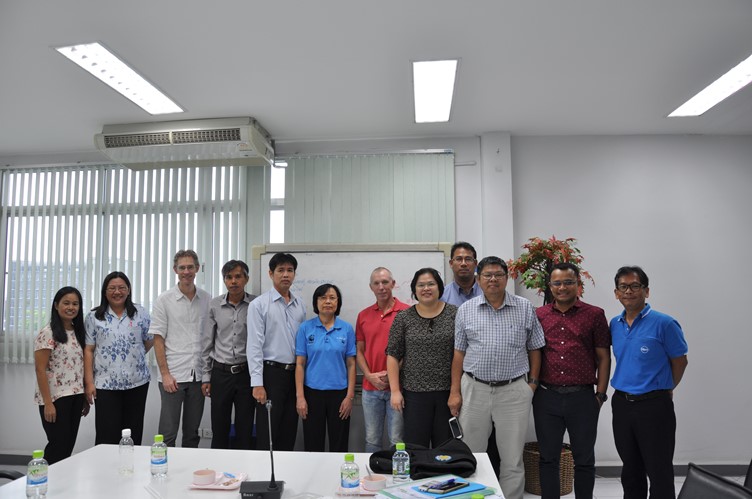
**Review of Surat Thani Blue Swimming Crab**

**Fishery Improvement Project 2018**



Department of Fisheries,

Prodprasop Building, Bangkok, Thailand

April 19-20, 2018

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| **Prepared for** | **Prepared by** |
| WWF-TH | Dr Robert Wakeford, MRAG Ltd. |
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# BACKGROUND

## Historical Overview

In 2012, WWF funded a pre-assessment of the Thai blue swimming crab (*Portunus pelagicus*) to assess the performance of the fishery in terms of the Marine Stewardship Council’s (MSC) principles and criteria for sustainable fishing (the ‘MSC Standard’).

Since the original 2012 pre-assessment report, the MSC has updated their Fisheries Certification Requirements (FCR) twice: first in January 2013 (version 1.3), and again in January 2014 (version 2.0). These updates introduced new and modified scoring issues under the performance indicators (PIs).

A scoping report was produced in February 2013 to highlight where changes under FCR version 1.3 occurred and identified additional actions based on the new scoring criteria. However, no further changes were made to the scoring issues following changes under FCR version 2.0, although the subsequent activities identified in the action plan was based on the current FCR structure, i.e. obsolete PIs under version 1.3 have been removed or combined with other PIs as appropriate.

The scoping report was presented at a stakeholder workshop in May 2013 in Bangkok. At this time the focus of the unit of assessment changed from that of a national-level fishery (i.e. Gulf of Thailand and Andaman Sea) to a regional-level in the Gulf of Thailand only. Further to this, a series of outreach meetings held between WWF-Thailand, national and provincial government authorities, industry and local fishing communities led to further refinements in the unit of assessment to focus solely on the Surat Thani province. The first Fishery Improvement Project (FIP) planning workshop was held in Laemsai Resort, Surat Thani in September 2014.

Later, in 2014, a national plan of action (NPOA) for blue swimming crab (BSC) in Thailand was developed by the Department of Fisheries. This had been partly informed by the series of national and provincial level stakeholder meetings on BSC management. The Surat Thani BSC action plan was later drafted in May 2016, bringing together elements of the previous components and aligning with the NPOA. Prior to the launch of the FIP, a technical workshop was held in July 2016 to (i) improve existing knowledge of the species caught as bycatch in the BSC fishery; (ii) better understand the risk to these species from fishing activities; and (iii) identify areas were additional information, detail or clarification is needed. The action plan was subsequently finalised in January 2017.

The FIP officially launched in February 2017 and details uploaded to FisheryProgress.org[[1]](#footnote-1). This report provides a summary of the first FIP Annual Review meeting. This work remains ongoing.

## Aims and Objectives

A meeting was held at the Department of Fisheries, Bangkok, between 19 and 20 April 2018 to review progress of the Surat Thani BSC FIP action plan. The aims of this meeting were two-fold:

* Review progress and milestones in a range of studies initiated from or related to the action plan.
* Critically review and update the FIP action plan.

The meeting had invited a number of key stakeholders from national government authorities, including the Department of Fisheries and the Department of Marine and Coastal Resources, academia and research institutes, industry and environmental NGO.

Participants were welcomed to the meeting chaired by Ms. Praulai Nootmorn, Senior Fisheries Expert from the Marine Fisheries R&D Division, Department of Fisheries. A list of participants and an outline of the meeting agenda are given in Appendix 1 and 2, respectively.

The purpose of this document is to update the Action Plan for 2018-19, based on the results of the FIP review meeting and provide information on the completed, ongoing and planned activities.

## The Standard: Marine Stewardship Council

The Marine Stewardship Council (MSC) is an independent, global, non-profit organization. It works to enhance responsible management of seafood resources, to ensure the sustainability of global fish stocks and the health of the marine ecosystem. It is supported by a broad coalition of those with a stake in the future of the global seafood supply. The MSC harnesses consumer power by identifying sustainable seafood products through an eco-label. Further details can be found on their website ([www.msc.org/](http://www.msc.org/)).

The Surat Thani blue swimming crab fishery has been assessed using MSC Fisheries Certification Requirements (FCR) version 2.0, which became mandatory for all new fisheries entering the programme after April 2015.

## Unit of Certification and Unit of Assessment

The MSC define a unit of certification as:-

*“Target stock(s) combined with the fishing method/gear and practice (including vessel/s) pursuing that stock, and any fleets, or groups of vessels, or individual operators that are covered by an MSC fishery certificate.”*

This definition is also necessary to enable the traceability of MSC related products (i.e. blue swimming crab) to be audited as part of the MSC chain of custody

The MSC define a unit of assessment as:-

*“The target stock(s) combined with the fishing method/gear and practice (including vessel/s) pursuing that stock, and any fleets, or groups of vessels, or individual operators or other eligible fishers that are included in an MSC fishery assessment.”*

[Source: MSC Certification Requirements v2.0]

An MSC full assessment will determine the environmental and ecological impacts of each gear type identified in the unit of certification. Within the Thai blue swimming crab fishery, two gear types will be looking to be certified as different units of assessment (UoA); bottom set gillnets and crab traps:

|  |  |
| --- | --- |
| **Unit of Assessment 1: Blue swimming crab bottom set gillnet fishery** | |
| Species: | Blue swimming crab *Portunus pelagicus* |
| Geographical Area: | Gulf of Thailand (between 6° and 13.5° North and 99° and 104.5° East. |
| Method of Capture: | Bottom set gillnet |
| Stock / management unit: | Surat Thani Province |
| Management System: | Managed by zonal delimitation but without restricted entry or licensing |
| Client Group: | WWF-Thailand |
| Eligible Fishers: | All licensed fishing vessels nominated by Client |

|  |  |
| --- | --- |
| **Unit of Assessment 2: Blue swimming crab trap fishery** | |
| Species: | Blue swimming crab *Portunus pelagicus* |
| Geographical Area: | Gulf of Thailand (between 6° and 13.5° North and 99° and 104.5° East. |
| Method of Capture: | Collapsible crab trap |
| Stock / management unit: | Surat Thani Province |
| Management System: | Managed by zonal delimitation but without restricted entry or licensing |
| Client Group: | WWF-Thailand |
| Eligible Fishers: | All licensed fishing vessels nominated by Client |

It should be noted that an assessment of a fishery using the MSC Standard, operating with more than one gear type, is based on the precautionary approach. Hence the impact of both gears will be assessed separately and the most vulnerable gear will be used to assess the fishery within the unit of certification (UoC), and not a weighted average method. The impacts of one gear can therefore lead the entire fishery to fail to meet the MSC Standard.

It is noted that more information on the likely distribution of the stock, or management unit, is ongoing as part of a FIP activity and the above definition within the unit of assessment therefore remains ongoing.

## MSC Pre-assessment: A Baseline

In order to review progress made towards a set goal (i.e. MSC Standard), it was important to establish a baseline from which to compare subsequent results. An MSC pre-assessment was conducted in 2009 and provides an indication of the likely scores expected at that time for a range of performance indicators. These are presented in the table below for each Principle.

In 2009, the fishery was deemed not to pass a full MSC assessment. The FIP Review Workshop used these results to monitor progress towards the MSC Standard. It is important to note here that these results are based on the views and opinions of an independent consultant and not that of WWF or an MSC assessment team. The results may therefore be subject to differ in an actual scoring of the fishery.

The fishery is scored through a number of Performance Indicators (PIs), each nested within one of three overarching Principles; (i) Stock Status (ii) Ecosystem Health, and (iii) Governance and Management.

For a fishery to pass a full MSC assessment, the average score from all PIs under each MSC Principle must equal or exceed 80. Where one or more individual PI does not meet a score of 80 or above, a condition may be set to improve the fishery. Conditions are usually set over a 5 year period, before re-certification and will be subject to review through an independent annual surveillance audit. However, if too many PIs score less than 80, the average score for the Principle will fail the fishery outright. It is highly recommended that all efforts are made to progress the fishery towards the highest MSC scores obtainable to minimise the risk of failing.

Within the FIP Action Plan, a high priority refers to a potential MSC score below scoring guidepost 60 (i.e. outright fail), medium priority between SG60 and SG80 (i.e. pass with conditions) and low priority above SG80 (i.e. pass).

Since the average score for each MSC Principle must equal or exceed 80, it is highly recommended that all efforts be made to progress the fishery towards the highest MSC scores obtainable to minimise the risk of failing. A summary of the priorities, timeframe and linkages between PIs taken from the original action using MSC FCR ver1.3 is shown in the table below. It should be noted that several PIs have either changed status (e.g. retained/bycatch to primary and secondary species) or been deleted (e.g. reference points/ research plan). These have been highlighted as grey boxes.

Table 1: Summary of pre-assessment of the Surat Thani blue swimming crab fishery showing level of priority for each of the 31 MSC Performance Indicators within three major Principles. High priority refers to a potential MSC score below Scoring Guidepost 60 (fail), medium priority between SG60 and SG80 (pass with conditions) and low priority above SG80 (pass) under MSC FCR ver1.3.

| **Performance Indicator Category** | | **Priority** | **Timeframe** | **Linkages** |
| --- | --- | --- | --- | --- |
| **Principal 1** | | | | |
| 1.1 | Outcome | | | |
| 1.1.1 | Stock Status | High | Medium/Long | 1.1.2, 1.2.1, 1.2.4 |
| 1.1.2 | Reference points | High | Medium/Long | 1.1.1, 1.2.1, 1.2.4 |
| 1.1.3 | Stock rebuilding | High | Medium | 1.1.1, 1.1.2, 1.2.2, 1.2.4 |
| 1.2 | Management | | | |
| 1.2.1 | Harvest strategy | High | Medium | 1.1.2, 1.1.2, 1.2.2, 1.2.4 |
| 1.2.2 | Harvest control rules and tools | High | Medium | 1.1.1, 1.1.2, 1.2.1, 1.2.3, 1.2.4, 3.1.1, 3.2.3 |
| 1.2.3 | Information and monitoring | Medium | Medium | 1.1.2, 1.2.1, 1.2.2, 1.2.4 |
| 1.2.4 | Assessment of the stock status | High | Medium/Long | 1.1.1, 1.1.2, 1.2.1, 1.2.2 |
| **Principal 2** | | | | |
| 2.1 | Retained species | | | |
| 2.1.1 | Outcome | High | Long | 1.1.1, 1.1.2, 1.2.2, 1.2.4, 2.1.2, 2.1.3 |
| 2.1.2 | Management | High | Medium/Long | 1.1.1, 1.1.2, 1.2.1, 1.2.2 |
| 2.1.3 | Information/ monitoring | Medium | Medium/Large | 1.2.3, 3.1.1 |
| 2.2 | Bycatch species | | | |
| 2.2.1 | Outcome | Medium | Medium/Long | 2.2.2, 2.2.3 |
| 2.2.2 | Management | High | Short/Medium | 2.2.1, 2.2.3 |
| 2.2.3 | Information/ monitoring | High | Medium | 2.2.1, 2.2.2, 3.1.1 |
| 2.3 | ETP species | | | |
| 2.3.1 | Outcome | Medium | Medium | 2.3.2, 2.3.3 |
| 2.3.2 | Management | Medium | Short/Medium | 2.3.1, 2.3.3 |
| 2.3.3 | Information/ monitoring | Medium | Medium | 2.3.1, 2.3.2, 3.1.1 |
| 2.4 | Habitats | | | |
| 2.4.1 | Habitat: status | Medium | Medium | 2.4.2, 2.4.3, |
| 2.4.2 | Habitat: management strategy | Medium | Medium | 2.4.1, 2.4.3, 3.1.1, 3.2.3 |
| 2.4.3 | Habitat: Information/ monitoring | Medium | Short/Medium | 2.4.1, 2.4.2, 3.1.1 |
| 2.5 | Ecosystem | | | |
| 2.5.1 | Ecosystem: Outcome | High | Medium | 2.5.2, 2.5.3, 3.2.5 |
| 2.5.2 | Ecosystem: Management | High | Medium | 2.5.1, 2.5.3, 3.1.1, 3.2.3 |
| 2.5.3 | Ecosystem: Information/ monitoring | High | Medium | 2.5.1, 2.5.2, 3.1.1 |
| **Principal 3** | | | | |
| 3.1 | Governance and policy | | | |
| 3.1.1 | Legal and customary framework | High | Medium/Long | 1.2.2, 2.1.2, 2.1.3, 2.2.2, 2.2.3, 2.3.2, 2.3.3, 2.4.2, 2.4.3, 2.5.2, 2.5.3 |
| 3.1.2 | Consultation, roles and responsibilities | Medium | Short/Medium | 3.2.2 |
| 3.1.3 | Long term objectives | High | Medium | 2.4.2, 3.2.4 |
| 3.1.4 | Incentives for sustainable fishing | Medium | Medium/Long | 3.2.5 |
| 3.2 | Fishery specific management system | | | |
| 3.2.1 | Fishery-specific objectives | High | Medium | 3.1.3, 3.2.4, 3.2.5 |
| 3.2.2 | Decision-making processes | High | Medium | 3.1.2 |
| 3.2.3 | Compliance & enforcement | High | Medium | 1.2.2, 3.1.1, 3.1.2, 3.2.1 |
| 3.2.4 | Research plan | Medium | Medium | 3.1.3, 3.2.1 |
| 3.2.5 | Management performance evaluation | High | Medium/Long | 1.1.1, 2.4.1, 2.5.1, 3.2.1, 3.2.2 |

## Overview of FIP Action Plan

This review of progress against the FIP Action Plan is presented by MSC performance indicator within each Principle, and not simply a review of each task and activity. Hence the performance of FIP activities (or tasks) may be relevant to more than one performance indicator and will be addressed under multiple PIs, where appropriate. A brief analysis of the progress made within each task against the MSC Scoring Guideposts (SG) is also given, in addition to further recommendations on how to maximise the opportunity of each PI meeting the MSC Standard at (SG80).

# FIP PROGRESS

## Summary of Performance Indicator Outcomes

This review of progress against the FIP Action Plan is presented by MSC performance indicator within each Principle, and not simply a review of each task and activity. Hence the performance of FIP activities (or tasks) may be relevant to more than one performance indicator and will be addressed under multiple PIs, where appropriate. A brief analysis of the progress made within each task against the MSC Scoring Guideposts (SG) is also given, in addition to further recommendations on how to maximise the opportunity of each PI meeting the MSC Standard at (SG80).

Table 2: Summary of MSC pre-assessment scoring and revised scoring following the 2018 FIP review meeting

| Principle | Component | PI number | Performance Indicator | Pre assessment scoring | Revised scoring April 2018 |
| --- | --- | --- | --- | --- | --- |
| 1 | Outcome | 1.1.1 | Stock status | <60 | <60 |
| 1.1.2 | Stock rebuilding | <60 | <60 |
| Management | 1.2.1 | Harvest Strategy | <60 | <60 |
| 1.2.2 | Harvest control rules and tools | <60 | <60 |
| 1.2.3 | Information and monitoring | 60-79 | 60-79 |
| 1.2.4 | Assessment of stock status | <60 | <60 |
| 2 | Primary species (managed bycatch) | 2.1.1 | Outcome | <60 | <60 |
| 2.1.2 | Management | <60 | <60 |
| 2.1.3 | Information | <60 | 60-79 |
| Secondary species (non-managed bycatch) | 2.2.1 | Outcome | <60 | <60 |
| 2.2.2 | Management | <60 | <60 |
| 2.2.3 | Information | <60 | 60-79 |
| ETP species | 2.3.1 | Outcome | <60 | <60 |
| 2.3.2 | Management | 60-79 | 60-79 |
| 2.3.3 | Information | 60-79 | 60-79 |
| Habitats | 2.4.1 | Outcome | <60 | <60 |
| 2.4.2 | Management | <60 | <60 |
| 2.4.3 | Information | 60-79 | 60-79 |
| Ecosystem | 2.5.1 | Outcome | <60 | <60 |
| 2.5.2 | Management | <60 | <60 |
| 2.5.3 | Information | 60-79 | 60-79 |
| 3 | Governance and Policy | 3.1.1 | Legal and customary framework | <60 | <60 |
| 3.1.2 | Consultation, roles and responsibilities | 60-79 | 60-79 |
| 3.1.3 | Long term objectives | <60 | <60 |
| Fishery specific management system | 3.2.1 | Fishery specific objectives | <60 | <60 |
| 3.2.2 | Decision making processes | <60 | <60 |
| 3.2.3 | Compliance and enforcement | <60 | <60 |
| 3.2.5 | Management performance evaluation | <60 | <60 |

## Review of progress

This section of the report provides further details of the progress made towards specific Performance Indicators within each Principle within various activities and milestones outlined in the FIP action plan.

### Principle 1: Stock status and fisheries management

There are a number of activities planned under Principle 1 to improve the stock status of Surat Thani blue swimming crab. This includes both literature reviews to determine the current state of knowledge and data collection.

**Activity 1: Establish status of BSC stock in Surat Thani using existing information**

The purpose of this activity is to review the current literature to determine the status of BSC in Surat Thani and the Gulf of Mexico. This will identify what additional information and data might need to be collected.

With **Milestone 1** complete, the results show there has been a number of individual assessments on BSC over the past decade from the Gulf of Thailand and Andaman Sea. There has not, however, not been an assessment of the BSC stock or ‘management unit’ in Surat Thani.

The assessments reviewed were completed in different regions based on data collected between 2003 and 2010. These assessments showed the level of fishing mortality (F) against the total mortality (Z) level. Although the results are considered outdated (more than 5 years old) and require clarification they indicate that the stock(s) were heavily over-exploited and the size at first capture (Lc50) was highly likely to be below the age at first capture (Lm50).

During the FIP review meeting, DoF indicated that MSY had been estimated each year and that during 2016 BSC assessment the results indicated that the stock still has overfishing. A new estimate will be updated in 2018. These results were not available for review.

There are no biological reference points defined for the fishery. However, the high level of fishing mortality and large number of undersized crabs retained strongly indicates the stock is high likely to be overexploited (low biomass) and have overfishing (high fishing mortality). Further to this, given the small size of crab retained, the stock is likely to be below the point of recruitment impairment as the fishery does not allow crabs to reach maturity and spawn at least once.

**Activity 2: Identify stock boundary or biological management unit for BSC in Surat Thani**

There are two parts to this activity in the FIP action plan. The first aims to collect new genetic material from BSC in Surat Thani and surrounding area (see Figure 1). The second part will compare the results to previous studies in other parts of Thailand.

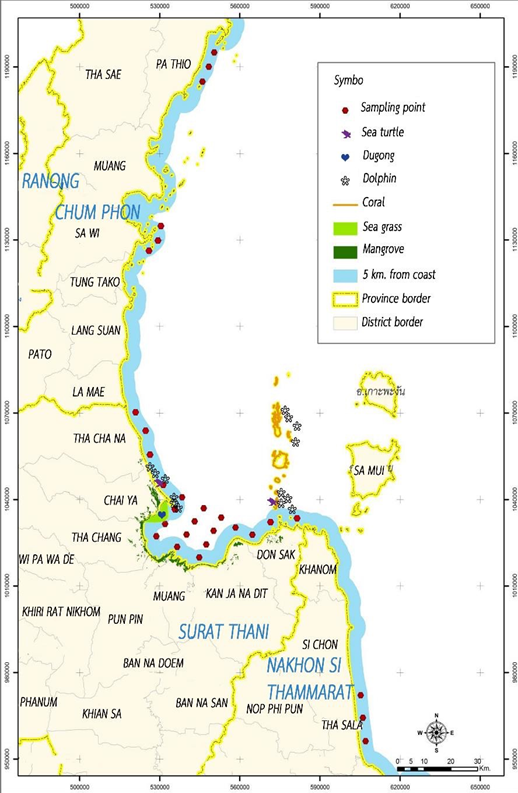


Figure 1: Location of sampling sites to collect genetic material to identify stock boundaries.

The results of the genetic analysis will be reported in **Milestone 2**, which will enable a critical analysis of stock distribution in **Milestone 3**. The sampling of blue swimming crab will also enable additional biological characteristics to be collected, which will support mapping of spawning and nursery grounds in Surat Thani in **Milestone 4**. These activities remain ongoing, with outputs expected for review in Q4 2018.

**Activity 3: Reference points**

Due to changes in the MSC Standard from version 1.3 to version 2.0, this activity has been moved to Activity 11a. **Activity 3 was removed from the 2017 FIP action plan**.

**Activity 4a: Establishment of community BSC banks in Surat Thani**

As part of the Marine Fisheries Management of Thailand Master Plan, eight crab banks have been established and implemented by Chumphon Marine Fisheries Research and Development Centre (Figure 2). The purpose of the crab banks are to support stock rebuilding such that the dependence on the number of released zoeae and crab larvae is reduced over time as the stock is rebuilt.

Large-scale stock enhancement should not be considered a long-term strategy to support the wild capture fishery as “the management of enhancement activities related to the fishery should not prevent the ability of wild stocks to sustain themselves at their optimum levels, according to their natural habitat related and biologically based productive capacities” [MSC FCR G7.7.4](https://www.msc.org/docs/default-source/default-document-library/for-business/program-documents/fisheries-program-documents/msc_fisheries_certification_requirements_and_guidance_v2-0.pdf).

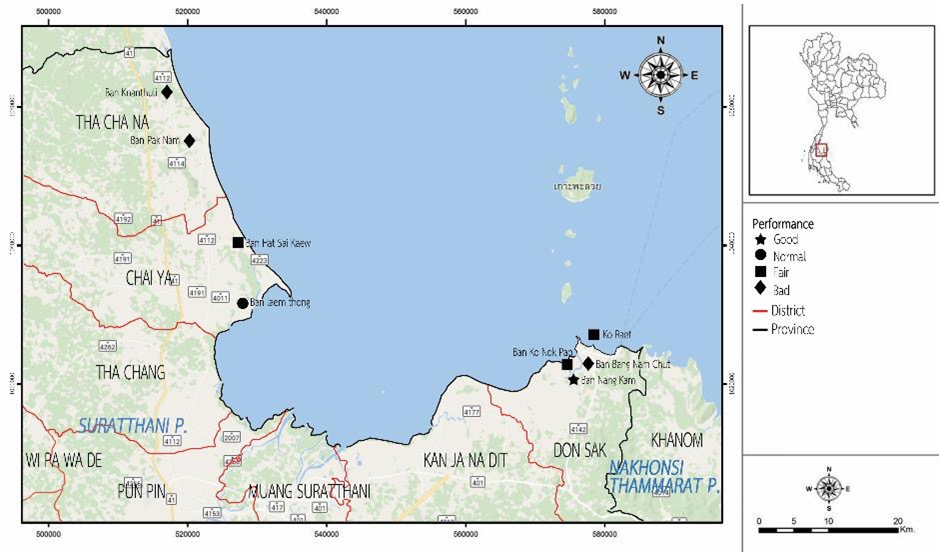


Figure 2: Location of blue swimming crab banks in Surat Thani and status.

Part of this key activity is to establish new crab banks (**Milestone 5**). However, it was noted that the performance of several existing crab banks were considered “fair” or “bad”. The FIP review meeting discussed how it is important to establish indicators to monitor and evaluate the performance of existing banks (**Milestone 6**). To date, Milestone 5 remains ‘ongoing’, and DoF is currently working with TFFA and local coastal communities. **Milestone 5** is expected to be completed by next FIP review meeting in 2019, whereas Milestones 6 will be completed by Q4 2019.

A white paper on crab stock enhancement was initially presented at the Boston Seafood Show[[2]](#footnote-2). This document presents best practice guidelines for stock enhancement of BSC, including the importance of site selection and timing of release of larvae. This contributes towards **Milestone 7** to develop best practice guidelines for crab banks in Thailand. Milestone 7 is ongoing and expected to be completed by Q4 2019.

**Activity 4b: Study of survival rate from BSC bank operations**

As part of the study on crab banks, research is being conducted to analyse the survival rate from BSC bank operations in Thailand. **Milestone 8** will provide a report on the survival rate and **Milestone 9** will document the migratory behaviour of juvenile crabs from various release sites. This research will help identify the most suitable release sites and may inform the extent of boundaries of a ‘management unit’. This work remains ongoing and outputs are expected to occur in before the next FIP review meeting in 2019.

**Activity 4c: Release young BSC in Surat Thani for stock enhancement**

Linked to activities 4a and 4b above, **Milestone 10** is a “release plan” document to describe the most suitable location(s), timing and size of crab etc. to be released from the banks to maximize stock enhancement. While this activity was planned to occur during 2017, this has been postponed until the end of 2018. **Milestone 11** will provide an evaluation of the research, which will include DNA analysis and micro tagging that can help identify the boundaries of the ‘management unit’. Due to the delayed start of this activity, progress will be reported under Milestone 11 in 2019 and 2020.

**Activity 5: Ensure draft Fisheries Management Plan (FMP) management measures are appropriate for Surat Thani BSC stock rebuilding**

A Draft FMP for BSC has been prepared by DoF and **Milestone 12** provides an opportunity for WWF and Universities to review and propose changes to strengthen the management measures for rebuilding the stock in Surat Thani. The FMP includes for example establishing the minimum landing size (MLS). The FIP review discussed whether the current measurements taken in the region were associated with carapace width or length. Concern was expressed that due to the extent of undersized carb in some areas, it would not be feasible to introduce the MLS immediately without incremental changes and requires further discussion. Due to initial delays in obtaining the draft FMP, Milestone 12 remains ongoing and is expected to be complete before the next FIP review.

**Activity 6: Determine the impact of shellfish farms on BSC stocks in Surat Thani**

**Milestone 13** is to provide a review of existing information to determine the potential and actual risk of impact from the shellfish (clam) farms in Ban Don Bay on the BSC stock. The FIP review meeting discussed the role of the National Fisheries Committee in establishing the farms. A review of the potential impacts from three sources of pollution is currently ongoing by DMCR and is expected to report their findings at the next FIP review meeting in 2019.

**Activity 7: Development of a Shellfish Management Plan for Surat Thani**

Following the outcome of activity 6, **Milestone 14** is a shellfish management plan (SMP) that may be necessary to mitigate any impacts of the farms on the BSC stock. While no progress has yet been made on this activity, this milestone remains ongoing and is expected to be completed by mid-2021.

**Activity 9: Education and outreach of destructive fishing techniques**

To help reduce the volume of undersized immature crabs retained in the fishery and therefore to prevent recruitment overfishing and support rebuilding of the stock, a series of education and outreach meetings are planned with fishing communities to increase local knowledge and facilitate better compliance within the BSC fishery.

A series of outreach meetings are planned to occur in November 2018 to coincide with the introduction of new fisheries regulations. **Milestone 15** remains ongoing and will document the outcome of the meetings with fishing communities.

**Activity 10: Implement a minimum landing size (MLS) for BSC in Surat Thani**

As part of the harvest strategy, this activity is to define and implement a harmonised minimum size of retained crab in Surat Thani. **Milestone 16** was presented at the FIP review meeting and reviews the current state of knowledge on the size of maturity and the size at first capture.

The review shows 2006 data in Surat Thani on the size at capture (Srichanngam and Rungruang, 2006). This was above the size of maturity from specimens in the Gulf of Thailand (Jindalikit, 2001). It is noted that the available data is old (over 12 years) and it is not clear if the measurements reflect carapace width or length. The data may no longer reflect the actual size of capture in the fishery in 2018. The information obtained from the review (e.g. length of maturity) will be used to communicate MLS with local fishing communities as **Milestone 17**. This remains ongoing and is expected to be completed by the next FIP review meeting.

**Activity 11a: Develop appropriate harvest control rules (HCRs) and tools**

The purpose of this activity is to establish rules that determine the appropriate level of fishing effort (mortality) at various levels of stock abundance relative to reference points to prevent the fishery from reducing the reproductive capacity of the stock. This will be achieved by defining applicable HCRs that link to the FMP and provide a management response when stock declines, which can be monitored through changes in biological reference points or suitable indicator (e.g. change in ratio, in case of LB-SPR). This includes pre-agreed actions to be identified in order to response when changing in indicator occurs.

The original **Milestone 18** was to develop an advocacy and policy brief to support development of HCRs. During the FIP review meeting, it was clarified that Milestone 18 has been revised and updated to report on a series of research programme projects that will determine an appropriate HCR. The results of this activity are not expected to occur before the development of biological reference points (activity 11b), and remain ongoing until March 2020.

It should be noted however, that appropriate management actions to reduce fishing mortality to sustainable levels should occur immediately and does not require an approved HCR to be established beforehand.

**Activity 11b: Develop biological reference points for the Surat Thani BSC stock**

The purpose of this activity is to identify target and limit reference points to ensure the Surat Thani BSC stock is managed at a sustainable level. The reference points will determine the structure of the HCR in activity 11a.

The FIP review meeting highlighted that work is planned to determine simple measurable biological reference points (e.g. minimum carapace width) that can be used as a proxy for fishing mortality calculated from an assessment of the stock based on length-based spawning potential ratio (LB-SPR).

**Milestone 19** is a report of the outputs from an LB-SPR assessment used to determine the effectiveness of different size-based thresholds used to manage the fishery as part of a HCR. This has been identified within the NPOA and has full support from DoF. The practical implementation of size-based reference points will be discussed and agreed following stakeholder consultation as part of **Milestone 20**. The LB-SPR assessment has been postponed and the results of each milestone is not expected to be available until March 2020.

**Activity 12: Small-scale fishing vessel monitoring scheme pilot study**

This activity was highlighted during the early development of the FIP action plan to better understand the temporal and spatial distribution of the blue swimming crab fishery and facilitate improved enforcement and control. **Activity 12 was previously removed from the 2017 FIP action plan** and included under activity 47 to conduct a socio-economic study of BSC fishers.

**Activity 13a: Review of reproductive biology of BSC in Thailand**

The purpose of this activity is to conduct a desk-based literature review to better understand the BSC reproductive biology and to identify areas/ periods where BSC are most vulnerable and may require additional protection.

The FIP review meeting was presented with a report under both **Milestone 21** and Milestone 22 (activity 13b). The review considers various aspects of BSC reproductive biology in Thailand, including Taxonomy, genetic diversity, habitat, abundance and distribution in the Gulf and Thailand and Andaman Sea.

It is suggested that recommendations for additional data collection be included in the review.

**Activity 13b: Review of habitat and distribution of BSC in Thailand**

**Milestone 22** and **Milestone 23** were designed to help better understand BSC distribution and areas where BSC are most vulnerable, e.g. nursery and spawning areas, that may require additional protection. A broad overview of existing information on the “distribution areas” of BSC in Thailand was presented to the FIP review meeting and a summary in Figure below.



Figure 3: Distribution of blue swimming crab in Thailand showing distribution areas (red circles).

The information available presents a useful summary of the distribution of BSC at a national level. Further specific details of the size/age distribution of BSC within Surat Thani specific to the FIP are provided in activity 13c below.

**To strengthen the review it is suggested that recommendations for additional data collection be included from the literature sources.**

**Activity 13c: Impact assessment of BSC fishery in Surat Thani**

To better understand BSC ecology and fishery impacts in Surat Thani to inform sustainable management, additional primary data collection is required. This is included within 3 main parts: (i) fishing gear used, (ii) fishing ground, and (iii) catch. Combined, these data help inform BSC distribution and reproductive biology at a Provincial level (i.e. study of BSC distribution and reproductive biology). Several milestones have been established to achieve this task that will build on existing work ongoing in the region. This includes for example, mapping of the coastal natural resources and aquaculture undertaken as part of EU-funded ‘Coastal Habitats and Resources Management’ programme (CHARM, 2002 - 2007).



Figure 4: Distribution of coastal natural resources and aquaculture in Surat Thani region (CHARM, 2006).

**Milestone 24** remains ongoing and will present the findings of an impact assessment within the region. The original timeframe for delivery was until December 2018, however this is now expected to the available before the next FIP review meeting in 2019.

A series of additional mapping exercises will be undertaken to show the distribution of the BSC broodstock area, spawning group, nursery ground (**Milestone 25**); distribution of BSC by size and relationship with habitat (**Milestone 26**); and fishing gear and fishing ground distribution (**Milestone 27**). These milestones remain ongoing and due to linkages with other related projects (e.g. genetic sampling), are now all expected to be available in September 2019.

**Activity 14: Review and collate existing data on BSC**

To ensure all relevant information is available to FIP stakeholders to better understand information gaps and support ongoing fisheries management and research, including stock assessment, **Milestone 28** is to provide a review of all existing sources of data on BSC, including fisheries statistics (e.g. temporal and spatial catch and effort) biological characteristics from different government departments and fisheries institutes, and weight categories from crab processors.

A comprehensive reference list was presented at the FIP review meeting. This is particularly helpful to highlight grey literature and studies only available in Thai.

**It is recommended that this Milestone remains ‘active’ throughout the FIP and new information is added as is becomes available. In future, it would be helpful to separate the information sources under different headings related to each MSC Performance Indicator (e.g. stock assessment, habitat). Furthermore, in addition to a list, it would be helpful to obtain an electronic copy of each report to share with stakeholders.**

It is recognised that one of the activities (Activity A) was to establish sub-working groups within the FIP. To date, it is not clear whether these have been established or which groups have been established.

**Activity 15: Review environmental impacts of inland agriculture on Surat Thani BSC stock**

The FIP review meeting was informed this activity has been renamed to ‘Review environmental impacts of land-based activities on Surat Thani BSC stock’. This change reflects more recent concerns associated with the environment, including use of plastics.

This collaborative work with the Department of Agriculture is ongoing and **Milestone 29** will provide a summary of the relevant research reports and publication by June 2020.

**Activity 16: Stock assessment of BSC in Surat Thani**

Little or no information was previously available on the status of the BSC stock in Surat Thani. An activity was planned between October 2016 and March 2017 to review of the current status of BSC in Surat Thani and the Gulf of Thailand more generally based on existing stock assessments and other relevant information. This was not a stock assessment or data collection task. A literature review on BSC population dynamics and stock status was presented under Milestone 1. The review of BSC stock status indicated that the previous assessments were now considered outdated and also needed to be more specific to the BSC stock or ‘management unit’ in the Surat Thani region.

The FIP review meeting enabled an opportunity to discuss the type of methods available. This work remains ongoing, and the LB-SPR was highlighted as a potential stock assessment method appropriate for the scale and intensity of the fishery.

**Milestone 30** is ongoing and will produce a stock assessment report (methods only) by the end of December 2019.

### Principle 2: Ecological Impacts

**Activity 17: Improve understanding of bycatch species outcome status**

A Risk Based Framework (RBF) workshop was held in 2016 under **Milestone 31** and is therefore completed. This collected a wide range of information on bycatch species, but also included information on the likely distribution of BSC and the spatial and seasonal distribution of fishing effort.

The workshop enabled an assessment of the potential risk of overexploitation using a Productivity-Susceptibility Analysis (PSA) of primary (managed bycatch) and secondary (unmanaged bycatch) species retained in the BSC trap and gillnet fishery. It also explored the risk posed by the fishery on Endangered, Threatened and Protected (ETP) species in addition to benthic habitats.

The results showed that 22 species, including invertebrates and fish were retained by gillnets and 36 species in the trap small to medium-scale fishery. In contrast, only 18 species were reported in gillnet and 10 species in the trap large-scale fishery, operating further offshore. Data obtained from stakeholders indicated that all named retained species were highly productive and widely distributed within the known fishing area. Thus all retained species reported by each gear type scored a ‘low’ risk.

While this did not trigger any immediate concerns, the results would be complemented by other activities to help ensure they can be considered representative of the entire fishery. The workshop however, did not attempt to quantify the level of bycatch species (in weight or numbers) and therefore the proportion of each species caught to determine if any are classified as ‘main’ or ‘minor’ species. However, given the extent of the number of species retained, it is likely that there are few, if any, species categorised as main (i.e. 5% or greater in the total catch).

**Activity 18: Development of a management strategy for bycatch species (as required)**

In line with MSC guidelines, a management strategy, consisting at least of appropriate conservation measures, must be developed to mitigate the impact of the fishery on certain (although not all) non-target or bycatch species. **Milestone 32** is to develop such as strategy, if required.

While a review of bycatch species retained in the BSC gillnet and trap fishery has been obtained through the RBF workshop and literature review (see activity 19 below), further information needs to be analysed and presented on the quantity and weight of bycatch species retained. This will determine if a management strategy is required for species classed as main (5% or more of the total catch), or classed as vulnerable if less than 5%. This is proposed as a new Milestone to support activity 18.

**Activity 19: Analysis of BSC fishery bycatch status (national level)**

Under **Milestone 33**, a review of current information should focus on (1) species composition and bycatch from bottom gill net and trap gears, and (2) ETP species interactions with the BSC fishery (national level). This should provide a baseline of information on bycatch in Thai BSC fisheries to inform development of sustainable management practices, e.g. spatial/ seasonal closures.

To date, information presented under **Milestone 33**, entitled ‘Catch rates and by-catch of BSC fisheries’, provides a high level assessment of retained catches in different fleet and gear segments (e.g. bottom gillnets, traps and trawls). This includes for example, information on catch rates (kg/day/boat) for different spatial and seasonal patterns, in addition to some economic data. The results of the literature review however, do not currently provide detailed quantitative data on species composition to help determine changes in relative proportion of retained species to determine different spatial or seasonal patterns. This may be obtained from fisheries independent (research) or fisheries dependent (fisheries observer) data sources. In addition, the report does not currently provide any information on ETP interactions within the BSC fishery at a national level.

Following a review of the available information sources presented in **Milestone 33**, it is recommended that primary data is collected from the fishery on the quantity of bycatch species retained. This may be obtained from ad-hoc research to capture spatial and seasonal patterns or through a more routine fisheries observer programme.

Additional information on the extent of reported ETP interactions should also be provided in Milestone 33. Again, where no data or reports of potential interactions currently exist, it is recommended to devise a method to collect this information directly from the BSC fishery. Ideally this would occur at both a provincial and national level.

**Activity 27: Development of a management strategy for habitats (as required)**

The RBF workshop under **Milestone 31** (activity 17) provided an opportunity to collect information on the distribution of main habitats encountered within the BSC and to conduct a Consequence Spatial Analysis (CSA) for habitats. The meeting also considered Vulnerable Marine Ecosystems (VMEs) within the area of fishing activity. There were two main habitats identified by fishers; mud and sand and artificial reef. Other habitats such as seagrass and natural reef were reported but completely avoided by fishers and were therefore not considered in the CSA assessment. Linked to activity 27, **Milestone 40** and **Milestone 41** plans to develop a National Plan of Action for seagrass and habitat conservation (see activity 34 below).

Results from the CSA indicated that the risk to main habitats from the trap and bottom gillnet fishery were ‘low’, indicating that they are resilient to serious impacts from the fishery.

It is recommended that the spatial distribution of the fishery is monitored in case fishing effort should move into vulnerable areas of seagrass and coral reefs. It is also recommended that improved knowledge of the encountered habitats, based on scientific surveys, would reduce the uncertainty in the habitat impacts from the fishery. It remains uncertain whether fishers avoid more sensitive habitats (seagrass and coral reefs) due to poor catch rates or whether this is a partial strategy to protect key areas. This requires further clarification as prior to developing a strategy specifically for habitats.

**Activity 28: Habitat biotype mapping**

To provide baseline information needed to determine the distribution of vulnerable habitats, and to identify critical gaps in information, **Milestone 35** is a review of existing sources of information to determine the distribution of main habitat types within the Surat Thani region.

Working with the Dept. of Mineral Resources, DMCR and WWF a number of data sources have already been identified. These include geological information and a seabed and landmark map of the Surat Thani region through the EU-funded CHARM programme (Figure 5).

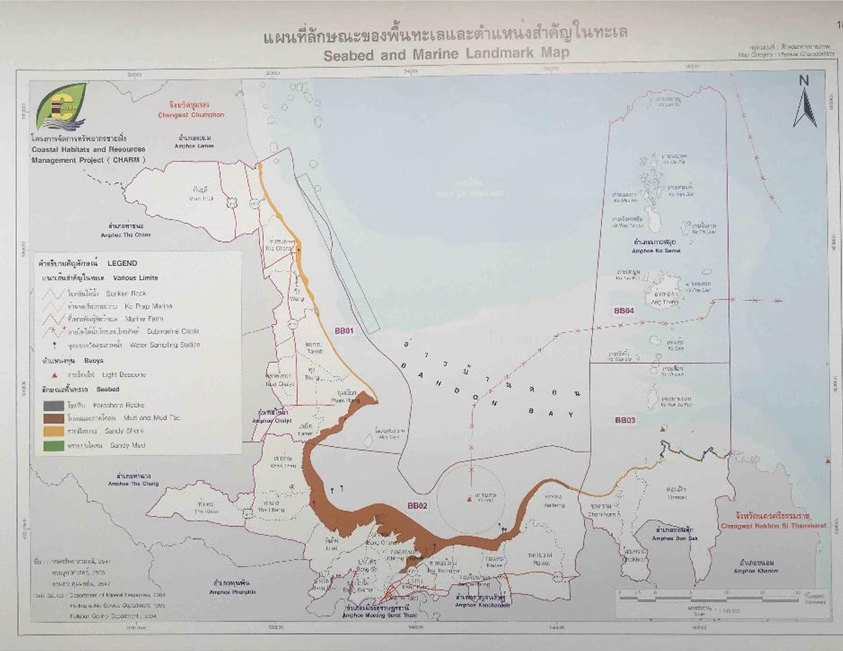


Figure 5: Seabed and landmark map (Source: CHARM, 2006)

A report to critically review these information sources is ongoing and will now be completed before the next FIP review meeting in 2019.

**Activity 29: Determine risk from BSC fishing on habitats**

To ensure information is adequate to determine the risk posed to habitat types by the fishery and the effectiveness of the strategy to manage impacts on habitat types, **Milestone 36** is a review of spatial and temporal fishing patterns by gear type with habitat type (identified from **Milestones 31 and Milestone 35** above).

Due to inputs required from activities 17 and 28, this work remains ongoing and will be completed before the next FIP review meeting in 2019.

**Activity 30: Determine success of habitat restoration projects within Surat Than**

To ensure information is adequate to determine the risk posed to habitat types by the fishery and the effectiveness of the strategy to manage impacts on habitat types, **Milestone 37** will review results obtained on the level of success from habitat restoration projects within the region to inform the distribution and status of habitats within Surat Thani.

This activity requires the coordination between DMCR, DoF and WWF and remains ongoing. It is now expected to be completed by June 2019.

**Activity 32: Development of a management strategy for minimising damage to the ecosystem (as required)**

In line with MSC guidelines, a management strategy, consisting at least of appropriate conservation measures, must be developed which take into account the impact of the trap and bottom gillnet fishery on key elements of the ecosystem.

The 2017 FIP action plan would consider management measures and/or initiatives to reduce impacts to the ecosystem under **Milestone 38**, as required, based on the information gained during Activity 17. During the RBF workshop, a Scale Intensity Consequence Analysis (SICA) was attempted for ecosystem impacts but there was not sufficient information available at the workshop or in the follow up information gathering to complete an assessment.

Whilst there remain a number of ongoing activities to collect information about the ecosystem, further analysis of the impact of the fishery on the ecosystem is required before **Milestone 38** can be achieved. As a result, this activity remains ongoing.

**Activity 33: Determine the main dynamics of ecosystem structure and function in the Surat Thani region**

Under **Milestone 39**, a literature review was completed to determine the main functions of the components within the ecosystem (e.g. EcoPath, EcoSim or similar). The review may also provide additional information on the impacts of the fishery on these components may also be inferred to support information lacking from the RBF workshop on ecosystems.

The review presented a food-web assessment in the Ban Don May area to study the ‘before’ and ‘after’ effects of a BSC stocking programme during 2007 and 2016. It therefore has linkages to **Milestone 6** on the evaluation of BSC banks. The study provided an understanding of the structure and function of various components within the ecosystem in the region using the EcoPath model.

**Activity 34: Develop National Action Plan for seagrass habitat conservation**

This activity aims to develop a National Action Plan for seagrass habitat conservation that seeks to mitigate effects of BSC fishery on seagrass habitats. Under **Milestone 40**, DMCR is still required to develop a schedule for the timing of the development of the action plan. To date this activity remains ongoing and is expected to be completed by the next FIP review meeting in 2019.

A National Action Plan for seagrass habitat conservation will then be developed under **Milestone 41**. This remains ongoing and is planned to be completed by Q4 2020.

### Principle 3: Governance and management

**Activity 35: Review (amended) Royal Ordinance 2015**

Under **Milestone 42**, the impact of the (amended) Royal Ordinance 2015 should be reviewed to determine whether it has been effective in delivering sustainable fisheries in accordance with MSC Principles. Since the original FIP action plan, a revised Royal Ordinance 2017 has been published and will form part of this review. As a result of the latest revisions, the timeframe of the **Milestone 42** has been postponed until Q4 2018.

It should be noted that one or more MSC pre-assessment(s) is currently ongoing and it is recommended that the results from these assessments (particularly under P3) should be harmonised, where possible, with the results of the BSC FIP.

**Activity 36a: Establish a Network System of BSC Fishery Information**

The purpose of this activity is to identify and develop a network of universities, government agencies, private companies, fishers’ groups, NGOs, and other interested parties at a national level with clear roles and responsibilities. This will highlight those individuals involved in the management process of BSC to support the management strategy.

Under **Milestone 43**, the objective was to obtain written agreement from at least two research institutes and government agencies and demonstrate a formal process to show there is an effective consultation process that is also open to interested parties.

Based on discussions held at the 2018 FIP review meeting, this Milestone has been revised based on new information.

Based on discussions held at the 2018 FIP review meeting, it was clarified that consultation is already facilitated through both the National and Provincial Fisheries Committees. The latter are made up of representatives of the local community and people with knowledge or operational experience of the field of fisheries or in natural resources. This Milestone has therefore been revised based on new information to review recent changes in consultation processes within Thai fisheries. In particular this will document how information and data collected during consultation processes are used or not used and how much influence local recommendations have on policy development. This revised **Milestone 43** is expected to be completed by the next FIP review meeting in 2019.

Further to this, **Milestone 44** was to provide a public report of the first working party meeting. This has been updated and modified to link with activity 36b (see below). **Milestone 44** has therefore been removed from the FIP action plan.

**Activity 36b: Establish a management advisory committee**

To ensure the management system has effective consultation processes that are open to interested and affected parties, **Milestone 45** is to establish a specific management advisory committee at a national level for all Thai BSC fisheries. This committee would facilitate the consultation process for the Thai BSC fisheries sector.

During the 2018 FIP review meeting it was confirmed that a specific management advisory committee (Fishery Management Committee, FMC) was developed at a national level for all Thai BSC fisheries and this committee facilitates the consultation process for these fisheries. It was established as ‘National Committee on Blue Swimming Crab Resource Management’ initially signed in March 2016 and revised in April 2017 due to re-structuring of Department of Fisheries. The first meeting Management Advisory Committee meeting was conducted on 23 January, 2017.

A meeting report under **Milestone 45** has been completed. This shows clearly the range of activities discussed during the meeting.

It is noted that the terms of reference for the FMC presented under **Milestone 49** (see activity 41). However, it is acknowledged that the FMC does not currently include representatives from the fishing community. It is highly recommended that key stakeholders from the BSC fishing community are included in the FMC.

**Activity 37: Amend national fisheries masterplans**

Under **Milestone 46**, the original 2017 FIP action plan was to update the national fisheries masterplan for Thai fisheries. This would include a masterplan for BSC that would provide clear long-term objectives to guide decision-making in the fisheries sector.

The 2018 FIP review meeting was presented with a draft Fishery Management Plan (FMP) under **Milestone 47** (see below), which includes the precautionary approach and clearly defines long-term objectives for the fisheries sector, including:

1. Reducing fishing capacity and effort;
2. Rebuilding fish resources through artificial reefs and restocking programs; and
3. Minimizing IUU fishing of the marine resources through effective compliance and enforcement.

Given the information contained in the FMP, **Milestone 46** **is no longer relevant and has been removed from the FIP action plan**. Instead, the objectives of activity 37 will be included in activity 39 (see below).

**Activity 39: Develop Fishery Management Plan (FMP)**

The 2018 FIP review meeting was presented with a draft Fishery Management Plan (FMP) under **Milestone 47**. In addition to including general long-term objectives for Thai fisheries, the FMP needs to be reviewed to ensure it includes short and long-term objectives specifically for the BSC fishery. In addition, the FMP needs to be reviewed and updated (where necessary) based on recent changes in the Royal Ordinance during 2015 and 2017.

This activity remains ongoing and is expected to be completed by the next FIP review meeting in 2019.

**Activity 40: Review of Working Group meeting reports**

To confirm the fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives, **Milestone 48** is a report to review Working Group update meetings to confirm they share latest data and information on a regular basis. The review may also provide recommendations to ensure explanations are given to outcomes.

The Department of Fisheries directive to establish ‘Working Group to Implement NPOA on Blue Swimming Crab Resource Management’ was initially signed in March 2016 and revised in August 2017 due to re-structuring of Department of Fisheries. The Working Group has the following duties:

* Drive NPOA on Blue Swimming Crab Resource Management
* Follow-up the progress of activities under the NPOA
* Develop progress reports and summary of NPOA implementation to present to the National committee
* Perform other duties as assigned

A report was presented at the 2018 FIP review meeting to report on the review of the Working Group (WG) outputs under Milestone 48. The report showed that the WG had met three times in 2017 during March, August, and October to discuss progress and concerns. The WG then summarized the results to report in National Committee meetings.

In additional to the information provided in the report, it would be helpful to provide a report for each meeting, with the agenda and list of participants. This would also show what decisions had been made, why and by whom. In future, rather than use the FIP to report progress, it is recommended to ensure longevity to post the reports online from a governmental website portal or similar.

Although the **Milestone 48** is complete, reporting of WG should remain ongoing.

**Activity 41: Review Fisheries Management Committee (FMC) terms of reference and outputs**

Under **Milestone 49**, a report of a review of the terms of reference and outputs from the FMC was presented at the 2018 FIP review meeting. The report highlighted the committee has the following responsibilities and duties:

* Determine BSC management model and coordinate with relevant agencies
* Supervise National Plan of Action on BSC Resource Management (NPOA)
* Monitor progress and find solutions related to the implementation of NPOA
* Establish the Working Group to implement NPOA
* Perform other duties as assigned

It is confirmed that **Milestone 49** is now complete. However, as highlighted under activity 36b above, it is acknowledged that the FMC does not currently include representatives from the fishing community. It is highly recommended that key stakeholders from the BSC fishing community are included in the FMC. This should be considered within the next 12 -18 months.

**Activity 42: Formation of a community action group**

Under **Milestone 50**, to ensure the fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives, a community action group should be formed.

This activity remains ongoing, and **Milestone 50** is expected to be complete by November 2018.

**Activity 43: Identify "fisher volunteers" to champion management of the BSC fishery**

To support monitoring, control and surveillance (MCS) mechanisms that ensure the fishery's management measures are enforced, under **Milestone 51**, the identification of a number of key stakeholders, or "fisher volunteers" will garner important support within the fishery and enable improved data collection and level of compliance with management measures (similar to fishers code of conduct).

A list of contact details of fisher volunteers has been compiled and **Milestone 51** is now complete.

It is recommended that further details are given of the roles and responsibilities of each fisher volunteer as a commitment to management of the fishery. This might include for example, local monitoring and surveillance activities and biological sampling of the catch.

Under Marine Stewardship Council’s guidelines there is a requirement to ensure a level of compliance with fisheries regulations. Although the fisher volunteer programme provides support to MCS, it is necessary to review data on the number of inspections, violations and successful prosecutions. Due to the current level of systematic IUU fishing in the sector (undersized crabs), the initial results could be used to highlight the extent of the problem (e.g. % undersized). In future, following additional education and outreach, the level of compliance with the BSC rebuilding plan should be monitored and enforced.

**Activity 45: Review monitoring and evaluation of management system**

To confirm there is a system for monitoring and evaluating the performance of the fishery-specific management system against its objectives, under **Milestone 52** a short review will be done to identify what actions are needed to ensure objectives within FMP are met.

To date, this Milestone is ongoing and is expected to be completed by the next FIP review meeting. This activity will support the results obtained from the FIP review meeting and ensure longevity within the management system after completion of the FIP activities.

**Activity 46: Communication plan**

There are a number of additional activities that are not directly related to specific MSC Performance Indicators but will provide support and additional information on the fishery.

To ensure relevant information and project outputs are disseminated in an effective and timely manner to support the management system, **Milestone 53** is designed to develop a Communications Plan (CP) to coordinate education and outreach of specific tasks within the FIP. A CP was developed at the end of 2017 and an overview of the activities were presented at the 2018 FIP review meeting. Whilst the design of the CP is complete there remain a number of ongoing activities to ensure implementation of the CP itself. These will be monitored throughout the FIP.

**Activity 47: Socio-economic study of BSC fishers**

To determine the likely impact on and vulnerability of small-scale fishers to reduction in BSC catch (from enforcement of MLS) and to better understand the incentives and compliance within the supply chain, **Milestone 54** is to undertake a socio-economic study on the BSC small-scale fisheries sector. This activity remains ongoing and the results of the study are expected in Q4 2019.

**Activity 48: Value chain analysis of BSC**

To identify in a transparent manner the linkages between producers, processors and buyers **Milestone 55** will review of existing literature will determine if a value chain analysis has already been performed within the Thai BSC fishery. This will identify gaps and provide recommendations for additional data and information. This activity remains ongoing and the results of the study are now expected in Q4 2019, similar to activity 47 above.

## Benchmark tracking

A summary of the status of the fishery is summarised using the MSC benchmark tracking (BMT) tool (Table 3), the Scoring Category Overview (Figure 6), the Actual verses Expected index table (Table 4), the BMT Progress Tracker (Figure 7) and the BMT Report Sheet (Table 5). These show an improvement in position from the time of the original MSC pre-assessment in 2012 to the FIP review meeting in April 2018.

Table 3: BMT Index Summary Table



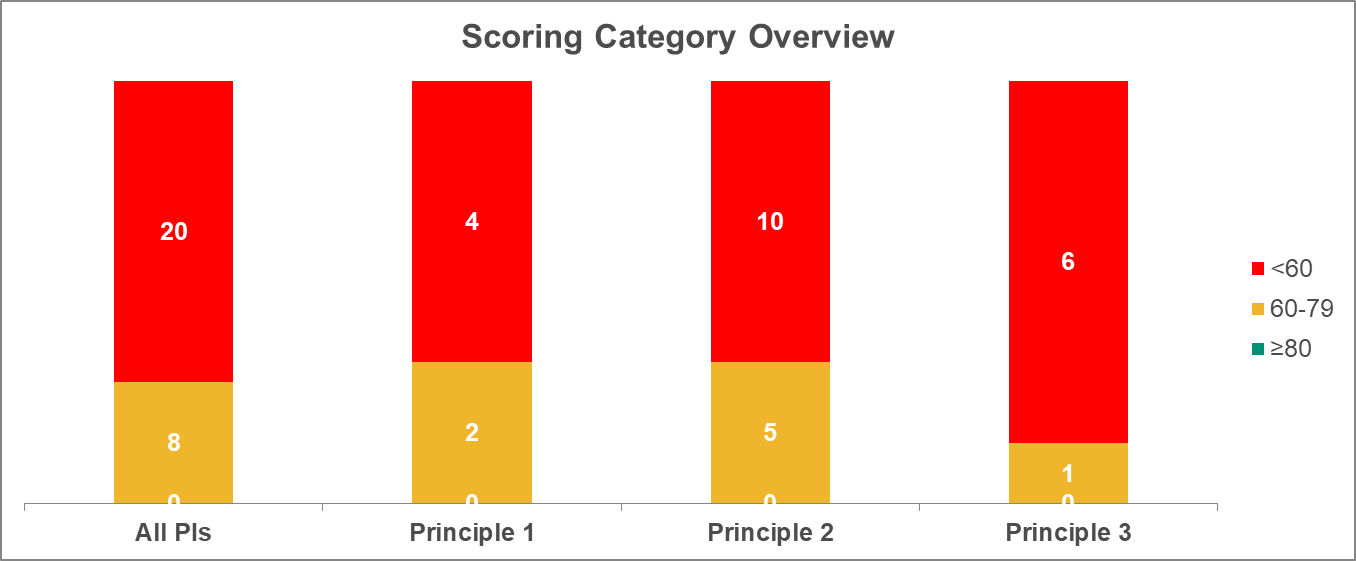


Figure 6: Scoring Category Overview

Table 4: Expected BMT Index Table





Figure 7: BMT Progress Tracker

Table 5: BMT Report Sheet



# REVISED ACTION PLAN

## Stock status and fisheries management

### PI 1.1.1 Stock status

|  |  |
| --- | --- |
| **Activity 1** | **Establish status of BSC stock in Surat Thani using existing information** |
| Description | Review of the current status of BSC in Surat Thani and the Gulf of Thailand more generally based on existing stock assessments and other relevant information. This is not a stock assessment or data collection task |
| Purpose | To determine the current status of BSC based on existing stock assessments |
| Activities | Desk based literature review of the current status of BSC in Surat Thani |
| Milestones | 1. Literature review final report (Mar 2017) **Complete** |
| Priority | High |
| Timeframe | October 2016 - March 2017 |
| Responsibility | Kasetsart University and TFFA |
| Link to NPOA | NPOA 1.1, NOPA 1.2 |

|  |  |
| --- | --- |
| **Activity 2** | **Identify stock boundary or biological management unit for BSC in Surat Thani** |
| Description | Collection and analysis of genetic data to support or refute the proposed stock distribution/ management unit of the BSC in Surat Thani |
| Purpose | To ensure the harvest strategy is appropriate for BSC in Surat Thani, or whether this needs to be extended to other areas |
| Activities | There are two parts of the activity implementation:  A. Collecting new specimens in Surat Thani and adjacent areas i.e. Chumphon and Nakorn Sri Thammarat Provinces (see Map 1). The specimens from 3 areas will be genetically analysed to describe stock distribution. This contributes to stock status monitoring, stock rebuilding, and zoning the management area. |
|  | B. Referencing with the previous research works by Dr. Panom K. Sodsuk i.e.  "Genetic diversity study on the blue swimming crab (Portunus pelagicus) and mud crabs (Scylla spp.) populations of Thailand” (2008)  "Interspecific Genetic Characterization and Relationships Based on Allozyme Markers in Mud Crabs (Scylla spp.) and blue swimming crab (Portunus pelagicus) of Thailand" (2009)  "Genetic Diversity and Inter-Populations Difference in the Blue swimming crab Portunus pelagicus (LINNAEUS, 1758), from Natural Sources of Thailand, Using Microsatellite Technique and Growth Performance Comparison" (2010)  It is noted that the first two papers were based on project started in 2003 and no information on what year of collected data used in analysis.) |
| Milestones | 2. Genetic analysis study final report (Dec 2018) 3. BSC stock boundary/ biological management unit defined (Dec 2018)  4. Map of spawning and nursery grounds of BSC in Surat Thani (Dec 2018) |
| Priority | Medium |
| Duration | Short |
| Timeframe | January – December 2018 |
| Responsibility | Walailak University, Ubon Ratchathani University, Rajamangala University of Technology Srivijaya, TFFA, Local DoF, Local DMCR |
| Link to NPOA | NPOA 1.3 |

### PI 1.1.2 Stock rebuilding

Activities related to crab bank issues appear in Activity 4. Although crab banks have been implemented by government agencies, private sector, and fishing communities, important data such as number of released zoeae/young crabs, places, and survival rate have not been reliably collected. Therefore, scientific evidence is not available to demonstrate whether crab banks significantly affect BSC stocks. Activity 4 supports the establishment of a community BSC bank, release of young crabs, and improved data collection to study on stock rebuilding. However, the assumption is that if FIP activities are effectively implemented for 3-4 years, stock status will improve to a healthier condition. The number of released zoeae/young crabs should be reduced in the long term to prevent unbalanced ecosystem from BSC becoming very dominant species. This is also aimed to achieve sustainable fisheries, which mean the fisheries that are harvested at a sustainable rate where resources do not decline over time and can rebuild stocks naturally.

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| **Activity 4a** | **Establishment of community BSC banks in Surat Thani** |
| Description | As part of Master Plan: Marine Fisheries Management of Thailand, there have been 8 BSC banks established and implemented by Chumphon Marine Fisheries Research and Development Center as presented in Map 2. Private sector established a crab bank center to provide support on equipment and zoeae/young crabs. No collected data on numbers of released zoeae/young crabs and places are available. |
| Purpose | To increase BSC resources in coastal areas of Surat Thani |
| Activities | There are five parts of the activity implementation:  A. For established BSC banks, DoF continues implementation with improvement on data collection e.g. no. berried crabs in BSC banks, catch, size composition, and species composition of catch from crab traps and gill nets.  B. For new establishment, the activities cover selecting communities, meeting for understanding on establishment of the community BSC banks, set up community BSC resources management committee. DoF provides equipment for the implementation of BSC banks  C. Knowledge sharing: communities in Surat Thani to visit and learn on success of Kung Kraben BSC bank centre  D. Design the evaluation of community BSC banks, considering the development of community conservation zones  E. Development of Best Practice Guide for crab banks - revise from the existing DoF publications with additional information, problems, challenges, evaluation, and factors of success. This part will start implementation in the second year (2018). |
| Milestones | 5. Establishment of BSC banks (April 2019) 6. Evaluation of BSC banks (Dec 2019) 7. Best practice guide for crab banks (Dec 2019) |
| Priority | Low |
| Timeframe | January 2017 – December 2019 |
| Responsibility | DoF, TFFA, Coastal Communities |
| Link to NPOA | NPOA 7 |

| **Activity 4b** | **Study of survival rate from BSC bank operations** |
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| Description | Related to activity 4a, this study will collect and analyse research findings on survival rate from BSC bank operations in Thailand. Existing information on migration route of BSC will also be reviewed |
| Purpose | To increase BSC resources in coastal areas of Surat Thani (specifically to modify BSC bank operations as necessary to maximise their success) |
| Activities | There are four parts of the activity implementation:  A. Consolidate and analyse research on survival rates  B. Research based on new data collection with DNA broodstock to evaluate survival rate from BSC bank operations  C. Research and new data collection in Surat Thani, related to Activity 2  D. Desk based literature review on BSC migration behaviour |
| Milestones | 8. Report from survival rate study (April 2019) 9. Report from migration behaviour study (April 2019) |
| Priority | Low |
| Duration | Medium |
| Timeframe | January 2017 – April 2019 |
| Responsibility | DoF, Kasetsart University, Walailak University, Ubon Ratchathani University, Rajamangala University of Technology Srivijaya |
| Link to NPOA | NPOA 8 |

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| **Activity 4c** | **Release young BSC in Surat Thani for stock enhancement** |
| Description | Release of 300,000 young BSC into Surat Thani. The activity covers selecting suitable areas, releasing young crabs with local communities, and follow-up and evaluate the resource enhancement |
| Purpose | To enhance the BSC stock in Surat Thani. The activity also creates participation in managing coastal resources |
| Activities | Develop and implement BSC release plan Evaluation of release success |
| Milestones | 10. Release plan document (Dec 2018) 11. Report on release evaluation (April 2019, April 2020) |
| Priority | Medium |
| Timeframe | January 2017 – April 2020 |
| Responsibility | DoF, Walailak University, Ubon Ratchathani University, Rajamangala University of Technology Srivijaya |
| Link to NPOA | NPOA 9 |

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| **Activity 5** | **Ensure draft Fisheries Management Plan (FMP) management measures are appropriate for Surat Thani BSC stock rebuilding** |
| Description | Provide recommendations, where necessary, to strengthen management measures for BSC in draft FMP |
| Purpose | To ensure the FMP has provisions for successful rebuilding of Surat Thani BSC stock |
| Activities | Meeting among relevant agencies and local fishing communities to discuss on FMP and management measures for stock rebuilding. Then, make recommendations to the DoF as appropriate. |
| Milestones | 12. Report or other communication presenting recommendations on FMP to the DoF (Apr 2019) |
| Priority | High |
| Timeframe | July 2017 – April 2019 |
| Responsibility | WWF and universities |
| Link to NPOA | 12.1, 12.2, 12.3, 12.5, 12.6 |

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| **Activity 6** | **Determine the impact of shellfish farms on BSC stocks in Surat Thani** |
| Description | Review of existing information to determine potential and actual risk of impact from shellfish farms (mariculture) in Ban Don Bay on the Surat Thani BSC stock. This activity does not involve new data collection |
| Purpose | To determine whether the development of shellfish farms in the Surat Thani region have a significant negative impact on the status of the BSC population |
| Activities | Desk based literature review of mariculture impacts on BSC stock in Surat Thani together with WWF’s research on Aquatic Ecosystem Services. The data was collected during 2014-2015, as part of aquaculture work including discharges from shrimp farms, currents, sedimentation, etc. |
| Milestones | 13. Final report on mariculture impacts (Apr 2019) |
| Priority | Medium |
| Timeframe | July 2017 – April 2019 |
| Responsibility | WWF (with universities) |
| Link to NPOA | NPOA 3.4 |

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| **Activity 7** | **Development of a Shellfish Management Plan for Surat Thani** |
| Description | Based on the outcome of Activity 6, it may be necessary to develop a Shellfish Management Plan to mitigate the negative impacts of shellfish farms in Ban Don Bay, Surat Thani |
| Purpose | To manage and minimise negative impacts of shellfish farms on BSC population |
| Activities | Development of a Shellfish Management Plan for Ban Don Bay, Surat Thani |
| Milestones | 14. Finalised and agreed Shellfish Management Plan document (June 2021) |
| Priority | Medium |
| Timeframe | January 2019 – June 2021 |
| Responsibility | WWF, DMCR, DoF |
| Link to NPOA | NPOA 3.5 |

### PI 1.2.1 Harvest strategy

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| **Activity 9** | **Education and outreach of destructive fishing techniques** |
| Description | As part of a communications plan, undertake a series of education and outreach meetings with fishing communities to increase local knowledge and facilitate better compliance within the BSC fishery. |
| Purpose | To reduce the volume of undersized immature crabs primary in the fishery to prevent recruitment overfishing and support rebuilding of the stock. |
| Activities | Design and implement education and outreach meetings. Content of education and outreach also cover brief legislations both for fishing operations (i.e. Royal ordinance 2015) and resource conservation (i.e. Marine and Coastal Resource Management Act B.E. 2015). |
| Milestones | 15. Meeting reports (Nov 2018) |
| Priority | High |
| Timeframe | January 2017 – November 2018 |
| Responsibility | WWF, DoF, DMCR |
| Link to NPOA | NPOA 13, NPOA 14, NPOA 15 |

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| **Activity 10** | **Implement a minimum landing size (MLS) for BSC in Surat Thani** |
| Description | Engage with scientists, processors and buyers to define and implement a harmonised minimum size of retained crab in Surat Thani. This should be based on the best available scientific advice |
| Purpose | To reduce the volume of undersized immature crabs retained in the fishery to prevent recruitment overfishing and support stock rebuilding |
| Activities | There are four parts of the activity implementation:  A. Gather scientific evidence and expert’s analysis on MLS as input to produce scientific advice for a MLS  B. Make use of information from A. to communicate with local fishing communities. This could be a content in Activity 9 education and outreach  C. Implement a MLS for BSC based on scientific advice  D. Memorandum of Understanding of companies, Thai Crab Product Group members, not to buy BSC smaller than 10 cm. and berried crabs. (Done in June 2016) |
| Milestones | 16. Report presenting science-based MLS for BSC (Mar 2017) **Complete** 17. Material used for communicating new MLS to fishers (Apr 2019) |
| Priority | High |
| Timeframe | January 2017 – April 2019 |
| Responsibility | DoF, WWF, Universities, local fishers, TFFA (BSC businesses) |
| Link to NPOA | NPOA 12.5 |

### PI 1.2.2 Harvest control rules & tools

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| **Activity 11a** | **Develop appropriate harvest control rules (HCRs) and tools** |
| Description | Develop HCRs to determine the appropriate level of fishing effort (mortality) at various levels of stock abundance relative to reference points to prevent the fishery from impairing the reproductive capacity of the stock |
| Purpose | To establish rules that determine the appropriate level of fishing effort (mortality) at various levels of stock abundance relative to reference points to prevent the fishery from impairing the reproductive capacity of the stock |
| Activities | Define applicable HCRs that link to FMP and response when stock declines, noticeable through changing in indicator (e.g. change in ratio, in case of LB-SPR). This includes pre-agreed actions to be identified in order to response when changing in indicator occurs. |
| Milestones | 18. Advocacy and policy brief (Mar 2020) |
| Priority | High |
| Timeframe | July 2017 – March 2020 |
| Responsibility | WWF, Universities, DoF |
| Link to NPOA | NPOA 12.6 |

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| **Activity 11b** | **Develop biological reference points for the Surat Thani BSC stock** |
| Description | Develop an appropriate suite of reference points that take into account the current data limitations within the fishery. These may relate to biomass, fishing mortality or a proxy value that relate to both the target and limit reference points |
| Purpose | To identify target and limit reference points to ensure the Surat Thani BSC stock is managed at a sustainable level. The reference points will determine the structure of the HCRs |
| Activities | Use LB-SPR method for determining provisional target/limit and biological reference point |
| Milestones | 19. Report of LB-SRP analysis (Mar 2020) 20. Agreed reference points (Mar 2020) |
| Priority | High |
| Timeframe | January 2019 – March 2020 |
| Responsibility | DoF |
| Link to NPOA | NPOA 10 |

### PI 1.2.3 Information & monitoring

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| **Activity 13a** | **Review of reproductive biology of BSC in Thailand** |
| Description | Review of spawning season, size at first maturity, sex ratio and fecundity of BSC in Thailand (national level). Provide recommendations for additional data collection, where required |
| Purpose | To better understand BSC reproductive biology and to identify areas/ periods where BSC are most vulnerable and may require additional protection |
| Activities | Desk based review of existing information |
| Milestones | 21. Updated report on BSC biology and life history in Thailand (Mar 2017) **Complete** |
| Priority | High |
| Timeframe | October 2016 – March 2017 |
| Responsibility | Kasetsart University, TFFA |
| Link to NPOA | NPOA 1.1 |

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| **Activity 13b** | **Review of habitat and distribution of BSC in Thailand** |
| Description | Review of habitat and distribution, in terms of size, sex, age and season, of BSC in Thailand (national level). Provide recommendations for additional data collection, where required |
| Purpose | To better understand BSC distribution and areas where BSC are most vulnerable, e.g. nursery and spawning areas, that may require additional protection |
| Activities | Desk based review of existing information |
| Milestones | 22. Updated report on BSC habitat and distribution in Thailand (Mar 2017) **Complete** 23. Map of BSC distribution in Thailand (Mar 2017) **Complete** |
| Priority | High |
| Timeframe | October 2016 – March 2017 |
| Responsibility | Kasetsart University, TFFA |
| Link to NPOA | NPOA 1.2 |

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| **Activity 13c** | **Impact assessment of BSC fishery in Surat Thani** |
| Description | New data collection is composed of 3 main parts: fishing gear, fishing ground, and catch, which leads to BSC distribution and reproductive biology (i.e. study of BSC distribution and reproductive biology) |
| Purpose | To better understand BSC ecology and fishery impacts in Surat Thani, in order to inform sustainable management |
| Activities | There are three parts of the activity implementation:  A. Data collection as part of a research  A1 Type and numbers of fishing gear  A2 Fishing grounds by gear types  A3 Catch data both target and bycatch to understand species composition  Target species (BSC): information on quantity, size, sex, ratio on berried crab to total catch, by gear types  By-catch species: information on species, quantity, and size |
| Activities  (cont’d) | A4 Environment factors – water qualities that affect to distribution and reproductive biology e.g. salinity, temperature, transparency, pH, oxygen, turbidity, chlorophyll A, and plankton adundance.  A5 Information on habitat e.g. sea grass, coral, etc to update information from the reference on “Vulnerability Maps of Natural Resources and Environment Ban Don Bay, Surat Thani, Thailand” in 2006 (Map 3)  B. Study specimens in laboratories for fecundity, first maturity, spawning season, spawning ground.  C. Data analysis, fishing effort evaluation, and prediction model  C1 Calculation of MSY  C2 Estimation of fishing effort to density and size of BSC, including analysis on different fishing effort on BSC biology  C3 Analyse catch per unit effort (CPUE)  C4 Estimation on mortality of BSC from ghost fishing to understand impacts from the loss of fishing gear on BSC.  C5 Environmental factors on reproductive biology and distribution of BSC  C6 Prediction model on BSC distribution and suitable environment for BSC |
| Milestones | 24. Report from impact assessment study (Apr 2019)  25. Map of BSC broodstock area, spawning group, nursery ground (Sept 2019)  26. Map of BSC distribution by size and relationship with habitat (Sept 2019)  27. Map of fishing gear and fishing ground distribution (Sept 2019) |
| Priority | High |
| Timeframe | June 2017 – Sept 2019 |
| Responsibility | Walailak University, Ubon Ratchathani University, Rajamangala University of Technology Srivijaya, Local DoF, Local DMCR |
| Link to NPOA | NPOA 2.3 |

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| **Activity 14** | **Review and collate existing data on BSC** |
| Description | Review all existing sources of data on BSC, including fisheries statistics (e.g. temporal and spatial catch and effort) biological characteristics from different government departments and fisheries institutes, and weight categories from crab processors |
| Purpose | To ensure all information is available to FIP stakeholders to better understand information gaps and support ongoing fisheries management and research, including stock assessment |
| Activities | There are three parts of the activity implementation:  A. Set up sub-working groups under the FIP  B. Gather and collate information in various issues/indicators under FIP  C. Update FIP stakeholders when new information is available. |
| Milestones | 28. A reference list (Mar 2017) **Complete** |
| Priority | High |
| Timeframe | October 2016 – March 2017 |
| Responsibility | DoF, WWF, TFFA, universities |
| Link to NPOA | NPOA 5 |

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| **Activity 15** | **Review environmental impacts of inland agriculture on Surat Thani BSC stock** |
| Description | Review environmental impacts of inland agriculture downstream (i.e. eutrophication and hypoxia) to identify risks to BSC population |
| Purpose | To ensure exogenous factors do not significantly impact status of BSC |
| Activities | Research study or programme to review environmental impacts of inland agriculture on Surat Thani BSC stock |
| Milestones | 29. Research reports/ publications (Jun 2020) |
| Priority | Medium |
| Timeframe | July 2017 – June 2020 |
| Responsibility | WWF, TFFA, Universities, (collaboration with Department of Agriculture) |
| Link to NPOA | NPOA 3.6 |

### PI 1.2.4 Assessment of stock status

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| **Activity 16** | **Stock assessment of BSC in Surat Thani** |
| Description | Following the review of stock status, it may be necessary to conduct a new stock assessment for BSC within Surat Thani (Ban Don Bay). This activity will review and apply appropriate methods based on data availability to determine the current status of the stock within the region |
| Purpose | To determine the status of the stock |
| Activities | There are three parts of the activity implementation:  A. Selection of assessment method  B. Data collection, some information share with activity no. 13c – data collection on BSC catch by fishing gear and by monthly records from fish markets in each district to estimate total landing, length at first capture, Lc50 of each fishing gear. |
|  | This also includes catch in adjacent provinces (i.e. Chumphon and Nakorn Sri Thammarat) to compare trend of catch with Surat Thani areas.  C. Weight and measure of specimen, sex ration, identification on reproductive stages, length a first maturity, Lm 50), breeding season, fecundity, and spawning ground.  D. Stock assessment |
| Milestones | 30. Stock assessment report (Dec 2019) |
| Priority | High |
| Timeframe | January 2017 – December 2019 |
| Responsibility | Walailak University, Rajamangala University of Technology Srivijaya, TFFA, Local DoF, Local DMCR |
| Link to NPOA | NPOA 1.4 |

## Ecosystem management

### PI 2.1.1 Primary species: outcome

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| **Activity 17** | **Improve understanding of bycatch species outcome status** |
| Description | One or more RBF workshops to simultaneously address primary, secondary and ETP species PIs, and habitats and ecosystem PIs |
| Purpose | Results will determine what follow-up action is required (e.g. develop new management strategies) |
| Activities | Collate available data in advance of RBF workshop(s) Undertake assessments at RBF workshop(s) |
| Milestones | 31. RBF workshop(s) report (Mar 2018) **Complete** |
| Priority | High |
| Duration | Medium |
| Timeframe | October 2016 – March 2018 |
| Responsibility | WWF, DoF, fishers |
| Link to NPOA | NPOA 2.1 |

### PI 2.1.2 Primary species: management

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| **Activity 18** | **Development of a management strategy for bycatch species (as required)** |
| Description | Management measures and/or initiatives to reduce bycatch of non-target species will be considered, as required, based on the information gained during Activity 17. This is currently a speculative activity as it is not known for which non-target species conservation measures may be required. |
| Purpose | In line with MSC guidelines, a management strategy, consisting at least of appropriate conservation measures, must be developed to mitigate the impact of the UoA on certain (although not all) non-target species |
| Activities | Activities under this activity are to be confirmed, but will likely be primarily desk based and involve consultation with DoF and fishers |
| Milestones | 32. Milestones are to be confirmed when the activity specification is agreed (likely to be an agreed management strategy document) |
| Priority | To be confirmed (likely to be high, if required) |
| Duration | To be confirmed (likely >12 months) |
| Timeframe | To be confirmed (will not start before mid-2017) |
| Responsibility | DoF, WWF, fishers |
| Link to NPOA | NPOA 2.1 |

### PI 2.1.3 Primary species: information

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| **Activity 19** | **Analysis of BSC fishery bycatch status (national level)** |
| Description | Review current information with focus on (1) species composition and bycatch from bottom gill net and trap gears, and (2) ETP species interactions with the BSC fishery (national level) |
| Purpose | To provide baseline information on bycatch in Thai BSC fisheries to inform development of sustainable management practices, e.g. spatial/ seasonal closures |
| Activities | Desk based review of existing information on bycatch in Thai BSC fisheries |
| Milestones | 33. Final report of bycatch study (Mar 2017) **Complete** |
| Priority | High |
| Timeframe | October 2016 – March 2017 |
| Responsibility | Kasetsart University, TFFA |
| Link to NPOA | NPOA 2.1 & 2.2 |

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| **Activity 19b** | **Analysis of BSC fishery bycatch data (fishery level) NEW** |
| Description | Collect additional primary data on (1) species composition and bycatch from bottom gill net and trap gears, and (2) ETP species interactions with the BSC fishery (fishery-specific level) |
| Purpose | To provide specific information on the catch proportion of all bycatch species in Thai BSC fisheries to inform development of sustainable management practices, e.g. spatial/ seasonal closures |
| Activities | Collect primary data through research surveys (using identical gillnet and trap gear) and fisheries observers (where required) to determine quantitative information on bycatch in Thai BSC fisheries |
| Milestones | 33b. Final report of bycatch research (Mar 2020) |
| Priority | High |
| Timeframe | July 2018 – March 2020 |
| Responsibility | Kasetsart University, TFFA (to be confirmed) |
| Link to NPOA | NPOA 2.1 & 2.2 |

### PI 2.2.1 Secondary species: outcome

See activity 17 (Primary species: outcome)

### PI 2.2.2 Secondary species: management

See activity 18 (Primary species: management)

### PI 2.2.3 Secondary species: information

See activity 19 (Primary species: monitoring)

### PI 2.3.1 ETP species: outcome

It is noted from the RBF workshop on bycatch species that although large ETP species (e.g. marine mammals) are unlikely to interact with the gear, smaller and more vulnerable species such as seahorses are caught, albeit infrequently. Further analysis should be given to the catch data with the potential to place fisheries observers on board to record all species. A new activity has been placed under activity 19b to review fisheries dependent and independent data.

See activity 17 (Primary species: outcome)

### PI 2.3.2 ETP species: management

See activity 18 (Primary species: management)

### PI 2.3.3 ETP species: information

See activity 19 (Primary species: monitoring)

### PI 2.4.1 Habitat: outcome

See activity 17 (Primary species: outcome)

### PI 2.4.2 Habitat: management

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| **Activity 27** | **Development of a management strategy for habitats (as required)** |
| Description | Management measures and/or initiatives to reduce impacts to vulnerable habitats will be considered, as required, based on the information gained during Activity 17. This is currently a speculative activity as it is not known for which habitats conservation measures may be required |
| Purpose | In line with MSC guidelines, a management strategy, consisting at least of appropriate conservation measures, must be developed to mitigate the impact of the UoA on certain (although not all) habitats that are encountered |
| Activities | Activities under this activity are to be confirmed, but will likely be primarily desk based and involve consultation with DoF and fishers |
| Milestones | 34. Milestones are to be confirmed when the activity specification is agreed (likely to be an agreed management strategy document) |
| Priority | To be confirmed (likely to be high, if required) |
| Duration | To be confirmed (likely >12 months) |
| Timeframe | To be confirmed (will not start before mid-2017) |
| Responsibility | DoF, WWF, fishers |
| Link to NPOA | NPOA 2.1 |

### PI 2.4.3 Habitat: information

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| **Activity 28** | **Habitat biotype mapping** |
| Description | Review of existing sources of information to determine the distribution of main habitat types within the Surat Thani region |
| Purpose | To provide baseline information needed to determine the distribution of vulnerable habitats, and to identify critical gaps in information |
| Activities | Desk based review of habitat types within the Surat Thani region. Inputs cover  A. Geological Map of Surat Thai (Map 4)  Seabed and Marine Landmark Map (CHARM 2006) (Map 5)  Online database of DMCR on habitat and characteristic of coastal lines |
| Milestones | 35. Report of habitat review (Apr 2019) |
| Priority | High |
| Timeframe | July 2017 – Apr 2019 |
| Responsibility | DMCR, WWF (collaboration with Department of Mineral Resources) |
| Link to NPOA | NPOA 3.2 |

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| **Activity 29** | **29 Determine risk from BSC fishing on habitats** |
| Description | Review spatial and temporal fishing patterns by gear type with habitat type (identified above) to determine distribution of fishing activity and risk of impact on habitats |
| Purpose | To ensure information is adequate to determine the risk posed to habitat types by the fishery and the effectiveness of the strategy to manage impacts on habitat types |
| Activities | Desk based assessment of risk to habitat distributions in the Surat Thani region |
| Milestones | 36. Report of habitat study (Apr 2019) |
| Priority | High |
| Timeframe | July 2017 – Apr 2019 |
| Responsibility | University, fishers |
| Link to NPOA | NPOA 3.2 |

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| **Activity 30** | **Determine success of habitat restoration projects within Surat Thani** |
| Description | Review results obtained from habitat restoration projects within the region to inform the distribution and status of habitats within Surat Thani |
| Purpose | To ensure information is adequate to determine the risk posed to habitat types by the fishery and the effectiveness of the strategy to manage impacts on habitat types |
| Activities | Review of habitat restoration projects within Surat Thani |
| Milestones | 37. Report of habitat restoration projects (the success) (Jun 2019) |
| Priority | High |
| Timeframe | July 2017 – June 2019 |
| Responsibility | DoF, DMCR, WWF |
| Link to NPOA | NPOA 3.7 |

### PI 2.5.1 Ecosystem: outcome

See activity 17 (Primary species: outcome)

### PI 2.5.2 Ecosystem: management

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| **Activity 32** | **Development of a management strategy for minimising damage to the ecosystem (as required)** |
| Description | Management measures and/or initiatives to reduce impacts to the ecosystem will be considered, as required, based on the information gained during Activity 17. This is currently a speculative activity as it is not known for which habitats conservation measures may be required. |
| Purpose | In line with MSC guidelines, a management strategy, consisting at least of appropriate conservation measures, must be developed which take into account the impact of the UoA on key elements of the ecosystem. |
| Activities | Activities under this activity are to be confirmed, but will likely be primarily desk based and involve consultation with DoF and fishers |
| Milestones | 38. Milestones are to be confirmed when the activity specification is agreed (likely to be an agreed management strategy document) |
| Priority | To be confirmed (likely to be high, if required) |
| Duration | To be confirmed (likely >18 months) |
| Timeframe | To be confirmed (will not start before mid-2017) |
| Responsibility | DoF, WWF, fishers |
| Link to NPOA | NPOA 2.1 |

### PI 2.5.3 Ecosystem: information

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| **Activity 33** | **Determine the main dynamics of ecosystem structure and function in the Surat Thani region** |
| Description | Literature review to determine the main functions of the components within the ecosystem (e.g. EcoPath, EcoSim or similar). The review may also provide additional information on the impacts of the fishery on these components may also be inferred |
| Purpose | There is adequate knowledge of the impacts of the fishery on the ecosystem |
| Activities | Desk based literature review of ecosystem dynamics in order to explore what activities are required to do. In the case that there are only few and out-of-date papers available, the second part of the report should explore researches of other countries for scoping future study. Results of literature review should cover discussion with universities and DMCR.  Research paper covers “the fisheries biology of the blue swimming crab *Portunus pelagicus* Linnaeus in the Gulf of Thailand” published in 1984. |
| Milestones | 39. Report on review of ecosystem dynamics (June 2018) **Complete** |
| Priority | High |
| Timeframe | July 2017 – June 2018 |
| Responsibility | DMCR, University, fishers |
| Link to NPOA | NPOA 3.2 |

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| **Activity 34** | **Develop National Action Plan for seagrass habitat conservation**  **(This activity is presented here but is also relevant under PI 2.4.1 Habitat: management** |
| Description | The development of a National Action Plan for seagrass habitat conservation that addressed and seeks to mitigate effects of BSC fishery on seagrass habitats |
| Purpose | There is adequate knowledge of the impacts of the fishery on the ecosystem. |
| Activities | Development of National Action Plan for seagrass |
| Milestones | 40. Action Plan development schedule (Apr 2019) 41. Finalised National Action Plan (Dec 2020) |
| Priority | Medium |
| Timeframe | January 2018 – December 2020 |
| Responsibility | DMCR |
| Link to NPOA | None |

## Governance systems

### PI 3.1.1 Legal and customary framework

|  |  |
| --- | --- |
| **Activity 35** | **Review (amended) Royal Ordinance 2015 and 2017** |
| Description | The impact of the (amended) Royal Ordinance 2015 and 2017 should be reviewed to determine whether it has been effective in delivering sustainable fisheries in accordance with MSC Principles |
| Purpose | To ensure the management system exists within an appropriate and effective legal and/or customary framework |
| Activities | Desk based review of all relevant new fisheries legislation |
| Milestones | 42. Updated scoring justification for PI 3.1.1 (Dec 2018) |
| Priority | Medium |
| Timeframe | July – December 2018 |
| Responsibility | DoF and WWF |
| Link to NPOA | NPOA 15 |

### PI 3.1.2 Consultation, roles and responsibilities

|  |  |
| --- | --- |
| **Activity 36a** | **Establish a Network System of BSC Fishery Information** |
| Description | Identify and develop a network of universities, government agencies, private companies, fishers’ groups, NGOs, and other interested parties at a national level with clear roles and responsibilities. This will highlight those individuals involved in the management process of BSC to support the management strategy.  The information in the Network System includes:  Database on fishers in BSC fishery  Database on fishing vessels in BSC fishery  Database on fishing gear targeting BSC  Database on catch by gear and by fishing ground  Database on regulations and notification related to BSC resource and fishery  Database on BSC researche documents  Application development to link with other databases and to report FIP progress/outcome.  Mobile phone application and publications to report the FIP progress  It is noted that database on research papers will start after the completion of desk studies activities i.e.  BSC stock status (Activity No.1)  Mariculture impacts on BSC stocks (Activity No.5)  BSC reproductive biology (Activity No.12a)  BSC habitat and distribution (Activity No.12b)  Bycatch status of BSC fishery (Activity No.18)  Habitat biotype mapping (Activity No.27)  Risk from BSC fishing on habitats (Activity No. 28)  Dynamics of ecosystem structure and function (Activity No. 32) |
| Purpose | To provide updated and accurate supporting information for decision-making process, management and planning. And to ensure the management system has effective consultation process that are open to interested and affected parties. |
| Activities | Develop ToR/mission statement for a new national-level research institute network  Facilitate dialogue between relevant agencies  Capacity building on process and analysis information as well as applying information for management purpose |
| Milestones | 43. Written agreement from at least two research institutes and government agencies (Apr 2019) 44. Report from 1st working party meeting (Jun 2018) **Complete** |
| Priority | Medium |
| Timeframe | July 2017 – April 2019 |
| Responsibility | DoF, DMCR, universities |
| Link to NPOA | NPOA 5.1, NPOA 6.2, NPOA 17 |

|  |  |
| --- | --- |
| **Activity 36b** | **Establish a management advisory committee** |
| Description | Establish a specific management advisory committee should be developed at a national level for all Thai BSC fisheries. This committee could facilitate the consultation process for these fisheries |
| Purpose | To ensure the management system has effective consultation processes that are open to interested and affected parties |
| Activities | Develop ToR/mission statement for a new national-level BSC management advisory committee |
| Milestones | 45. Report from 1st advisory committee meeting (Jun 2018) **Complete** |
| Priority | Medium |
| Timeframe | January 2017 – June 2018 |
| Responsibility | WWF, DoF |
| Link to NPOA | NPOA 5, NPOA 6 |

### PI 3.1.3 Long term objectives

|  |  |
| --- | --- |
| **Activity 37** | **Amend national fisheries masterplans** |
| Description | Individual national fisheries masterplans should be developed that are specific to individual fisheries so that they specify management policies and include details on the application of these policies. This could be a relatively quick issue to remedy |
| Purpose | To ensure the management policy has clear long-term objectives to guide decision-making that are consistent with MSC Principles and Criteria, and incorporates the precautionary approach |
| Activities | Desk based review and amendment of national fisheries masterplan for the BSC fishery in Surat Thani |
| Milestones | ~~46. Updated national fisheries masterplan for BSC fishery in Surat Thani~~ **Deleted** |
| Priority | Medium |
| Timeframe | ~~January 2017 – December 2018~~ |
| Responsibility | DoF |
| Link to NPOA | None |

### PI 3.2.1 Fishery specific objectives

|  |  |
| --- | --- |
| **Activity 39** | **Develop Fishery Management Plan (FMP)** |
| Description | Develop fishery-specific short and long-term objectives to be explicit with the fishery management system. |
| Purpose | To confirm the fishery has clear, specific objectives designed to achieve the outcomes expressed by MSC’s Principles 1 and 2. |
| Activities | After recommendations from Activity 5 are available, use them as an input to develop FMP. Other inputs together with meetings with DoF and other relevant agencies and local fishing communities. |
| Milestones | 47.Draft FMP (Apr 2019) |
| Priority | High |
| Duration | Short |
| Timeframe | January 2017 – April 2019 |
| Responsibility | DoF, WWF, FIP stakeholders |
| Link to NPOA | None |

### PI 3.2.2 Decision making processes

|  |  |
| --- | --- |
| **Activity 40** | **Review of Working Group meeting reports** |
| Description | Review existing Working Group update meetings to confirm they share latest data and information on a regular basis. The review may also provide recommendations to ensure explanations are given to outcomes. |
| Purpose | To confirm the fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives |
| Activities | Desk based review of Working Group outputs |
| Milestones | 48. Report of desk review on Working Group outputs (Dec 2017) **Complete/ Ongoing** |
| Priority | Medium |
| Timeframe | July – December 2017 |
| Responsibility | DoF, WWF |
| Link to NPOA | NPOA 5 |

|  |  |
| --- | --- |
| **Activity 41** | **Review Fisheries Management Committee (FMC) terms of reference and outputs** |
| Description | Review FMC terms of reference will determine what decision making processes have been developed and how the committee responds to research, monitoring and evaluation in a timely and transparent manner |
| Purpose | To confirm the fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives |
| Activities | Desk based review of FMC terms of reference and outputs |
| Milestones | 49. Report of desk review of FMC terms of reference and outputs (Dec 2017) **Complete**  49b. Look at opportunities to include key stakeholders from fishing community (Dec 2019) **New** |
| Priority | Medium |
| Timeframe | July – December 2017 (New – Dec 2019) |
| Responsibility | TFFA, WWF, DoF |
| Link to NPOA | NPOA 5.2 |

|  |  |
| --- | --- |
| **Activity 42** | **Formation of a community action group** |
| Description | Formation of a community action group for the conservation and restoration of BSC population will provide a transparent process with clear decision making arrangements to improve management of the resource |
| Purpose | The ensure the fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives |
| Activities | Development of community action group ToR/mission statement |
| Milestones | 50. Report of 1st community action group meeting (Jul – November 2018) |
| Priority | High |
| Duration | Medium |
| Timeframe | July 2017 – November 2018 |
| Responsibility | WWF, DoF |
| Link to NPOA | NPOA 13.6, NPOA 14 |

### PI 3.2.3 Compliance and enforcement

|  |  |
| --- | --- |
| **Activity 43** | **Identify "fisher volunteers" to champion management of the BSC fishery** |
| Description | The identification of a number of key stakeholders, or "fisher volunteers" will garner important support within the fishery and enable improved data collection and level of compliance with management measures (similar to fishers code of conduct) |
| Purpose | To support monitoring, control and surveillance mechanisms that ensure the fishery's management measures are enforced |
| Activities | Develop process for selecting fisher volunteers |
| Milestones | 51. List and contact details of fisher volunteers (Jan - Jul 2018) **Complete**  51b. Provide details of roles and responsibilities of fisher volunteers (Dec 2019) **New** |
| Priority | High |
| Duration | Medium |
| Timeframe | July 2017 – July 2018 |
| Responsibility | DMCR, DoF |
| Link to NPOA | NPOA 13, NPOA 14.4 |

|  |  |
| --- | --- |
| **Activity 43b** | **Review of monitoring, control and surveillance data - NEW** |
| Description | Although the fisher volunteer programme provides support to MCS, it is necessary to review data on the number of inspections, violations and successful prosecutions. Due to the current level of systematic IUU fishing in the sector (undersized crabs), the initial results could be used to highlight the extent of the problem (e.g. % undersized). |
| Purpose | To review effectiveness of existing monitoring, control and surveillance mechanisms that ensure the fishery's management measures are enforced |
| Activities | Review data on the number of inspections, violations and successful prosecutions in BSC fishery |
| Milestones | 51c.Review data on the number of inspections, violations and successful prosecutions (Dec 2019) |
| Priority | High |
| Duration | Medium |
| Timeframe | July 2018 – Dec 2019 |
| Responsibility | DoF (to be confirmed) |
| Link to NPOA | NPOA 13, NPOA 14.4 |

### PI 3.2.4 Management performance evaluation

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| --- | --- |
| **Activity 45** | **Review monitoring and evaluation of management system** |
| Description | Short review of what need to be done to ensure objectives within FMP |
| Purpose | To confirm there is a system for monitoring and evaluating the performance of the fishery-specific management system against its objectives. |
| Activities | Follow up with DoF staff |
| Milestones | 52. Updated score and justification for PI 3.2.5 (June 2019) |
| Priority | Medium |
| Timeframe | Will start in 2019 (January – June 2019) |
| Responsibility | tbc |
| Link to NPOA | None |

# SUMMARY

This review has analysed progress made in the first year for the blue swimming crab fishery in Surat Thani against the 2017 FIP action plan. A summary of progress for each milestone against MSC Performance Indicators is shown in Appendix 3.

The FIP has made a good start and completed a number of initial Milestones within the expected timeframe. These have led to significant increases in the level of baseline knowledge in the fishery, particularly associated with bycatch species, ETP, habitat distribution and ecosystem structure and function through various literature reviews and the RBF workshop on bycatch species. This highlighted the importance of effective reporting and analysis of catch (and effort) data, as well as other biological characteristics i.e. carapace width. Analysis of the catch data will also highlight other potential concerns such as ETP species (e.g. seahorses) that may not be caught in significant numbers, but remain vulnerable.

While the review of information has led to the identification of several new tasks (e.g. ETP species and monitoring, control and surveillance), others have also now been made redundant.

Overall, three Performance Indicators are likely to increase their scores above 60, which indicates the now partially meet the MSC standard, albeit at a low level.

Moving forwards in the next 12-24 months, the fishery faces a number of challenges related to rebuilding the stock. These include establishing a suitable stock assessment method and associated biological reference points, and increasing the level of compliance to enforce MLS. It is recognised that the transition of the fishery during the rebuilding phase may require a step-wise approach, which requires the full support from local fishing communities. The communications and outreach plan should continue to support these activities between different stakeholder groups.

# APPENDIX 1: List of participants

|  |  |  |
| --- | --- | --- |
| **No.** | **Name** | **Organization** |
| 1. | Ms. Praulai Nootmorn | Marine Fisheries R&D Division, Department of Fisheries |
| 2. | Mr. Somchai Wiboonpan | Marine Fisheries R&D Division, Department of Fisheries |
| 3. | Ms. Jintana Jindalikit | Marine Fisheries R&D Division, Department of Fisheries |
| 4. | Mr. Wuttichai Wangkahart | Marine Fisheries R&D Division, Department of Fisheries |
| 5. | Ms. Kamonthip Pradubtham | Fisheries Resource Management and Measure Determination Division, DoF |
| 6. | Ms. Jinda Phetkamnerd | Department of Fisheries, Central Gulf Fisheries Research and Development Center (Chumphon), DoF |
| 7. | Ms. Chutima Chomwilai | Coastal Aquaculture R&D Division, DoF |
| 8. | Ms. Yupparet Banchuen | Coastal Aquaculture R&D Division, DoF |
| 9. | Mr. Atichart Intongkum | Marine and Coastal Resources R&D Center, Central Gulf of Thailand, DMCR |
| 10. | Ms. Rattana Yotsing | Marine and Coastal Resources R&D Center, Central Gulf of Thailand, DMCR |
| 11. | Prof. Dr. Tuantong Jutagate | Ubon Ratchathani University |
| 12. | Assoc. Prof. Dr. Amornsak Sawasdee | Walailak University |
| 13. | Mr. Treerat Chaotawee | Thai Frozen Food Association |
| 14. | Mr. Pramook Takienkam | Thai Frozen Food Association |
| 15. | Ms. Tunkornpak Keawnet | Thai Frozen Food Association |
| 16. | Ms. Rattana Choosri | Thai Food Processors' Association |
| 17. | Mr. Ratthawit Panyachaipat | WWF Thailand |
| 18. | Ms. Pakawan Talawat | WWF Thailand |
| 19. | Mr. Michael Osmond | WWF US |
| 20. | Dr. Robert Wakeford | MRAG Ltd |

# APPENDIX 2: Meeting Agenda



**Blue Swimming Crab Fishery Improvement Project**

**Annual Evaluation 2018**

**19-20 April 2018, Plodprasop Building, Department of Fisheries**

**Agenda**

**19 April 2018**

09.30 - 09.45 Welcome speech by DoF Representative

09.45 - 10.00 Introduction of the participants (all participants)

Introduction on BSC FIP Annual Evaluation (WWF Thailand)

10.00 - 10.15 Summary of the first year implementation (WWF Thailand)

10.15 - 12.00 Monitoring and Evaluation – Principle 1 (stock outcome)

12.00 - 13.00 Lunch Break

13.00 - 15.00 Monitoring and Evaluation – Principle 1 (harvest strategy)

15.00 - 16.30 Monitoring and Evaluation – Principle 2 (primary and secondary species)

**20 April 2018**

09.30 - 10.45 Monitoring and Evaluation – Principle 2 (ETP species, habitats, and ecosystem)

10.45 - 12.00 Monitoring and Evaluation – Principle 3 (Governance and Policy)

12.00 - 13.00 Lunch Break

13.00 - 14.30 Monitoring and Evaluation – Principle 3 (Fishery Specific Management System)

14.30 - 15.00 Monitoring and Evaluation – Additional activities

15.00 - 16.00 Other FIP-related issues, discussion, Q & A

15.00 - 16.00 Wrap-up and conclusion of the annual evaluation

**Remark:** the meeting will run in both English and Thai and timetable can be changed based on the situation and discussion

# APPENDIX 3: Progress of FIP Action Plan







1. <https://fisheryprogress.org/fip-profile/thailand-blue-swimming-crab-bottom-gillnettrap> [↑](#footnote-ref-1)
2. Hines A.H. and Zohar, Y. 2018. Stock enhancement: strategic approach for the blue swimming crab in SE Asia. 14pp. [↑](#footnote-ref-2)