallopterus
Siphamia mossambica

Atherinidae

Atherinomorus lacunosus

Aulostomidae

Aulostomos chinensis

Balistidae

Aluterus scriptus

*Balistapus undulatus**
*Balistoides conspicillum**
*Balistoides viridescens**
*Melichthys indicus**
Melichthys niger
*Odonus niger**
Pseudobalistes fuscus
*Rhinecanthus aculeatus**
Sufflamen bursa
*Sufflamen chrysopterum**
Sufflamen fraenatum

Blenniidae

Alloblennius parvus
*Aspidontus dussumieri**
Aspidontus tractus
Cirripectes castaneus
Ecsenius midas
Ecsenius nalolo
Exallias brevis
Hirculops cornifer
Blenniella cyanostigma
Istiblennius dussumieri
Istiblennius edentulus
Pereulixia kosiensis
Plagiotremus rhinorhynchus
Plagiotremus tapeinosoma
Scartella emarginata

Bothidae

Bothus mancus
Dinematichthys sp.
Engypropon sp.

Caesionidae

Caesio caeruleaurea
Caesio lunaris
Caesio teres
*Caesio xanthonota**
*Caseio xanthalythos**?
Pterocaesio tile

Callionymidae

Callionymus marleyi
Synchiropus postulus
Synchiropus stellatus

Caracanthidae

Caracanthus madagascariensis
Caracanthus unipinna

Carangidae

Alectis ciliaris

Alectis indica
Alepes djedaba
Carangoides oeruleopinnatus
Carangoides ferdau
Carangoides fulvooguttatus
Caranx heberi
Caranx ignobilis
Caranx melampygus
Caranx papuensis
Caranx sexfasciatus
Decapterus macarellus
Gnathanodon speciosus
Pseudocaranx dentex
Scomberoides lysan
Seriolina nigrofasciata
Trachinotus botla

Carcharhinidae

Carcharhinus amblyrhynchus
Carcharhinus leucas
Galeocerdo cuvier
*Triaenodon obesus**

Chaetodontidae

*Chaetodon auriga**
*Chaetodon blackburnii**
Chaetodon dolosus
*Chaetodon guttatissimus**
*Chaetodon interruptus**
*Chaetodon kleinii**
*Chaetodon lunula**
*Chaetodon madagaskariensis**
*Chaetodon meyeri**
*Chaetodon trifascialis**
Chaetodon trifasciatus
Chaetodon vagabundus
*Chaetododon zanzibariensis**?
*Forcipiger flavissimus**
*Hemitaurichthys zoster**
Heniochus acuminatus
Heniochus diphreutes
Heniochus monoceros

Cirrhitidae

Amblycirrhitus bimacula
*Cirrhitichthys oxycephalus**
*Paracirrhites arcatus**
*Paracirrhites forsteri**

Clinidae

Pavoclinus graminis
Pavoclinus laurentii

Congridae*Conger cinereus***Congrogadidae***Halimuraena shakai***Coracinidae***Dichistius multifasciatys***Creediidae***Apodocreedia vanderhorsti**Limnichthys nitidus***Cynoglossidae***Cynoglossus sp.**Parapaglusia bilineata***Dasyatidae***Maculabatis gerrardi**Neotrygon kuhlii**Taeniura lymma**Taeniura meyeni**Urogymnus asperrimus***Dinopercidae***Dinoperca petersi***Diodontidae***Diodon hystrix**Diodon liturosus***Echeneidae***Echeneis naucrates***Ephippidae***Platax teira**Tripteron orbis***Exocoetidae***Exocoetidae sp.**Fistularia commersonii**Fistularia petimba**Fistularidae***Gerreidae***Gerres longirostris***Gobiesocidae***Lepadichthys coccinotaenia***Gobiidae***Callogobius sclateri**Eviota prasina**Fusigobius duospillus**Fusigobius longispinus**Gnatholepis sp.**Gobiodon rivulatus**Heteroleotris tentaculata**Heteroleotris zonata**Istigobius decoratus**Nemateleotris magnifica**Pleurosicya mossambica**Priolepis cincta**Ptereleotris eteroptera**Ptereleotris evides**Trimma macrophthalmum**Valenciennea strigata***Grammistidae***Grammistes sexlineatus***Haemulidae***Diagramma centurio**Plectorhinchus chubbi***Plectorhinchus flavomaculatus***Plectorhinchus gaterinus**Plectorhinchus vittatus**Plectorhinchus plagiodesmus**Plectorhinchus playfairi***Plectorhinchus schotaf**Pomadasys commersonii**Pomadasys furcatus***Hemiramphidae***Hyporhamphus affinis***Holocentridae***Myripristis berndti**Myripristis botche**Myripristis kuntee**Myripristis murdjan***Myripristis vittata***Neoniphon argenteus**Neoniphon sammara**Sargocentrom ittodai**Sargocentron caudimaculatum***Sargocentron diadema****Istiophoridae***Istiophorus platypterus**Istiompax indica***Khuliidae***Khulia mugil***Kraemeriidae***Kraemia samoensis***Kyphosidae***Kyphosus bigibbus***Labridae***Anampses caeruleopunctatus**Anampses lineatus**Anampses meleagrides***Anampses twistii***Bodianus anthioides**Bodianus atrolumbus***Bodianus axillaris**Bodianus bilunulatus***Bodianus diana***Bodianus perditio**Bodianus trilineatus**Calotomus carolinus**Cheilinus trilobatus**Cheilium inermis**Chlorurus atrilunula**Chlorurus cyanescens**Cirrhilabrus exquisitus**Coris aygula**Coris caudimacula**Coris cuvieri**Coris cuvieri***Coris formosa***Gomphosus caeruleus***Halichoeres cosmetus**Halichoeres hortulanus***Halichoeres iridis***Halichoeres nebulosus**Halichoeres scapularis*(?)**Hemigymnus fasciatus**Hologymnosus annulatus**Hologymnosus doliatus**Iniistius pavo**Labroides bicolor**Labroides dimidiatus***Labropsis xanthonota**Macropharyngodon bipartitus***Macropharyngodon cyanoguttatus**Macropharyngodon vivienae***Novaculichthys taeniourus**Oxycheilinus bimaculatus**Oxycheilinus diagramma**Pseudocheilinus evanidus**Pseudocheilinus hexataenia**Pseudodax molluccanus***Pseudojuloides cerasinus**Stethojulis albovittata**Stethojulis interrupta**Stethojulis strigiventer**Thalassoma amblycephalum**Thalassoma genivittatum**Thalassoma hebraicum**Thalassoma lunare***Thalassoma lutescens**Thalassoma purpureum**Thalassoma trilobatum***Scaridae***Calotomus carlinus*(?)*

Scarus frenatus
Scarus ghobban
*Scarus rubroviolaceus**
Scarus scaber(?)*
*Scarus tricolor**
Scarus viridifucatus

Lethrinidae

Gnathodentex aureolineatus
*Gymnocranius grandoculis**
Gymnocranius griseus
Lethrinus crocineus
Lethrinus harak
Lethrinus lentjan
*Lethrinus microdon**
*Lethrinus nebulosus**
Lethrinus variegatus
Monotaxis grandoculis

Lutjanidae

Aphareus furca
Aphareus rutilans
*Aprion virescens**
Lutjanus argentimaculatus
*Lutjanus bohar**
Lutjanus fulviflamma
*Lutjanus gibbus**
*Lutjanus kasmira**
*Lutjanus lutjanus**
Lutjanus monostigma
Lutjanus rivulatus
Lutjanus russellii
*Macolor niger**
*Paracaesio sordida**
*Paracaesio xanthura**

Malacanthidae

Malacanthus brevisrostris
Malacanthus latovittatus

Mobulidae

Mobula birostris

Monacanthidae

Cantherines dumerilii
Cantherines frontocintus
Cantherines pardalis
Paraluteres prionurus
Pervagor janthinosoma
Stephanolepis auratus

Monodactylidae

Monodactylus argenteus

Mugilidae

Planiliza macrolepis
Mugil cephalus

Crenimugil buehanani

Mullidae

*Mulloidies vanicolensis**
Mulloidichtys flavolineatus
*Parupeneus barberinus**
Parupeneus trifasciatus
Parupeneus heptacanthus
*Parupeneus cyclostomus**
*Parupeneus indicus**
*Parupeneus macronemus**
*Parupeneus pleurostigma**
Parupeneus rubescens

Muraenidae

Echidna nebulosa
Gymnomuraena zebra
Gymnothorax breedeni
Gymnothorax buroensis
Gymnothorax eurostrus
Gymnothorax favagineus
Gymnothorax flavimarginatus
Gymnothorax fuscomaculatus
Gymnothorax javanicus
Gymnothorax margaritophorus
Gymnothorax melatremus
Gymnothorax meleagris
Gymnothorax nudivomer
Gymnothorax undulatus
Gymnothorax zonipectis
Gymnothorax griseus
Gymnothorax picta

Myliobatidae

Aetobatus narinari

Nemipteridae

Scolopsis vosmeri

Notocheiridae

Carcharias taurus
Iso natalensis
Odontaspidae

Ophichthidae

Myrichthys maculosus

Ophidiidae

Brotula multibarbata

Opistognathidae

Opistognathus margaretae

Oplegnathidae

Oplegnathus pealopesi
Oplegnathus robinsoni

Orectolobidae

Stegostoma fasciatum

Ostraciidae

Ostracion cubicus
Ostracion meleagris

Pempheridae

*Parapriacanthus ransonneti**
Pempheris adusta
*Pempheris schwenkii**

Pinguipedidae

Paraperis hexophthalma
Paraperis punctulata
Paraperis robinsoni
Paraperis sp.

Platycephalidae

Onigocia oligolepis
Thysanophrys chiltonae
Sunagocia otaitensis

Pleuronectidae

Samariscus triocellatus

Plotosidae

Plotosus lineatus

Polynemidae

Polydactylus plebeius

Pomacanthidae

Apolemichthys kingi
*Apolemichthys trimaculatus**
Centropyge acanthops
Centropyge bispinosa
*Centropyge multispinis**
Genicanthus caudovittatus
*Pomacanthus imperator**
*Pomacanthus rhomboides**
*Pomacanthus semicirculatus**
Pygoplites diacanthus

Pomacentridae

*Abudefduf natalensis**
Abudefduf notatus
Abudefduf sexfasciatus
Abudefduf sordidus
Abudefduf sparoides
Abudefduf vaigiensis
*Amphiprion akallopisos**
*Amphiprion allardi**
*Chromis dasygenys**
*Chromis fieldi**
Chromis lepidolepis
*Chromis nigrura**

Chromis opercularis
*Chromis weberi**
Chrysiptera unimaculata
Dascyllus aruanus
Dascyllus carneus
*Dascyllus trimaculatus**
Neopomacentrus cyanomos
Plectroglyphidodon dickii
Plectroglyphidodon jhonstonianus
Plectroglyphidodon lacrymatus
Plectroglyphidodon leucozonus
*Pomacentrus caeruleus**
Pomacentrus pavo
Pomacentrus trichourus

Pomatomidae

Pomatomus saltatrix

Priacanthidae

Heteropriacanthus cruentatus
*Priacanthus hamrur**

Pseudochromidae

Chlidichthys johnvoelckeri
Pseudochromis dutoiti
Pseudochromis melas
Pseudochromis natalensis

Pseudogrammidae

Pseudogramma polyacantha

Ptereleotridae

Ptereleotris sp.

Rhincodontidae

Rhincodon typus

Rhinobatidae

Rhynchobatus djiddensis

Sciaenidae

Argyrosomus japonicus
Umbrina canariensis
Umbrina robinsoni

Scombridae

Acanthocybium solandri
Sarda orientalis
*Scomberomorus commerson**
Thunnus albacares

Scorpaenidae

Parascorpaena mcadamsi
Parascorpaena mossambica
Pterois miles
Pterois mombasae
Scorpaenodes kelloggi

Scorpaenodes parvipinnis
Scorpaenodes varipinnis
Scorpaenopsis brevifrons
Scorpaenopsis oxycephala
Scorpaenopsis venosa
Sebastapistes cyanostigma
Sebastapistes mauritiana
Sebastapistes strongia
Taenianotus triacanthus

Scorpididae

Neoscorpis lithophilus

Serranidae

*Aethaloperca rogae**
*Cephalopholis argus**
*Cephalopholis miniata**
Cephalopholis nigripinnis
*Cephalopholis sonnerati**
Epinephelus andersoni
*Epinephelus coeruleopunctatus**
Epinephelus fasciatus
*Epinephelus flavocaeruleus**
Epinephelus lanceolatus
Epinephelus macrospilos
Epinephelus malabaricus
Epinephelus marginatus
Epinephelus posteli
Epinephelus rivulatus
Epinephelus tauvina
Epinephelus tukula
Nemanthias carberryi
Plectranthias longimanus
Plectropomus punctatus
*Pseudanthias squamipinnis**
*Pseudanthias evansi**
Variola albimarginata
*Variola louti**

Siganidae

Siganus luridus
Siganus stellatus
*Siganus sutor**

Soleidae

Aseraggodes xenicus
Pardachirus morrowi

Sparidae

Acanthopagrus catenula
Chrysoblephus anglicus
Chrysoblephus puniceus
Diplodus hottentotus
Diplodus capensis
Lithognathus mormyrus
Pachymetopon aeneum
Pachymetopon grande

Rhabdosargus holubi
Rhabdosargus sarba
Rhabdosargus thorpei

Sphyraenidae

Sphyraena jello

Sphyrnidae

Sphyrna sp.

Syngnathidae

Doryrhamphus excisus excisus

Synodontidae

Saurida gracilis
Synodus binotatus
*Synodus dermatogenys**
Synodus jaculum
Synodus variegatus

Teraponidae

Terapon jarbua

Tetraodontidae

Amblyrhynchotes honckenii
Arothron hispidus
Arothron meleagris
*Arothron nigropunctatus**
Arothron stellatus
Canthigaster ambionensis
Canthigaster bennetti
Canthigaster cyanospilota
Canthigaster janthinoptera
Canthigaster smithae
Canthigaster valentini

Torpedinidae

Torpedo sinuspersici

Trichonotidae

Trichonotus marleyi
Enneapterygius abeli
Enneapterygius elegans
Enneapterygius pusillus
Enneapterygius ventermaculus
Helcogramma fuscopinna
Helcogramma obtusirostris

Zanclidae

*Zanclus cornutus**