Monitoring Control and Surveillance Protocol for the Mahe Plateau Demersal Trap and Line Fishery Co-Management Plan

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Executive Summary

- A risk assessment and risk management approach was used to inform the development of the Monitoring, Control and Surveillance (MCS) Protocol for the Mahe Plateau Demersal Fishery Co-Management Plan.

- At 3 separate Risk Assessment workshops the Seychelles Fishing Authority (SFA) and fishers from Mahe and Praslin/La Digue independently analyzed, ranked and identified key risks in the fishery to be addressed by the MCS Protocol.

- The Mahe Plateau Demersal Fishery Co-Management Plan will be implemented in 2 phases. Phase 1 consists of 9 management regulations. Stakeholders identified 12 regulations from the *Fisheries Act 2014* for inclusion in the MCS. From the 21 regulations, 25 risks were identified for analysis in Phase 1 of the MCS.

- Phase 2 of the fishery management plan consists of 7 management regulations from phase 1 plus 9 new/revised regulations. From the 28 management regulations to be covered in phase 2 of the MCS, 32 risks were identified for analysis.

- Risks related to the use of prohibited fishing gear; the take of regulated fish; unlicensed/unauthorized fishing; and the sale of fish by recreational fishers. Risks were ranked from Low to Severe.

- In Phase 1, 16 of the 25 identified risks were classified as 'HIGH' or greater. In Phase 2, this increased to 22 of the 32 identified risks.

- Specific Surveillance and Enforcement resources have been directed at risks rated 'HIGH' and greater. Risk factors rated 'MODERATE/HIGH' and less, are included in general surveillance and enforcement activities.

- A costed Implementation plan is provided to deliver the MCS Protocol. This covers surveillance/enforcement, monitoring/data collection, and education and awareness related actions. Resources needed to deliver the monitoring/data collection, and education and awareness related actions, are covered in the Fishery Management Plan Implementation Plan.

- Enforcement/surveillance implementation costs are separated into 'set-up costs', near shore/coastal patrols, offshore/outer Mahe Plateau patrols and land-based patrols on the islands of Mahe, Praslin and La Digue. Set-up costs are estimated at SR 377,000. Annual surveillance costs are estimated at SR 843,680. The enforcement costs include vessel operating costs and crew allowances only. Surveillance operations will use existing enforcement officer resources.

- The annual surveillance budget will deliver 80 days of near-shore day patrols; 24 days of near-shore night patrols; 28 days of offshore/outer Mahe Plateau patrols; and 85 days of land-based patrols across the 3 islands.

- Key risks to the successful implementation of the MCS Protocol have been identified:
    - Limited resources to deliver the surveillance/enforcement required to maintain the integrity of the fisheries management plan;
    - Long-term effective engagement with key stakeholders and its importance to compliance with fisheries regulations;
    - Limited engagement with key fishery stakeholders in the development of the fishery management plan: in particular recreational fishers, sports fishers and hire craft operators, and an
    - Effective Communications Strategy.

Acknowledgements

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Introduction

The Monitoring Control and Surveillance (MCS) Protocol has been developed to facilitate the implementation of the Mahe Plateau Demersal Trap and Line Fishery Co-Management Plan (hereafter referred to as the Mahe Plateau Fishery Management Plan). The Mahe Plateau Fishery Management Plan was developed using an Ecosystem Approach to Fisheries (EAF) management. A fundamental element to the successful implementation of the plan is the SFA having the resources to deliver the MCS Protocol and engage effectively with key stakeholders.

The Mahé Plateau covers an area of approximately 41,000 km^2, this area supports a multispecies fishery (demersal, reef-associated and pelagic fish species), multiple vessel types (schooners/whalers and small (outboard motor) boats) using multiple gear types. The hand-line fishery is by far the most important type of fishing technique, accounting for more than 73% of total fish landings. The trap fishery is the second most dominant fishery, primarily occurring in near-shore habitats around the 3 main granitic islands of Mahe, Praslin and La Digue.

The sport and the recreational sectors also target demersal species. The sport fishery is a relatively small sector made up of licensed super ski boats primarily taking tourists out for big game fishing for species such as wahoo, dolphin fish, sailfish, tunas and marlins. The main gear type used is trolling, however, some handline fishing for demersal species is also conducted. Its contribution to the coastal livelihood is relatively unknown, as there are few data collected for this fishery, even though a logbook system was introduced by the SFA in the early nineties. Similarly, the monitoring of the recreational fishery is very challenging given anyone can fish for leisure or as a hobby in the Seychelles. Fishing is considered as a fundamental right of every Seychellois citizen and therefore there is currently no restriction on access (i.e. no license is required for recreational fishing).

The Mahe Plateau Fishery Management Plan has been developed to address concerns of overfishing of key species, declining catch rates, the large quantities of fish sold by non-commercial fishers, fishing on spawning aggregations, and the catching of small fish. Stakeholders have proposed 16 management measures to address these and

other concerns. In developing the MCS Protocol, an additional 12 regulations from the *Fisheries Act 2014* relevant to the Mahe Plateau region were identified by stakeholders.

Figure 1: The Mahe Plateau demersal fishery area.

Methodology

A risk assessment and risk management approach was used to inform the development of the Monitoring, Control and Surveillance Protocol for the Mahe Plateau demersal fishery. The methodology used is current best practice, follows ISO31000 guidelines and has been adopted by many national and international fisheries agencies and organizations (e.g. FAO, Indian Ocean Commission, Australian Fisheries Management Authority) (International Standard 2009; AFMA 2013). In an environment where there are finite surveillance, enforcement and monitoring resources, the formal risk assessment approach provides a transparent and accountable process for priortising allocation of resources. The risk assessment process involves 5 steps; these steps include establishing the context of the risk environment; identifying the full spectrum of possible risks in the implementation of the fishery management plan; analyzing the risks; evaluating the risk assessment results; and treating the risks by identifying specific monitoring or surveillance/enforcement actions (Figure 2).

Consultation

The commercial fishers, fishermen's associations, Fishing Boat Owners Association (FBOA), sports fishing/charter operators, recreational fishers, NGO's, Government Agencies notably SFA and the Coastguard represent the key stakeholders in the development and implementation of the Mahe Plateau Fishery Management Plan. All sectors were engaged in, or had the opportunity to contribute to the risk assessment and prioritization process. Separate risk assessment workshops for the government

agencies, and the fishing industry were conducted; 3 risk assessment workshops in total: 1) SFA and other government enforcement agencies; 2) Mahe fishing industry 3) Praslin/La Digue fishers. The participants worked through steps 1-4 in the risk management process. A final MCS workshop was conducted where SFA staff, along with the project consultants, evaluated the final risk ratings and determined how those risks should be treated. This involved identifying the surveillance and enforcement resources needed, and how these could be used to address the risks. Units represented by SFA attendees included, research, data management, monitoring and enforcement.

Figure 2: The 5 step risk assessment process used to identify priority areas for monitoring and surveillance/enforcement (adapted from AFMA 2013). Key to the success of this approach is input from key stakeholders in the identification and analysis of the risks and regular monitoring and review of the MCS protocol.

Context of the risk assessment

The context of the risk assessment took into account a range of factors: notably the geographical extent of the fishery area (Mahe Plateau) and the local and regional context; multiple landing sites; multiple gears, species and vessel types; variable economic value of species in the fishery; variable economic status of the industry; level of investment and support from the community; and constraints in resources that can be directed to surveillance and enforcement. The context of the fishery was discussed and agreed to by the stakeholders engaged in the development of the MCS Protocol.

Identification of risks

In the context of the Mahe Plateau MCS Protocol, the risks relate to the non-compliance with the regulations in the Mahe Plateau Fishery Management Plan and

relevant provisions in the *Fisheries Act 2014* (see Table 5 for complete list of risks that were analyzed). Risks also relate to the lack of data and information needed to ensure the integrity of the management regulations and the sustainability of the stocks.

Analysis of the risks: likelihood and consequence

The SFA and government enforcement units, the Mahe fishing industry and the Praslin/La Digue fishing industry independently conducted the risk assessment. This resulted in 3 independent risk ratings that were averaged to produce the final risk analysis.

The analysis of the risks to prioritise them for monitoring and surveillance is a three-step process:
Step 1: involved the likelihood of the risk occurring. Each risk was assigned a numerical score from 1 – 5 based on a qualitative rating (Rare, Unlikely, Moderate, Unlikely, Almost certain) based on the probability that the activity will occur (Table 1). Factors considered in assessing likelihood included: incentives fishers or sectors have to be non-compliant, including the influence of their economic status; and the general sentiment amongst fishers in terms of their acceptance of fisheries management regulations.

Step 2: the likelihood scores were then hidden and participants considered the risks in terms of the consequence of them occurring. The risks were assigned a numerical score from 1 – 5 based on a qualitative rating of the 'consequence' of the activity (Insignificant, Minor, Moderate, Major, Severe) in terms of its impact on the integrity of the regulations, sustainability of the fish stocks and/or the credibility of the enforcement agencies (Table 2). Factors considered in assessing the consequences included: uncertainty in information about the risk impacts and the need to be precautionary; and the reputation of the SFA in its ability to effectively manage the fishery on behalf of the stakeholders.

Step 3: for each stakeholder group the risk rating for each risk was then determined by converting the Likelihood x Consequence scores to a score between 1 and 4.0 where 'Severe' ratings were given a score of 4, 'High' ratings were given a score of 3, 'Moderate' ratings were given a score of 2, and 'Low ratings a score 1 (Table 3).

The final risk ratings were then determined by taking the average (n=3) of the SFA (government), Mahe, and Praslin/La Digue individual risk rating scores. Each group was given equal weighting towards the final risk rating for the individual risks. Taking the average of converted risk scores provided higher resolution in the final risk ratings (Table 4) as it numerically divided risks into 7 categories and resulted in reduced error and bias through the rounding of averaged scores. Risk levels were colour coded for ease of analysis by stakeholders.

Table 1: Likelihood scores used in the Rating of Risks. Definitions are based on the probability that the activity relating to the risk will occur.

Score	Risk rating	Rating description
5	Almost certain	95% probability exists that the activity will occur
4	Likely	70% probability exists that the activity will probably occur
3	Moderate	50% probability exists that the activity may occur
2	Unlikely	30% probability exists that the activity could occur
1	Rare	5% probability exists that the activity will occur under exceptional circumstances

Table 2: Consequence scores used in the Rating of Risks. Definitions are based on the expected impact the activity will have on the integrity of the regulations, sustainability of the fish stocks and/or the credibility of the enforcement agencies.

Score	Risk Rating	Rating Description
5	Severe	The consequences would threaten regulatory integrity and the survival of the fish stocks and subsequently any further commercial fishing venture. Loss of enforcement credibility.
4	Major	The consequences would probably threaten regulatory integrity and the survival of the fish stocks and subsequently any further commercial fishing venture. Loss of enforcement credibility.
3	Moderate	The consequences would probably not threaten regulatory integrity or the continued survival of the fish stocks. The enforcement program may be subject to significant review or operational change.
2	Minor	The consequences would present minimal threats to regulatory integrity or the continued survival of the fish stocks. However it may threaten the efficiency or effectiveness of a particular component of the regulatory regime causing minor review or operational modification.
1	Insignificant	The consequences would present minimal threats to regulatory integrity or the continued survival of the fish stocks and would be dealt with via routine operations, i.e. no specific targeted compliance activity.

Table 3: The risk-rating matrix (Likelihood x Consequence) used in the individual stakeholder group risk assessments.

Likelihood	Consequence					
		Insignificant	Minor	Moderate	Major	Serious
	Rare	Low	Low	Low	Moderate	Moderate
	Unlikely	Low	Low	Moderate	Moderate	High
	Moderate	Low	Moderate	Moderate	High	High
	Likely	Moderate	Moderate	High	High	Severe
	Almost certain	Moderate	High	High	Severe	Severe

Table 4: The risk-rating matrix that was used in the final risk ratings. The matrix numerically split risks into 7 categories by 0.5 rather than by 1, reducing bias and error associated with rounding averaged scores.

Rank range	Risk Level
0 - 1.0	LOW
1.1 - 1.5	LOW/MODERATE
1.6 - 2.0	MODERATE
2.1 - 2.5	MODERATE/HIGH
2.6 - 3.0	HIGH
3.1 - 3.5	HIGH/SEVERE
3.6 - 4.0	SEVERE

Evaluation of risks

The SFA staff at the final workshop (24/03/15) determined the risk levels (e.g. 'high' and above) that would receive priority assessment in terms of monitoring and surveillance/enforcement resources.

Results - Key MCS Risks

Context of the risk assessment

The Mahe Plateau demersal fishery covers an area of approximately 41,000 km^2 (refer to Figure 1). There are multiple landing sites (approximately 50 identified sites), which make effective coverage of these sites for surveillance and monitoring activities challenging.

The geographic context of the fishery is important element in the development and implementation of the MCS protocol. The Mahe Plateau fishery area, encompassing the offshore plateau region, the inshore regions around the 3 main granitic islands of Mahe, Praslin and La Digue and the Praslin Special Co-Management Area (designated under the Praslin Fisheries Co-Management Plan), is a subsection of the broader demersal fishery that operates within the Seychelles Economic Zone. Other major fishing grounds include the Amirantes plateau, offshore banks, and outer coral atolls. Sports fishing/charter vessels, schooners and whalers access all areas of the demersal fishery in multi-day fishing trips; in contrast the smaller boats access inshore areas around the 3 main granitic islands during 1-2 day trips.

An area around Praslin and La Digue has been designated as a Special Co-Management Area, with its own MCS protocol being implemented by the SFA in partnership with stakeholders represented by the Praslin Co-Management Coordinating Committee (PFCCC). Consistency in provisions of the 2 fisheries management plans (where practical) has been sought in order to reduce the complexity of enforcement.

The Mahe Plateau Fishery Management Plan is one of the first area/fishery-specific management plans for the Seychelles. It is expected that there will be a high risk of non-compliance with regulations in the first year of implementation due to limited awareness and acceptance of the need for a management plan, in particular with those stakeholders who did not engage in the development of the management plan or MCS protocol.

Of significant concern is the limited involvement of recreational fishers, and hire craft operators (sports fishing/ charter vessel operators) in the development of the Plan. This represents a level of risk to compliance with the regulations. A number of fishers operating in particular in the trap fishery are considered 'part-time' fishers; therefore their effective engagement in the management of the fishery presents additional challenges.

Schooners and whalers, and some sports fishing/charter vessel operators, not only fish within the Mahe plateau region but also in more offshore regions such as Amirantes plateau and outer atolls, therefore ensuring the spatial accuracy in the catch and effort data recorded during multi-day trips will be challenging.

Risk prioritisation

The implementation of the Mahe Plateau Fishery Management Plan will occur in 2 phases. The risk assessment was conducted for each phase of the fishery management plan. In Phase 1 a total of 25 separate risks were identified and assessed. In Phase 2 an additional 7 risks (32 in total) were identified and assessed. These risks related to the use of e.g. prohibited fishing gear; the take of regulated fish; unlicensed/unauthorized fishing; and the sale of fish by recreational fishers. Table 5 provides a summary of the final risk ratings for each risk factor identified by the stakeholders. The risk relating to non-compliance with priority regulations in the

Fisheries Act 2014 are grouped separately from the regulations in the Mahe Plateau Fishery Management Plan.

The SFA determined that risks rated 'HIGH' and greater would receive targeted surveillance and enforcement. Risk factors rated 'MODERATE/HIGH' and less would be included in general surveillance and enforcement activities. In Phase 1, 16 of the 25 identified risks were classified as 'HIGH' or greater (Table 5). In Phase 2, the total number of risks and the number rated 'high or greater' had both increased (22 risks rated 'high or greater' out of the 32 identified risks).

Table 5: Summary of final risk ratings for the 34 risks identified to ensure the effective implementation of the Mahe Plateau Fishery Management Plan during the 2-phased implementation process. The risk rating identifies the priority risk areas in the management of the fishery. Regulations where the risk of non–compliance was rated 'HIGH' and above are assigned specific targeted surveillance and enforcement resources.

Fisheries Act 2014	**Risk Factor**	**Risk Rating**
IUU fishing: A foreign vessel shall not be used for fishing or fishing related activity in Seychelles waters unless authorized.	Un-authorized fishing on the plateau by foreign vessels.	SEVERE
Lobster: no fishing by unlicensed fisher during open season	Unlicensed fishers take lobster during open season.	SEVERE
Lobster: no fishing during closed season	Lobster taken during closed season by either licensed or non-licensed fishers.	SEVERE
Lobster: minimum size limit 75mm carapace length and no berried females	Take of lobster less than 75mm carapace length and the take of berried females.	SEVERE
Non-licensed and recreational fishers prohibited from selling or trading fish.	Sale of fish by non-licensed fishers.	SEVERE
Spear guns: Possession and use for fishing without an authority prohibited.	Use of prohibited fishing gear: Spear guns.	HIGH
Use of nets to target sharks prohibited.	Use of prohibited fishing gear: Use of nets to target sharks.	HIGH
Minimum mesh size 40mm.	Use of traps with mesh size less than 40mm in the SMA.	HIGH
Poisons and explosives prohibited.	Use of prohibited fishing gear: Poisons and explosives.	MODERATE/HIGH
Use of nets to obstruct reef passes and channels prohibited.	Use of prohibited fishing gear: nets to obstruct reef passes and channels.	MODERATE/HIGH
Demersal trawl nets prohibited.	Use of prohibited fishing gear: Demersal trawl nets.	MODERATE
Use of nets between 1600 and 0500 prohibited.	Use of prohibited fishing gear: Use of nets 1600 to 0500.	LOW/MODERATE
Mahe Plateau Fishery Management		

Plan (Phase 1)		
That the catching and retaining or possessing of bourzwa less than 32cm fork length is not permitted within the fishery area.	Retaining bourzwa less than MLS by licensed and non-licensed fishers.	SEVERE
That semi-industrial vessels using long-line gear must retain or be in possession of no more than 20 demersal fish species per vessel (demersal species listed in the management plan).	Semi-industrial vessels breaching catch limit for specified demersal fish species.	SEVERE
For unlicensed fishers and recreational fishers (including recreational fishers on charter vessels) bag limits apply per person per day: Bourzwa =5; Zob gris = 5	Risk of recreational fishers using private vessels and unlicensed fishers breaching bag limits for specified demersal fish species.	SEVERE
Licensed fishers are permitted to use a maximum of 6 traps per boat per day for the period 3 days before to 3 days after the full moon (7 days in total) on the specified Kordonnyen spawning sites during the peak spawning months of September to April inclusive.	Breaching limits on number of traps during Full Moon period (7 days) from September to April on the specified Kordonnyen spawning sites on MAHE.	SEVERE
That the catching and retaining or possessing of zob gris less than 32cm fork length is not permitted within the fishery area.	Breach of size limit for zob gris by licensed and non-licensed fishers.	HIGH/SEVERE
For unlicensed fishers and recreational fishers (including recreational fishers on charter vessels) bag limits apply per person per day: Bourzwa =5; Zob gris = 5	Recreational fishers on charter vessels breaching bag limits for specified demersal fish species.	HIGH/SEVERE
For unlicensed fishers and recreational fishers (including recreational fishers on charter vessels) a combined demersal species bag limit of 20 fish per person per day	Risk of recreational fishers breaching combined species bag limit.	HIGH
No traps are left in the sea overnight on the specified Kordonnyen spawning sites during the peak spawning months of September to April inclusive.	Risk of traps being set at night during Full Moon period (7 days) from September to April on the specified Kordonnyen spawning sites on MAHE.	HIGH
Maximum of 25 traps per registered fishing vessel.[1]	Licensed vessel (fisher) breaching limits on the number of traps that can be used.	MODERATE/HIGH

[1] The Mahe Plateau Fishery Management Plan (draft) sets the trap limit at 20 per vessel. The initial proposal, and that which was presented in the MCS risk assessment was a maximum limit of 25 traps.

Licensed fishers are permitted to use a maximum of 6 traps per boat per day for the period 3 days before to 3 days after the full moon (7 days in total) on the specified Kordonnyen spawning sites during the peak spawning months of September to April inclusive.	Breaching limits on number of traps during Full Moon period (7 days) from September to April on the specified Kordonnyen spawning sites on PRASLIN.	MODERATE/HIGH
No nets to be used on any rabbitfish spawning areas at any time of the year.	Use of prohibited fishing gear: Use of nets to fish rabbitfish spawning areas.	MODERATE/HIGH
Maximum of 2 traps per non-registered fishermen (recreational fisher) or vessel.	Non-registered fishers breaching limits on the number of traps that can be used.	MODERATE
No traps are left in the sea overnight on the specified Kordonnyen spawning sites during the peak spawning months of September to April inclusive.	Risk of traps being set at night during Full Moon period (7 days) from September to April on the specified Kordonnyen spawning sites on PRASLIN.	MODERATE
Mahe Plateau Fishery Management Plan (Phase 2). (Phase 1 management measures carry over into Phase 2 including 2 revised regulations (*); new regulations introduced in Phase 2 listed below)		
* Minimum size limit increased to Lm50: the catching and retaining or possessing of bourzwa less than msl (cm fork length) is not permitted within the fishery area.	Risk of licensed, non-licensed fishers and recreational fishers catch and retaining fish less than the MSL.	SEVERE
Minimum size limit based on Lm50: the catching and retaining or possessing of bordmar less than msl (cm fork length) is not permitted within the fishery area.	Risk of licensed, non-licensed fishers and recreational fishers catch and retaining fish less than the MSL.	SEVERE
Minimum size limit based on Lm50: the catching and retaining or possessing of maconde less than msl (cm fork length) is not permitted within the fishery area.	Risk of licensed, non-licensed fishers and recreational fishers catch and retaining fish less than the MSL.	SEVERE
Bag limits (in possession limits) for the take of all high-risk species, per recreational fisher.	Recreational fishers breaching bag limits for specified demersal fish species.	SEVERE
* Minimum size limit increased to Lm50: the catching and retaining or possessing of zob gris less than msl (cm fork length) is not permitted within the fishery area.	Risk of licensed, non-licensed fishers and recreational fishers catch and retaining fish less than the MSL.	HIGH/SEVERE

Minimum size limit based on Lm50: the catching and retaining or possessing of vyey plat less than msl (cm fork length) is not permitted within the fishery area.	Risk of licensed, non-licensed fishers and recreational fishers catch and retaining fish less than the MSL.	HIGH/SEVERE
Minimum size limit based on Lm50: the catching and retaining or possessing of vara vara less than msl (cm fork length) is not permitted within the fishery area.	Risk of licensed, non-licensed fishers and recreational fishers catch and retaining fish less than the MSL.	HIGH
Minimum size limit based on Lm50: the catching and retaining or possessing of karang plat and karang balo less than msl (cm fork length) is not permitted within the fishery area.	Risk of licensed, non-licensed fishers and recreational fishers catch and retaining fish less than the MSL.	HIGH
Whalers and schooners limited to 2 traps per vessel per day.	Risk of breaching the limits on the number of traps used by whalers and schooners.	MODERATE

Surveillance Activities

Specific surveillance and enforcement were identified to address each of the 'HIGH' and greater risks. A number of risks can be managed under one or several strategies. The results of this assessment have been used to develop the Surveillance and Enforcement Plan outlined in Appendix 3. This plan is to guide SFA in the development of the annual surveillance/enforcement action plans within the Mahe Plateau fishery area.

Regulations assessed as 'HIGH' and greater in terms of risk are assigned a 'High status' in terms of prioritizing compliance resources. Regulations assessed as 'HIGH/MODERATE' or less in terms of risk are assigned a 'Medium status' in terms of prioritizing compliance resources. For each type of surveillance activity, the target sector and priority regulations are identified. To effectively enforce some regulations, surveillance activities need to be directed to specific locations within the fishery area at specific times; e.g. limits on the number of traps used to target any of specific rabbitfish spawning aggregation sites and monitoring compliance with recreational bag limits on sport fishing vessels.

Surveillance/enforcement patrols are divided into near shore/coastal day or night patrols, offshore/outer Mahe Plateau patrols and land-based patrols on the islands of Mahe, Praslin and La Digue. The annual surveillance budget will deliver 80 days of near-shore day patrols; 24 days of near-shore night patrols; 28 days of offshore/outer Mahe Plateau patrols; and 85 days of land-based patrols across the 3 islands (refer to Appendix 5).

The risk of non-compliance with regulations is typically highest in the first year of operation of a fisheries management plan. Lack of awareness and limited support are significant contributors to non-compliance. This underscores the importance of an

effective and comprehensive Communications Strategy (refer to the Mahe Plateau Fishery Management Plan).

Monitoring Activities

The monitoring activities required to deliver the data needs for the MCS protocol and implement the Mahe Plateau Fishery Management Plan are summarized in Appendix 4. SFA have the primary responsibility in delivering the Monitoring Plan. This includes traditional MCS monitoring of the fishing vessels, and catch and effort data. Collection of biological data relating to the future setting of minimum size limits for key species in the fishery is also included. This data is a high priority as it is important to the integrity of the Management Plan. Key elements of the monitoring activities proposed under the MCS Protocol are outlined below.

The risk assessment process was not applied to the individual risks associated with failing to deliver the information and data identified as important in the Mahe Plateau Fishery Management Plan. This is because that data is considered fundamental to the integrity of the Plan, and it was agreed that all of the associated activities would be supported and adequately resourced.

Revision of the current SFA Catch Assessment Surveys (CAS)

SFA is reviewing the design and implementation of the CAS. To address the issues raised in the recent risk assessment and stock assessment report (Gutierrez 2015) it is recommended that the revised CAS has the ability to: collect species-specific catch and effort data from all sectors landing product in Mahe, Praslin and La Digue; and collect spatial catch data that references where the majority of catch is taken. This will significantly improve the quality of input data for stock assessments.

Fishery independent data

For minimum size limits (MSL) to be an effective fisheries management tool they need be based on length at maturity. Typically minimum legal sizes are set at the length at which 50% of the population reaches maturity (L_m50). For example, the length at maturity relationship for *Lutjanus sebae* (Bourzwa) in Western Australia (Indian Ocean) is being used to set biologically relevant minimum legal sizes in Western Australian fisheries (Fig. 3; S Newman pers. comm.). L_m50 for this species is in the range of 40-45 cm FL, significantly greater than the MSL for Bourzwa of 32 cm FL in the Mahe Plateau fishery management plan. The collection of data on length/weight and reproductive status for at least the key species in the fishery is critical to the integrity of the management plan. Minimum size limits set with no biological basis will be ineffective in reducing fishing pressure on the spawning stock. This justifies the inclusion of the collection of biological data in the Monitoring component of the MCS plan.

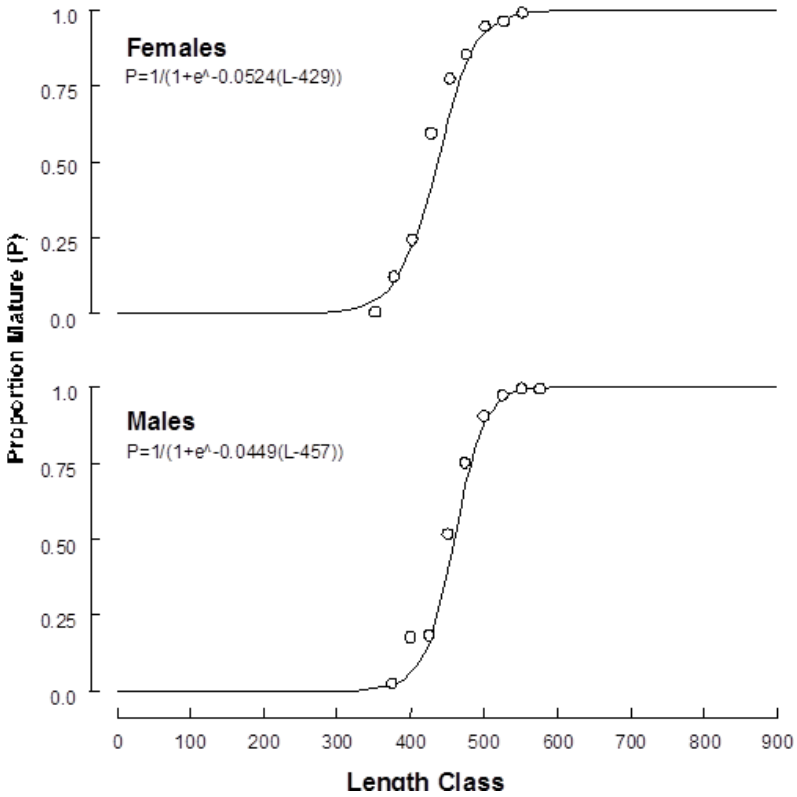

Figure 3. Length at maturity relationship for *Lutjanus sebae* (bourzwa) in Western Australia (Indian Ocean). (Source: S. Newman, Western Australian Fisheries).

Compliance data

To assess the effectiveness of the MCS Protocol, data and information is needed that enables the tracking of infringements, to measure compliance rates and provide intelligence for investigations. For efficiency and to be in alignment with best practice an electronic compliance database needs to be developed and an SFA staff member identified with responsibility for ensuring quality control in data entry, extracting data/summaries as required by gear type, by vessel type, by location, by offence, by fishery sector (e.g. commercial fisher (semi-industrial, schooner/whalers, small boats), charter operator, recreational fisher). In particular it is critical that relevant expertise is utilised in the development of the initial database ensuring that all relevant information is incorporated in a logical manner. This will ensure that future analyses and summaries can be carried out on the relevant data and can be done very quickly and cost-effectively. It is recommended that SFA enforcement officers review periodically the processes for collection of intelligence/compliance data to ensure that the standard of data is maintained.

MCS Implementation costs

Estimates of the financial resources needed to successfully implement the main elements of the MCS protocol are summarized in Appendix 5. Cost estimates are based on information provided by SFA. Resources needed to implement the recommended surveillance and enforcement program for the Mahe Plateau fishery

area are divided into set-up costs and annual surveillance costs. The new tender vessel that will support the L'Amitie in conducting the offshore/outer Mahe Plateau surveillance patrols is a critical component of the surveillance resources needed for the effective implementation of this MCS protocol. All other surveillance activities are being delivered with existing resources.

Enforcement/surveillance implementation costs are separated into 'set-up costs', near shore/coastal patrols, offshore/outer Mahe Plateau patrols and land-based patrols on the islands of Mahe, Praslin and La Digue. The annual surveillance budget will deliver 80 days of near-shore day patrols; 24 days of near-shore night patrols; 28 days of offshore/outer Mahe Plateau patrols; and 85 days of land-based patrols across the 3 islands.

Set-up costs are estimated at SR 377,000. Annual surveillance costs are estimated at SR 843,680. The enforcement costs include vessel operating costs and crew allowances only. Surveillance operations will use existing enforcement officer resources. Inadequate resources will result in poor enforcement and will undermine the integrity of the entire Mahe Plateau Fishery Management Plan.

Challenges and risks for implementation

Key risks to the successful implementation of the MCS Protocol have been identified:

- Limited resources to deliver the surveillance/enforcement;
- Long-term effective engagement with key stakeholders in importance of compliance with fisheries regulations;
- Limited engagement with key fishery stakeholders in the development of the fishery management plan: in particular recreational fishers, sports fishers and hire craft operators, and an
- Effective Communications Strategy.

<u>Recreational fishers and Seychellois community – limited support</u>

- Limited engagement with the broader Seychellois community and recreational fishers in the development of the fishery management plan and the MCS protocol represents one of the highest risks. Prior to the development of the fishery management plan there were few restrictions on recreational fishing and no monitoring of catch or effort.

<u>Surveillance and Enforcement</u>

- Insufficient resources to effectively deliver the surveillance activities now and over the long-term.

<u>VMS</u>

- VMS units not operating on all vessels fishing on the Mahe Plateau, notably semi-industrial vessels, schooners and whalers.

<u>Management of rabbitfish spawning sites</u>

- Clear marking of the key rabbitfish spawning sites specified in the management plan to which several regulations apply. The plan proposes that the center of each of these sites is marked with a buoy and a circle with a diameter of 100 m from this point marks the boundary of the spawning site for management purposes.
- Difficulty in detecting fish traps that are set underwater and have no surface marker.

Education and Awareness Plan / Communications Strategy

- Lack of an effective Communications Strategy, and one that includes an Education and Awareness Program.
- Insufficient resources (people and SR) to implement strategy effectively over the long-term.

Recommendations

Surveillance and Enforcement

- Resourcing of surveillance and enforcement activities outlined in this protocol over the long-term is critical. It is recommended that SFA investigate alternative strategies to support and finance surveillance activities. e.g. future UNDP/GEF partnerships, partnership with other government agencies (e.g. SNPA), partnership with private business sector, and contributions by industry.

- SFA to work with other government agencies (e.g. Coast guard, SNPA) in surveillance activities.

- All surveillance activities should be used to further educate fishers on the regulations and the importance of compliance in ensuring the long-term sustainability of the fishery resource.

IUU Fishing Response Strategy

- IUU fishing on the Mahe Plateau was identified as one of the highest risks in the fishery. To successfully address this issue will require a coordinated response among government agencies and the fishing industry. The IUU Fishing Response Strategy would be an inter-agency strategy to structure information and data gathering and handling processes, storage of information and process for sharing with other relevant agencies. The strategy would provide a framework for an integrated/shared surveillance response (i.e. deployment of the most appropriate vessel – SFA, Coast guard).

- The fishing vessels operating legally on the Mahe Plateau have the capacity to provide intelligence information relating to possible IUU fishing activities. It is critical that a response to receiving intelligence information is demonstrated and feedback provided to the 'informant'.

Consultation with recreational fishers and hire craft operators

- It is strongly recommended that stakeholders from all sectors are regularly engaged throughout the implementation of the fishery plan and the MCS protocol. Engagement can occur during the CAS surveys, surveillance patrols, revision of the fishery plan and the updating of the MCS risk assessments.

Communications Strategy

- Effective Education and Awareness is critical to the successful implementation of the Mahe Plateau Fishery Management Plan and the Monitoring, Control and Surveillance protocol. This needs to be appropriately resourced and implemented.

- Recommend that a broader Communications Strategy is developed that would include education and awareness materials e.g.: information leaflets and notices at major landing places and ports (including ferries) in Praslin and La Digue outlining key fisheries regulations in Creole and French for fishers and the Seychellois community; specific leaflet outlining the regulations relating to the management of rabbitfish aggregation sites and a map showing the specific location of the spawning sites specified in the Plan; information leaflets and posters outlining key fisheries regulations in Creole, French and English for domestic and international tourists.

- Recommend that SFA outsource the development of the Communications Strategy to a communications/education specialist.

Penalty provisions

- It is recommended that the penalty provisions outlined in the *Fisheries Act 2014* that are relevant to the regulations in the Fisheries Management Plan are reviewed, to ensure that they represent appropriate levels of deterrence, and reflect the relative value of the fishery resource.

- Stakeholders have raised concerns regarding the risk of individuals repeatedly committing offences if the penalties are not sufficient. It is recommended that options for cancelling the fishing licenses of repeat offenders be investigated.

- Fisheries Infringement Notices (FINs): Enforcement officers in some jurisdictions have the authority to issue on the spot fines (akin to traffic infringements) for certain fishery offences. It is recommended that a FINs system be scoped and evaluated for the Seychelles.

Amendments to the *Fisheries Act 2014*

- Sharks: Recommend amendment to the *Fisheries Act 2014* that introduces a maximum mesh size for pelagic nets that provides for the retention of small pelagic species (e.g. mackerels) but reduces the likelihood of entanglement of sharks. This is consistent with the intent of the current prohibition on the use of nets to target sharks.

Review process

- It is recommended that there is a biennial review of the MCS Protocol, in particular the surveillance/enforcement plan. This is to ensure that the priority enforcement issues and monitoring/data and information requirements identified in the MCS Protocol are being delivered. The MCS Protocol will be reviewed when new regulations come into effect.

- The compliance rate data identified in this protocol is essential to inform the review, as this will identify where there are outstanding risks. The Risk Assessment Process outlined in Figure 2 identifies the process for conducting the review to ensure the MCS protocol addresses the key risks and optimises the use of limited surveillance and monitoring resources.

References

International Standard (2009). ISO 31000 Risk Management – principles and guidelines. International Organisation for Standardisation, Switzerland.

AFMA (2013). National Compliance 2013-15 Risk Assessment Methodology: The Compliance Risk Management Process.

Appendices

Appendix 1: Summary of the regulations under the *Fisheries Act 2014* and the *Mahe Plateau Demersal Trap and Line Fishery Co-Management Plan 2015* covered by the MCS Protocol.

Source	No.	Management Regulation	Intent (Management Plan regulations)
Fisheries Act	1	IUU fishing: A foreign fishing vessel shall not be used for fishing or fishing related activity in Seychelles waters unless authorized.	
	2	Lobster fishing: no fishing by unlicensed fisher during open season.	
	3	Lobster fishing: no fishing during closed season.	
	4	Lobster fishing: minimum size limit 75mm carapace length and no berried females.	
	5	Sale of fish: Recreational fishers prohibited from selling fish.	
	6	Regulated gear - Spear guns: Possession and use for fishing without an authority prohibited.	
	7	Regulated gear - Nets: Use of nets to target sharks is prohibited.	
	8	Regulated gear - Traps: Minimum mesh size 40mm.	
	9	Regulated fishing activity: Poisons and explosives are prohibited.	
	10	Regulated gear - Nets: Use of nets to obstruct reef passes and channels prohibited.	
	11	Regulated gear - Demersal trawl nets prohibited.	
	12	Regulated gear - Use of nets between 1600 and 0500 prohibited.	
Mahe Plateau Demersal Fishery Management Plan (Phase 1)	13	Minimum size limit for bourzwa (red snapper: *Lutjanus sebae*) of 32 cm FL (fork length).	That all Bourzwa caught less than 32 cm FL must be released back into the water. This minimum size limit is not based on size at maturity. Size limits will be adjusted in Phase 2 of the management plan based on size at maturity.

	14	A demersal fish bag limit of 20 fish per semi-industrial vessels using long-line grear.	The intent is to remove the capacity for large semi-industrial vessels to target large quantities of demersal fish on the plateau and for them to refocus their fishing effort on pelagic species off the plateau. Semi-industrial vessel can have no more than 20 demersal fish species in possession (species list in the Fisheries Management Plan).
	15	Minimum size limit for Zob gris (green jobfish: *Aprion virescens*) of 32 cm FL (fork length).	That all Zob gris caught less than 32 cm FL must be released back into the water. This minimum size limit is not based on size at maturity. Size limits will be adjusted in Phase 2 of the management plan based on size at maturity.
	16	Recreational bag limits for: Bourzwa = 5; Zob gris = 5 applies to recreational fishers and fishers on sports fishing/charter vessels.	There is a need to limit targeting on key species by all sectors, especially those species considered at risk due to historical high levels of fishing effort and/or their particular biological characteristics.
	17	A combined demersal species bag limit for recreational fishers of 20 fish per person per day.	There is a need to limit the take of <u>all</u> demersal species and this responsibility needs to be shared among all sectors. This strategy is to limit the daily catch of individual recreational fishers to reduce the risk of overfishing.
	18	A maximum limit of 20 active traps per licensed (commercial) fishing vessel.	There is a need to limit the capacity for future effort increases in the trap fishery and also remove any latent effort currently existing in this sector of the fishery.
	19	Licensed fishers limited to a maximum of 6 traps per boat per day for 7 days spanning the full moon (3 days prior and 3 days post) on listed Kordonnyen spawning sites from September to April inclusive.	The intent is to constrain the capacity for targeting kordonnyen (rabbitfish) spawning aggregations. Spawning sites are listed in Appendix 2.
	20	A maximum vessel limit of 2 traps for recreational fishers.	There is a need to limit the capacity for future effort increases in the recreational sector while also allowing recreational fishers the opportunity to use traditional methods to catch fish for subsistence.
	21	No traps to be left in the sea overnight on listed Kordonnyen spawning sites from September to April inclusive.	The intent of the strategy is to ensure there are no traps left in the water during night hours on the nominated Kordonnyen spawning sites during spawning months.

		Phase 1 management regulations apply in addition to the new measures listed.	
Fisheries Co-Management Plan (Phase 2)	22	Bag limits (in possession limits) for all high-risk species.	There is a need to limit targeting on key species by all sectors, especially those species considered at risk due to historical high levels of fishing effort and/or their particular biological characteristics.
	(Phase 1 #13)	Minimum size limit for Bourzwa (red snapper: *Lutjanus sebae*) based on Lm50 (FL).	The intent of the MSL is to allow key species identified at-risk, the opportunity to breed before they can be caught and retained, fish caught below the MSL must be released back in the water.
	23	Minimum size limit for Bordmar (*Lutjanus sanguineus)* based on Lm50 (FL).	
	24	Minimum size limit for Maconde (*Epinephelus chlorostigma*) based on Lm50 (FL).	
	(Phase 1 #15)	Minimum size limit for Zob gris (*Aprion virescens*) based on Lm50 (FL).	
	25	Minimum size limit for Vyey plat (*Epinephelus multinotatus*) based on Lm50 (FL).	
	26	Minimum size limit for Vara vara (*Lutjanus bohar*) based on Lm50 (FL).	
	27	Minimum size limit for Karang plat (*Carangoides fulvoguttatus)*; and Karang balo (*Carangoides gymnostethus*) based on Lm50 (FL).	
	28	Whalers and schooners limit of 2 traps per day.	There is a need to limit the capacity for future effort increases in the trap fishery and also remove any latent effort currently existing in this sector of the fishery

Appendix 2: List of kordonnyen (rabbitfish) spawning sites to which regulations apply. The area of the spawning aggregation site is defined by a central point (Lat. and Long.) with a diameter of 100 m. The center of each of these sites is to be marked with a suitable buoy.

No:	SPAWNING AGGREGATION SITE	Lat. (S)	Long. (E)
1	Pate Hillary	4.33787	55.6672
2	Pate Dans Nord	4.34067	55.6783
3	Pate Sans Swet	4.34618	55.68423
4	Pate Consolation Deor	4.37462	55.75793
5	Pate Consolation Andan	4.37023	55.76255
6	Pate Roches Deor	4.36583	55.71849
7	Pate Roches Andan	4.36617	55.72129
8	Pate Sarlo	4.39411	55.75408
9	Petit Bonhomme (small)	4.36215	55.67528
10	Petit Bonhomme (large)	4.36142	55.67013
11	Pate Desire	4.34587	55.67882
12	Pate Dividi	4.35661	55.67706
13	Pate Polite	4.37827	55.74485
14	Pate Florent	4.37783	55.75067
15	Pate Bamboche		
16	Fond L'ilot		

Appendix 3: Surveillance and Enforcement Plan.
This plan is to guide SFA in the development of the annual surveillance/enforcement action plans within the Mahe Plateau fishery area.

Regulations assessed as 'HIGH' and greater in terms of risk are assigned a 'High status' in terms of prioritizing compliance resources. Regulations assessed as 'MODERATE/HIGH' or less in terms of risk are assigned a 'Medium status' in terms of prioritizing compliance resources. For each type of surveillance activity, the target sector and priority regulations are listed. Note: to effectively enforce some regulations, surveillance activities need to be directed to specific locations within the fishery area at specific times; e.g. limits on the number of traps used to target rabbitfish spawning aggregation sites and monitoring compliance with recreational bag limits on sport fishing vessels.

NOTE: It is recommended that all surveillance activities be used to further educate fishers on the regulations and the importance of compliance in ensuring the long-term sustainability of the fishery resource.

PHASE 1:

Priority status	Surveillance action	Target sector and regulations	When/Where
HIGH	Near shore/ coastal: On-water evening/night patrols	Lobster fishing • No fishing by unlicensed fishers • No fishing during closed season • No possession berried females • Minimum legal size 75mm carapace length Nets • No use of nets to target sharks • No setting of nets on rabbitfish spawning areas	Lobster: Inner islands coastal patrols; need intelligence data to identify hot-spots/high risk areas. Areas include: NW Mahe, west of Praslin. Nets: Targeting of sharks - need to identify hotspots/high risk areas where netting occurs. Nets mostly set late in the day, left overnight and retrieved in early morning. Nets: Set on rabbitfish spawning areas. Patrols to target specific sites: Listed in Appendix 2.
HIGH	Near shore/ coastal: On-water	Traps • No traps to be left in sea overnight on the specified Rabbitfish spawning sites during 7-day period spanning Full Moon (3 days	Traps: Regular patrols targeting September to April: the week spanning Full Moon.

	evening/night patrols	prior to 3 days following Full Moon).	Alternatively: random months within period September to April. Patrols to target specific sites: Listed in Appendix 2.
HIGH	Near shore/ coastal: On-water day patrols	<u>Lobster fishing</u> • Compliance with all regulations <u>Traps</u> • Minimum mesh size of 40cm <u>Spear guns</u> • Use of spear guns to take fish not permitted in the fishery area. <u>Undersized fish</u> • Catch and retaining or possession of Bourzwa less than 32 cm TL not permitted • Catch and retaining or possession of Zob gri less than 32 cm TL not permitted <u>Catch limits</u> • Non-licensed/recreational fisher/ recreational fishers on charter/sports fishing vessels, catch and retain or possess more than bag limit 5 Bourzwa and 5 Zob gris per person per fishing trip. • Non-licensed/recreational fisher/ recreational fishers on charter/sports fishing vessel, catch and retain or possess more than bag limit of 20 demersal fish species per person. Catch limit applies to the species list Appendix 1 of the Co-Management Plan.	<u>Lobster:</u> Inner islands coastal patrols; need intelligence data to identify hot-spots/high risk areas. Areas include: NW Mahe, west of Praslin. Increase the frequency of patrols during the OPEN season.
HIGH	On-water Offshore/ Outer Mahe Plateau patrols	<u>IUU fishing</u> • Unlicensed vessels fishing on the Plateau	<u>IUU Fishing:</u> Engage and coordinate with other enforcement agencies, share intelligence data and vessels/resources: e.g. NDEA, Marine Police, Coast Guard, SNPA, ICS, Nature Seychelles, and Defence Force. Engage other commercial vessels to be vigilant and

		Undersized fish • Catch and retaining or possession of Bourzwa less than 32 cm TL not permitted • Catch and retaining or possession of Zob gri less than 32 cm TL not permitted Catch limits • Semi-industrial long-liners catch and retain or possess more than 20 fish per trip. Catch limit applies to species listed in the Fishery Management Plan. • Non-licensed/recreational fisher/ recreational fishers on charter/sports fishing vessel, catch and retain or possess more than bag limit 5 Bourzwa and 5 Zob gris per person per fishing trip. • Non-licensed/recreational fisher/ recreational fishers on charter/sports fishing vessel, catch and retain or possess more than bag limit of 20 demersal fish species per person. Catch limit applies to the species list Appendix 1 of the Co-Management Plan.	provide intelligence data. High-risk area for IUU Fishing is the SE area of the Plateau. All other regulations: Routine surveillance patrols
HIGH	Land-based day inspections e.g. main landing sites and ports	Lobsters • Fishing by unlicensed fishers during OPEN season • Fishing during CLOSED season • No possession berried females • Minimum legal size 75mm carapace length Spear guns • Use of spear guns to take fish not permitted in the SMA Illegal sale of fish	Lobsters: Monthly routine surveillance patrols and targeted land-based surveillance missions based on when fishery is OPEN/CLOSED. Spear guns: Target Hot spots: Eden Island Resort, airport (need to work with Customs and have targeted education at the airport). Need to coordinate with other enforcement agencies as per IUU Fishing. Illegal sale of fish: Intelligence information needed

		• Sale of fish by unlicensed fishers <u>Undersized fish</u> • Catch and retaining or possession of Bourzwa less than 32 cm TL not permitted • Catch and retaining or possession of Zob gri less than 32 cm TL not permitted <u>Catch limits</u> • Semi-industrial long-liners catch and retain or possess more than 20 fish per trip. Catch limit applies to species listed in the Fishery Management Plan. • Non-licensed/recreational fisher/ recreational fishers on charter/sports fishing vessel, catch and retain or possess more than bag limit 5 Bourzwa and 5 Zob gris per person per fishing trip. • Non-licensed/recreational fisher/ recreational fishers on charter/sports fishing vessel, catch and retain or possess more than bag limit of 20 demersal fish species per person. Catch limit applies to the species list Appendix 1 of the Co-Management Plan.	to identify hot spots e.g.: MAHE – Beau Vallon beach, Eden Island, Wharf Marina, Marine Charter, Gondwana jetty. District markets on particular days. PRASLIN: numerous locations. <u>Undersized fish:</u> Target key landing sites (commercial and recreational). Recreational sector: mainly target afternoons. Commercial sector: mainly target areas in early morning. <u>Catch limits: - Semi-industrial</u> track vessels using VMS, use data to determine time of landing; conduct unload inspections. <u>Catch limits – recreational fishers</u> target key landing sites. MAHE: Eden Island, Wharf Marina, Beau Vallon beach, Bel Ombre jetty, Anse A La Mouche, Port Launay. PRASLIN: Cote D'Or, Grande Anse, Baie St Anne. LA DIGUE: La Passe. <u>Catch limits – charter / sport fishing vessels –</u> Target key charter vessel landing sites during typical landing times e.g. between 3 – 5 pm. MAHE: Eden Island, Wharf Marina, Beau Vallon beach, Bel Ombre jetty, Anse A La Mouche, Port Launay. PRASLIN: Cote D'Or, Grande Anse, Baie St Anne. LA DIGUE: La Passe.
MEDIUM	Near shore/ coastal: On-water evening/night patrols	<u>Nets</u> • No use of nets between 1600 and 0500 • Use of nets to obstruct reef passes and channels • No nets to be used to take rabbitfish at any time of the year <u>Traps</u> • Maximum of 6 traps per boat per day for the 7 days spanning the Full Moon on the specified Rabbitfish spawning sites.	Routine surveillance patrols

MEDIUM	Near shore/ coastal: On-water day patrols	<u>Poisons and explosives</u> • Use prohibited <u>Traps</u> • Minimum mesh size of 40cm • Maximum of 25 active traps per licensed fisher/vessel • Maximum of 2 traps per non-licensed fishermen or vessel	<u>Poisons / explosives:</u> Routine surveillance patrols <u>Traps:</u> Monthly patrols targeting September to April: the week spanning Full Moon. Alternatively: random months within period September to April. Patrols to target specific sites listed in the Plan.

Phase 2: Fisheries Management Plan: Phase 2 to include all of the Management Regulations and surveillance needs listed above in addition to that listed here.

Priority status	**Surveillance action**	**Target sector and regulations**	**When/Where**
HIGH	Near shore/ coastal: On-water day patrols	<u>Undersized fish</u> • Minimum size limits for Bouzwa, Bordmar, Maconde, Zob gris, Vyey plat, Vara vara, karang plat and karang balo. <u>Catch limits</u> • Non-licensed/recreational fisher/ recreational fishers on charter/sports fishing vessel, catch and retain or possess more than the bag limit (for individual demersal fish species) per person.	Routine patrols
HIGH	On-water Offshore/ Outer Mahe Plateau patrols	<u>Traps</u> • No traps to be left in sea overnight on the specified Rabbitfish spawning sites during 7-day period spanning Full Moon (3 days prior to 3 days following Full Moon).	<u>Traps:</u> Regular patrols targeting September to April: the week spanning Full Moon. Alternatively: random months within period September to April. Patrols to target specific sites: Listed in Appendix 2.
MEDIUM	On-water	<u>Traps</u>	Routine patrols

	Offshore/ Outer Mahe Plateau patrols and Land-based port inspections	• Schooners and whalers limited to 2 traps per vessel.	

Appendix 4: Monitoring and data collection required to support the implementation of the MCS Protocol.

SFA have the primary responsibility in delivering the Monitoring Plan. This includes traditional MCS monitoring of the fishing vessels, and catch and effort data. Collection of biological data relating to the future setting of minimum size limits for key species in the fishery is also included. This data is a high priority as it is important to the integrity of the Management Plan.

Action	Monitoring and data collection activities	Responsibility	When
SFA fishery-dependent surveys	<u>SFA catch and effort surveys</u> • SFA to implement revised CAS: collect catch and effort data from all sectors landing product in Mahe, Praslin and La Digue. Spatial catch data based on sector where majority of catch taken. This is to improve the quality of input data for stock assessments.	SFA monitoring unit.	Immediate
Develop an electronic Compliance data base	<u>Develop electronic database</u> • Database needed to track infringements, measure compliance rates and provide intelligence for investigations. • Setup database • Identify SFA staff person to manage database, ensure quality control in data entry, extract data/summaries as required by gear type, by vessel type, by location, by offence, by fishery sector (e.g. commercial fisher, charter operator, recreational fisher) <u>Collect compliance data</u> • Develop process and forms for systematic and consistent collection of compliance data.	SFA SFA	Immediate
Monitor any vessels	<u>Vessels fitted with VMS:</u>	VMS unit SFA	On-going

fitted with VMS in relation to fishing activity on the Mahe Plateau.	Monitor activity of any vessels (Semi-industrial vessels; schooners and whalers) fishing on the Mahe Plateau; provide to enforcement unit, information may be used to guide surveillance activities and identify sectors that need to be targeted in communications strategy.		
Collect data on size at maturity for key species.	<u>Fish size at maturity estimates</u> • Determine Lm50 for the most important species (refer to the Fishery Management Plan). • Consult with key stakeholders to revise Minimum Legal Sizes in the Plan (phase 2) to ensure they are biologically based and therefore maximize effectiveness in building fish stocks.	SFA	Complete by mid 2016.

Appendix 5: Summary of the cost of implementation of the MCS Protocol.
Estimates of the financial resources needed to successfully implement the main elements of the MCS protocol are summarized. Cost estimates are based on information provided SFA