Bazaruto National Park

Management Oriented Monitoring System in Bazaruto National Park, Results from 2006

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April 2007

Management Oriented Monitoring System in Bazaruto National Park

Introduction

The Management Oriented Monitoring System (MOMS) was adapted from the Namibian project: Event Book System a community-based natural resource monitoring system from Namibia (Stuart-Hill *et al.*, 2005). MOMS it is a guide for simple record of the level of use of the natural resources by stakeholder in a given area for management purposes. The fact that this system is simple it can be use by local community and most importantly, they can select what they want to monitor and it is not a research orientated. The entire system is paper-based, which seems to be the appropriate technology for remote rural areas and avoid the sustainability problems of ever-charging computer technology (Stuart-Hill *et al.*, 2005).

MOMS system successful adapted to the Mozambican System. Within a period of three month (October to December of 2004), the experimental phase was implemented in Bazaruto Archipelago National Park. Within the context, the modules have been select, modified and inserted to a new register form to better fit the area needs. The selected modules are for game scouts, tourism operators and scientist. A full and definitive monitoring register programme is in place since late January 2005 in the Bazaruto Archipelago National Park. The information collected from this system is inserted in the reports to DNAC/MITUR.

Bazaruto National Park was the first conservation area to use MOMS. This system helped to correct and adjust the previous monitoring system in the park. The experimental phase   the system started in 2005, and as been use to registering information that as been collected by rangers and the tourism operator within the Park.

Description of the Monitoring System

The system provides the possibility to collect data which will be gathered in three different levels of registering books, the Yellow Book (daily data collection), the Blue Book (monthly data collection) and Red Book (annual data collection).

The Yellow book consists of the daily register monitoring forms developed for each event or monitoring area. This information is then summarized and transferred to Monthly Report that shall be provided to the protected area managers for inclusion in the Monthly Summary Book for the entire area, in which it becomes possible to identify the monthly trends of each event. Finally, all collected data are introduced into the Red Book which is reflecting annual trends and allows taking management decisions regarding the monitored aspects.

Description of produced modules and reports

Game Scouts

- *Patrol Books* – A4 register books distributed to each game scout (17)
- *Register Books* – A4 yellow books distributed to each outpost (5)
- *Monthly Reports* – A4 forms that summarise the information for the month for each module monitored (9 to each outpost – from April to December)
- *Monthly Summary Books* – A4 blue books distributed to each outpost and to the Park Administration (5)
- Annual Summary Books – A4 red books (*not produced at this stage*)

- Annual Research Report – (*not finalised at this stage*)

Tourism Operators

- *Checklists* – A2 posters for the diving and fishing activities distributed to each tourism operator (12, 6 diving + 6 fishing)
- *Register Books* – A4 yellow books distributed to each tourism operator (6)
- *Monthly Reports* – A4 forms that summarise the information for the month for each module monitored (9 to each operator)
- *Monthly Summary Books* – A4 blue books distributed to each tourism operator (6).

| Level One - Yellow | → | Level Two - Blue | → | Level Three - Red |

REGISTO DE ACTIVIDADES ILEGAIS

PARQUE NACIONAL DO
ARQUIPÉLAGO DO BAZARUTO

Sistema de Monitoria Orientado para
Gestão

Livro de Registo de Ocorrências

Ano: 2006

Período de Patrulhamento: .... - ....

Posto de Fiscalização:

....

ACTIVIDADES ILEGAIS

PARQUE NACIONAL DO
ARQUIPÉLAGO DO BAZARUTO

Sistema de Monitoria Orientado para
Gestão

Livro de Registos Mensais

Ano: 2006

Período de Monitoria: .... - ....

Posto de Fiscalização:

....

ACTIVIDADES ILEGAIS

PARQUE NACIONAL DO
ARQUIPÉLAGO DO BAZARUTO

Sistema de Monitoria Orientado para
Gestão

Livro de Registo
de Tendências Anuais

2005 - 2016

- The Book of Events is a collection of daily information for different monitoring module.

- The forms filled during daily patrols.

- At end of the month, the information is transferred to monthly book registration.
- The information is always present in charts, in order to see the trends monthly.
- The information from yellow book to blue book is transferred with help of the Monthly Summaries sheets.

- At the end of the year the information is transferred from the monthly book to the annual trends book.
- The information is always present in charts, in order to see the trends yearly.
- The information from yellow book to blue book is transferred with help of the yearly summaries.

Description of the flow of information

<u>Game Scouts</u>

The game scouts go out in patrols each carrying their own Patrol Book. The book contains reduced versions of the complete register forms developed for each module. In the Patrol Book the scouts register the different events for each of the monitoring modules. Back at the outpost patrol, the information gathered is transferred to the Register Book. The same can be applied to tourism operators and their staff. At the end of each month, the information from the Register Book of each outpost and operator will be summarized and inserted in the Monthly Report that shall be provided to the protected area manager for inclusion in the Monthly Summary Book for the entire area.

- There are 5 different outposts, or points where the data is captured (Figure 1):

    ➢ Sitone and Zenguelemo (both in Bazaruto Island),
    ➢ Chizungune (Benguerua Island),
    ➢ St. Carolina Island,
    ➢ Magaruque Island.

- At the end of each month, the information from the Register Book at each outpost needs to be summarized and inserted in the:

    ➢ Monthly Report that shall be provided to the Park Administration for inclusion in the Monthly Summary Book for the entire area,
    ➢ Monthly Summary Book to stay in each individual outpost.

- The Park Administration is in possession of a Monthly Summary Book that compiles the information for the entire archipelago. This book will compile the data provided both by the game scouts and tourism operators.

- At this stage no Annual Summary Book has been developed.

<u>Tourism Operators</u>

- When the tourism operator staff comes back from diving or fishing activities they can quickly fill in the Checklist posters with relevant information for these two modules. At the end of each day, the information needs to be summarised and transferred from the checklists into the Register Books.

- A third module was provided to the operators – Special Species. This includes marine species (Dugong, Turtle, Whale, Whale-shark, and Manta ray) and terrestrial species (Red-duiker, Simango Monkey). Because there is overlapping between the marine species included in the special species module and in the diving module, it is important to note that these monitor sightings in different circumstances – during the diving activity or others (i.e. fishing, walking on the beach, etc). Thus, the observations registered during diving should be inserted in the Diving module, while the rest of the observations should be inserted in the Special Species module.

- Also monitored but not included in a specific MOMS module or form is:

  - *Tagging* – Does not require the filling in of a register. The operator should provide a photocopy of the ORI form to the Park Administration.
  - *Tourist statistics* – The information regarding tourist numbers and origin shall continue to be supplied as done up to date, in the printouts of the hotel system.

- There are 6 tourism operators where the data is captured (Figure 1):

  - Bazaruto Lodge and Indigo Bay (in Bazaruto Island),
  - Benguerua Lodge, Marlin Lodge and Gabriel Lodge (in Benguerua Island),
  - Magaruque Lodge (in Magaruque Island).

- At the end of each month, the information from the Register Book of each operator needs to be summarized and inserted in the Monthly Report that shall be provided to the Park Administration for inclusion in the Monthly Summary Book for the entire area.

- Each operator has been provided with a Monthly Book in case the operators wish to construct a database for their own management purposes.
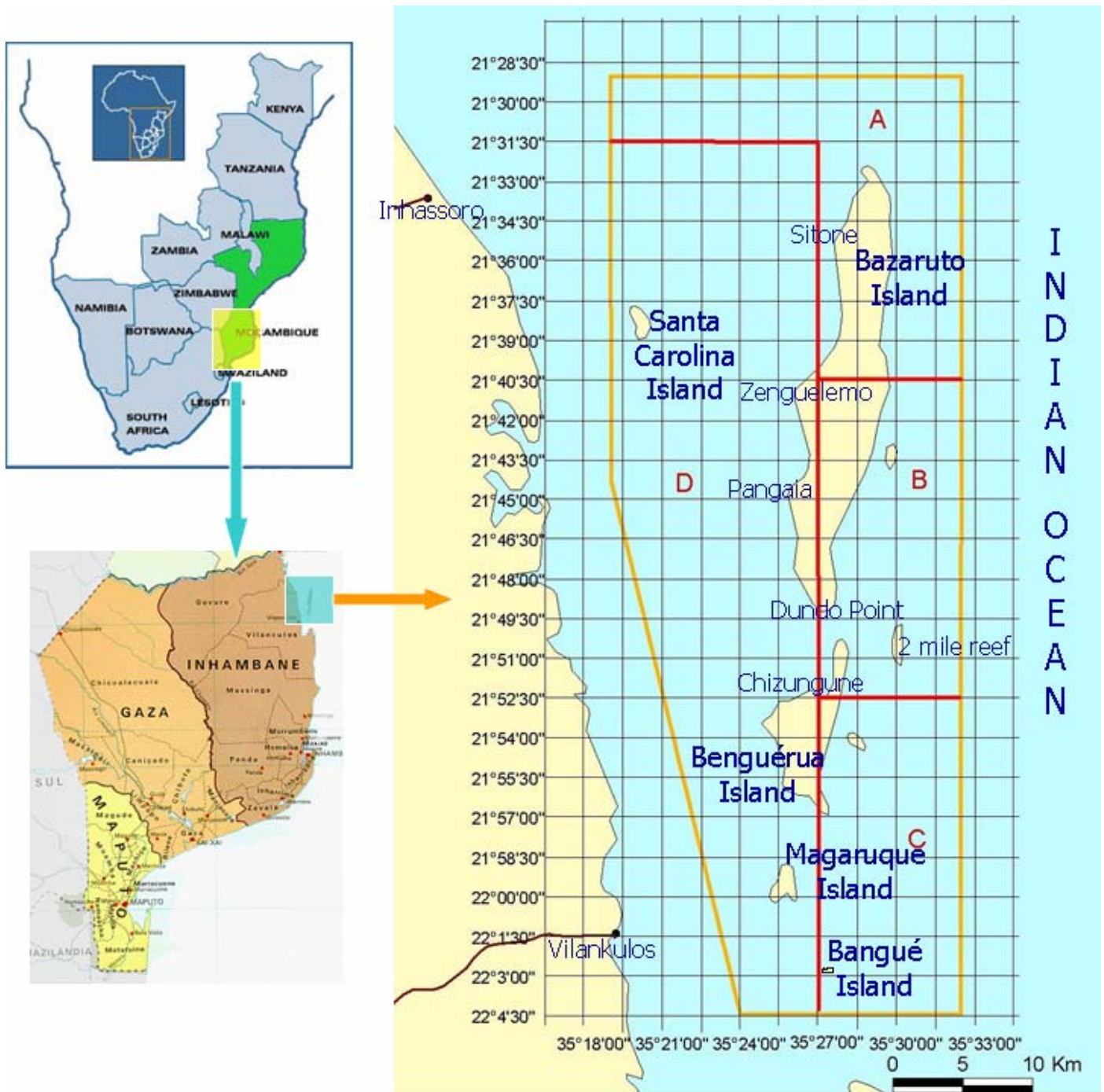
Figure 1: The map illustrate the 5 different outposts, or points where the data is captured, Sitone, Zenguelemo, (in Bazaruto Island), Chizungune (in Benguérua Island), Magaruque and Santa Carolina Island. For tourism operators there are 6 different places, Bazaruto Lodge and Indigo Bay (in Bazaruto Island), Benguerua Lodge, Marlin Lodge and Gabriel Lodge (in Benguerua Island), and Magaruque Lodge (in Magaruque Island).

List of the modules included in the Monitoring system

These are the modules currently included in the Register (yellow) and Monthly Summary (Blue) book; see the description for each module in (Videira 2005).

<u>Game Scouts</u>

      i.   Patrolling
      ii.   Special Species
      iii.   Illegal Activities
      iv.   Community fishing (boats and shore)
      v.   Collecting Activity

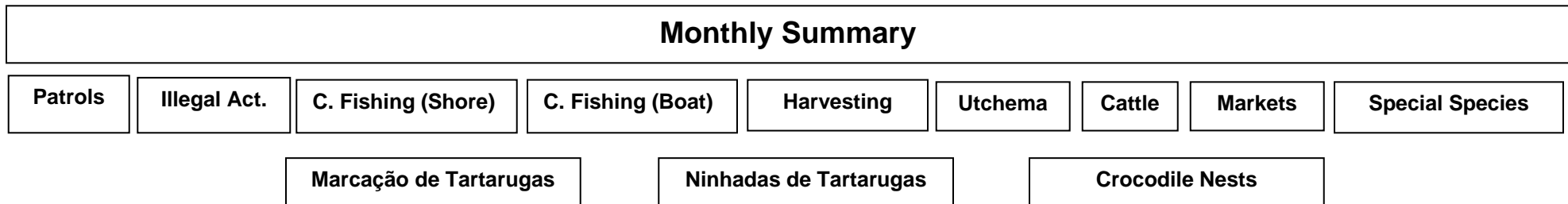Tourism Operators
      i.   Special Species
      ii.   Diving
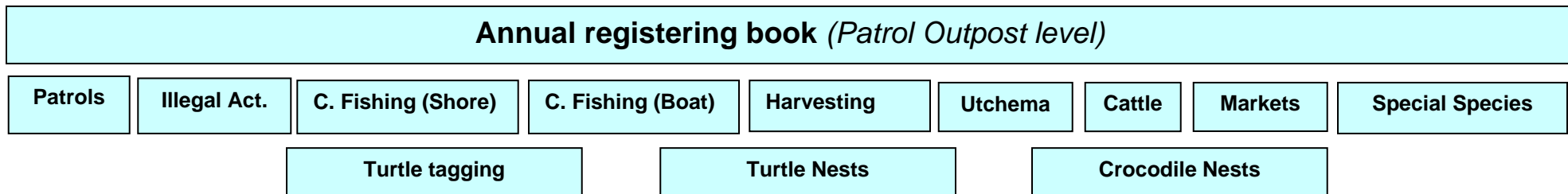   iii. Fishing

Patrols

Collection of Information

Patrol Book

Daily registering	Patrols (Daily register)	Illegal Activities (Occasional)	C. Fishing (Shore) (Occasional)	C. Fishing (Boat) (Occasional)	Harvesting (2 x por mes)	Utchema (Monthly)

Cattle (Quaternary)	Markets (Quaternary)	Special Species (Occasional)	Turtle tagging (Occasional)	Turtle Nests (October - March)	Crocodile Nests (Sep – Jan)
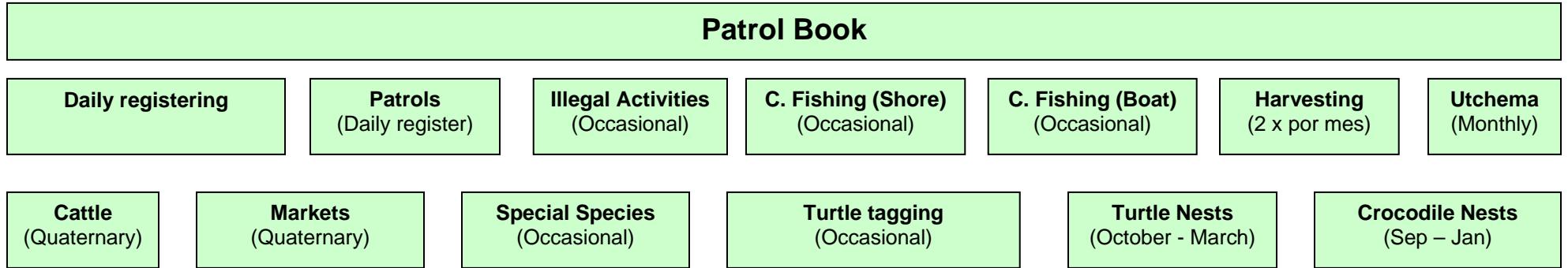
Events registration at patrol outpost level

Book of Events

Patrol	Illegal Act.	C. Fishing (Shore)	C. Fishing (Boat)	Harvesting	Utchema	Cattle	Markets	Special Species

Turtle tagging	Turtle Nests	Crocodile Nests
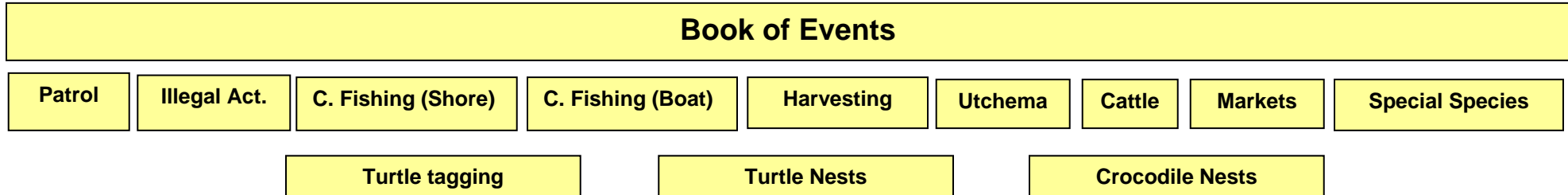
Feedback from patrol outposts to the park headquarters administration

Monthly Summary

Patrols	Illegal Act.	C. Fishing (Shore)	C. Fishing (Boat)	Harvesting	Utchema	Cattle	Markets	Special Species

Marcação de Tartarugas	Ninhadas de Tartarugas	Crocodile Nests

9

Data presenting at outpost patrol level

Annual registering book *(Patrol Outpost level)*

Patrols	Illegal Act.	C. Fishing (Shore)	C. Fishing (Boat)	Harvesting	Utchema	Cattle	Markets	Special Species

Turtle tagging	Turtle Nests	Crocodile Nests

Tourism Operators

Events report at tourism operators

Events registrations

Special Species (Occasional)	Turtle Nests (Occasional)	Sport fishing (Occasional)
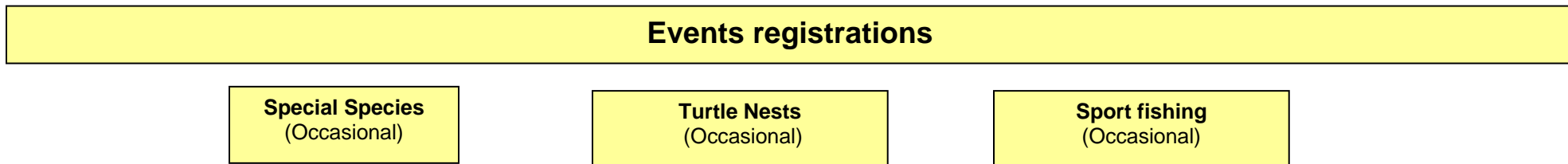
Feedback from tourism operators to the park headquarters administration

Monthly Summary

Special Species	Diving	Sport fishing	Fish tagging	Tourism Statistics	Tourism Revenues

Data Presenting at Tourism Operator Level

Annual registering Books *(Tourism Level)*

Special Species	Diving	Sport fishing
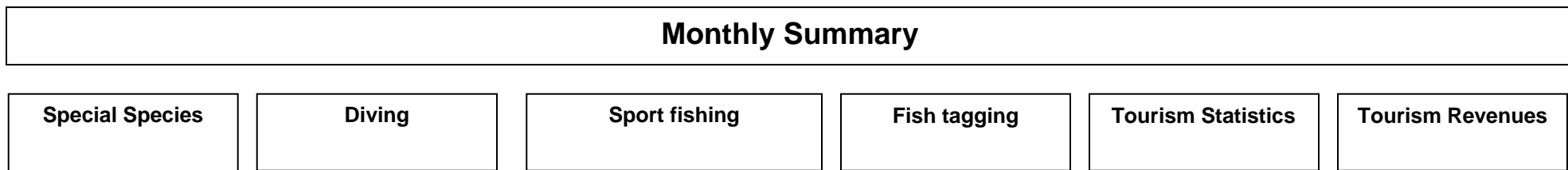
Park Administration

Data Presentation at Headquarters level –Annual

Annual registering book *(Headquarters level)*

Patrols	Illegal Act.	C. Fishing (Shore)	C. Fishing (Boat)	Harvesting	Utchema	Cattle	Markets	Special Species

Turtle tagging	Turtle Nests	Crocodile Nests

Diving	Sport fishing	Fish tagging	Tourism Entry	Tourism Revenues
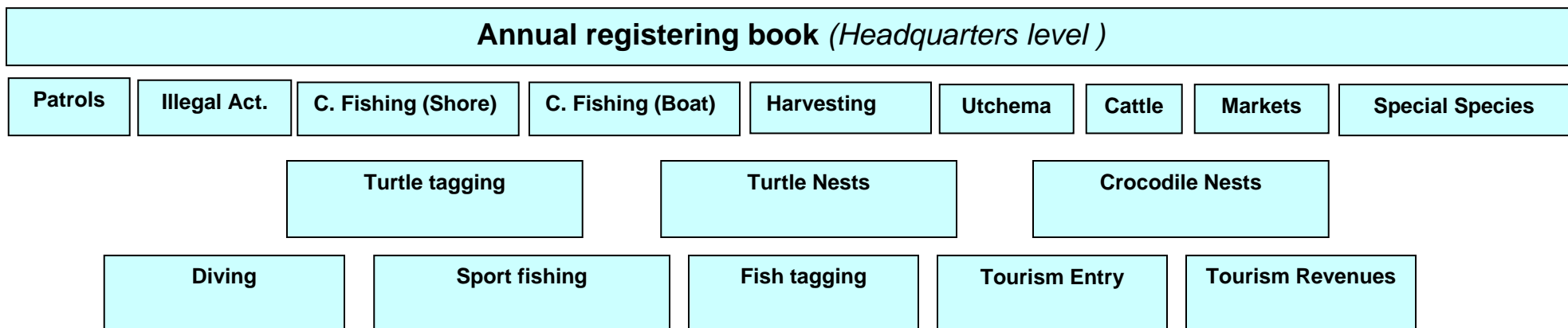
Data presenting at tourism Operators level – Annual trends

Livro de Registos de Tendências Anuais

Patrols	Illegal Act.	C. Fishing (Shore)	C. Fishing (Boat)	Harvesting	Utchema	Cattle	Markets	Special Species

Turtle tagging	Turtle Nests	Crocodile Nests

Diving	Sport fishing	Fish tagging	Tourism Entry	Tourism Revenues
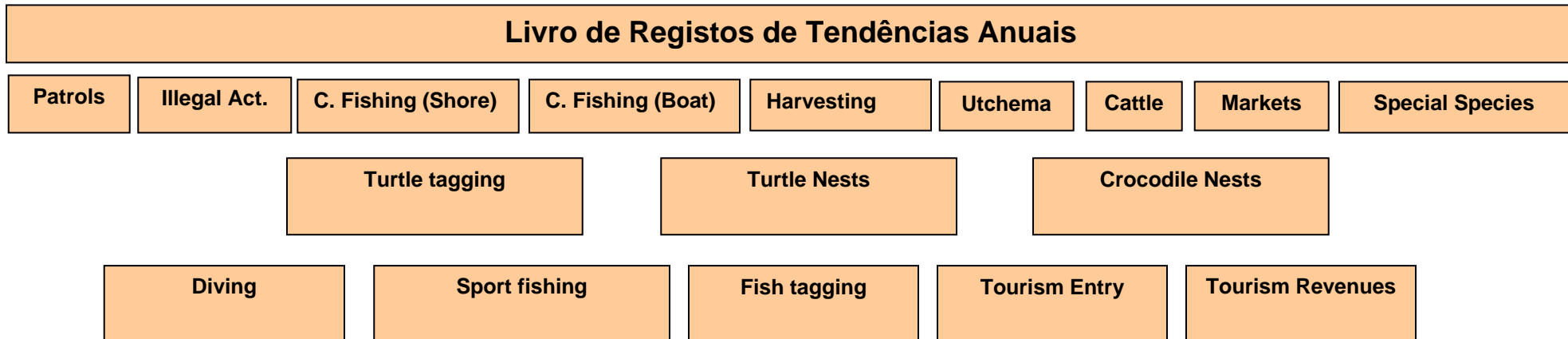
The Results of the 2006 data collection in Bazaruto National Park

The results present in this report are the park total, which is possibly, because the data from outpost patrol handle to the park headquarters in order to prepare the summary for the park in 2006. The data present in this report represent the information from modules related to community fishing boats using fishing nets, patrol effort, number of illegal activities, animal involved on illegal activities and number of sighting of special species per month on each outpost. In Bazaruto National Park, five outposts have adopted the system, Sitone, Zenguelemo, Chizungune, Magaruque e Santa Carolina.
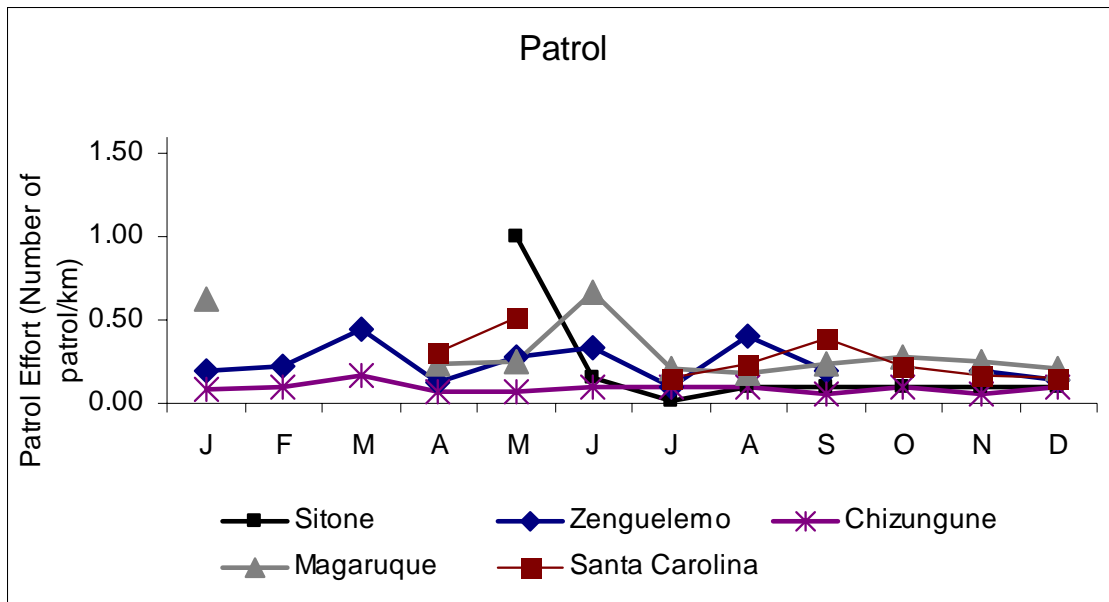
Figure 2: Results of trends change over the month regarding to patrol effort (number of patrol per km) cover by rangers on each outpost during activities in 2006.
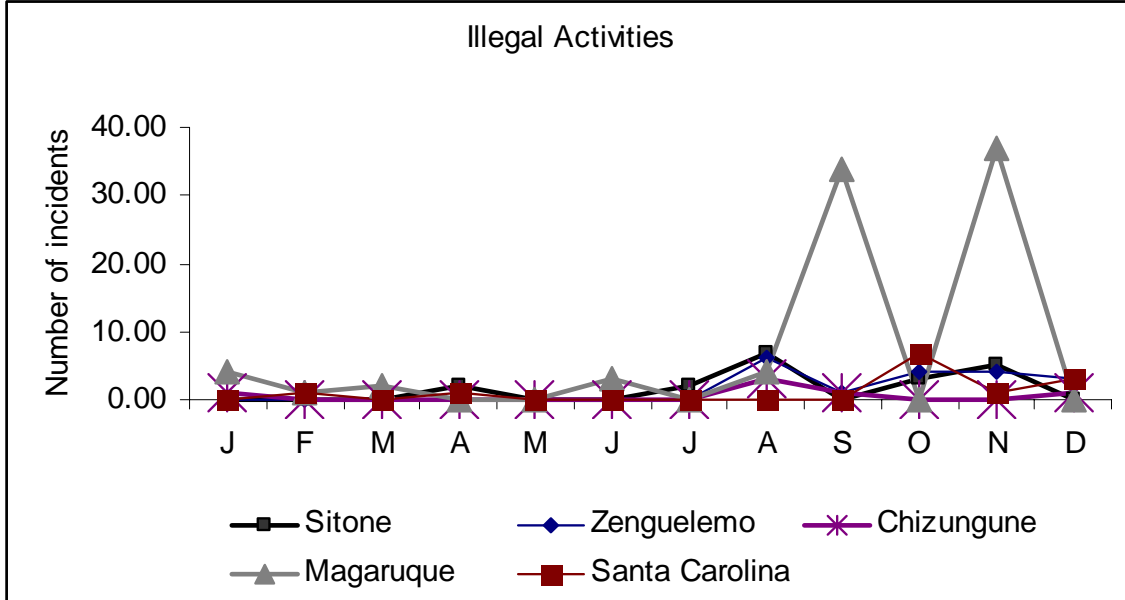
Figure 3: Illegal activities, regarding the number of incidents on each outpost patrol during 2006

Table 1: of the summary of the illegal activities (special species involved)

	Animals involved	Sitone	Zenguelemo	Chizungune	Magaruque	Santa Caroline
Illegal Activities	Number of Dugongs	0	0	0	0	0
	Number of turtles	0	0	1	0	16
	Number of sharks	6	0	0	0	0
	Number of Kg or kg	1	0	0	19	79
	Number of kg and Sea cucumber	0	0	0	1	20
	Number of Read Duiker	0	0	12	10	0
	Number of monkeys	0	0	0	0	0
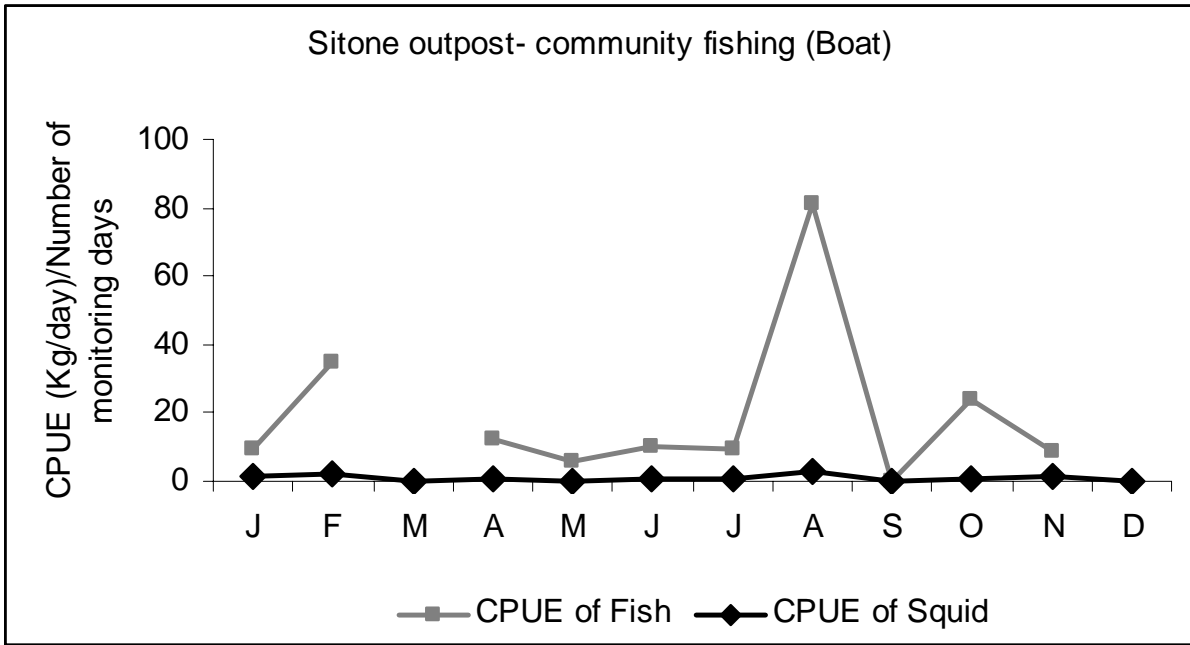
Figure 4: CPUE of community fishing (Boat) using fishing net on Sitone outpost
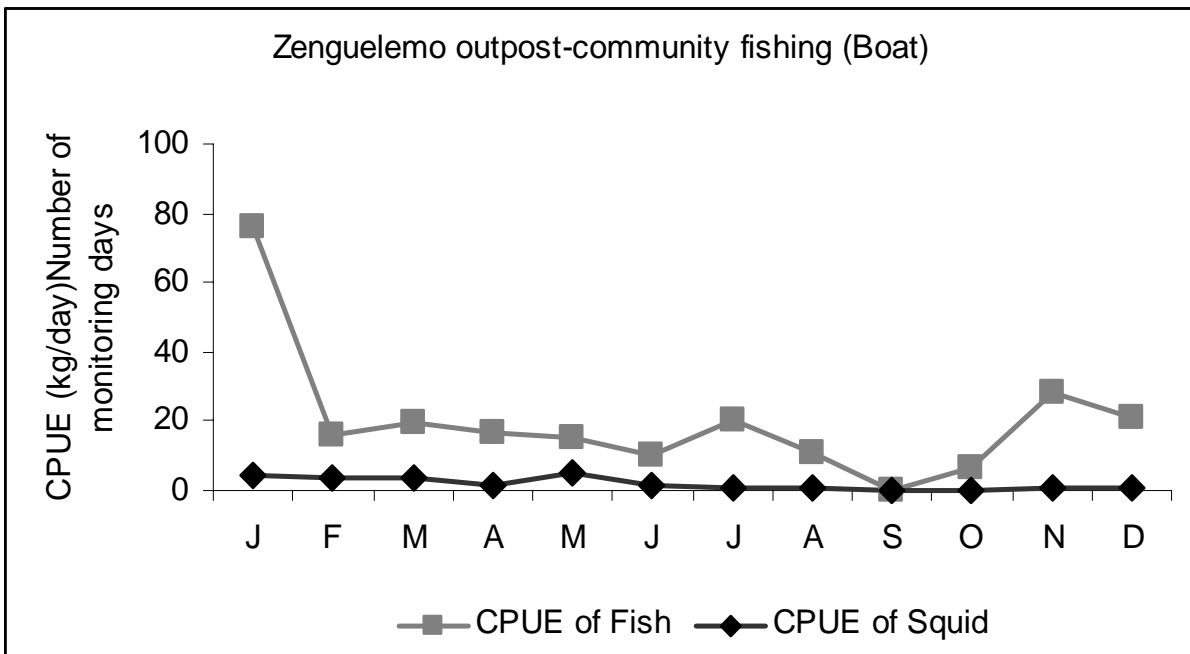
Figure 5: CPUE of community fishing (Boat) using fishing net on Zengulemo outpost
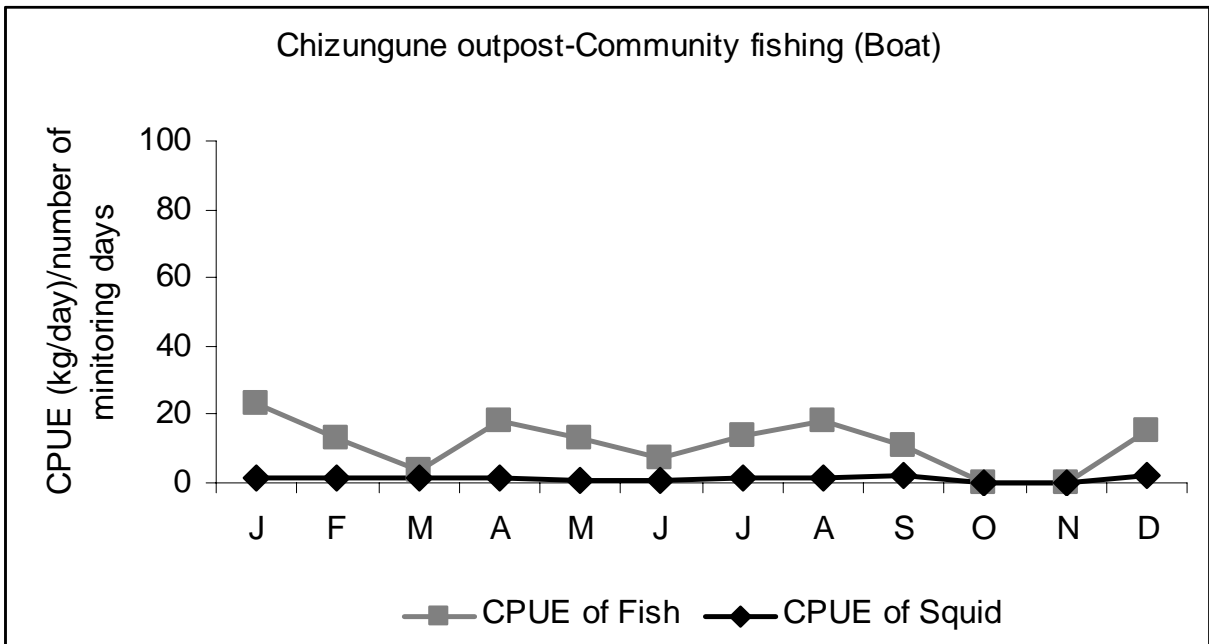
Figure 6: CPUE of community fishing (Boat) using fishing net on Chizungune outpost
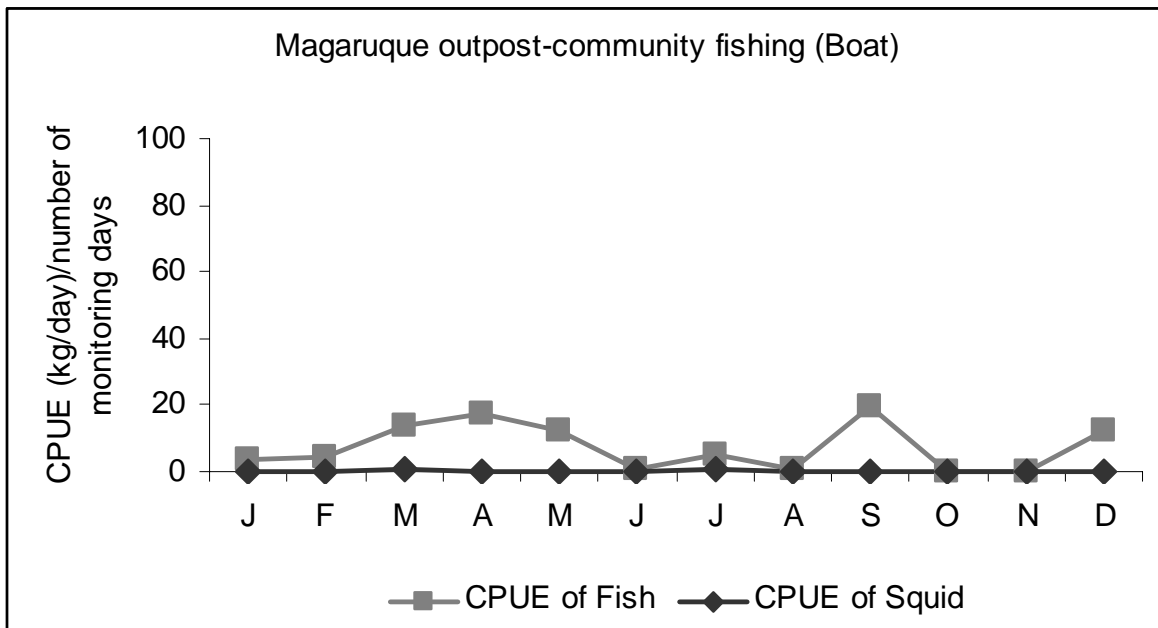
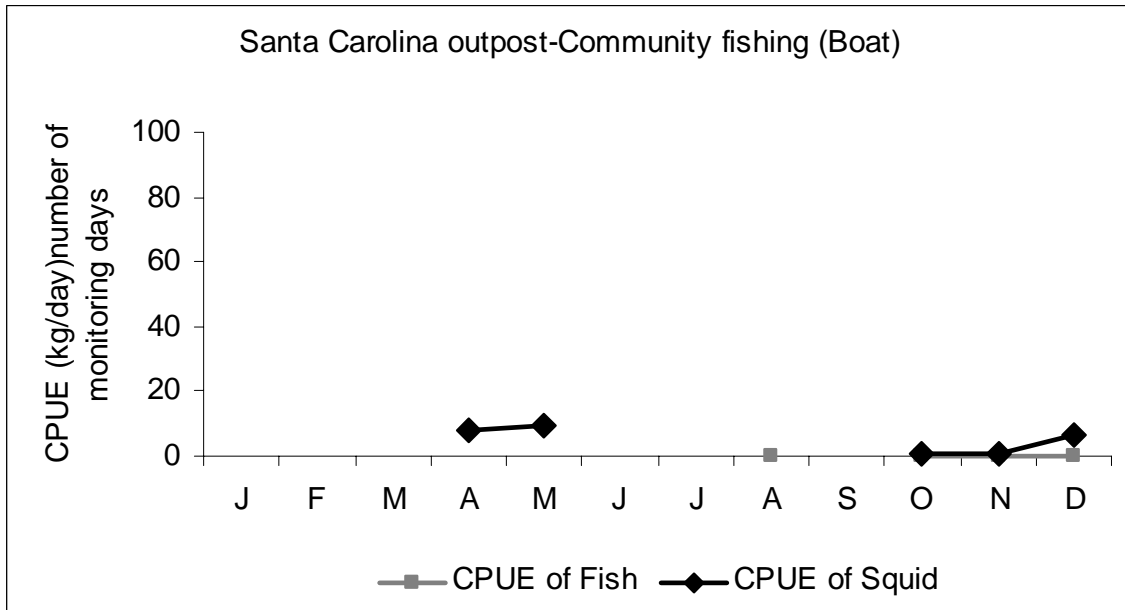**Figure 7:** CPUE of community fishing (Boat) using fishing net on Magaruque outpost

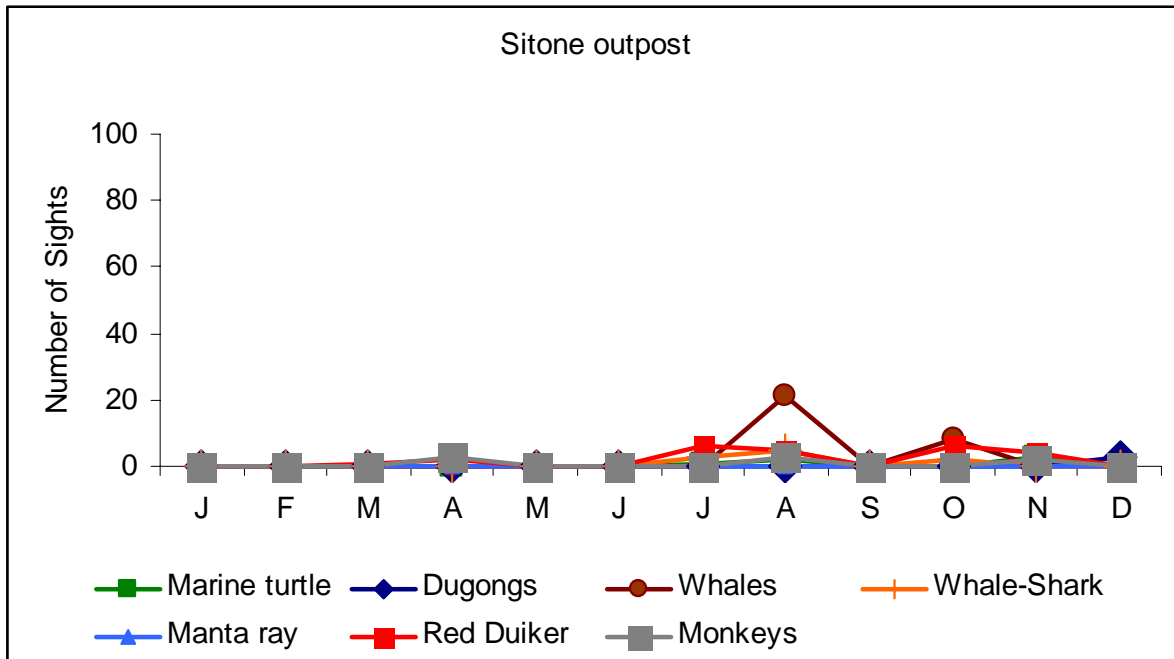**Figure 8:** CPUE of community fishing (Boat) using fishing net on Santa Carolina outpost

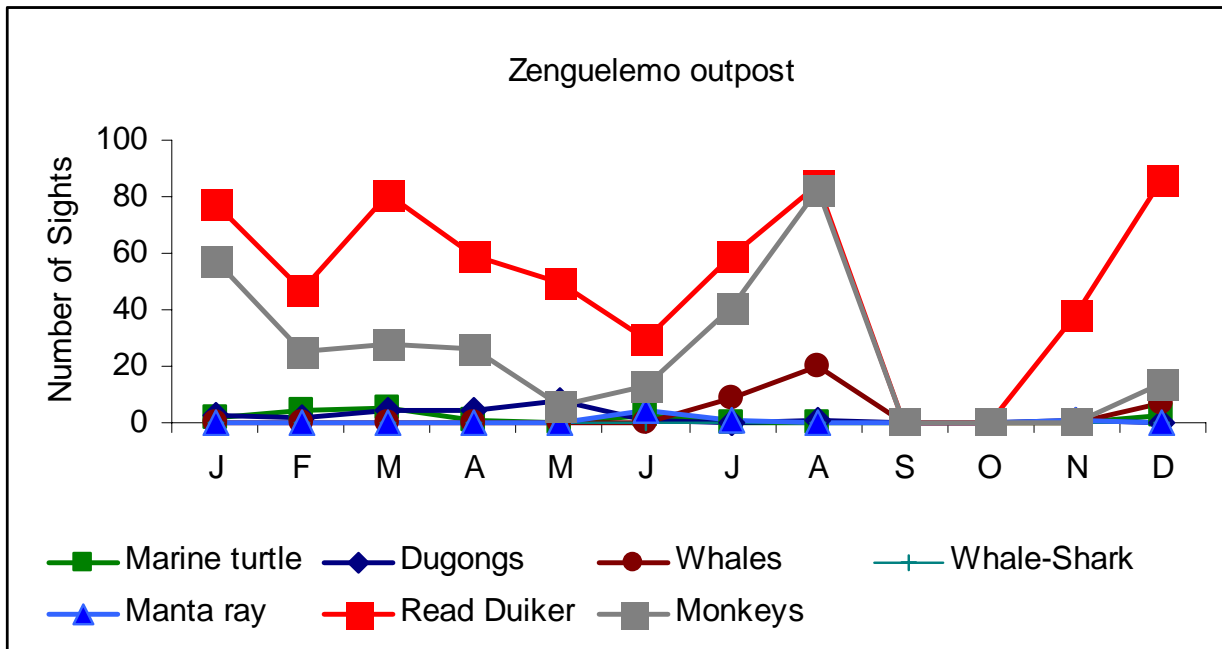**Figure 9:** Number of special species sights during patrol event Sitonr outpost

Figure 10: Number of special species sights during patrol event Zenguelemo outpost
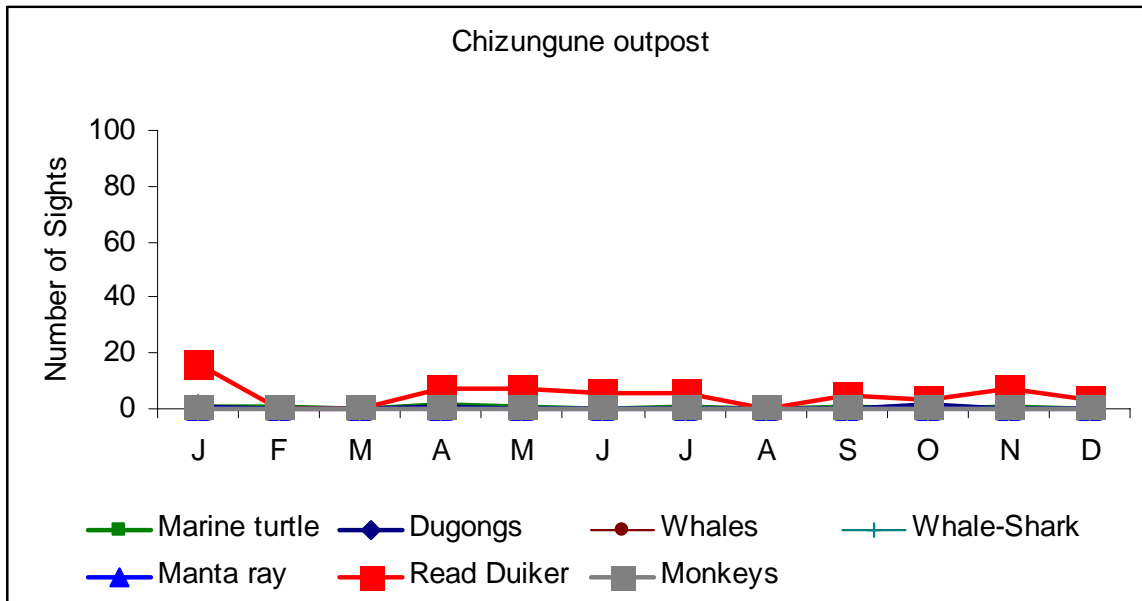

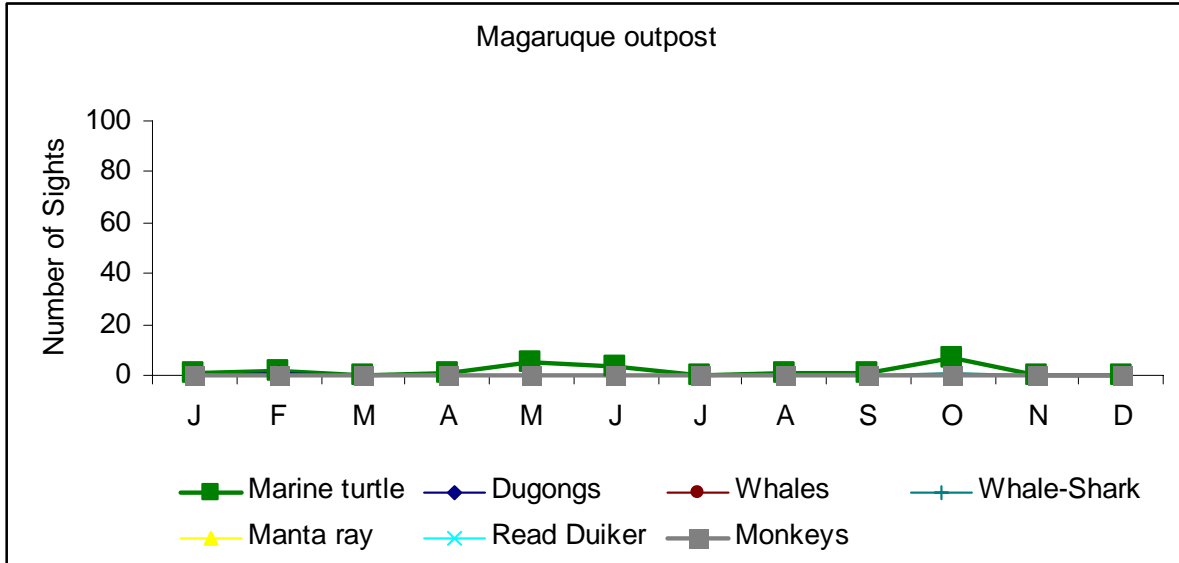**Figure 11:** Number of special species sights during patrol event on Chizungune outpost

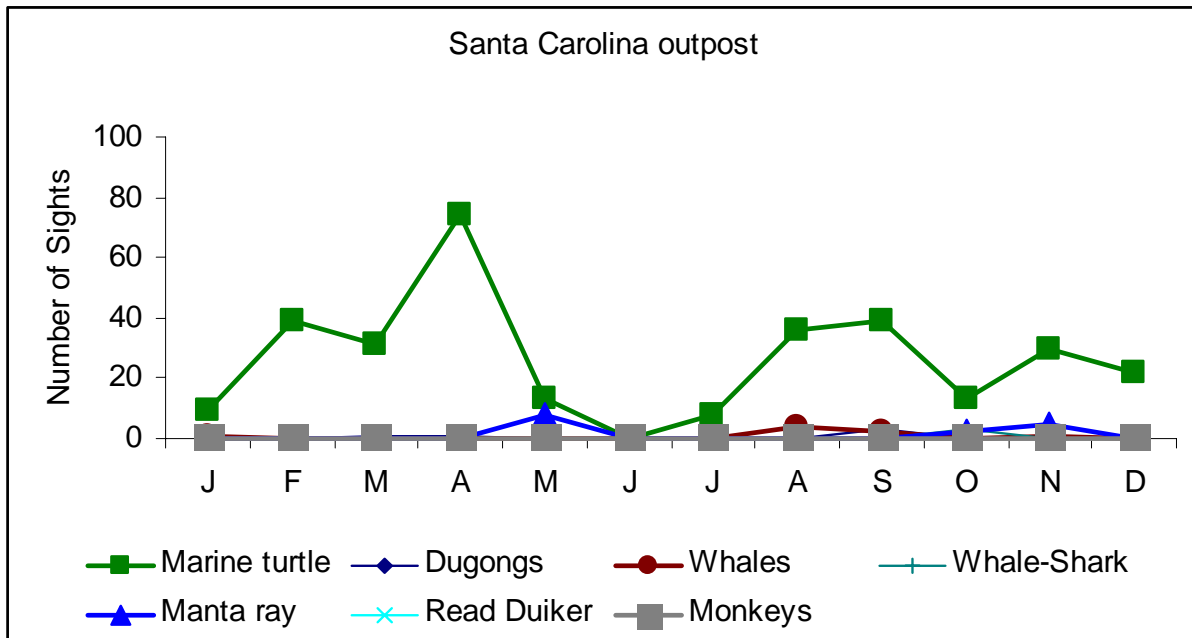**Figure 12:** Number of special species sights during patrol event Magaruque outpost

Figure 13: Number of special species sights during patrol event Santa Carolina outpost

Discussion and Remarks

Patrol Effort

The patrol effort was systematic on Zenguelemo and Chizungune outpost, during the 2006 activities, was calculate using the number of patrol done per number of km covered by rangers. The rest of the outposts have gaps on effort rate, because the rangers did not consider the number of kilometers, they only considered the number of patrols from the outpost.

Illegal Activities and the number of animal involved

The illegal activities are very high in Magaruque and Santa Carolina and involve the illegal fishing and red Duiker pouching local people. Another remark is the incidental catch of sea turtle in Santa Carolina. Zenguelemo outpost is the one that there is no registration of illegal activities, probable due to the patrol effort by rangers. There is no registration on the dugong hunting, in the park.

Fishing community- Boat (fishing net)

The CPUE calculate from each outpost patrol reviled that the amount of kg caught very high in Zenguelemo. In general the local people catch more than 10 kg per day of fish and 0.5 to 1 kg of squid per day. The outpost of Zenguelemo is the one with more fish effort and a total of 240.52 kg of fish and 22.17. This probable could be due to very good collecting system established within the outpost.

Especial Species

The Sitone outpost the species with more sighting are whales from July to October and red duiker in July and October. The outpost of Zenguelemo is important for red duiker and monkeys, any period of the year. On the other hand, Chizungune outpost is also important for red duiker. Santa Caroline is has more sighting of sea turtles and Manta ray.

Problems and constrains

Problems	Probable solution
Low literacy of rangers	Capacity and training of rangers
Difficulties in record the information and to summarise form daily registration to monthly registration	Capacity and training of rangers
Delay on data registration	Control and supervision from the park headquarter
Lack of interests from tourism operators	Make MOMS compulsory for all tourism operators within the park

Reference:

Stuart-Hill, G. Diggle, R., Munali, B., Tagg, J. and Ward, D., (2005). The Event Book System: a community-base natural resource monitoring system from Namibia. Biodiversity and Conservation. 14:2611-2631pp

Videira, E. J. P. S (2005). Simple Analyses of the Implementation of the Management Oriented Monitoring System (MOMS) in Bazaruto Archipelago National Park in Year 2005. 17pp. Report submitted to WWF.

Annex 1: CPUE from each out post patrol per month

Month	Sitone CPUE of Fish	Sitone CPUE of Squid	Zenguelemo CPUE of Fish	Zenguelemo CPUE of Squid	Chizungune CPUE of Fish	Chizungune CPUE of Squid	Magaruque CPUE of Fish	Magaruque CPUE of Squid	Santa Carolina CPUE of Fish	Santa Carolina CPUE of Squid
J	9.20	1.17	76.20	4.58	23.30	1.53	3.75	0.20		
F	34.60	2.30	15.60	3.79	13.10	1.34	4.25	0.33		
M		0.00	19.70	3.71	3.30	1.39	13.54	0.38		
A	12.50	0.54	16.90	1.65	18.23	1.79	17.16	0.31		7.80
M	5.77	0.27	15.40	4.75	13.05	1.00	12.03	0.00		9.30
J	10.40	0.77	10.50	1.15	7.21	0.49	0.57	0.00		
J	9.06	0.72	20.00	0.61	13.66	1.54	5.31	0.40		
A	81.00	3.14	11.10	0.73	18.18	1.20	1.04	0.00	0.23	
S	0.00	0.00	0.00	0.00	10.79	1.98	19.33	0.05		
O	24.08	0.88	6.42	0.00	0.00	0.00	0.00	0.00	0.00	1.00
N	8.75	1.25	27.90	0.52	0.00	0.00	0.00	0.00	0.00	1.00
D		0.00	20.80	0.68	15.40	2.25	12.68	0.19	0.00	6.23
Total	**195.36**	**11.04**	**240.52**	**22.17**	**136.21**	**14.51**	**89.67**	**1.86**	**0.23**	**25.33**