

# Indonesia blue swimming crab - trap & gillnet Three-Year Evaluation Report

Version 1.3, November 2022

## FIP Information

Target species scientific name(s) and common name(s) [state target stock(s), if relevant]	<i>Portunus pelagicus</i> Blue swimmer crab, Rajungan (Bahasa, Indonesia)
Fishery location	FMA 712, Java Sea
Gear type(s)	Gill net, pot/trap
Estimated FIP Landings (weight in tons)	68,240,160 kg
Vessel type(s) and size(s)	Small Vessels of Less than 10 GT 60% (<2 GT) 30% (2-5 GT) 10% (>5 GT)
Number of vessels	36,000
Management authority	Asosiasi Pengelolaan Rajungan Indonesia (APRI)
Assessor name(s)	Vineetha Aravind
Assessor Organization/Affiliation	Independent
Date of report completion	28.09.2023

## FIP Background (Optional)

The FIP was initiated in 2009, but went inactive later. It was activated later in 2014, with another Pre-assessment report published in June 2015. The workplan prepared in 2015 was revised twice during 2018, then in 2021 and 2022. The activities of the FIP were slightly affected by Covid-19, but it shows promising progress through these years. I have reviewed this FIP in 2020 and I think this FIP can go for full assessment in the near future.

## Stakeholder Consultation & Meetings

Name	Affiliation	Date (22 September 2023) and Subjects Discussed
<b>Arinta Dwi Hapsari, S.Pi., M.Si.</b>	Directorate of Fish Resources Management, Ministry of Marine Affairs and Fisheries	<ul style="list-style-type: none"> <li>• APRI's collaboration in preparing HS and FMP</li> <li>• APRI's important role in building Supply chain connection</li> </ul>
Dian Kusumawati Kurniawan Priyo Anggoro Aryo Bayu Aditomo, S.Pi, M.Pi	Agency of Marine Affairs and Fisheries of East Java Province	<ul style="list-style-type: none"> <li>• Importance of BSC as a commercial commodity</li> <li>• Government programmes for sustainability- crab apartments</li> <li>• Stopping illegal mini trawl usage</li> <li>• Designing conservation habitat</li> </ul>
<b>Jufri Effendi Fitriyani Istiqomah</b>	Fisheries Agency of Pamekasan District	<ul style="list-style-type: none"> <li>• Collaboration with APRI</li> <li>• Piloting of 4.5-inch mesh size gill net</li> <li>• Piloting of escape vent in traps</li> </ul>
<b>Sofyan Cholid M. Ulil Haiba Surindra</b>	Fisheries Agency of Rembang District	<ul style="list-style-type: none"> <li>• Collaboration with APRI</li> <li>• Piloting of 4.5-inch mesh size gill net</li> <li>• Piloting of escape vent in traps</li> <li>• Crab apartments</li> </ul>
<b>Ir. Zarochman, M.Pi. Dr. Suparman Sasmita, S.Pi., M.Si. Zainal WS</b>	National Research and Innovation Center	<ul style="list-style-type: none"> <li>• Piloting of 4.5-inch mesh size gill net</li> <li>• Piloting of escape vent in traps</li> <li>• Research on expanding BSC fishery to deeper waters</li> </ul>
<b>Prof. Dr. Ir. Indra Jaya, M.Sc. Dr. Beginer Subhan, S.Pi., M.Si.</b>	IPB University	<ul style="list-style-type: none"> <li>• Piloting of TREKfish – VMS for fishery area mapping</li> </ul>

<b>Muhammad Arif Rahman, S.Pi., M.App.Sc</b>	Brawijaya University	
<b>Eka Nurrahema Ning Asih, S.Kel., M.Si.</b>	Trunojoyo Madura University	
<b>Taufik Budhi Pramono, S.Pi., M.Si.</b>	Jenderal Soedirman University	
<b>Muhammad Huri</b>	Head of Pagagan Village, Pamekasan	<ul style="list-style-type: none"> <li>• Piloting of 4.5-inch mesh size gill net</li> <li>• Piloting of escape vent in traps</li> </ul>
<b>Sugeng</b>	Secretary of Gedongmulyo Village, Rembang	<ul style="list-style-type: none"> <li>• Piloting of 4.5-inch mesh size gill net</li> <li>• Piloting of escape vent in traps</li> </ul>
<b>Jumari</b>	Head of Layur Subdistrict, Rembang	<ul style="list-style-type: none"> <li>• Piloting of 4.5-inch mesh size gill net</li> <li>• Piloting of escape vent in traps</li> </ul>
<b>Tang Tee Por</b>	PT Rex Canning/APRI Member	<ul style="list-style-type: none"> <li>• APRI's efforts in FIP</li> <li>• Control document to prevent purchase of juvenile and berried crabs</li> <li>•</li> </ul>
<b>PT Toba Surimi Industries</b>	PT Toba Surimi Industries/APRI Member	
<b>Hengky Setia Adi, M.Si.</b>	PT Grahamakmur Ciptapratama/APRI Member	
<b>Rini Rachmanniah</b>	PT Nirwana Segara/APRI Member	
<b>PT Fresh On Time Seafood</b>	PT Fresh On Time Seafood/APRI Member	
<b>PT Ocean Champ Seafood</b>	PT Ocean Champ Seafood/APRI Member	
<b>Subairi Faisal Umam</b>	Fisher Group (Pamekasan)	<ul style="list-style-type: none"> <li>• Piloting of 4.5-inch mesh size gill net</li> <li>• Piloting of escape vent in traps</li> </ul>
<b>Saerin Priyono Khairul</b>	Fisher Group (Rembang)	<ul style="list-style-type: none"> <li>• Piloting of 4.5-inch mesh size gill net</li> <li>• Piloting of escape vent in traps</li> </ul>
<b>Ir. Bambang Arif Nugraha</b>	APRI Expert Officer	<ul style="list-style-type: none"> <li>• APRI's efforts in FIP</li> <li>• Grievance redressal</li> <li>• Stock assessment using SPR</li> <li>• Pilot projects of gill net and trap</li> <li>• Collaboration with national &amp; provincial government, scientists and fishers</li> <li>• Stock rebuilding activities</li> <li>• Conservation area development</li> </ul>
<b>Dr. Ayu Ervinia</b>	APRI Research & Executive Director	
<b>Mohamad Bagus Satria</b>	APRI GM for FIP Implementation	
<b>M. Wijdan Taqiyuddin</b>	APRI FIP & Co-Management Coordinator	
<b>Dicky Darmawan</b>	APRI Report & Publication Coordinator	
<b>Fitriyani Dewi Mauldyda</b>	APRI Staff	

<b>Lailatul Qomariyah</b>	APRI Community Organizer of Pamekasan District	
<b>Kamal Mustabiq</b>	APRI Community Organizer of Rembang District	
<b>Farhan Ramadhan</b>	APRI Enumerator of Pamekasan District	
<b>Rasyid Prasetyo U.</b>	APRI Enumerator of Rembang District	

## Summary of Findings and Recommendations

- FIP should add *S. serrata* as Primary species in Fishery progress.
- FIP can study the effect of 4.5-inch mesh size of gill net and escape vent of traps have on the primary species.
- Some evidences on the implementation of the management strategies of primary species and regular review of these strategies can help the FIP score 80 or above in this 2.1.2.
- The project TREKfish can considerable improve FIP score
- The FIP can do an RBF for *C. lucifera* and *Arius spp.*

I think this FIP is almost ready to move into full certification and might pass with conditions.

## Summary of MSC Performance Indicator Scores

Principle	Component	Performance Indicator		Previous Score [2022]	Current Score [2023]	Rationale or Key Points
1	Outcome	1.1.1	Stock status	60-79	60-79	With the cooperation of The FIP is conducting stock assessment using the Center for Fisheries Research and Development (Puslitbang Perikanan), Indonesian Blue Swimming Crab Processing Association (APRI) started data collection for stock assessment in 2014. The result was published in 2016 for two sites, Pamekasan and Rembang, though data was collected from three sites (Sumiono et al., 2016). The Length based Spawning Potential Ratio (LBSPR) was used for stock assessment with the data collected through enumerators. In the following years SPR was calculated for three regions- East Java (2016-2020), SE Sulawesi (2016-2020) and Central Java (2017-2020) (APRI, 2020). The study found that SPR of East Java was above the limit reference point

						<p>(LRP) of 0.2, whereas that of SE Sulawesi and Central Java was below 0.2. All the stock were below Target reference point (TRP). The study also found that in all the three regions, exploitation rate is higher than 0.5, and therefore, BSC stock is over exploited.</p> <p>The stock assessment in 2021, collected samples from 10 sites of 6 locations (APRI 2021). The study showed that SPR of BSC in Indonesia ranges from 20-30%, but in some sites it was below 20%.</p> <p>The 2022 stock assessment focused on data collected from Pamekasan, East Java and the average SPR was found to be 24% (Ervinia et al., 2022). The SPR of all the months except November was found to be above 20%.</p> <p>Scoring Issues:</p> <p>1.1.1a: Based on the latest stock assessment it is assumed that the stock is likely to be above the point at which recruitment would be impaired (PRI)</p> <p>1.1.1b: It cannot be said that the stock is fluctuating at a level consistent with MSY.</p> <p>I agree with the scoring given by FIP</p>
		1.1.2	Stock rebuilding	60-79	60-79	<p>In the roadmap to develop Harvest strategy of BSC in WPP 712, two operation objectives are stated.</p> <ol style="list-style-type: none"> <li>1. Increase Spawning Potential Ratio level to 30% in the next five years, at Limit Reference Point of 20%.</li> <li>2. Improve the blue swimming crab stock above the limit biomass (<math>B_{limit}</math>) measured based on MSY defined by government.</li> </ol> <p>The generation time of BSC is 1.5 to 2 years and the rebuilding timeframe specified is 5 years. It exceeds one generation time.</p> <p>The FIP has envisaged various plans for stock rebuilding like, developing a conservation zone, training in mariculture of BSC so that the fishing pressure is reduced, gear modifications and restrictions, GTK5! and Crab apartment, habitat restoration and enhancement, catch reduction and restocking. The FIP has started implementing these activities and this was enthusiastically discussed in the stakeholder meeting.</p> <p>Regular monitoring is in place to determine whether the rebuilding strategies are effective in rebuilding the stock within the specified timeframe.</p>

						<p>I feel that the FIP could score 80 in this soon with all the efforts they are putting in rebuilding the stock. I agree with the scoring given by FIP</p>
	Management	1.2.1	Harvest Strategy	60-79	60-79	<p>The Harvest strategy (HS) for BSC is detailed and has control rules and tools in place to control effort and has considered overcapacity and its causes. The FIP is developing an information base and is regularly reviewing stock status.</p> <p>The HS includes size limits of minimum catchable size of 10 cm, release of juveniles and berried female crabs (within 5 minutes of capture, GTK5 and crab apartments), increasing mesh size of gill net (4.5 inch) and introducing collapsible traps or escape vent in traps (pilot projects underway), improvement of ecosystem and coastal regulation. The strategy also includes measures to be adopted if the stock falls, though could not find any references whether it was implemented at least once. The HS is expected to achieve stock management objectives as in PI 1.1.1 SG 80.</p> <p>The strategy is likely to work based on plausible argument.</p> <p>Monitoring is in place on the effectiveness of HS and periodical (quarterly) review is conducted.</p> <p>There is biennial review of the of the potential effectiveness and practicality of alternative measures to minimise UoA related mortality of unwanted catch of the target stock, and they are implemented, as appropriate. (Stakeholder consultation)</p> <p>I agree with the scoring given by FIP</p>
		1.2.2	Harvest control rules and tools	60-79	60-79	<p>HCRs are well defined for the fishery. The HCRs adopted are size limit and seasonal closures linked to size frequency. From simulation studies conducted by APRI, the most effective management plan will be size limit of 10 cm Carapace length (CL) and seasonal closure of 2 months (HCR design for BSC FMA712).</p> <p>The HCR ensures that exploitation rate is reduced as the stock approaches PRI and keeps it fluctuating around <math>B_{MSY}</math>. At the same time, it is not sure that the HCRs are implemented fully. The size limit seems to be adopted by fishers (stakeholder consultation) and most of them are</p>

						<p>complying to it. There is no evidence that seasonal closure is practiced.</p> <p>To describe the uncertainty of LB-SPR estimation, a Monte Carlo simulation with 1000 bootstrapped iterations on life history parameters were used. The assessment identifies major sources of uncertainty such as representativeness of samples across the footprint of the fishery, sex ratios in catches, representativeness of length data and temporal fluctuations in abundance (Ervinia &amp; Maduppa, draft paper). It is not clear whether the assessment has taken into account all the unknown sources of uncertainty like climate, environmental or anthropogenic non-fishery related factors, though the simulations have accounted for temporal fluctuations in abundance.</p> <p>Various tools like incentive systems and awareness sessions (called socializations) are used to adopt HCRs. There are pilot projects by APRI with local and national government support in using increased mesh size for gill nets (4.5 inch) and traps with escape vents called tomb traps) in some areas. These seems to be effective in controlling exploitation, evident from the SPR near 20% in many areas in the stock assessment in 2021 (APRI, 2021).</p> <p>I agree with the scoring given by FIP of 60-79. If the stock goes above 20% and near 30% in all areas, then the fishery can score above 80 in this SG.</p>
		1.2.3	Information and monitoring	60-79	60-79	<p>APRI enumerators collecting data from landing centres and support from the research organization Ministry of Marine Affairs and Fisheries (MMAF) has resulted in considerable progress in data collection and publishing of stock structure and stock productivity. Data collection programme of APRIs enumerators, landing report of MMAF, fisher license and catch certificate provides information on fleet composition. There is uncertainty if species-specific catch data is available for entire distribution of stocks and all fishery removals. In addition, the level of accuracy and precision of data needs to be verified to ensure that harvest control rules, when implemented, are triggered when appropriate and to</p>

						<p>measure the effectiveness of HCR when triggered. (Summary HS Rajungan) I agree with the scoring given by FIP</p>
		1.2.4	Assessment of stock status	80	80	<p>Based on the life history of this crab, an SPR of 30% may be appropriate. Therefore, the assessment is appropriate for the stock. To ascertain the uncertainty of LB-SPR estimation, a Monte Carlo simulation with 1000 bootstrapped iterations on life history parameters were used. Sampling to inform the stock assessment occurs monthly (700 samples per month) across 10 sites. The sites were chosen after interviewing fishers regarding the fishing area and acknowledging that population dynamic parameters (e.g. growth and recruitment) and exploitation rates of crabs vary among locations to ensure the samples represented the whole stock. Further, enumerators have been trained regularly to reduce bias and uncertainty in data collection.</p> <p>The assessment is reviewed by the National Commission for Fish Stock Assessment, an independent entity that reports to the Minister for Marine Affairs and Fisheries (MMAF).</p> <p>I agree with the scoring given by FIP</p>
2	Primary species	2.1.1	Outcome	80	80	<p>The PA in 2015 (MRAG, 2015) has concluded that there are no primary species in this fishery. But the data collected on non-target species (NTS) by APRI and analysed and published in 2019 reports that the mud crab <i>Scylla serrata</i> is a species managed by reference points. in Indonesia. The reference points are based on the Ministerial Decree No. 16/2022 regarding the Management of Lobster (<i>Panulirus</i> sp.), Mud Crab (<i>Scylla</i> sp.) and Blue Swimming Crab (<i>Portunus</i> sp.) in the Area of Republic of Indonesia. Minimum legal size for the <i>Scylla</i> sp. is 12 cm carapace width and not egg-berried female. The wild capture for aquaculture only can be done for the crab that above 30 grams and availability of quota that issued by the Minister of Marine Affairs and Fisheries based on the recommendation from the National Committee for Stock Assessment. Therefore, <i>S. serrata</i> must be considered as primary. I think the FIP should register this in the indicator scores of fisheryprogress.org.</p>



						<p>The data collection of NTS and subsequent RBF conducted in 2019 at Pamekasan and later years (2020, 2021 &amp; 2022) in other locations by APRI gave a PSA score of 2.51 and MSC score of 84.</p> <p>There are no minor primary species in this fishery.</p> <p>Therefore, this SG can be scored at 80.</p>
		2.1.2	Management strategy	80	60-79	<p>The PA in 2015 (MRAG, 2015) has concluded that there are no primary species in this fishery. But the data collected on non-target species (NTS) by APRI and analysed and published in 2019 reports that the mud crab <i>Scylla serrata</i> is a species managed with reference points in Indonesia.</p> <p>The reference points are based on the Ministerial Decree No. 16/2022 regarding the Management of Lobster (<i>Panulirus</i> sp.), Mud Crab (<i>Scylla</i> sp.) and Blue Swimming Crab (<i>Portunus</i> sp.) in the Area of Republic of Indonesia. Minimum legal size for the <i>Scylla</i> sp. is 12 cm carapace width and not egg-berried female. The wild capture for aquaculture only can be done for the crab that above 30 grams and availability of quota that issued by the Minister of Marine Affairs and Fisheries based on the recommendation from the National Committee for Stock Assessment.</p> <p>The management is as follows:  Regulation in managing Giant mud crab/Giant mangrove crab (<i>Scylla serrate</i>) is catching and/or removing crabs (<i>Scylla</i> spp.), with Harmonized System Code 0306.24.10.00, from the territory of the Republic of Indonesia can only be carried out with the following provisions:  (a) Capturing and/or sending out side of <i>Scylla</i> spp. on December 15th to February 5th both in spawning and non-spawning conditions and with carapace widths above 15 (fifteen) cm or weights above 200 (two hundred) grams per individual;  (b) Capturing and/or sending out side on February 6th to December 14th in a non-spawning condition with carapace widths above 15 (fifteen) cm or a weight above 200 (two hundred) grams per individual;  (c) Sending out side on December 15th to February 5th both in spawning and non-spawning conditions and with</p>

						<p>carapace widths above 15 (fifteen) cm or weights above 200 (two hundred) grams per individual originating from aquaculture and evidenced by a Certificate the Origin; or</p> <p>(d) Sending out side on February 6th to December 14th in a non-spawning condition with carapace widths above 15 (fifteen) cm or a weight above 200 (two hundred) grams per individual originating from aquaculture and evidenced by a Certificate the Origin.</p> <p>Thus, there is a strategy in place to maintain the primary species. This strategy might work based on plausible argument.</p> <p>It can be argued that the alternative measures employed to reduce the UoA related mortality of target species like the piloted mesh size for gill net (4.5 inch) and escape vent for traps can work for primary species. I would urge the FIP to study this too as a report on this could help you in full assessment.</p> <p>Some evidences on the implementation of the management strategies of primary species and regular review of these strategies can help the FIP score 80 or above in this SG.</p>
		2.1.3	Information	80	80	<p>The PA in 2015 (MRAG, 2015) has concluded that there are no primary species in this fishery. But the data collected on non-target species (NTS) by APRI and analysed and published in 2019 reports that the mud crab <i>Scylla serrata</i> is a species managed in Indonesia. An RBF was conducted (see 2.1.1) and it can be said with confidence that some quantitative evidence is available to do PSA and to support a strategy to manage the species.</p> <p>I agree with the scoring given by FIP</p>
	Secondary species	2.2.1	Outcome	80	<p><i>Charybdis feriata</i> -60-79</p> <p><i>Eubleekaria jonesi</i> 60-79</p>	<p>APRI has developed an SOP for NTS. APRI enumerators are trained to record non-target species (NTS) landings along with BSC landings. They are provided with a code for each NTS and they can record this on a log sheet which can be used for MSC RBF. This provides enough information to do RBF. The effort APRI has spent in this direction is commendable.</p> <p>The pre-assessment of 2020 at Madura Islands for traps found five main crustacean secondary species and a PSA analysis showed <i>Portunus sanguinolentus</i> is in the high-</p>

						<p>risk category. APRI RBF analysis in 2019 shows that <i>P. sanguinolentus</i> is below 2% by weight of total catch. It is also a highly resilient species and research related to the population dynamics of <i>the P. sanguinolentus</i> has been carried out and show that the stock is healthy (Mustabiq et al.). so it can be excluded from this analysis.</p> <p>A PSA analysis with 2019 data showed that <i>Charybdis feriata</i> is in the medium risk.</p> <p>The bait species <i>Eubleekaria jonesi</i> is also in the medium risk category according to the PSA conducted during pre-assessment.</p> <p>APRI has conducted data collection of NTS (both gill net and traps) from 7 sampling sites: Pernalang, Pati, Rembang, Gresik, Pamekasan, Sumenep and Konawe Selatan during 2020 &amp; 2021. There is an interim report from the same sites in 2022. A glance through these reports shows that the secondary species differ from site to site and from year to year.</p> <p>I found the following species more than 5% from one or two sites – <i>C. lucifera</i>, <i>Arius spp.</i> In the APRI report from 2021. These must be considered under main secondary species.</p> <p>There seems to be no minor secondary species.</p> <p>The FIP has not reported any mammals or reptiles other than ETP interacting with the gears. As the gear used are bottom set, interaction with birds can be ruled out.</p> <p>For now, I think the FIP can score this SG as 60-79, but the FIP should think of doing an RBF for <i>C. lucifera</i> and <i>Arius spp.</i></p>
		2.2.2	Management strategy	60-79	80	<p>APRI has developed with the help of scientific community measures to reduce by catch of juveniles and other species. The FIP is conducting two pilot projects – one is trials of gill nets with mesh size of 4.5 inches instead of the currently used 3.5-4 inch (Pamekasan &amp; Rembang) and introduction of traps with escape vents (at Pamekasan). (APRI 2021-traps with escape vents-trials; stakeholder consultation; APRI 2022- pilot project nets with 4.5 inch).</p> <p>During stakeholder consultation the local fisheries government who collaborated in these pilot projects</p>

						<p>commented that the by catch was reduced considerably by this.</p> <p>This is in accordance with the Ministerial KP Regulation No. 17 year 2021, Article 11 (1c) “fishing activities are carried out using the passive and environmentally friendly fishing gears in accordance with the provisions of laws and regulations”.</p> <p>The use of these measures constitutes a partial strategy which can work and the results of the pilots till now is promising.</p> <p>There is an annual review of the effectiveness of the measures, through the management committee meeting in province level. (Stake holder consultation).</p> <p>This SG can score 80.</p>
		2.2.3	Information	80	80	<p>It is evident that APRI is collecting enormous information on NTS and has done RBF using the collected information. But as noted in 2.2.1, there are 3 species - <i>Eubleekaria jonesi</i>, <i>C. lucifera</i> and <i>Arius spp.</i> Which are yet to be done RBF. The fishery has enough information to do an RBF for these species, if they choose to.</p> <p>At the same time, it can be said that the available information is enough to develop a partial strategy for the management of these species.</p> <p>Therefore, I agree with the scoring.</p>
	ETP species	2.3.1	Outcome	80	80	<p>The major ETP species affected by the BSC fishery is the horseshoe crab, <i>Tachypleus gigas</i>. The species is fully protected by the Decree of the Indonesian Ministry of Environment and Forestry Regulation No.20/2018 and Government Regulations No.7/1999. Sealife base reports that this species is data deficient and therefore the FIP conducted an RBF and found that it is of medium risk due to fishery.</p> <p>APRI through its NTS surveys have found that, the release of live horse crab maybe possible in traps.</p> <p>The survival of horse shoe crab is possible in gillnets too based on the documentation of the releasing of the horse shoe crab from gillnet. The BSC fishers usually do one day fishing (about 6 hours in the sea). Most of the catches have high opportunity to survive, especially for species</p>

					<p>who has hard exoskeleton (shell) like horseshoe crab (stake holder consultation).</p> <p>At the same time, the NTS study conducted by APRI for 2019, 2020, 2021 and 2022 shows a very low level of interaction with horse shoe crab. There are no national limits for the species.</p> <p>Based on the NTS field data collection, there were no records on marine mammals or turtle interaction with the gears used in BSC fishing. A possible explanation could be that the BSC fishing grounds are near shore (&lt;4 mil), shallow coastal water. The main BSC fishing ground may not be the habitat or migration routes for marine mammals and sea turtles. Regarding the management measures, government has issued the Ministerial Decree No. 79/2018, the National Action Plan for Marine Mammals and Ministerial Decree No. 65/2022 and the National Action Plan for Turtle.</p> <p>APRI conducted a study at Madura Island on the interaction of cetaceans with the fishery. The study reports an incidence of accidental bycatch of finless porpoise in fish gill net. It was a first incident according to fisher interview and the fishers had never seen the mammal before. At the same time, it cannot be ruled out that there could be more incidents of accidental by catch. The FIP need more data on this and I think they have plans to continue such studies.</p> <p>The low number of cetacean sightings during this survey make it impossible to generate a relative abundance estimation of the cetaceans nor the risk assessment map as per the original intention. Anecdotal information and direct observations to date seem to suggest that the risk of blue-swimming crab fishery to the cetaceans in southeast Madura is low. In other words, pending further information, there seems to be no significant overlap between the cetacean habitats and the blue swimming crab fishery in southern and eastern Pamekasan, Gili Raja, Gili Genting and Pinggir Papas. No cetacean entanglement due to the bubu ropes was found in the study area during this study.</p>
--	--	--	--	--	---

						<p>APRI has studied the direct effects of UoA on the ETP species. Some consideration on the indirect effects of the UoA on the ETP species is studied. I agree with the score of FIP.</p>
		2.3.2	Management strategy	80	80	<p>For Horse shoe crab, as per APRI's observations, the measures developed for managing BSC are effective in reducing interactions. Like the mesh size of gill net (4.5 inch) and escape vent for traps. As the gear selectivity improved, ETP interactions reduced.</p> <p>APRI is also conducting socializations to create awareness among fishers regarding handling and release of ETP species. Posters are installed and workshops on mitigation and handling of ETP species is conducted regularly.</p> <p>APRI with the help of scientific community has studied interactions with mammals. A workshop was conducted for the same and the importance of reporting of such interactions were conveyed.</p> <p>A pre- and post-test following the workshop demonstrated an improved understanding of ETPs. Based on the NTS field data collection, there were no records on marine mammals or turtle interaction with the gears used in BSC fishing. A possible explanation could be that the BSC fishing grounds are near shore (&lt;4 mil), shallow coastal water. The main BSC fishing ground may not be the habitat or migration routes for marine mammals and sea turtles. Regarding the management measures, government has issued the Ministerial Decree No. 79/2018, the National Action Plan for Marine Mammals and Ministerial Decree No. 65/2022 and the National Action Plan for Turtle.</p> <p>APRI conducted a study at Madura Island on the interaction of cetaceans with the fishery. The study reports an incidence of accidental bycatch of finless porpoise in fish gill net. It was a first incident according to fisher interview and the fishers had never seen the mammal before. At the same time, it cannot be ruled out that there could be more incidents of accidental by catch. The FIP need more data on this and I think they have plans to continue such studies.</p>

						<p>The low number of cetacean sightings during this survey make it impossible to generate a relative abundance estimation of the cetaceans nor the risk assessment map as per the original intention. Anecdotal information and direct observations to date seem to suggest that the risk of blue-swimming crab fishery to the cetaceans in southeast Madura is low. In other words, pending further information, there seems to be no significant overlap between the cetacean habitats and the blue swimming crab fishery in southern and eastern Pamekasan, Gili Raja, Gili Genting and Pinggir Papas. No cetacean entanglement due to the bubu ropes was found in the study area during this study.</p> <p>I agree with the score of 80.</p>
		2.3.3	Information	80	80	<p>Qualitative and some quantitative information is available for assessing PSA of horse shoe crab. The FIP conducted a study on interactions with cetaceans (APRI 2022). The study found that there were no significant overlap between the cetacean habitats and the blue swimming crab fishery in southern and eastern Pamekasan, Gili Raja, Gili Genting and Pinggir Papas. Earlier in 2021 a workshop was conducted to discuss mitigation and handling of ETP species in the fishery.</p> <p>Agree with score of 80</p>
	Habitats	2.4.1	Outcome	80	60-79	<p>According to La Sara et al (2016) the BSC is found in sandy substrates mixed with mud close to mangroves and seagrass beds, but away from coral reefs. Fishers confirmed this during stakeholder meeting. The impact of fishery on habitat is not extensively studied but can be inferred from studies on similar gears. Results from studies in other areas suggest that traps have low impacts on habitats due to the nature of the fishery and the type of habitats encountered.</p> <p>Hisamudin et al (2021) based on their research explained that the condition of seagrass in the waters close to the location of blue swimming crab fishing is still healthy, which indicates that blue swimming crab fishing activity does not have a significant impact on the degradation of seagrass ecosystems. At the same time the Habitat</p>

					<p>Indicator Assessment results based on Ecosystem approach given in the BSC management plan gives a score of 3, which shows poor sea grass conditions. The mangrove habitats which scored a 2 in the assessment also shows severe habitat loss, though the existing mangrove are found healthy.</p> <p>There is not enough information on impact of gill net on habitat.</p> <p>There are no VMEs identified within the fishing grounds. In the islands in Madura, a study shows that the coral reefs are in good condition and the BSC fishing has low impact (Ardiansah et al 2021 )</p> <p>Currently, the protected area that proposed by APRI and the RZWP3K has been agreed and in the process of integration with spatial planning and territory of Central Java Province (April 2022).</p> <p>To further study the fishing grounds a device named TREKfish which can trace the catch of fish (fish, crab, lobster, etc.) and is equipped with fishER (fisheries electronic reporting system) software is employed on a trial basis at 3 areas and 15 locations. The tool is suitable for both small-scale and industrial fisheries, and was designed and developed to support origin, tracking and SIM (Seafood Import Monitoring) programs. TREKfish is basically a tool or instrument for tracking or tracing fishing trails. This can track the foot print of the fishing operation. According to Prof. Dr. Ir. Indra Jaya, (IPB Univ.), the data collected so can be overlaid with the catch data collected by APRI enumerators and can be used to map the fishery like the location of berried crab and juveniles, fishing grounds, whether there is any overlap, etc. the project is running for the last six months and with a data of two years can be used to recommend conservation measures and closed areas.</p> <p>An RBF (CSA) was conducted on one of the fishing areas, Pamekasan for trap fishing with a resultant score of 2.22 and MSC score of 92. The score shows that the impact of the UoA on habitat is very low.</p> <p>The FIP could try doing CSA with gill nets too. Also, it is not evident that the FIP has done CSA for all habitat where crab fishing is conducted.</p>
--	--	--	--	--	---



					<p>Or there is only one habitat type? Maybe the FIP could wait for TREKfish data to reach a conclusion.</p> <p>Ir. Zarochman, M.Pi. during stakeholder consultation discussed the trials undertaken by the scientific community to extend the fishery to deeper waters. This is an ambitious project and is still in planning and experimental stage. But the aim is to reduce fishing pressure on coastal zone. The first trials have found that at deeper areas (30-60 mts) the crabs are of larger size (15-17 cm Carapace length, CL). Meat composition was also found higher. The commercialization requires more technology and better facilities compared to the presently running day fishing.</p> <p>I could not find any studies on minor habitats.</p> <p>As a conclusion I will say the FIP has made large strides in this area, yet to score this at 80 at this stage seems to be ambitious.</p>	
		2.4.2	Management strategy	80	60-79	<p>Prohibition of trawls and use of passive gears by the Indonesian Govt. is a major management strategy in protecting the environment. The encouragement in using traps and gear exchange programme (where the destructive mini trawl is exchanged for more environmentally friendly traps &amp; gill nets) conducted by local government in collaboration with APRI is another measure to reduce the impact on habitat.</p> <p>There are no specific management measures/strategy for habitat management currently in the fishery other than what is set out in National policy (PP_Nomor_27_Tahun__2021).</p> <p>Hisamudin et al (2021) based on their research explained that the condition of seagrass in the waters close to the location of blue swimming crab fishing is still healthy, which indicates that blue swimming crab fishing activity does not have a significant impact on the degradation of seagrass ecosystems. At the same time the Habitat Indicator Assessment results based on Ecosystem approach given in the BSC management plan gives a</p>

						<p>score of 3, which shows poor sea grass conditions. The updated BSC Fishery Management Plan (Ministerial Decree No. 83/2022), the strategies and action plan related to the seagrass improvement has been established, including the rehabilitation program, developing the protected areas for seagrass, supervision and enforcement, etc. Some rehabilitation also has been conducted such as in Central Java.</p> <p>The project TREKfish once completed can be a guide towards better habitat management strategies. This along with the movement of fishing to deeper waters can bring out an 80 score, I think.</p> <p>The FIP has conducted an RBF for traps using one habitat, but it is doubtful that fishing happens only in one habitat type. Also, there is another gear, gill net which has more impact on the fishing ground. An RBF on this could help in devising better management strategies, I think.</p> <p>Currently I feel the score should be 60-79. I do not mean that the FIP has not made any progress here for a reduced score, but I feel the FIP need to make more changes to reach a score of 80 in a full assessment.</p>
		2.4.3	Information	80	80	<p>The FIP through its student grants and partnership with research organisations have generated much data on the habitats of BSC. Habitats like seagrass and mangroves have been studied (Hisamudin et al. 2021, Syam's et al. 2021). The BSC management plan have assessed habitat indicators of crab using ecosystem approach.</p> <p>Vessel tracking system, TREKfish has started collecting data, but according to Prof. Dr. Indra Jaya, during stakeholder meeting, it may take at least two years to completely map the fishing area and reach any conclusions and prepare strategies for management.</p> <p>APRI has developed a system for reporting of lost gear. A CSA conducted on the impact of traps in one of the fishing areas has given a low score showing very less impact. Qualitative and some quantitative data was available for CSA.</p> <p>There is continuous monitoring and the FIP is striving to collect adequate information on the impact of the fishery on habitats.</p>

	Ecosystem	2.5.1	Outcome	60-79	60-79	<p>The fishery is targeted and is currently completely exploiting the resource. Key ecosystem elements of the fishery are identified. There is research on the food and feeding habits of BSC and the food chain in which BSC is involved from different parts of the world. Some research is done from the area where FIP is operating.</p> <p>The high fishing effort of the BSC trap fisheries may affect the trophic structure and/or species composition of the ecosystem. A trophic model of the marine fisheries resources of the north coast of Central Java, Indonesia was constructed using the Ecopath with Ecosim software (Narhakim, 2003). The model consists of 27 ecological groups with a mean trophic level of 3.04. Overall, the study found that the north coast of Central Java ecosystem can be regarded as moderately mature and relatively stable system. The impact of the fishery was low to moderate in comparison with the fisheries of other systems. Therefore, it is anticipated that the Java Sea ecosystem should be moderately resilient to perturbation. Tropical ecosystems are usually resilient to disturbance due to the high biodiversity. Maduppa et al., 2022 has published a report on eDNA metabarcoding of decapod crustaceans across Indonesian waters. The study gives an insight to the biodiversity of the waters and the genetically distinct populations of <i>P. pelagicus</i>. This SG can score better with an RBF, though it is not an easy task.</p>
		2.5.2	Management strategy	60-79	80	<p>The measures in place to reduce the impact of fishery on target species can help manage the ecosystem impact. The national ban on trawl gear, minimum size limit of catch and release of juveniles and berried crabs (GTK5! And crab apartments) are effective in reducing the impact of UoA on the ecosystem dynamics. The fishing gear swap programme of exchanging the illegal mini trawl with traps and encouraging exchange of gill nets towards traps will also work positively for the fishery.</p>

						<p>The pilot projects of bigger mesh size gill nets and traps with escape vents are supposed to minimize the fishing pressure on target and other species.</p> <p>The research on extending the fishery to deeper waters can also have a positive impact on coastal ecosystem by reducing fishing pressure.</p> <p>Altogether this constitutes a partial strategy which will work together to reduce impact of fishery on the ecosystem component.</p> <p>The stakeholder meeting and APRIs reports suggests that this measures/partial strategy is implemented successfully in most of the areas, though not in all.</p> <p>Considering all these I think the score can reach an 80.</p>
		2.5.3	Information	80	80	<p>The FIP has prepared a BSC Fisheries Management Plan draft in 2021, that discusses ecosystem elements in detail. The habitat indicators are assessed based on Ecosystem approach. Water quality parameters, various habitats and climate change have been assessed.</p> <p>The information is sufficient to broadly understand the key elements of ecosystem. Main impact of UoA on the key elements of ecosystem is known and some like biodiversity, trophic structure are studied in detail.</p> <p>The main functions of target species, secondary species and ETP are known and is used in preparing the management plan. The fishery is continuing to monitor the ecosystem elements.</p> <p>This meets 80.</p>
3	Governance and Policy	3.1.1	Legal and customary framework	80	80	<p>The management of blue swimming crab fisheries in Indonesia is carried out collaboratively. There is a framework for cooperation in BSC fisheries that involves various parties, including the government, academia, researchers, to industry. This cooperation framework is contained in regulations or decree related to the BSC management committee that are ratified within the province.</p> <p>The Ministry of Marine Affairs and Fisheries (MMAF) has issued the regulation related to the establishment of the Fisheries Management Committee at the Fisheries Management Area (FMA) level (Permen KP No. 22 Tahun 2021 (Ministerial Regulation No. 22/2021)) with its</p>

					<p>purpose being to improve management efficiency and coordination of fisheries within an FMA. The Fisheries Management Committee in FMA level involves all stakeholders in the fisheries. The structure of the committee has been established, and the executive coordinator determined. The Fisheries Management Committee in FMA level will improve the coordination between stakeholders, and make it easier to monitor and evaluate the fisheries. In East Java, BSC Management and Data Committee has been established and the action plan and the HCR is agreed. In Pamekasan, the village regulation is established.</p> <p>ettlement of legal disputes is carried out based on existing regulations. APRI together with the local government and other parties have developed village regulations (Pagagan Village Regulation on BSC Management) in several locations to improve the management of BSC at the grassroot level and increase community participation. In the village regulation, the steps to be taken for dispute resolution is stipulated. If it is not resolved at the village level, it will be taken to the authorized law enforcers, including the courts. There are cases of fisheries disputes, including the use of non-environmentally friendly fishing gear, which are brought to court and processed legally.</p> <p>The fishery is conducted by traditional fishermen and their rights are well protected. They are given priority in obtaining license to fish, free insurance is provided and each person has an ID card.</p> <p>I agree with the scoring of FIP.</p>	
		3.1.2	Consultation, roles and responsibilities	80	80	<p>I agree with the scoring of FIP.</p> <p>The stakeholder meeting explained the role of consultation in management. Village community meets weekly and reviews any issues.</p> <p>When the minimum size of crab caught was increased to 10 cm from 8 cm it was first discussed in the village committee and then enforced. The new gill net with mesh size of 4.5 inches was prepared by the fisheries group under APRIs supervision. Then it was discussed with scientific researchers and pilot project started. This is an</p>

						<p>example of how information obtained from stakeholders are considered in making regulations.</p> <p>The Fisheries Management Committee in FMA level involves all stakeholders in the fisheries. The structure of the committee has been established, and the executive coordinator determined. The Fisheries Management Committee in FMA level will improve the coordination between stakeholders, and make it easier to monitor and evaluate the fisheries.</p> <p>This shows that people involved in management are identified and their roles and responsibilities are well established.</p> <p>Altogether it can be seen that the consultation process provided opportunities for expressing opinions by all affected parties.</p>
		3.1.3	Long term objectives	80	80	<p>There are clear long-term objectives in several pieces of legislation and explicit reference to the precautionary principle and SG80 is met. (Third year audit report, 2020).</p> <p>The BSC management plan clearly and explicitly specifies long term objectives of managing the fishery that is consistent with MSC fisheries standard and use a precautionary approach. The objectives can guide decision making.</p> <p>In a full assessment this can score 100.</p>
	Fishery specific management system	3.2.1	Fishery specific objectives	80	80	<p>In 2021, the BSC Management Plan has been reviewed to update and improve the management of BSC in Indonesia. The management objectives are clear and involves short-term and long-term objectives.</p> <p>East Java province has issued the regulation related to the establishment of blue swimming crab management committee. The committee consists of all stakeholders in the fishery. Harvest Strategy has been reviewed to meet the requirements of the fishery.</p> <p>The score is above 80.</p>
		3.2.2	Decision making processes	60-79	80	<p>he Ministry of Marine Affairs and Fisheries (MMAF) has issued the Blue Swimming Crab Fisheries Management Plan through Ministerial Decree No. 70/KEPMEN-KP/2016. Later, MMAF issued a regulation related to the update for the Blue Swimming Crab Fisheries Management Plan and has established the Fisheries</p>

						<p>Management Committee based on Fisheries Management Area level through the Ministerial Regulation No. 20/PERMEN-KP/2021. The Fisheries Management Committee includes various stakeholders in BSC fisheries that their authorities and their roles are as described in that Ministerial Regulation.</p> <p>The BSC management plan (2021) clearly discusses an established decision making process that can achieve fishery specific objectives (2.4 Fisheries governance). The process is set to respond to major issues arising from research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions (For eg; the change of mesh size of gill net to 4.5 inches)</p> <p>The precautionary principle of the management decision making is stated in 1.3 Fisheries Management Vision of management plan.</p> <p>National and regional policy, regulation, etc., are accessible through the MMAF website and provincial/district websites. For example, for the Harvest Strategy, Fisheries Management Plan, BSC minimum legal size are available on the MMAF website (kkp.go.id) and another government website (such as bpk.go.id)</p> <p>There is no evidence of the fishery being subject to legal challenges that I could find, but stakeholder meeting assured that there is a transparent dispute resolution system in the fishery. The In the village regulation, the steps to be taken for dispute resolution is stipulated. If it is not resolved at the village level, it will be taken to the authorized law enforcers, including the courts.</p> <p>One of the major area of dispute is the illegal mini trawl fishing. It is managed by force sometimes (like last month a mini trawl was burned down with its catch in Central Java) but most of the time it is resolved through talks and discussions. There are out reach programmes to create awareness regarding illegal fishing practices and gear swap offers.</p> <p>I agree with the score of FIP.</p>
		3.2.3	Compliance and enforcement	60-79	80	<p>The Directorate General of Surveillance, Control and Monitoring of Fisheries Resources (PSDKP) is responsible for monitoring Indonesian waters beyond</p>

						<p>12nm with surveillance support from the navy. Provincial governments oversee monitoring from the shoreline to 12nm with surveillance support from the water police. In both cases, criminal charges and prosecution can only take place through police investigations. To improve the compliance and enforcement, in sites like Rembang, Pamekasan, and Konawe Selatan, village regulation is strengthened and already implemented in Pamekasan specifically Pagagan Village, while the other sites it is still in progress. APRI has made major improvements in this SG and more documented information on the compliance to this could help score higher.</p> <p>Monitoring, control and surveillance (MCS) tools in the fishery include licensing and registration for all vessels and IDs for fishermen.</p> <p>Indonesia do not resort to sanctions and fines, rather believes in awareness and working through village committees to reach an agreement. This takes time to enforce but is more effective and shows better cooperation of fishers.</p> <p>Stakeholder meetings showed that fishers are complying with new regulations. APRI with local and National government has brought out many new regulations and a large group of fishers seems to comply with it. This is mainly due to approach of APRI and local governance. One example is the pilot project in Pamekasan using gill nets of 4.5 inch mesh size. The fishers were involved in the net fabrication and are happy to use that.</p> <p>There is non-compliance, like use of illegal mini trawls, but it is not systematic. Rather random acts. APRI has performed a major role in creating awareness about sustainable fishing practices among crab fishers. Score is 80.</p>
		3.2.4	Management performance evaluation	80	80	<p>Total catch and MSY is periodically evaluated as evidenced through the publishing of Regulations (e.g 50/2017). The Management Plan stipulates that the plan is to be evaluated annually to evaluate the implementation and ensure that funds, human resources and facilities are adequate to implement the action plans, and whether any changes are required in order to meet their goals. Evaluation activities are coordinated by the DGCF and</p>



					<p>carried out by the Management Committee at the Provincial level. The compliance program and the operational action plan for BSC is evaluated. Regulation 71/2016 regulates fishing gear and vessels within 'fishing lanes' within the FMAs. This regulation specifies that the monitoring and evaluation of fishing lanes and the placement of gear and vessels in each FMA will be conducted by the DGCF and the provincial office responsible for the relevant fisheries. Since implementation in 2011, this regulation has been amended several times demonstrating that they are evaluated and updated as required. Based on the examples provided above, there are mechanisms in place to evaluate key parts of the management system. The stock assessment is internally reviewed annually by MMAF's Committee for stock assessment and externally reviewed by an independent scientist as required. In addition, the management plan prescribes a review period of 5 years, however, it has only been in place since 2016. Nonetheless, the Plan has been reviewed internally by scientists from the MMAF research agency and externally from university scientists. In recognition that fisheries management remains constrained by a range of factors such as illegal fishing, a second amendment to the Fisheries Law is being drafted which constitutes a review of the overarching legal framework.</p> <p>Agree with the scoring.</p>
--	--	--	--	--	---

## Environmental Workplan Results

Result	Related Action on Fishery Progress	Related MSC Performance Indicator	Explanation
--------	------------------------------------	-----------------------------------	-------------

Habitat Indicator Assessment results based on Ecosystem approach given in the BSC management plan	Conduct a study on habitat and ecosystem impact	2.4.1, 2.4.2, 2.5.1, 2.5.2	Genetic data collected and analysed for eDNA metabarcoding to identify decapod crustaceans in Indonesian waters. this is used for risk assessment. FIP continues to record by catch samples. BSC habitat mapping is conducted in many areas and important habitats like sea grass and mangrove were assessed. Vessel monitoring system, TREKfish started collecting data on fishing locations. This project aims in mapping the habitat.
HS developed through draft and discussions, finalized and socialization continuing.	Contribute to development of harvest strategy for Indonesia BSC	1.2.1, 1.2.2, 1.2.3	Using SPR from 2016-2019 Directorate General of Capture Fisheries (Ministry of Marine Affairs and Fisheries-MMAF) has launched a harvest strategy for management of blue swimming crab, snapper, and grouper fisheries as the fisheries management area (LPP WPPNRI). APRI, SFP, and BRPL prepared the draft HS. This was discussed and legalized in 2021. Socialization of HS is continuing. Village committee formation initiated in many fishing villages. Registration of vessels, GTK5! And crab apartment continuing. Crab apartment in Rembang has been modified to be a floating crab apartment to minimize the impact of waves on the buildings.
Fishermen comply with regulations	Development of compliance and enforcement measures	2.3., 2.3.2, 2.3.1, 3.2.3.	APRI continue to improve the compliance and enforcement, guidelines and/or logbook creation for several issues needs to be created and developed such as for responsible fisheries practice, GTK5! (Movement to release the undersize and/or egg berried female BSC), ETP species, ghost fishing, and landing report. The ghost fishing gear clean up and ETP species logbook already developed and distributed to the co-management sites. Training for identification and handling of ETP species conducted
FMA committee established in East Java	Establish Indonesia BSC fisheries Co-Management at local level	3.1.1, 3.1.2, 3.1.3, 3.2.1, 3.2.2	APRI with Agency of Marine Affairs and Fisheries of East Java established the BSC fishery management committee through the Head of Agency of Marine Affairs and Fisheries of East Java Decree No. 188.4/864/120.3/2021. Meetings in national, provincial, district, and village levels continuously done to discuss the blue swimming crab fisheries. In national level, the harvest strategy and harvest control rules has been discussed. And in the district and village level, the local issues such as protected area has been discussed. APRI through the community organizers routinely conduct weekly meeting with the fisher community and coordinate it with the village authorities. The action plan and HCR document has been developed and legalized in the East Java Province on November 2021. The FMA committee has been established through the Ministerial Decree No. 22/2021.
Fishery foot print mapped	Fishing effort studies	1.2.2	Vessel Tracking System (VTS) called TREKfish was developed by PT Panrita Jaya and IPB University. It is installed in 15 boats distributed in Rembang, Pamekasan, and Pangkajene dan Kepulauan on October 2021. Data analysis

			continuing. The study aims to create a foot print of the fishery and might take another year or two to complete and publish results.
Improvement in compliance to minimum size and berried crab protection regulation, better traceability	Implement control document to improve compliance and traceability	3.2.3, 3.2.4	APRI has implemented control document for the blue swimming crab supply chain in Indonesia. The control document is evaluated through audits. In 2021, the percentage of compliance was 98.8% for the collector level and 97.8% for the mini plant level.
Catch quality improved, juveniles and bycatch reduced	Improve the selectivity of fishing gear	2.3.2, 2.3.1, 2.5.1 2.2.1	Trap with escape vents prototype has been developed and implemented in Pamekasan, Madura since July 2021. Pilot project is continuing. Another pilot project is using 4.5-inch mesh size in gill nets. This is running in Rembang, Pamekasan, Lampung, and Cirebon
Fishermen aware of ghost fishing and may eventually work towards reducing ghost fishing	Management measures on ghost fishing	2.3.2, 2.3.1, 2.5.2 2.5.1, 2.2.2	Poster related to the ghost fishing installed in the 7 locations - Peralang, Pati, Rembang, Gresik, Pamekasan, Konawe Selatan, and Pangkajene dan Kepulauan.  Ghost fishing cleanup conducted. APRI co-management also collects lost fishing gear that fishermen retrieve from the sea.
Reduce impact of UoA on ETP is the anticipated result. Currently this is under implementation.	Management measures on post-capture handling of ETP species	2.3.2, 2.3.1, 2.5.2 2.5.1, 2.2.2	The installation of poster about the ETP species and how to handle it has been conducted in the 7 locations. Hands on training for the fishermen and other stakeholders related to handling of ETP species has been conducted in May 2021.
<i>Charybdis feriata</i> -60-79  <i>Eubleekaria jonesi</i> (bait) 60-79  <i>I think the FIP has data to conduct RBF of the following species -</i> <i>C. lucifera</i> <i>Arius spp.</i>	Non Target Species Field Assesment - Using the Marine Stewardship Council's Risk Based Framework for Data Limited Fisheries	2.3.3, 2.3.2, 2.3.1 2.2.3, 2.2.2, 2.2.1	RBF conducted using the data collected for NTS over the last 7 years.
Yearly stock status published. The latest in these is an interim draft report of 2022.	Stock assessment of <i>Portunus pelagicus</i> in Indonesia	1.2.4, 1.2.3, 1.1.1	APRI has conducted the training for enumerators and community organizers about data collection of blue swimming crab and non-target species with the help of Prof. Dr. Ir. Indra Jaya, M.Sc. from the Komnas Kajiskan (National Stock Assessment Agency), Dr. Ir. Zairion, M.Sc. as a non-target species and risk assessment expert from IPB University, and Syahril Abd Raup, S.T., M.Si from the Directorate General of Capture Fisheries MMAF.

			Data collection and analysis related to the stock of the blue swimming crab continuously carry out. Biweekly meeting for the monitoring and evaluation of data collection by enumerators continue to be conducted.
Envisaging that stock health will be restored and conservation areas reserved for continuous stock enhancement.	Stock enhancement and restocking of blue swimming crab ( <i>Portunus pelagicus</i> )	1.1.2	APRI collaborated with Bappenas, UNDP, GMC Project, BBPBAP Jepara, and Agency of Marine Affairs and Fisheries of East Java Province and decided to undertake restocking activities. Location for stock enhancement have been identified for Rembang and Madura. In Rembang, conservation area for blue swimming crab has been submitted to the government through the Agency of Marine Affairs and Fisheries, involved in the update of the RZWP3K and has been agreed. Currently, it is in the process of integration with the spatial planning and territory of the Central Java Province.

## Supporting References

- APRI 2019. Risk Based Framework (RBF) of the Blue Swimming Crab Fisheries in Pamekasan of East Java, Indonesia
- APRI 2020. Indonesia Blue Swimming Crab Fishery Improvement Project. NON-TARGET SPECIES FIELD ASSESSMENT 2020 (Using the Marine Stewardship Council's Risk Based Framework for Data Limited Fisheries using MSC's Productivity, Susceptibility Analysis)
- APRI 2020. Indonesia Blue Swimming Crab Fishery Improvement Project. Stock Assessment of the Blue Swimming Crab (*Portunus pelagicus*) for Sustainable Management in Indonesia in 2019-2020
- APRI 2021. APRI Non-target species. 2021
- APRI 2021. Indonesia Blue Swimming Crab Fishery Improvement Project. Stock Assessment of the Blue Swimming Crab (*Portunus pelagicus*) for Sustainable Management in Indonesia –2021 Midterm Report
- APRI 2021. Rebuilding Plan for Blue Swimming Crab (*Portunus pelagicus*) in Madura Island, East Java, Indonesia 2021
- APRI 2021. GTK5! Implementation. SUMMARY. Asosiasi Pengelolaan Rajungan Indonesia (APRI) Indonesian Blue Swimming Crab Association
- APRI 2021. Traps handover activity report – Rembang
- APRI 2021. Traps handover activity report – Pamekasan
- APRI 2021. Ghost fishing clean up. Summary report
- APRI 2021. Implementation report. Mitigation and handling of ETP species.
- APRI 2021. ETP species. Poster installations
- APRI 2021. Control document & audit system. Summary
- APRI 2021. Crab Apartment Implementation
- APRI 2022. The Interactions between the Blue Swimming Crab Fisheries and the Cetaceans in Madura, Indonesia. FINAL REPORT FOR THE INDONESIAN BLUE SWIMMING CRAB ASSOCIATION (APRI), REVISION 25. MAY 2022.
- APRI 2022. Interim results of NTS
- APRI 2022. Pilot Project of Fishing Gear Swap into 4.5 Inch Nets for Blue Swimming Crab Fishery (2022)
- APRI 2022. Pilot Project of Fishing Gear Swap into 4.5 Inch Nets for Blue Swimming Crab Fishery (2022)

- APRI 2023. Indonesia Blue Swimming Crab Association. Development of Conservation Area. Asosiasi Pengelolaan Rajungan Indonesia
- Ardiansah et al 2021. The coral reef health at surrounding blue swimming crab fishery sites in Mandangin Island, East Java, Indonesia IOP Conf. Ser.: Earth Environ. Sci. 944 012021
- BSC Fisheries Management Plan. Draft. 2021. Kementerian Kelautan dan Perikanan Direktorat Jenderal Perikanan Tangkap Direktorat Pengelolaan Sumber Daya Ikan 2021 (Google translated)
- BSC Third year audit report. 2020
- East Java action plan - HCR. 2021-22 (Google translated from Indonesian)
- FMA Meeting 2022. Meeting of Fisheries Management Institutions for Fisheries Management Areas of the Republic of Indonesia (FMA) 714
- HCR Design for FMA712. Evaluation and Risk Assessment of Blue Swimming Crab Fisheries Management using MERA
- Hisamudin et al., 2021. Hubungan Kondisi Rajungan (*Portunus Pelagicus*) dan Ekosistem Padang Lamun di Perairan Pulau Poteran Madura. REKAYASA. Journal of Science and Technology. <https://journal.trunojoyo.ac.id/rekayasa> (Google translated)
- Indra Jaya, Muhammad Iqbal dan Agung Tri. 2023. FINAL REPORT TREKfish Observation on Blue Swimming Crab Fishing in the waters of REMBANG, PAMEKASAN dan LEMPANGENG
- Maduppa et al., 2022. eDNA metabarcoding of decapod crustaceans across Indonesian seas has implications for biodiversity conservation and fisheries sustainability. Front. Mar. Sci. 9:918295. doi: 10.3389/fmars.2022.918295
- Mustabiq et al., Population dynamics of the three-spot swimming crab (*Portunus sanguinolentus*) in Pati Waters, Central Java
- RINGKASAN EKSEKUTIF. STRATEGI PEMANFAATAN (HARVEST STRATEGY). PERIKANAN RAJUNGAN DI WILAYAH PENGELOLAAN PERIKANAN NEGARA REPUBLIK INDONESIA (WPPNRI 712) (Google translated)
- Sukandar et al., (2022) Current status of the coral reef ecosystem in Gresik Regency, East Java
- Syam's et al., 2021. PEMETAAN MANGROVE MENGGUNAKAN CITRA SATELIT LANDSAT UNTUK PENGELOLAAN RAJUNGAN YANG BERKELANJUTAN DI PERAIRAN BANGKALAN (Google translate)

XXXXXXXXXXXX