

CONVENTION ON INTERNATIONAL TRADE IN ENDANGERED SPECIES
OF WILD FAUNA AND FLORA



Thirty-first meeting of the Animals Committee
Online, 31 May, 1, 4, 21 and 22 June 2021

Species specific matters

BANGGAI CARDINALFISH (*PTERAPOGON KAUDERNI*)

1. This document has been submitted by Indonesia as an update from previous report that had been submitted on June 8, 2020.*
2. At its 18th meeting (Geneva, 2019), the Conference of the Parties adopted Decisions on Banggai Cardinal Fish, as follows:

18.263 Directed to Indonesia

Indonesia is encouraged to continue its conservation and management measures to ensure the sustainability of international trade in Pterapogon kauderni, and submit a progress report on these measures, including the implementation of recommendations made by the Animals Committee in document AC30 Com.1 (Rev. by Sec.), to the Secretariat for onward transmittal to the Animals Committee, with its own recommendations, as appropriate.

3. At its 30th meeting (Geneva, 2018), the Animal Committee appreciated the detailed and informative document provided by Indonesia (document AC30 Doc 21.2), and adopted the following recommendations for Indonesia:
 - a) Indonesia is encouraged to consider the recommendations from the study by the International Union for Conservation of Nature (IUCN) in information document AC30 Inf. 16 in further development and implementation of National Plan of Action for the Banggai Cardinalfish, and report on progress to the Animals Committee at its 31st meeting (AC31).
 - b) It was noted that Indonesia intends to extend the area of marine protected areas to become up to 869.059 ha. Indonesia was encouraged to enhance designation of identified marine protected areas and to report on implementation, including enforcement, of the Banggai Marine Protected Areas to AC31. The report should inter alia provide information on the population trends and on the effectiveness of the management methods applied in different zones of the marine protected areas and outside these areas.
 - c) It was recommended that Indonesia build on the T0 survey making sure that data obtained in future surveys are comparable with T0. It was further recommended that recording the number of sea urchins during monitoring at transects, as well as having control sites outside protected areas may be beneficial.

* The geographical designations employed in this document do not imply the expression of any opinion whatsoever on the part of the CITES Secretariat (or the United Nations Environment Programme) concerning the legal status of any country, territory, or area, or concerning the delimitation of its frontiers or boundaries. The responsibility for the contents of the document rests exclusively with its author.

- d) Indonesia informed the in-session working group that it will carefully consider all releases of the species, including unintentional releases from captive-breeding facilities, in particular with the view of avoiding genetic mixing, transfer of pathogens or other negative impacts on the species and ecosystems. It was suggested that any releases of specimens of Banggai Cardinalfish are reported to AC31 (number of specimens, sites of release, and purpose of release).
 - e) Indonesia is encouraged to adopt site-specific harvest quota according to the National Plan of Action and report to AC31 on the methodology for setting the quota and on the quota adopted. In establishing the harvest quota, Indonesia is invited to consider the recommendations provided in information document AC30 Inf. 16.
 - f) Subject to available funding, and as described in the National Plan of Action, Indonesia is encouraged to carry out a genetic study, and a trade survey reflecting the geographic origin of the traded specimens and describing the trade routes.
 - g) Indonesia is encouraged to work with relevant technical partners on implementing the National Plan of Action.
4. Indonesia has undertaken actions and measures to conserve and manage Banggai Cardinal Fish as directed by Decision No. 17.259 (REF. COP 17), and submitted its progress report in AC 29 (AC29 Doc. 25.2) and AC 30 (AC30 Doc. 21.2). The actions are based on the Banggai Cardinal Fish National Plan of Action (2017-2021) where 5 major targets have been agreed: 1) availability of and information on Banggai Cardinal Fish population in its natural habitats and other geographic areas, 2) implementation of protection and preservation of Banggai Cardinal Fish and its natural habitats, 3) sustainable use and trade of Banggai Cardinal Fish, 4) Improvement of human resources capacity to conserve and manage Banggai Cardinal Fish, 5) Improvement of conservation governance, and 6) implementation of restocking of Banggai Cardinal Fish population.

The followings are progress of activities that had been implemented since AC 30 for each target of the Banggai Cardinal Fish National Plan of Action. However, it should be noted that, due to the Covid-19 pandemic, some activities of the management and conservation of the Banggai Cardinal Fish in 2020 and 2021 were postponed.

4.1 Information on Banggai Cardinal Fish population in its natural habitats and other geographic areas.

As previously reported in AC 29 and AC 30, Indonesia has accomplished most of the planned actions under Target 1 except for the genetic test for BCF in Banggai Islands and introduction areas due to the fund availability. Among the actions that have been accomplished since AC 30 in 2018 are T1 and T2 surveys of BCF population, and the development of BCF survey and monitoring guidelines in 2019 which were used as a reference in T1 and T2 surveys. The monitoring guidelines (published with ISBN number: 978-602-53618-5-2) include guidelines on BCF microhabitat monitoring, namely sea urchins, anemones, and corals (see Figure 1).

Following the T0 population survey conducted in October 2017, the T1 and T2 surveys were conducted in October 2018 and October 2019, respectively. In order for the data from the three surveys to be compared, the T1 and T2 surveys were carried out in 24 observation points (Figure 2) and they followed the same Belt Transect method (as recommended by Indonesian Institute of Sciences (LIPI)) that was used in T0. During the three surveys, besides BCF population, the microhabitat was also recorded, namely sea urchins, anemones, and corals. Among the 24 survey points, there was one located outside of MPA which acted as a control site. It is located in Paisuluno Village, Banggai Kepulauan. Details of the survey method and observation points were already reported in AC 30 (AC30 Doc. 21.2).

T0, T1, and T2 survey results show that the density of BCF had relatively stable and upward trends in several locations among the 24 observation points. There was no significant difference between the population in control site and that within the MPA. The presence of BCF positively correlated with the presence of sea urchins and anemones as their microhabitat. The results reinforce the importance of protecting anemone and sea urchin populations as part of a holistic approach to rehabilitate and maintain BCF stock. Efforts to protect the species are conducted through enforcing harvest control based on MPA zones, meaning that harvesting activity is prohibited within the MPA No Take Zones (i.e. core zone, rehabilitation zone, marine tourism zone).

Due to the COVID-19 pandemic, the T3 survey will be conducted in October 2021, which will cover 9 observation points in Buang-Buang. The T3 survey result will be used to determine micro habitat rehabilitation and/or restocking sites. Moreover, the T3 survey will be conducted in conjunction with the genetic field study survey by the Indonesian Institute of Sciences (LIPI).

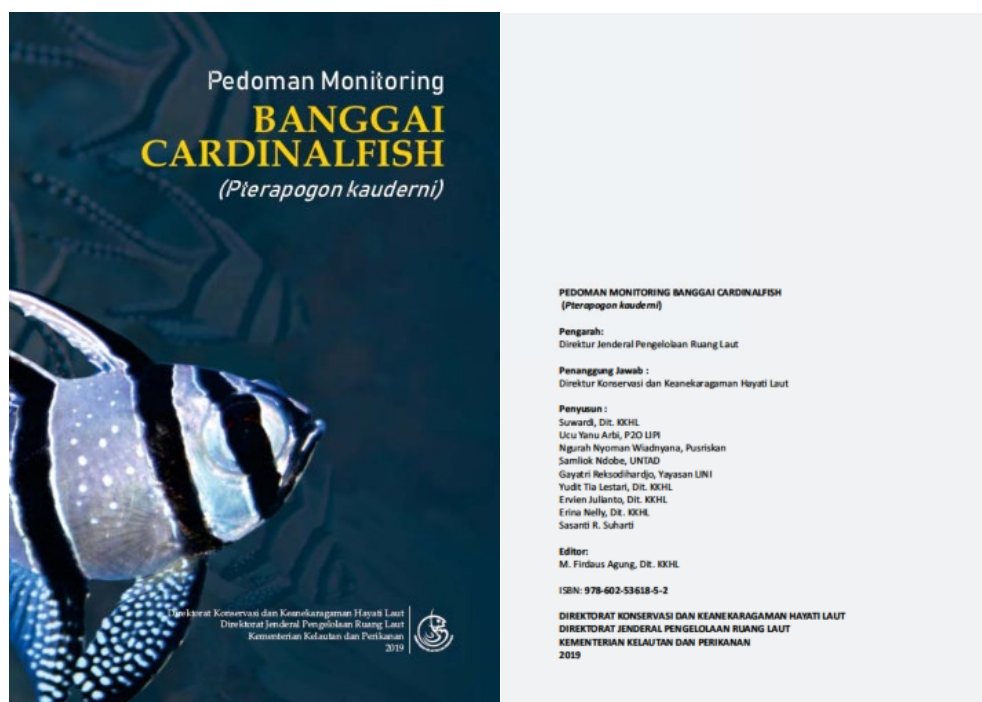


Figure 1. Banggai Cardinalfish Monitoring Guidelines

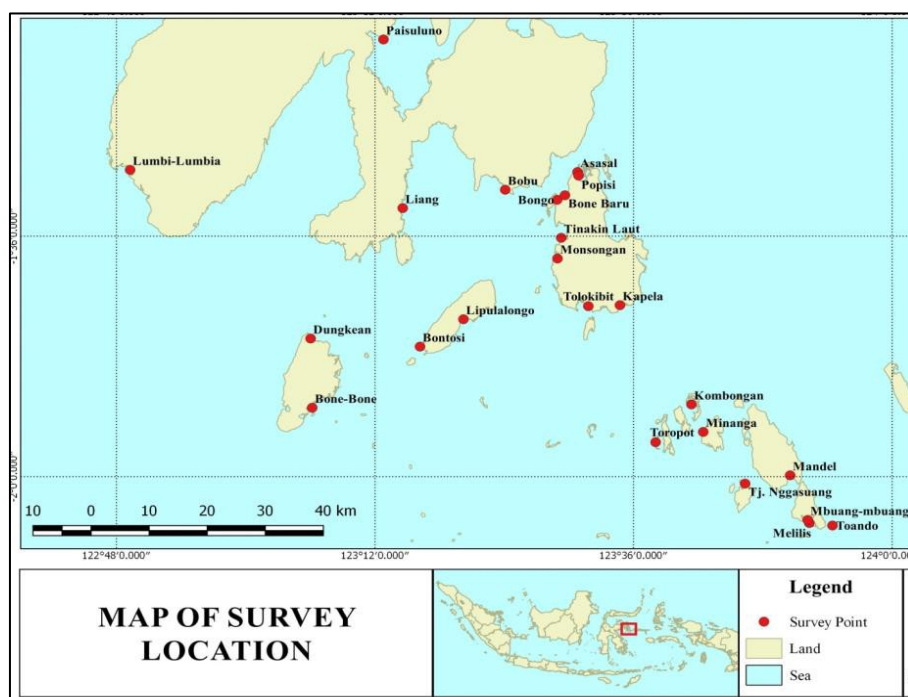


Figure 2. 24 Observation points for BCF population monitoring

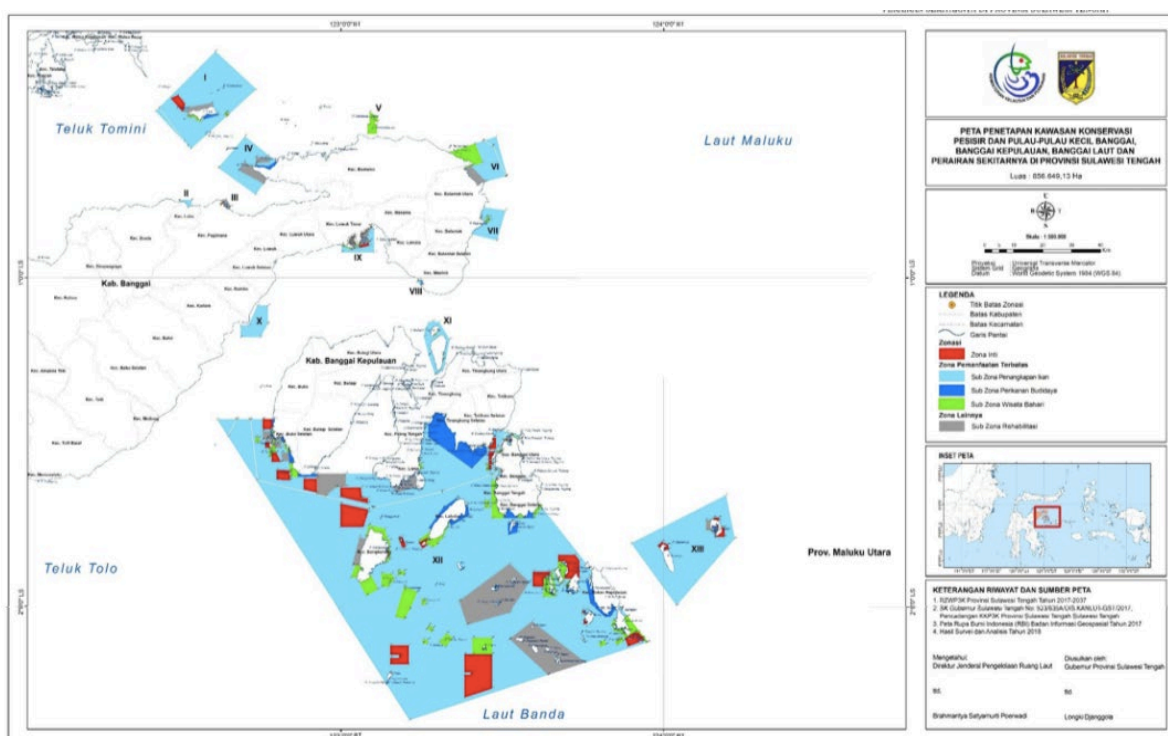
4.2 Protection and preservation of Banggai Cardinal Fish and its natural habitats

Following the designation of the Banggai MPA by the Governor of Central Sulawesi in 2017, the Ministry of Marine Affairs and Fisheries established Banggai Dalaka MPA through Ministerial Decree No. 53/2019. The total area of Banggai Dalaka MPA is 856,649 hectares that covers 3 districts, namely Banggai, Banggai Kepulauan, and Banggai Laut. Banggai Dalaka MPA consists of several zones: core zone (no-take and no-entry area), sustainable fisheries zone (limited and regulated fishing is allowed), utilization zone (no-take area but regulated tourism is allowed), and rehabilitation zone (zone dedicated only for habitat and ecosystem rehabilitation activities) (Figure 3). As a follow up to the establishment decree, the MPA zonation and management plan has been developed by Central Sulawesi Government and is currently in process of being signed into law by the governor. The zonation and management plan will include short and long term strategies and programs of Banggai Dalaka MPA management as well as regulate activities on each zone. The management plan will include management activities and actions such as: regular patrols, protection of fish spawning and nursery areas, habitat rehabilitation and fish population recovery, community education and assistance, sustainable tourism development, and aquaculture.

Additionally, to improve the management effectiveness of Banggai Dalaka MPA, in 2020 the Central Sulawesi Government formed Banggai Dalaka MPA management unit through the Central Sulawesi Governor Regulation No.51 Year 2020, and it will occupy the MPA management office that previously been established in Bone Baru village, Banggai Laut in 2019. The management unit main task is to manage and oversees the utilisation of marine and fishery resources in Banggai Dalaka MPA which include various economical, endemic fish and important marine biota. Further, the MPA management activities were also conducted in 2020 which include public dissemination of Banggai Dalaka MPA and biophysical data series collection.

As reported in AC 30, complementing the BCF habitat protection, the Ministry of Marine Affairs and Fisheries has set limited protection status on BCF under the Ministerial Decree No. 49/2018 which prohibits BCF harvest during reproduction peak times (in February, March, October, and November) within Banggai Islands waters. Enforcement and surveillance on both Banggai Dalaka MPA and BCF protection regulation are conducted collaboratively between the Directorate General of Surveillance-MMAF, Fisheries Quarantine Agency-MMAF, Central Sulawesi Fisheries Office, and Banggai Laut-Banggai Kepulauan Fisheries Office as well as with 10 surveillance community groups. There has been no report on the violation on BCF-related regulations.

Additionally, to raise public awareness regarding the importance of enhancing conservation and sustainable utilisation of marine ornamental fish, BCF has been designated as one of national mascots for ornamental fish in 2021 through the Ministry of Marine Affairs and Fisheries Decree No.2 Year 2021.



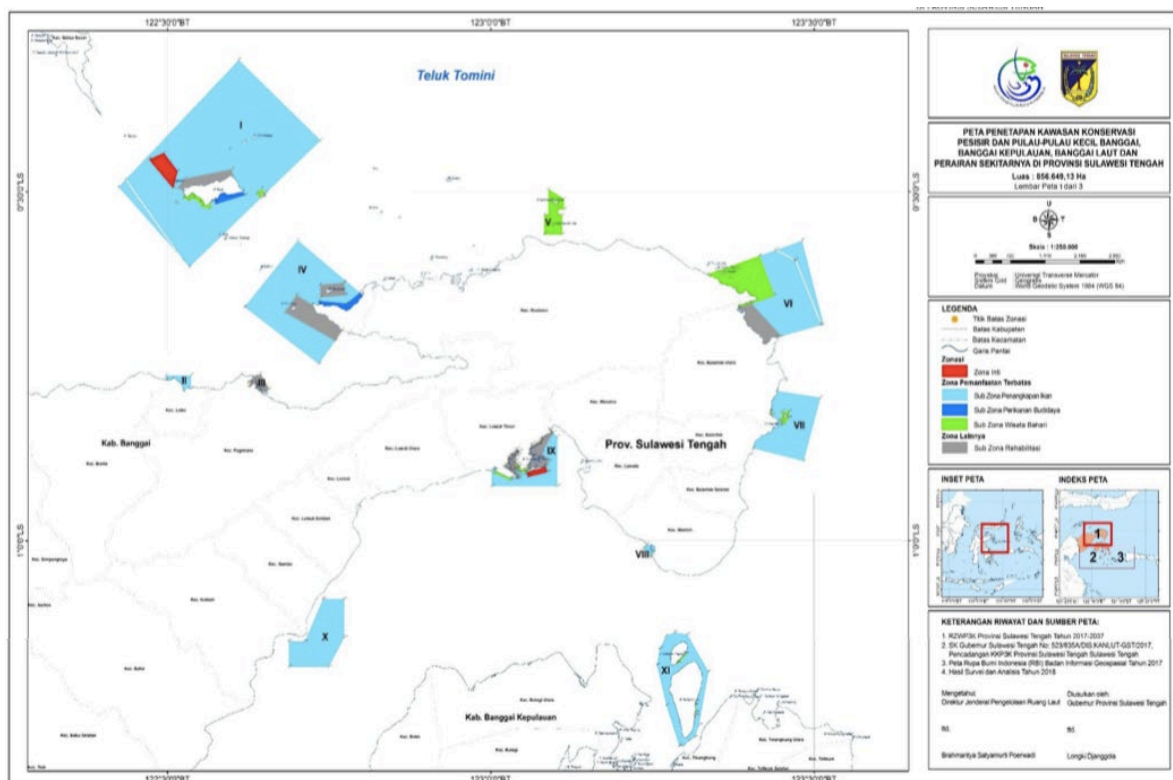


Figure 3. Banggai MPA

4.3 Sustainable use and trade of Banggai Cardinal Fish

Several actions have been accomplished and ongoing process since AC 30 which include harvest quota, BCF utilization mechanism, as well as business registration. Concerning harvest quota, based on the T0-T2 population surveys result, the Indonesian Institute of Sciences (LIPI) has recommended national harvest quota as much as 63.828 individuals. This recommendation then was then followed by the establishment of the site-specific (provincial) harvest quota through Ministry of Marine Affairs and Fisheries Decree No.21 Year 2021. As stipulated on the Minister of Marine Affairs and Ministerial Decree No.21/2021, the total BCF harvest quota for 2021 is 63,380, allocated for Central Sulawesi, Southeast Sulawesi, and North Sulawesi no more than 10,000, 52,880, and 500 respectively..

The harvest quota was established based on the Total Allowable Catch (TAC) method as published in a research journal by Sri Turni Hartati et al. (2012) – Fisheries Research Center. Moreover, the harvest quota establishment was also developed based on national consultation as well as data and information from BCF population and habitat monitoring, harvest, and trade which are collected in collaboration between the Ministry of Marine Affairs and Fisheries with key stakeholders (local fishers, universities and NGOs). It was also specifically established and accommodate rights-based fisheries, thus prioritized the local fishing community or registered local BCF business actors.

The harvest quota recommendation is one of important steps to realize the sustainable use and trade of BCF in Indonesia. As a nationally protected fish under Ministerial Decree No.49/2018, BCF utilization will follow the mechanism stipulated in the Ministry of Marine Affairs and Fisheries Regulation No.61/2018 on utilization of national protected fish and/or listed in CITES Appendix. Thus, under this ministerial regulation, utilization and trade of BCF will require fish utilization permit (SIPJI), harvest quota permit, and fish transport (SAJI) permit.

Implementation of fish utilization permit (SIPJI) and harvest quota permit mechanism will allow monitoring on harvest period, fishing ground, and quota, while the fish transport (SAJI) permit will allow control and monitoring of quota implementation, fish origin, destination, and harvest volume data. Moreover, total volume, origin, and destination data will also be recorded by the Fish Quarantine Agency-MMAF. In that context,, implementation of Ministerial Regulation No.61/2018 for BCF utilization will fulfill legality, traceability, and sustainability aspects which is in line with CITES principles.

Another on-going action is business registration. Currently there are 6 (six) BCF business actors in Banggai that are registered in Fish Quarantine Agency-MMAF. The registered traders will be encouraged to apply for trade permit (SIPJI) as required by the Minister Regulation No.61/2018. Dissemination on BCF utilization permit mechanisms based on MMAF Ministerial Regulation No. 61/2018 for traders has been carried out and continues to be conducted to reach out to wider public engagement. Electronic web-based permit application (e-SIPJI and e-SAJI) and reporting are also currently being developed to facilitate permit application process as well as to improve trade database monitoring. As of 2021, BCF utilization permit (SIPJI) has been issued for 3 (three) companies consist of 2 (two) export trade permits and 1 (one) aquaria permit.

4.4 Improvement of human resources capacity

All of the action plans under this target are focused on strengthening community capacity in BCF sustainable management. Since AC 30, accomplished actions include technical capacity building on aquaculture, microhabitat rehabilitation, as well as BCF business/traders registration assistance. In collaboration with the Indonesian Nature Foundation (LINI Foundation), technical capacity building on aquaculture for Banggai, Banggai Laut, and Banggai Kepulauan fishers was conducted in 2018 at LINI Aquaculture and Training Center (LATC) in Les Bali Utara Village. Meanwhile, capacity building on the rehabilitation of anemone and coral microhabitat for community groups and stakeholders in Banggai, Banggai Laut, and Banggai Kepulauan was conducted in 2019 at Bone Baru Village, Banggai Laut. Additionally, assistance on BCF business/trader registration was conducted in 2019 in conjunction with the dissemination of MMAF Ministerial Regulation No. 61/2018.

4.5 Improvement of conservation governance

During the course of 2 years, accomplished activity was the development of ex-situ aquaculture and training centre. With regards to ex-situ aquaculture, successful trials have been carried out for ex-situ spawning and ranching in several aquaculture facilities, namely Ambon Marine Aquaculture Fisheries Center (BPBL Ambon), Gondol Center for Marine Aquaculture Research and Fisheries Counseling (BBRBLPP Gondol), Paisubatango Estuarine Fish Hatchery Center (BBIP Paisubatango), and Bitung Marine Biota Conservation Center (LKBL Bitung). Meanwhile, a community training center for BCF spawning and ranching has been established in Bone Baru Village and functions well. This center is managed by BCF Lestari Group, a local community group that received facility and capacity building assistance from MMAF in 2017 and 2018. A BCF Center Facility has also been built in Bone Baru Village, Banggai Kepulauan, which is planned to be operated as Banggai Dalaka MPA management office.

4.6 Restocking of Banggai Cardinal Fish population

Restocking activities have taken into account the recommendation by AC 29 which stated that restocking has to be conducted while minimizing genetic mixing. Currently, BCF restocking activities follow the Banggai Cardinalfish (*Pterapogon kauderni*) Rehabilitation Guidelines that have been published, with ISSN number: 978-602-53618-4-5 (Figure 4). The guidelines consist of two parts, namely restocking BCF, which is focused on the recovery of BCF population in their original (endemic) distribution areas with consideration to the genetic characteristics of BCF, and rehabilitation of BCF microhabitat. These guidelines are then further developed into two separate technical guidelines, namely technical guidelines on BCF Microhabitat Rehabilitation and technical guidelines on BCF Restocking (Figure 5), which is currently still in the process to be formalized under Director General Marine Spatial Management Decree.

Specimens sourced from captive breeding outside endemic distribution (Ambon, Bitung, Bali, Batam) are for commercial purposes and will not be released to the wild. Captive-bred specimens in endemic habitats (Banggai, Banggai Kepulauan, and Banggai Laut) are for commercial purposes as well, and 5% must be restocked according to MAF Ministerial Regulation No. 61/2018.

There was an effort in restocking 2,625 captive-bred specimens at Paisubatango Estuarine Fish Hatchery Center (BBIP Paisubatango), Banggai Kepulauan District, in 2012. Another restocking activity is planned to occur in 2020 by BCF Lestari community group using captive-bred sources.

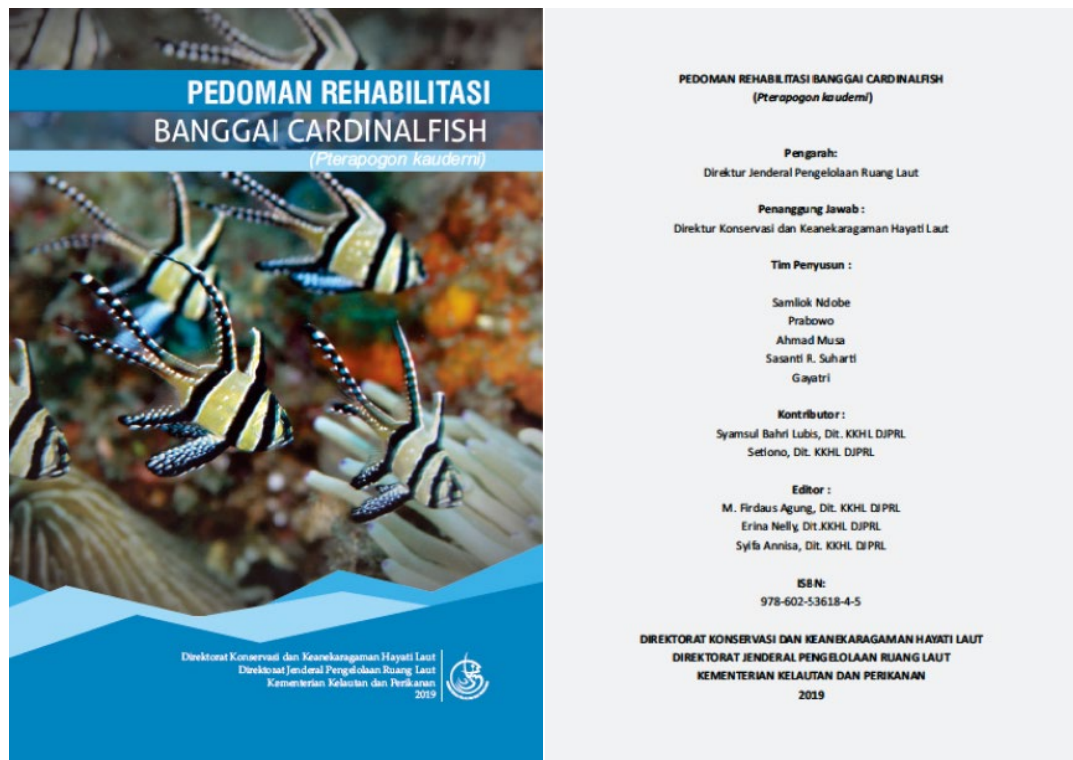


Figure 4. Guidelines on BCF Rehabilitation



Figure 5. Technical guidelines on Anemone Rehabilitation and BCF Restocking

- In regards to cooperation with relevance technical partners in implementing the BCF national conservation action plan (NPOA), Indonesia has been working closely with Yayasan LINI (LINI Foundation), Yayasan Pemerhati Lingkungan (Environmental Observer Foundation), Yayasan Kehati (Biodiversity Foundation), Yayasan Burung Indonesia (Bird Indonesia), and Tadulako University since 2017. Implementation of the BCF NPOA also involves as well as is under close supervision and coordination with experts from the LIPI as

Indonesia's CITES Scientific Authority and the Fisheries Research Center of MMAF. All of these organizations have been involved in activities such as BCF population surveys, dissemination and awareness raising, technical capacity building, as well as the development of guidelines on BCF monitoring, restocking, and rehabilitation. We are also in the process of initiating cooperation with Yayasan Bionesia (Bionesia Foundation) and Institut Pertanian Bogor/IPB (Bogor Agricultural University) for BCF genetic survey and mapping. However, due to COVID-19 condition, the genetic study could not be implemented. Indonesia also welcomes any support from parties, international organizations, and donors for RAN BCF implementation, especially on genetic study and survey.

6. The attached documents are as follows:




- Documentation of all activities from year 2018 and 2019 is on Attachment A;
- Response to AC30 Inf.16 (by IUCN) is provided in Attachment B; and
- Trade data of Banggai Cardinalfish through Kendari is provided in Attachment C.

Revised recommendations

7. The committee is invited to make following recommendations on the report made by Indonesia:

- a) acknowledge and take note that this document submitted by Indonesia is in accordance with the 30th Animal Committee recommendation;
- b) appreciate Indonesia's efforts which, as explained in this report, have resulted in many positive outcomes of BCF protection, conservation and management that ensure its sustainable use. As BCF is not listed under the Appendix species, efforts on BCF conservation and management are regulated under the Indonesian national laws; and
- c) acknowledge the current status of BCF as a non-CITES-listed species and, referring to significant progress achieved by Indonesia explained in this report, agree that BCF shall not be discussed further in future CITES meetings.

Attachment A. Documentation of activities in 2018-2019
(English only / Únicamente en inglés / Seulement en anglais)

Activities	Documentation
T2 Population survey in Banggai Laut, and Banggai Islands, November 2019	
Technical capacity building on BCF Aquaculture at LATC Bali in 2018	
Socialization and technical capacity building on BCF rehabilitation in Banggai Laut District, August 2019	

Activities	Documentation
<p>BCF ranching by BCF Lestari community group in Bone Baru, Banggai Laut</p>	
<p>Dissemination of MMAF Ministerial Regulation No. 61/2018 in Banggai Laut, November 2019</p>	

Activities	Documentation
BCF business registration assistance in Banggai Laut, November 2019	

No	Recommendation in AC30 Inf.16 (by IUCN)	Response
1.	Habitat and microhabitat	
i.	Regulate the exploitation of urchins and anemones (key <i>P. kauderni</i> microhabitats), particularly through implementation plans for the Banggai Dalaka MPA. The status of these key microhabitats at some sites may justify a temporary moratorium on their take , and perhaps activities for assisted recovery .	<ul style="list-style-type: none"> • Zonation Management Plan (RPZ) of Banggai Dalaka MPA has been developed which consists of annual programs, including establishing the core zone as no-take zone, and rehabilitation zone for BCF microhabitat. • Based on the results of T0, T1, and T2 surveys, there was a decrease in the population of anemones and sea urchins at several survey points/locations due to the use for local community consumption. T0, T1 and T2 survey results that record the population of BCF, anemone, and sea urchin will be used as the basis for determining harvest quota, and if necessary, a moratorium on taking microhabitat. Rehabilitation of anemones and corals was conducted in 2019. • Efforts to protect anemone and sea urchin are conducted through enforcing harvest control based on MPA zones, meaning that harvesting activity is prohibited within the MPA No Take Zones (i.e. core zone, rehabilitation zone, marine tourism zone). • Due to the COVID-19 pandemic, the T3 survey will be conducted in October 2021, which will cover 9 observation points in Buang-Buang. The T3 survey result will be used to determine micro habitat rehabilitation and/or restocking sites. Moreover, the T3 survey will be conducted in conjunction with the genetic field study survey by the Indonesian Institute of Sciences (LIPI).
ii.	Identify suitable sites for piloting the "BCF Garden" concept, as a tool for habitat and microhabitat conservation and management.	<ul style="list-style-type: none"> • BCF Garden is planned to be developed in Bone Baru, Banggai Laut District. • To support the development of BCF garden, site selection criteria is being developed and BCF population monitoring has been conducted monthly since February 2020 in Bone Baru village.
2.	Population Structure	
i.	Take into account known or inferred ESUs in implementation of a quota system for native <i>P. kauderni</i> within its endemic range. The status of <i>P. kauderni</i> at some sites may justify a temporary moratorium on take.	<ul style="list-style-type: none"> • Recommendation Letter by LIPI No. B. B-5131/PH.1/KS.02.04/XII/2019 on December 23, 2019, regarding BCF harvest quota. The recommended quota for 2020 is 63.828. • As stipulated on the Minister of Marine Affairs and Ministerial Decree No.21/2021, the total BCF harvest quota for 2021 is 63,380, allocated for Central Sulawesi, Southeast Sulawesi, and North Sulawesi no more than 10,000, 52,880, and 500 respectively.

No	Recommendation in AC30 Inf.16 (by IUCN)	Response
		<ul style="list-style-type: none"> • Temporary moratorium on BCF harvest follows the Ministerial Decree No. 49/2018 on the limited protection status of BCF which prohibits BCF harvest during reproduction peak times (in February, March, October, and November). • Genetic studies (ESU) have been conducted by Tadulako University (Dr. Samliok Ndobe) but only at several survey points/locations. A more comprehensive genetic study is planned to be carried out in conjunction with the T3 survey, which begins with the collection of BCF samples in 24 survey locations, then continues with genetic testing and ESU mapping. • In 2021, 2 (two) research on genetic diversity will be conducted in Banggai and Lembeh and Tumbak Strait (outside BCF natural habitat)
ii.	Take into account the need to conserve the genetic structure of <i>P. kauderni</i> in activities related to culture or re-stocking , as proposed in the NPOA.	<ul style="list-style-type: none"> • BCF Center at Bone Baru which is managed by BCF Lestari Community Group will function as a training center for BCF spawning and ranching, where, according to the regulations, farmers must restock 5%, based on MAF Ministerial Regulation No. 61/2018 while taking into account the ESU of BCF seeds to be used for restocking. • Ex-situ BCF spawning and ranching has been successfully carried out by Ambon Marine Aquaculture Fisheries Center (BPBL Ambon), Gondol Center for Marine Aquaculture Research and Fisheries Counseling (BBRBLPP Gondol), Paisubatango Estuarine Fish Hatchery Center (BBIP Paisubatango), and Bitung Marine Biota Conservation Center (LKBL Bitung) for commercial purposes. However, genetic structure (ESU) was not considered. • The genetic study is planned to be carried out in conjunction with the T3 survey, which begins with the collection of BCF samples in 24 survey locations, then proceeds with genetic testing and ESU mapping. It is expected that after obtaining BCF genetic data and ESU distribution maps in Banggai regions, cultivation and restocking can be done based on the genetic structure (ESU).
iii.	Should funds and/or partnerships become available, carry out a comprehensive genetic study of the native <i>P. kauderni</i> populations, of which the aims should be to (i) identify the ESUs within the endemic range and their (relative) relatedness; and (ii) develop diagnostic tools for assignment of origin to support management of native, introduced, and captive-bred <i>P. kauderni</i> , including traceability.	<ul style="list-style-type: none"> • The genetic study is planned to be carried out in conjunction with the T3 survey, which begins with the collection of BCF samples in 24 survey locations. The genetic sampling will be followed by BCF genetic authenticity diagnosis conducted under collaboration with universities and experts; one of them is IPB University which also focuses on DNA Barcoding analysis for protected and look-alike fish

No	Recommendation in AC30 Inf.16 (by IUCN)	Response
		<p>species, thus it can be a start for the development of such diagnostic tools.</p> <ul style="list-style-type: none"> • Currently the traceability mechanisms implemented following MMAF Ministerial Regulation No. 61/2018 are Fish Species Utilization Permit (SIPJI), Foreign Fish Species Transportation Document (SAJI-LN), and Domestic Fish Species Transportation Document (SAJI-DN) from fishers/fish farmers until exporters
3.	Population status	
i.	<p>Revisit and consider revising the <i>P. kauderni</i> monitoring protocol based on stakeholder experience after practical application during T0 surveys, to ensure data can be compared among years and a wide range of stakeholder groups can consistently apply the methodology.</p>	<ul style="list-style-type: none"> • After conducting the T0 survey, BCF Monitoring Guidelines have been revised with ISSN Number: 978-602-53618-5-2 (Figure 2). The subsequent surveys (T1 and T2) were guided by this document, therefore the results can be compared. • Survey/monitoring involves stakeholders, including Tadulako University, Makassar Marine and Coastal Resources Management Agency (BPSPL Makassar), LINI Foundation, BCF Lestari Community Group, and KALI Foundation using the same survey/monitoring method. • Recent research journals/articles on BCF population status are as follows: <ul style="list-style-type: none"> ○ Population trends of Banggai cardinalfish in the Banggai Islands, Central Sulawesi, Indonesia To cite this article: N N Wiadnyana <i>et al</i> 2020 <i>IOP Conf. Ser.: Earth Environ. Sci.</i> 420 012033 ○ Monitoring the endemic ornamental fish <i>Pterapogon kauderni</i> in Bokan Kepulauan, Banggai marine protected area, Indonesia. DOI: 10.13170/depik.9.1.15363 Samliok Ndobe1*, Kris Handoko2, Deddy Wahyudi3, Moh. Yasir2, Yulina Irawati2, Wendy Alexander Tanod3, Abigail Mary Moore4 • Importance of monitoring an endangered endemic species - intra- species biodiversity perspectives on the Banggai cardinalfish conservation and trade To cite this article: Abigail Mary Moore <i>et al</i> 2021 <i>IOP Conf. Ser.: Earth Environ. Sci.</i> 681 012120
ii.	<p>Clarify the anticipated outcomes/impacts of the various activities outlined in the NPOA on <i>P. kauderni</i> populations in Indonesia. This will provide a useful framework for considering how best to implement any one activity, and will be useful for measuring effectiveness of the proposed activities.</p>	<ul style="list-style-type: none"> • The results of the interim evaluation on the implementation of BCF NPOA in the 3rd year are as follows: <ul style="list-style-type: none"> a. Community-based ex-situ BCF hatchery/cultivation has been successfully carried out by BCF Lestari Community Group in Bone Baru Village which is a BCF endemic distribution area, and currently functions as a BCF training center. <p>Table 2. BCF Aquaculture Production by BCF Lestari Community Group</p>

No	Recommendation in AC30 Inf.16 (by IUCN)	Response																																			
		<table><tr><th>Month</th><th>Pond</th><th>Broodstock (number)</th><th>Broodstock origin</th><th>Offspring (number)</th></tr><tr><td rowspan="3">March 2018</td><td>1</td><td>87</td><td>Popisi</td><td>364</td></tr><tr><td>2</td><td>12</td><td>Bone Baru</td><td>12</td></tr><tr><td>3</td><td>33</td><td>Bongo</td><td>9</td></tr><tr><td rowspan="4">April 2018</td><td>1</td><td>60</td><td>Popisi</td><td>351</td></tr><tr><td>2</td><td>25</td><td>Bone Baru</td><td>86</td></tr><tr><td>3</td><td>23</td><td>Bongo</td><td>9</td></tr><tr><td></td><td></td><td>TOTAL</td><td>831</td></tr></table>	Month	Pond	Broodstock (number)	Broodstock origin	Offspring (number)	March 2018	1	87	Popisi	364	2	12	Bone Baru	12	3	33	Bongo	9	April 2018	1	60	Popisi	351	2	25	Bone Baru	86	3	23	Bongo	9			TOTAL	831
Month	Pond	Broodstock (number)	Broodstock origin	Offspring (number)																																	
March 2018	1	87	Popisi	364																																	
	2	12	Bone Baru	12																																	
	3	33	Bongo	9																																	
April 2018	1	60	Popisi	351																																	
	2	25	Bone Baru	86																																	
	3	23	Bongo	9																																	
			TOTAL	831																																	
		<p>Table 3. BCF Trade by BCF Lestari Community Group</p> <table><tr><th>No</th><th>Time</th><th>Shipment (number of fish)</th><th>Notes</th></tr><tr><td>1</td><td>Oct 2018</td><td>75</td><td>Shipped to Bali CC</td></tr><tr><td>2</td><td>Feb 2019</td><td>230</td><td>190 fish were shipped to LATC because the other 40 died during flight delay</td></tr><tr><td>3</td><td>June 2019</td><td>262</td><td>Shipped to LATC Bali</td></tr><tr><td>4</td><td>July 2019</td><td>155</td><td>Shipped to LATC Bali</td></tr><tr><td></td><td>TOTAL</td><td>722</td><td></td></tr></table>					No	Time	Shipment (number of fish)	Notes	1	Oct 2018	75	Shipped to Bali CC	2	Feb 2019	230	190 fish were shipped to LATC because the other 40 died during flight delay	3	June 2019	262	Shipped to LATC Bali	4	July 2019	155	Shipped to LATC Bali		TOTAL	722								
No	Time	Shipment (number of fish)	Notes																																		
1	Oct 2018	75	Shipped to Bali CC																																		
2	Feb 2019	230	190 fish were shipped to LATC because the other 40 died during flight delay																																		
3	June 2019	262	Shipped to LATC Bali																																		
4	July 2019	155	Shipped to LATC Bali																																		
	TOTAL	722																																			
		<p>b. Alternative livelihoods for local people related to BCF aquaculture and marine tourism are emerging</p> <p>c. The Population of BCF and microhabitat in their native habitat relatively decreased due to the massive extraction of wild microhabitat.</p> <ul style="list-style-type: none">Fish catches other than BCF have increased due to the presence of conservation areas. In addition, there is also limited protection for BCF so they must not be captured during peak spawning season in February, March, October, and November in accordance																																			

No	Recommendation in AC30 Inf.16 (by IUCN)	Response
		with MMAF Ministerial Decree No. 49/2018. For example, the catch of octopus which became more immense is supported by the initiation of a temporary closure of octopus fisheries which was carried out in two coral reef areas within the MPA and BCF's natural habitat for 3 months in October to December in 2018 and 2019. This measure can be replicated in other locations within the MPA and BCF's natural habitat.
iii.	Determine the goal of NPOA actions in terms of population size , taking into consideration that the T0 "baseline" shouldn't necessarily be the level to aim for since many populations are already severely depleted. Example goals include preventing further declines, rebuilding populations to a particular level, and/or enabling on-going and sustainable trade.	The objectives of BCF NPOA are to maintain the stability of BCF population, to protect BCF's natural habitat, and to utilize BCF sustainably with controlled traceability and quota mechanisms to provide value-added economic for fishers/local communities. They are divided into 6 targets.
4.	Sustainable harvest	
i.	Work with stakeholders to determine site-specific quotas for initial implementation, explore the practicality of rights-based fisheries , and follow up with population monitoring and quota adjustment as needed	<ul style="list-style-type: none"> • KKP has collaborated with stakeholders (local fishers, universities, and NGOs) in monitoring the population and habitat, harvest, and trade of BCF as a basis for developing quota adjustments. • Harvest quota is specifically established and accommodates rights-based fisheries, so it will prioritize the community, fishers, or registered local BCF traders/business actors. • Proposed quota based on T0, T1, and T2 survey results has been submitted to the Scientific Authority/LIPI, and then LIPI issued a BCF Quota Recommendation Letter. (No: B. B-5131/PH.1/KS.02.04/XII/2019 on December 23, 2019). The recommended quota for 2020 is 63,828. • In support of the sustainability, legality, and traceability aspects, efforts have been made to assist the business sector in proactively obtaining the BCF utilization permit (SIPJI) through socialization, assistance, and facilitation for related stakeholders. • As of 2021, BCF utilization permit (SIPJI) has been issued for 3 (three) companies consist of 2 (two) export trade permits and 1 (one) aquaria permit.
ii.	Identify suitable sites for piloting the " BCF Garden " concept, as a tool for ensuring sustainable harvest of <i>P. kauderni</i> .	<ul style="list-style-type: none"> • It is necessary to formulate criteria for prospective BCF Garden locations, taking into account the availability of BCF, microhabitat, community support, and surveillance. • BCF distribution is mainly found in Banggai Laut and Banggai Islands. • BCF Lestari Community Group in Bone Baru Village, Banggai Laut District, works on BCF cultivation.
iii.	In order to monitor take over time, implement fisher reporting of fishing ground(s) (known or inferred	<ul style="list-style-type: none"> • The monitoring of harvest period, fishing ground, and quota will be implemented

No	Recommendation in AC30 Inf.16 (by IUCN)	Response
	ESUs) and number of fish from each site, in addition to the current requirements for total volume, general origin, and destination.	<p>through Fish Species Utilization Permit (SIPJI) and Harvest Permit mechanisms.</p> <ul style="list-style-type: none"> The monitoring of quota implementation, fish origin, destination, and volume data will be controlled under Fish Species Transportation Document (SAJI) mechanisms. Total volume, origin, and destination data are also recorded by Fish Quarantine and Inspection Agency (BKIPM).
iv.	Explore whether technological solutions (such as mobile phone technologies) could facilitate robust fisher reporting and data management	Reporting by fishers and the management of utilization data will be facilitated through web-based applications (e-SIPJI and e-SAJI) which are currently being developed.
5.	Trade- regional	
i.	Improve monitoring of trade within Indonesian with measures to further improve Fish Health and Quarantine data collection, enhance data management and make the data access portal more user-friendly.	<ul style="list-style-type: none"> The improvement of domestic trade monitoring, trade data management, and accessible data portal will be facilitated through web-based applications (e-SIPJI and e-SAJI) which are currently being developed. Distribution, fish health, and quarantine data are also recorded by Fish Quarantine and Inspection Agency (BKIPM).
ii.	Carry out a study on <i>P. kauderni</i> trade through Kendari .	<ul style="list-style-type: none"> BCF trade through Kendari was recorded in 2013-2019. Based on BCF trade data by Kendari Fish Quarantine Unit in 2013-2019, the destinations were Jakarta, Denpasar, Makassar, Surabaya, Mataram and South Sumatera (data in Attachment C).
iii.	Consolidate best practice guidelines for the catch and trade of <i>P. kauderni</i> to minimize mortality along the supply chain, based on existing resources provided by LINI and CITES.	<ul style="list-style-type: none"> Best practice in BCF capture by fishers is using selective and environmentally friendly gears (bondre/scoop net) thus there is no mortality Best practices in trade will be consolidated to minimize mortality in the supply chain.
iv.	Consider how to ensure the growth of community-based aquaculture activities as proposed in the NPOA, either inside or outside the endemic distribution of <i>P. kauderni</i> , increases incentives for wild, native fish conservation and benefits stakeholders within the species' endemic range.	<ul style="list-style-type: none"> Development of BCF aquaculture in endemic areas has been carried out by conducting technical training for community groups in Banggai Laut and Banggai Kepulauan, and BCF cultivation has been successfully carried out by BCF Lestari Community Group (Table 4). Development of BCF cultivation outside endemic areas has been successfully carried out by BPBL Ambon, BBRBLPP Gondol, BBL Banggai Laut, and LKBL Bitung. In 2010-2011, BBRBLPP Gondol brought broodstock from the Banggai Islands for aquaculture activities, and in 2011, BBRBLP Gondol succeeded in producing/breeding offspring. In 2008, Ambon BPBL brought in broodstock from Banggai Kepulauan, and in 2012 it succeeded in producing offspring. Since 2004, aquaculture activities (ranching for offspring from broodstock caught in Lembeh Strait) have been carried out several times by LKBL Bitung - LIPI (in

No	Recommendation in AC30 Inf.16 (by IUCN)	Response
		2004, 2011, 2013, 2016, 2017). Broodstock in Lembeh Strait was originally transported from Banggai Kepulauan in the 1990s. <ul style="list-style-type: none"> Currently the standard price for BCF being developed, which will be used for wild capture and cultured specimens, both within and outside endemic distribution areas, to provide value-added to communities within endemic distribution areas.
		-
v.	Establish best practice guidelines for culture of <i>P. kauderni</i> that mitigate against impacts on genetically distinct wild populations of the species	BCF cultivation guidelines that have been developed and used in trainings will be reviewed again to include genetic elements (ESU) after sampling for genetic testing is carried out in conjunction with the T3 survey.
6.	Trade – international	
i.	Importing countries should endeavour to collect more complete information on <i>P. kauderni</i> imports (e.g. collecting data at the species level, and on whether imported individuals are wild caught or captive-bred).	<ul style="list-style-type: none"> Information on species names and origins (cultured or wild) until 2019 have been recorded by Fish Quarantine and Inspection Agency In the future, BCF data and their origins will be accommodated through Fish Species Transport Permit (SAJI) mechanisms and web-based application e-SAJI
ii.	Consideration should be given to whether the online survey of <i>P. kauderni</i> importers, wholesalers and retailers piloted for this report should be repeated , but with sufficient time allowed to gather a larger sample size of responses.	<ul style="list-style-type: none"> There are 6 registered BCF traders/business actors/enterprises in Banggai (data by Fish Quarantine and Inspection Agency/BKIPM) Survey on traders/business actors/enterprises will be conducted after they register Socialization of fish utilization permit mechanisms based on MAF Ministerial Regulation No. 61/2018 has been conducted for traders/business actors. None of the traders/business actors applies for SIPJI because they have a problem with transportation cost to Jakarta.
7.	Existing management	
i.	Consider the above recommendations in context of the NPOA strategies and actions, as summarised in Table 13	All recommendations are in line with the targets and action plans of the 2017-2021 BCF NPOA.
ii.	Consider prioritizing NPOA activities within the endemic range of the species, when prioritization is needed due to limited resources or capacity.	BCF NPOA is implemented by stakeholders, especially in the endemic distribution areas of BCF, namely Banggai District, Banggai Laut District, and Banggai Kepulauan District, <i>inter alia</i> : technical assistance on cultivation, technical assistance on rehabilitation, providing monitoring and surveillance facilities, providing aquaculture facilities, assistance on the registration of traders/business actors and establishing a specific quota.

No	Recommendation in AC30 Inf.16 (by IUCN)	Response
		<ul style="list-style-type: none"> - Technical assistance on aquaculture in collaboration with LINI Foundation for Banggai, Banggai Laut, Banggai Kepulauan fishers in 2018 at LINI Aquaculture and Training Center (LATC) in Les Bali Utara Village (Figure 4). - Providing surveillance/monitoring and aquaculture facilities in 2018 to 10 BCF Community Groups in Banggai, Banggai Laut, and Banggai Kepulauan. - Technical capacity building on the rehabilitation of anemone and coral microhabitat in 2019 to community groups and stakeholders in Banggai, Banggai Laut and Banggai Kepulauan in Bone Baru Village, Banggai Kepulauan.
iii.	Revisit and consider revising protocols for <i>P. kauderni</i> translocations , distinguishing among restocking/reinforcement, reintroduction and introduction activities, which reflect best practice approaches such as those provided in the IUCN Guidelines for Reintroductions and Other Conservation Translocations.	A review on BCF rehabilitation/restocking guidelines will be carried out after a genetic study (ESU) that will be carried out in conjunction with the T3 survey. Further, guidelines for cultivation, translocations, and introduction will be developed/reviewed while referring to genetic structure (ESU) and IUCN protocol.
iv.	Implement the planned zonation of the Banggai Dalaka MPA , using a community-based approach that empowers stakeholders to be stewards of <i>P. kauderni</i> and its habitats, and to identify with <i>P. kauderni</i> as a flagship species for holistic and sustainable coastal resource management. Consider the aforementioned “BCF Garden” concept as a possible tool to achieve this recommendation.	<p>BCF management has been accommodated in Banggai Dalaka MPA management and zonation plan documents, including regular patrols, protection of fish spawning and nursery areas, habitat rehabilitation and fish population recovery, community education, and assistance, tourism development and mariculture.</p> <p>Additionally, to improve the management effectiveness of Banggai Dalaka MPA, in 2020 the Central Sulawesi Government formed Banggai Dalaka MPA management authority through the Central Sulawesi Governor Decree No.51 Year 2020, and it will occupy the MPA management office that previously been established in Bone Baru village, Banggai Laut in 2019. Further, the MPA management activities were also conducted in 2020 which include public dissemination of Banggai MPA and biophysical data series collection.</p>

**Trade Data of Banggai Cardinalfish
through Kendari Fish Quarantine Unit
January 2013 - February 2019**

Volume

Destination	Unit	Year						
		2013	2014	2015	2016	2017	2018	2019
Denpasar	Individual	72,180	112,445	296,930	387,051	354,142	217,461	16,946
Jakarta	Individual	20,085	34,832	54,232	54,054	48,186	60,711	6,682
Makassar	Individual	300						225
Surabaya	Individual	225	200					
Mataram	Individual				2,025			
Sumatera Selatan	Individual					150	420	
Total	Individual	92,790	147,477	351,162	443,130	402,478	278,592	23,853

Value

Destination	Unit	Year						
		2013	2014	2015	2016	2017	2018	2019
Denpasar	IDR	725,579,700	449,780,000	1,180,647,500	1,548,204,000	1,416,568,000	869,844,000	67,784,000
Jakarta	IDR	116,782,500	139,328,000	213,253,000	216,216,000	192,744,000	242,844,000	26,728,000
Makassar	IDR	750,000						900,000
Surabaya	IDR	562,500	800,000					
Mataram	IDR				8,100,000			
Sumatera Selatan	IDR					600,000	1,680,000	
Total	IDR	843,674,700	589,908,000	1,393,900,500	1,772,520,000	1,609,912,000	1,114,368,000	95,412,000