

# Fishery Improvement Project (FIP) Basic FIP Workplan

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*Blue swimming crab, Palk Bay India*

**Crab Meat Processors Association (CMPA)**

DATE OF REPORT

June 3, 2019

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The template for this report was modified from the Fishery Progress 'Comprehensive Fishery Improvement Project (FIP) Scoping Document' . Available at:  
<https://fisheryprogress.org/resources/launching-fip>

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## Scope

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The action plan provided below targets over-arching and fundamental cross-cutting actions, as a basic FIP action plan. The workplan comprises overarching recommendations for fundamental institutional structures to support a coordinated and collaborative approach to management improvements, followed by 7 key target actions that will support improvements across all indicators found to score <80 in the Marine Stewardship Council (MSC) Pre-assessment. Completion of all actions may not bring the fishery into full compliance with the MSC Standard, but will provide fundamental organization and information systems to inform any additional actions needed.

## Definition of the FIP Unit of Assessment (UoA)

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Definition of the FIP Unit of Assessment (UoA)

**Table 1: Description of the fishery's Unit of Assessment.**

<b>Target species (common and scientific names)</b>	Blue swimming crab (BSC) ( <i>Portunus pelagicus</i> )
<b>Stock(s)</b>	Indo-West Pacific Ocean – Palk Bay, India
<b>Fishing method or gear type</b>	Gillnet
<b>Fishing fleet or group of vessels, or individuals fishing operators pursuing stock</b>	Industrial export licensed small-scale fishing boats in Palk Bay management area in the Indian Exclusive Economic Zone (EEZ)

## Performance Indicators Summary

As part of an MSC pre-assessment for the blue swimmer crab fishery in 2018, a number of Performance Indicators (PIs) were scored such that the fishery would fail under a full MSC assessment (SG <60), and require conditions for other PIs (SG 60-79). The scores for all PIs are included in Table 1 including the likely time frame for the PI to be addressed.

**Table 1.** Summary information for each Performance Indicator highlighted within the MSC pre-assessment as scoring either as fail (SG <60), achieve a conditional pass (60-79), or pass (SG ≥80).

Principle	Component	PI	Performance Indicator	RBF required ? (y/n)	Likely scoring level	Actions Linked
1	Outcome	1.1.1	Stock status		80	1, 4
		1.1.2	Stock rebuilding		NA	
	Management	1.2.1	Harvest Strategy		<60	1, 2, 4
		1.2.2	Harvest control rules and tools		<60	1, 2, 4
		1.2.3	Information and monitoring		60-79	4
		1.2.4	Assessment of stock status		<60	4
<b>Number of PIs less than 60: 3</b>						
2	Primary Species	2.1.1	Outcome		80	5
		2.1.2	Management		80	2, 5
		2.1.3	Information		60-79	5
	Secondary species	2.2.1	Outcome		80	5
		2.2.2	Management		80	2, 5
		2.2.3	Information		60-79	5
	ETP species	2.3.1	Outcome	Yes	Can't be determined	5
		2.3.2	Management		<60	5
		2.3.3	Information		60-79	5
	Habitats	2.4.1	Outcome	Yes	Can't be determined	6
		2.4.2	Management		60-79	2, 6
		2.4.3	Information		60-79	6
	Ecosystem	2.5.1	Outcome		60-79	6
		2.5.2	Management		<60	6
		2.5.3	Information		60-79	6
<b>Number of PIs less than 60: 2</b>						
3	Governance & policy	3.1.1	Legal and customary framework		80	3, 8
		3.1.2	Consultation, roles and responsibilities		<60	7, 8
		3.1.3	Long term objectives		60-79	7
	Fishery specific management system	3.2.1	Fishery specific objectives		<60	3, 7
		3.2.2	Decision making processes		<60	7, 8
		3.2.3	Compliance and enforcement		<60	1, 2, 3, 8
		3.2.4	Management performance evaluation		<60	7, 8
	<b>Number of PIs less than 60: 5</b>					

## Key Stakeholders

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Below are a list of potential stakeholders to be included in the CMPA-led FIP in Palk Bay:

### Government Institutions -

- Central Marine Fisheries Research Institute (CMFRI)
- Tamil Nadu Marine Police
- Tamil Nadu State Department of Fisheries (DoF)
- Ministry of Environment, Forests and Climate Change (MoEF-CC)
- Wildlife Crime Control Bureau (WCCB)
- Compensatory Afforestation Fund Management and Planning Authority (CAMPA)
- Marine Products Export Development Authority (MPEDA)

### NGOs –

- WWF India
- Marine Stewardship Council
- OMCAR Foundation
- Wildlife Institute of India

### Universities –

- Suganthi Devadason Marine Research Institute (SDMRI)
- Tamil Nadu Fisheries University

### Seafood Industry –

- Crab Meat Processors Association (CMPA) member companies (Peninsular Fisheries, Philips Foods India, Handy Waterbase India Private Ltd, Vitality Aquaculture Private Ltd, Hiravathi Marine Products Ltd, and Bay Seafoods) & other seafood exporting companies around Palk Bay.

### Other Institutions –

- Boat Owners Associations (Trawl & Small-scale)
- OMKAR Foundation (works on creating environmental awareness and extension strategies, sensitisation materials, etc.)
- Seafood Exporters Association
- Shellfish Traders

## Overarching Recommendations to Support Detailed Actions

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Below are some key overarching recommendations that would support the detailed actions proposed below.

- Consider hiring consultants to help with key strategic areas for action:
  - Monitoring, Control, and Surveillance (MCS) Consultant to support the creation of enforceable regulations and associated monitoring and enforcement systems
  - Management consultant to help design a tiered management structure as recommended here, with decision making, consultation and review processes that align with the Principal 3 of the MSC Standard.
- To support revisions in the management system, it is recommended that Crab Meat Processors Association (CMPA) lead the formation of **Palk Bay Blue Swimming Crab Management Council (PBCMC)** to be comprised of key FIP stakeholders, which should be fully functional by the end of first year. To this end, all stakeholders must endorse a Crab Fisheries Action Plan supported by the Blue Swimming Crab Fisheries Management Plan.
- The FIP Action Plan can serve as an opportunity to also define and formalize the different levels of management in the Blue Swimming Crab Fishery. The following are recommendations to formalize functions and roles for the existing levels of management within the fishery. These recommendations establish a formal implementation of the BSC Crab Management Plan working cohesively, from the TN-State Fisheries Department level, to the district level and the local villages' management level.
  1. **Tamil Nadu State Fisheries Department:**
    - Strengthen legal framework
    - Amend the TN Marine Fishing Regulation Act to ensure fishery control measures, decision-making process and sanctions imposed at village level are legally binding in court.
    - Consider formation of a *Tamil Nadu (TN) State Fisheries Council* to be responsible for statutory control and management of the fishery implemented by TN State Fisheries Department; via the existing "Village Panchayats or Urr-Panchayats" by passing amendments or G.O. under TN Marine Fishing Regulation Act
  2. **District Level Palk Bay:**
    - Conduct oversight and responsibilities for formal management of the BSC fishery at the district level.
    - Consider the formation of a *District Level Palk Bay Fisheries Council*, which can work together with the *Tamil Nadu (TN) State Fisheries Council*, and the *local village stakeholders*, to ensure implementation of data collection, compliance and enforcement activities in Palk Bay.
  3. **Local village level stakeholders (Urr-Panchayats):**
    - Work with the district level management to implement management measures and controls.



## Detailed Action Recommendations

### Action 1

<b>Action Number and Name</b>	1-Establish and Implement a Minimum Legal Size (MLS) and a ban for fishing and marketing berried females.
<b>Problem Statement</b>	The occurrence of the non-mature individuals and ovigerous females in catches were recorded in the landings throughout the year and considered one of the main reasons related with the decline in catches. Due the lack of rules regarding the management of BSC fishery the establishment of a MLS based on Carapace Width (CW) and a ban for berried females are considered priority measures to prevent the decline of BSC biomass.
<b>Action Goal</b>	Define rules for management of BSC in relation with the crabs size and berried females.
<b>Action Description</b>	<p>The main tasks that can be draw from this action will be:</p> <p><b>Year 0</b></p> <p>1.1 Design a field study during the spawning season for determining the size at first maturity (CW at which 50% of the individuals have reached maturity) by checking the gonad development and the presence of eggs. (6 months).</p> <p>1.2 Pilot study for monitoring the size frequency distribution on CW and the proportion of berried females in landings centres and local fish markets. (6 months).</p> <p><b>Year 1</b></p> <p>1.3 Implement and continue the monitoring on CW size frequency distribution and proportion of berried females in landings centres and local fish markets. (12 months)</p> <p><b>Year 2</b></p> <p>1.4 Establish a Minimum Legal Size (MLS) sufficiently above the mean size at maturity, allowing females to spawn at least once before being available for being captured. Based on the current biological knowledge and until the study is done, we propose that the MLS should probably be around 120 mm CW when BSC is about 1-year-old (6 months)</p> <p>1.5. A MLS measuring device should be developed and distributed along with training at the village level (6 months)</p> <p>1.6 Keep the monitoring on CW size frequency distribution and proportion of berried females in landings centres and local fish markets.</p> <p><b>Year 3</b></p> <p>1.7 Establish a ban for fishing and marketing berried females along the entire fishing season (6 months)</p> <p>1.8 The establishment of both management measures would need fishers and stakeholders' engagement through participative workshops. (12 months).</p> <p>The Crab Meat Processing Industry fully commits to stop procurement of ovigerous female and under sized crab. It is recommended that the CMPA/PBCAC seek a ban on procurement of undersized and berried crabs needs as part of the new amendments to the TN marine fishing regulation act and Crab Fishery Management</p>

	<p>Plan for the Palk Bay. This should also include a ban on procurement from illegal gears (such as Disco Valai (Trammel gillnets) and Country Trawls (Thalumadi).</p> <p>1.9 Village level monitoring committees should be formed to monitor and report landed BSC catch harvested, including crab size and proportion of berried females. (12 months)</p> <p><b>Year 4</b> 1.10 Ensure there are clear penalties and fines for violations; and document incidents and sanctions applied for violations. (12 months).</p>
<b>Expected Completion Date</b>	By year 4
<b>Priority</b>	High
<b>Estimated Cost</b>	Client Group to define
<b>Responsible Parties</b>	CMFRI CMPA/ PBCAC TN Fisheries Department
<b>MSC PI(s) Addressed by the Action</b>	1.1.1, 1.2.1, 1.2.2, 1.2.3, 1.2.4, 3.2.3

## Action 2

<b>Action Number and Name</b>	2- Gear-crafts regulation and monitoring
<b>Problem statement</b>	As a result of the evaluation some uncertainties related with the possible combinations or types of mesh used in the fishery was found. This action is oriented to define a specific regulation for the gear and its use.
<b>Action Goal</b>	Define specific regulations for the gear and their use.
<b>Action Description</b>	<p>The main tasks defined in this context are:</p> <p><b>Year 0</b> 2.1 Agreement for Mesh size regulation for bottom set gill net and depth-based gear restrictions for setting gillnets near seagrass beds. (12 months).</p> <p>2.2 Consider a cap on the number of gillnets that can be used from each fish landing sites to avoid overcrowding in shallow waters. (12 months).</p> <p>The establishment of both management measures would need fishers and stakeholders' engagement through participative workshops.</p> <p><b>Year 1</b> 2.3 Implement monitoring at local landing sites for proper gear configuration; outreach and education on new regulations. (12 months).</p> <p><b>Year 2</b></p>

	2.4 Ensure there are clear penalties and fines for violations; and document incidents and sanctions applied for violations. (12 months).
<b>Expected Completion date</b>	By year 1
<b>Priority</b>	High
<b>Estimated Cost</b>	Client group to define
<b>Responsible Parties</b>	CMFRI CMPA/ PBCAC TN Fisheries Department
<b>MSC PI(s) Addressed by the Action</b>	1.2.1, 1.2.2, 2.1.2, 2.2.2, 2.4.2, 3.2.3

### Action 3

<b>Action Number and Name</b>	3- Formalization of the fleet
<b>Problem Statement</b>	The gillnet fisheries in Palk Bay operates under an open access regime with no tangible controls on fishing vessels or number of gears that can be deployed in the fishing zones. In order to categorize the fleets for management of the fishery a register system for the crafts involved in BSC fishery must be established and effort monitored.
<b>Action Goal</b>	Address the current informal status of the fleet
<b>Action Description</b>	<p>The main tasks defined in this context are:</p> <p><b>Year 0</b> 3.1 All traditional crafts involved in BSC will be registered with the State Fisheries Department. Gillnet fishing gears deployed in the Palk Bay must be required to have well-defined marker buoys with details of fishing village, name of owner, gear registration number and other tags (e.g. OBBGN) for TN State Fisheries Department to identify violations of fishing gear, mesh size, and other zonal violations at sea. (12 months).</p> <p><b>Year 1</b> 3.2 The number of fishing crafts and fishing trips targeting BSC will be monitored on a weekly basis. (6 months).</p> <p><b>Year 2</b> 3.3 Ensure there are clear penalties and fines for violations; and document incidents and sanctions applied for violations. (12 months).</p>
<b>Expected Completion Date</b>	By year 2
<b>Priority</b>	High
<b>Estimated Cost</b>	Client group to define
<b>Responsible Parties</b>	TN Fisheries Department; District and Village Management

<b>MSC PI(s) Addressed by the Action</b>	3.1.1, 3.2.1, 3.2.3
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#### Action 4

<b>Action Number and Name</b>	4- Designing and Implementing a Harvest Control Rule (HCR).
<b>Problem Statement</b>	Currently, there is no means of adjusting the exploitation rate as reference points are approached. There is a need for the fishery to have a well-defined and effective HCR in place effective in achieving sustainable exploitation levels. Typical approaches like TACs and ITQs are not suitable for this fishery.
<b>Action Goal</b>	Link the exploitation level with the stock status
<b>Action Description</b>	<p>The main tasks defined in this context are:</p> <p><b>Year 0</b>  4.1 Review HCR approaches taken by crab fisheries around the world and discuss their suitability for the BSC fishery. (12 months).  4.2 Evaluate if indicators monitored in the BSC fishery are somehow indicative of stock status. (12 months).</p> <p><b>Year 1</b>  4.3 Develop a monitoring program for current or new indicators indicative of stock status. Since CPUE has been monitored for several years in the fishery and, when properly standardized, could be a good indicator of stock abundance, we encourage to work on developing a CPUE sensible to stock status. Indicators based on size at catch can also be used to detect changes in the status of the BSC (12 months).</p> <p><b>Year 2</b>  4.4 Develop an interim HCRs plan and discuss it with stakeholders (12 months)</p> <p><b>Year 3</b>  4.5 Finalise a HCR to be agreed and incorporated to the harvest strategy. (12 months).</p> <p><b>Year 4</b>  4.6 Implement the HCR agreed and set up a process of periodic review of the HCR along with the entire harvest strategy, based on the results of the next stock assessment. (12 months)</p> <p><b>Year 5</b>  4.7 Review HCR ( 6 months)</p>
<b>Expected Completion Date</b>	By year 4
<b>Priority</b>	High
<b>Estimated Cost</b>	Client group to define
<b>Responsible Parties</b>	CMFRI Other Scientific organizations (Local universities and/or external consultants with stock assessment expertise for similar species)

<b>MSC PI(s) Addressed by the Action</b>	1.1.1, 1.2.1, 1.2.2, 1.2.3, 1.2.4
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## Action 5

<b>Action Number and Name</b>	5- Stock Assessment Review
<b>Problem Statement</b>	There is a need to review and improve the stock assessment methodology in use as well as identify mainly the catch and effort data quality and needs to feed the improved stock assessment model. Further, the stock assessment methodology should be reviewed and revised to address the uncertainties in data collection, data processing and estimation.
<b>Action Goal</b>	Improve the stock assessment methodology and information inputs
<b>Action Description</b>	<p>The main tasks defined in this context are:</p> <p><b>Year 0</b> 5.1 Consultation process between the fisheries scientist and the field staff to review the catch and effort data quality. Determine gaps, uncertainties and needs. (12 months).</p> <p><b>Year 1</b> 5.2 Apply pre-existing CPUE standardisation methodology and evaluate robustness of outcome and uncertainties (12 months).</p> <p><b>Year 2</b> 5.3 If CPUE methodology is unsatisfactory, evaluate and try options for other assessment techniques, mainly looking at data-poor methods. Catch, effort and size-at-catch would likely be the only data available for the fishery; it is important to focus stock assessment methods on these data since fishery independent surveys are unlikely to be set and maintained in a monitoring plan (12 months).</p> <p>5.4 Review options for reference points (12 months)</p> <p><b>Year 3</b> 5.5 Define a new methodology and associated data needs, and schedule for data collection and assessment regularly. (12 months).</p> <p>5.6 Agree on reference points with stakeholders. (12 months).</p> <p><b>Year 4</b> 5.7 Commission a peer review of the completed revised stock assessment. (6 months).</p> <p><b>Year 5</b> 5.8 Improve the stock assessment as suggested by the reviewers. Review and adjust again reference points (6 months).</p>
<b>Expected Completion Date</b>	By year 4

<b>Priority</b>	High
<b>Estimated Cost</b>	Client group to define
<b>Responsible Parties</b>	CMFRI Other Scientific organizations (Local universities and/or external consultants with stock assessment expertise for similar species)
<b>MSC PI(s) Addressed by the Action</b>	1.1.1, 1.2.1, 1.2.2,1.2.3, 1.2.4

## Action 6

<b>Action Number and Name</b>	6 - Address information gaps for fishery related primary and secondary species
<b>Problem Statement</b>	In order to address the uncertainties related with the primary and secondary species this action seeks to achieve reliable information through the extensive review and analysis.
<b>Action Goal</b>	Provide reliable data on the captures and interactions with fishery related species.
<b>Action Description</b>	<p>The actions proposed here are based on the guidance provided in the MSC Fisheries Standard V2.01 Section: GSA3.6.</p> <p>The main tasks defined in this context are:</p> <p><b>Year 0</b></p> <p>6.1.a Evaluate and identify data gaps in the catch composition for <i>all</i> the gear-vessel combinations fishing BSC. (6 months)</p> <p>6.1.b Improve upon current monitoring system to provide reliable information of the major primary and secondary non-target species retained and discarded for <i>all</i> gear-vessel combinations, including species and volumes. Given that no ‘main’ primary or secondary species were identified, the likelihood that the UoA impacts primary or secondary species less precaution in the adequacy of the information is required. The fishery should consider one of the following data collection methods to obtain that information: standardized logbooks, interviews with fishers, enforced mandatory retention of all catch with full dockside monitoring or gathering information obtained from co-management and community based management. (6 months)</p> <p><b>Year 1</b></p> <p>6.2 a Based on selected data collection method, develop and implement system to review and report data of non-target primary and secondary species interactions (12 months).</p> <p>6.2.b Conduct outreach and training for fishery stakeholders for successful implementation of existing and new measures.</p> <p><b>Year 2</b></p> <p>6.3. Confirm if data collected for all gear-vessels combinations, that catch volumes of non-target species are <u>less</u> than 5% of the overall catch, continue to implement the data collection system selected in Year 1. (12 months)</p>

	<p>6.4 If non-target species are 5% or <u>more</u> of the overall catch, implement <u>two</u> of the following collection methods: standardized logbooks, interviews with fishers, mandatory retention of all catch with full dockside monitoring, or information obtained from co-management and community-based management. (12 months)</p> <p><b>Year 3</b> 6.5 Based on information gathered via actions 5.1, 5.2, 5.3, and 5.4, determine the level of impact the fishery is having on non-target primary and secondary species to determine whether additional management and/or research is needed to ensure non-target species are not threatened by the fishery and minimize unwanted mortality to the extent practicable (12 months).</p> <p><b>Year 4</b> 6.6 If needed, conduct outreach and training for fishery stakeholders for successful implementation of existing and new measures.</p>
<b>Expected Completion Date</b>	Expected by Year 4
<b>Priority</b>	Medium
<b>Estimated Cost</b>	Client group to define
<b>Responsible Parties</b>	CMPA/PBCAC TN Fisheries Department; District and Village Management CMFRI NGOs/Universities/Researchers
<b>MSC PI(s) Addressed by the Action</b>	2.2.1, 2.2.2, 2.2.3

## Action 7

<b>Action Number and Name</b>	7- Address information gaps for fishery related ETP species
<b>Problem Statement</b>	This action seeks to achieve reliable information through the extensive review and analysis in order to address the uncertainties related with ETP species.
<b>Action Goal</b>	Provide reliable data on the captures and interactions with ETP species
<b>Action Description</b>	<p>The actions proposed here are based on the guidance provided in the MSC Fisheries Standard V2.01 Section: GSA3.6.</p> <p>Given the scale and nature of the fishery, the recommendations provided are sufficient to meet the SG60 level for the Information PIs for ETP species, or alternatively, for the fishery to score using the Risk-Based Framework (RBF), For the RBF approach the fishery will need to collect and provide the following information on Productivity of ETP species (average age of maturity, average maximum age, fecundity, average maximum size, average size at maturity, reproductive strategy, trophic level, and density dependence). Most importantly, the fishery will need one of the following as well: areal overlap fishing effort with habitat, overlap of fishing effort with target species distribution, concentration of the stock, position of the</p>

stock within the water column relative to gear and habitat, selectivity of gear type, potential of gear to retain species, post capture mortality upon release of species.

The main tasks related are:

**RBF approach:**

**Year 0**

7.1. Conduct data analysis to identify information gaps required to conduct a Productivity and Susceptibility Assessment of ETP species ( 6 months).

7.2. Design a simple plan to collect data that is lacking (6 months). Review resources describing interview-based approach, such as the methodology of Moore et al (2010)<sup>1</sup>. Use interview-based approach and qualitative data to fill data gaps related to ETP species.

**Year 1**

7.3 Implement data collection plan using qualitative data from interviews and other data sources. Conduct a study with fishery interviews to obtain qualitative information on overlap of the ETP species and the fishery, and potential interactions. For example, the methodology from Moore et al (2010) for the susceptibility attributes.(12 months)

Other potential alternatives to obtain this information in addition to interviews with fishers include; use of standardized logbooks, enforcing mandatory retention of all catch with full dockside monitoring, or connect information obtained from co-management and community-based management. Analyse and review results. (12 months)

**Year 2**

7.4 Based on information gathered via actions in Year 0 and 1, determine the level of impact the fishery is having on non-target ETP species to determine whether additional management and/or research is needed to ensure non-target ETP species are not threatened by the fishery and minimize unwanted mortality to the extent practicable.

If the fishery wishes to not conduct an RBF and wishes to reach SG80 level, MSC recommends more than one form of data collection to reduce bias. Thus logbooks or interviews with fishermen by itself are not enough to reach SG80. Additional information sources need to be provided.

**Year 3**

7.5 Based on information gathered via actions 7.1, 7.2, 7.3, and 7.4, determine the level of impact the fishery is on ETP species to determine whether additional management and/or research is needed to ensure ETP species are not threatened by the fishery (12 months).

**Year 4**

7.6 If needed, conduct outreach and training for fishery stakeholders for successful implementation of existing and new measures.

<sup>1</sup> Moore, J. E., T. M. Cox, R. L. Lewison, A. J. Read, R. Bjorkland, S. L. McDonald, L. B. Crowder et al. "An interview-based approach to assess marine mammal and sea turtle captures in artisanal fisheries." *Biological Conservation* 143, no. 3 (2010): 795-805.



<b>Expected Completion Date</b>	Year 4
<b>Priority</b>	High
<b>Estimated Cost</b>	Client group to define
<b>Responsible Parties</b>	CMPA/PBCAC TN Fisheries Department; District and Village Management CMFRI NGOs/Universities/Researchers
<b>MSC PI(s) Addressed by the Action</b>	2.3.1, 2.3.2, 2.3.3

## Action 8

<b>Action Number and Name</b>	8 – Increase the knowledge of habitats and potential fishery impacts
<b>Problem Statement</b>	There is currently some information to support characterization of habitat, but more information is needed regarding potential impacts
<b>Action Goal</b>	Provide reliable information about fishery impacts on habitat
<b>Action Description</b>	<p>The action is based on the development of collaboration with scientist and NGOs to address the data gaps related to the habitat status and the impacts of BSC fishery. Given the lack of data and quantification of physical impacts of fishing gear, the tasks below employ the Consequence Spatial Analysis to fulfil the RBF.</p> <p>The main tasks include:</p> <p><b>Year 0</b> 8.1 Identify researchers and organizations with interest in investigating habitat issues related to the BSC fishery in the area.</p> <p>8.2 Provide maps of fishing areas, habitat substrate, fisher based knowledge of fishing effort to determine overlap of fishing effort with vulnerable habitats such as seagrass, sponge and coral reef habitats. Conduct at least one mapping exercise in the first year and third year of the FIP to study impacts of gillnets on benthic habitats as part of this effort. Develop simple research plan to collect spatial data using interview data, for example in the methodology from Leopold et al (2014)<sup>2</sup>.</p> <p><b>Year 1</b> 8.3 Implement simple research plan stemming from Leopold et al (2012), which will include required information regarding the consequence of fishing activities and spatial distribution of habitat types.</p> <p><b>Year 2</b></p>

<sup>2</sup> Léopold, M., Guillemot, N., Rocklin, D., & Chen, C. (2014). A framework for mapping small-scale coastal fisheries using fishers' knowledge. *ICES Journal of Marine Science*, 71(7), 1781-1792.

	<p>8.4 Based on information gathered via actions in Year 0 and 1, determine the level of impact the fishery is having on habitat to determine whether additional management and/or research is needed to ensure habitat is not adversely impacted by the fishery and minimize unwanted impacts to the extent practicable.</p> <p><b>Year 3</b> 8.5 Conduct outreach and training for fishery stakeholders for successful implementation of existing and new measures.</p>
<b>Expected Completion Date</b>	Client group to define
<b>Priority</b>	High
<b>Estimated Cost</b>	Client group to define
<b>Responsible Parties</b>	CMPA/PBCAC TN Fisheries Department; District and Village Management CMFRI NGOs/Universities/Researchers
<b>MSC PI(s) Addressed by the Action</b>	2.4.1, 2.4.2, 2.4.3

## Action 9

<b>Action Number and Name</b>	9 – Increase the knowledge of ecosystems and the possible fishery impacts
<b>Problem Statement</b>	There is currently some information to support an evaluation of fishery impacts on ecosystems, but more information is needed
<b>Action Goal</b>	Provide reliable information about fishery impacts on ecosystems
<b>Action Description</b>	<p>The actions below are based on the development of work flow with scientist and NGOs to address the data gaps related to ecosystem status and the impacts of BSC fishery. Given the lack of data and management of fishery, the tasks below help employ the Scale Intensity Consequence Analysis (SICA) as part of the RBF. The main tasks include:</p> <p><b>Year 0</b> 9.1 Identify researchers and organizations with interest in investigating ecosystem issues related to the BSC fishery in the area.</p> <p>9.2 Provide maps of fishing areas, habitat substrate, fisher-based knowledge of fishing effort to determine overlap of fishing effort with Pal Bay ecosystem and ecosystem functions. Conduct at least one mapping exercise in the first year and third year of the FIP to study impacts of gillnets on ecosystem as part of this effort. Develop simple research plan to collect spatial data from interview data based on methodology from Leopold et al (2014).</p> <p><b>Year 1</b> 9.3 Implement simple research plan stemming from Leopold et al (2012), which will include required information regarding the consequence of fishing activities and ecosystem functions.</p> <p><b>Year 2</b></p>

	<p>9.4 Based on information gathered via actions in year 0 and year 1, determine the level of impact the fishery is having on the Palk Bay and regional ecosystem to determine whether additional management and/or research is needed to ensure ecosystem and key ecosystem functions are not threatened by the fishery and minimize unwanted mortality to the extent practicable (12 months).</p> <p><b>Year 3</b> 9.5 Conduct outreach and training for fishery stakeholders for successful implementation of existing and new measures.</p>
<b>Expected Completion Date</b>	Year 3
<b>Priority</b>	High
<b>Estimated Cost</b>	Client group to define
<b>Responsible Parties</b>	CMPA/PBCAC TN Fisheries Department; District and Village Management CMFRI NGOs/Universities/Researchers
<b>MSC PI(s) Addressed by the Action</b>	2.5.1, 2.5.2, 2.5.3

## Action 10

<b>Action Number and Name</b>	10- Review and reinforce roles and responsibilities with regards to consultation and decision making
<b>Problem Statement</b>	<p>Consultation with stakeholders appears to be occasional and is not systematic in regularly seeking and accepting information. There is a need to develop a mechanism for formal consultation, engagement or co-operation between village fishery stakeholders (Urr-Panchayat) at the fish landing centers, TN State Government, federal institutions and the seafood fishing industry. Within this, decision-making, implementation and enforcement roles should be clear; with transparent mechanisms for consultation and reporting on decisions and regular review of the management system.</p>
<b>Action Goal</b>	Define and establish a formal consultation structure
<b>Action Description</b>	<p>See above for the general recommendation on structuring the three tiers of fishery management.</p> <p>The following tasks will address the action goal:</p> <p><b>Year 0</b> 10.1 Promote the creation of the village level management structures that fit within a PBCFMC as described above, with clarified roles and responsibilities.</p> <p>10.2 Review the Management Plan proposed by CMFRI through a participative process that also ensures there is a clear structure for consultation and detail regarding the roles and responsibilities for all the stakeholders involved in BSC fishery, as per the general recommendations at the beginning of this action plan. The consultation and decision making processes at all three levels from State to District to Village levels should be explicitly defined in the FMP or via proposed amendments to fishery specific management measures that can be passed under a</p>

	<p>Government Order or amendment to the TN Marine Fishing Regulation Act to formally recognize the decisions taking place through the PBCFMC. Roles in implementation, enforcement and evaluation should also be clearly defined.</p> <p><b>Year 1</b> 10.3 The PBCFMC, also recommended for creation, should meet regularly under explicit consultation and decision-making rules, with meeting minutes shared to reflect information considered in decision making processes.</p> <p>10.4. Ensure that there are explicit short and long-term objectives for the fishery to guide decision-making that align with the precautionary principle and MSC Principles 1 and 2 that guide the PBCAC and in the Fishery Management Plan.</p> <p><b>Year 2</b> 10.5 Provide minutes or summary reports from all management meetings (at all levels) resulting in management decisions for the fishery that explain key considerations and conclusions. Documented and highlight the local knowledge used in decision-making. Ensure these are made available to all stakeholders.</p> <p><b>Year 3</b> 10.6 Conduct an outreach program regarding management structure and regulations, and opportunities for consultation to achieve goals stated in the National laws (Wildlife Protection Act), TN Marine Fishing Regulation Act, G.O.s specific to Palk Bay that ensure effectiveness of fishery management plan and PBCAC resolutions.</p> <p><b>Year 4</b> 10.7 Ensure there is a mechanism to regularly evaluate key components of the fishery specific management system both internally and by external parties as well. To this end, the three levels of BSC fishery management in the Palk Bay, i.e. TN State Fisheries Department, District level fisheries stakeholders, and Village level fisheries stakeholders should hold regular meetings to discuss the strategies in place and how implementation is taking place by State Government bodies (TN State Fisheries Department) and the Village Panchayats (Village level Crab Fisheries Council representatives). Evaluation of the effectiveness of the FMP should initially be led by the TN State Fisheries Department. Within 1 year of implementation of the FMP, an external review should be commissioned. This review should consider effectiveness of community awareness programs for increasing compliance.</p>
<b>Expected Completion Date</b>	Year 4
<b>Priority</b>	High
<b>Responsible Parties</b>	CMPA/PBCAC TN Fisheries Department; District and Village Management CMFRI NGOs/Universities/Researchers
<b>MSC PI(s) Addressed by the Action</b>	3.1.2, 3.1.3, 3.2.1, 3.2.2

## Action 11

<b>Action Number and Name</b>	11- Reinforce a system for Control and monitoring
<b>Problem Statement</b>	Monitoring, control and surveillance mechanisms exist, but there is a reasonable probability that they are less effective as existing regulations are not enforced by State Fisheries Department in this fishery.
<b>Action Goal</b>	Improve the effectiveness of the Monitoring, control and surveillance mechanism
<b>Action Description</b>	<p>The tasks proposed to achieve this objective are:</p> <p><b>Year 0</b> 11.1 Develop a monitoring plan to identify the violators of the BSC fishing and address the conflicts through the Village level stakeholders and the facilitation of CMPA</p> <p><b>Year 1</b> 11.2 Penalization of the violators will be undertaken as per the decision of village level stakeholders and by existing policy decisions.</p> <p><b>Year 2</b> 11.3 The implementation of PBCFMP will be strengthen at the community/ village level through awareness program and through monitoring by Marine police and community.</p> <p><b>Year 3</b> 11.4 Review successful implementation (6 months)</p>
<b>Expected Completion Date</b>	Year 3
<b>Priority</b>	High
<b>Estimated Cost</b>	Client group to define
<b>Responsible Parties</b>	State Fisheries Department, NGOs, traditional fishermen welfare association and CMPA
<b>MSC PI(s) Addressed by the Action</b>	3.1.1, 3.1.2, 3.2.2, 3.2.3