Final Evaluation Report

Your Details	
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Project Title	Assessing the population, distribution, and conservation status of Raja Ampat Epaulette Shark (*Hemiscyllium freycineti*) in West Papua, Indonesia
Application ID	40288-1
Date of this Report	January 17th, 2025

1. Indicate the level of achievement of the project's original objectives and include any relevant comments on factors affecting this.

Objective	Not achieved	Partially achieved	Fully achieved	Comments
Identify willingness to participate in conservation participation from the local communities and tourists from Yenbuba and Arborek villages in Raja Ampat Islands through interview and participatory mapping from 10% of each location's local and tourist population.			✓	The objective was modified from identifying 'local ecological knowledge (LEK) and threats' to as stated. This is due to the objective 1 proposed initially has been conducted and data has been collected from our survey in 2023 for the epaulette shark in the area and we believe identifying the newly proposed topic will be crucial in building from the previously collected data as well as the direct conservation intervention for the species. This change was approved by the Rufford's Foundation trustees through Jane Raymond and Simon Mickelburgh on April 17th, 2024.
Identify information on Raja Ampat epaulette shark (RAES) population and distribution from 24 Ha area in Yenbuba and 24 Ha area in Arborek, Raja Ampat Islands through capture-mark-recapture (CMR) and photo-identification methods for four months.			✓	The area surveyed were lower (12.9 and 7.82 Ha respectively) than the previously proposed 24 Ha for each location due to the low tides that arrive fast 3 hours after peak high tide, making further survey not possible as to avoid survey boat stranded on top of substrates, especially the coral reefs.

Provide at least a workshop on implementation of RAES for at least 5 local community representatives, 5 dive operators/resorts, and a BLUD UPTD Raja Ampat MPA representative.			✓	The workshop was only conducted in Arborek as per the suggestion from our collaborator, Arborek Dive Shop (ADS) and other stakeholders, to prevent the potentially uncontrolled interaction with the species in Yenbuba due to unassessed conservation monitoring capacity there.
Provide a science-based management recommendation for the species conservation to BLUD UPTD of Raja Ampat MPA, Ministry of Maritime Affairs and Fisheries (MMAF), and National Research and Innovation Agency (BRIN).			✓	

2. Describe the three most important outcomes of your project.

a) Both locals and tourists in Yenbuba and Arborek showed positive willingness in supporting RAES conservation through the proposed scheme of citizen science and responsible tourism for RAES monitoring with:
   - Important factors for the tourists in their response were identified such as volunteering experience, tourism preferences, knowledge of RAES protection, and activity variation in the scheme offered.
   - Important factors for the locals in their response were identified such as origin, income, tourism preferences, knowledge of RAES endemicity, activity variation in the scheme offered, completeness of equipment, and duration length of scheme offered.
   - Their willingness was valued in 'willingness to pay' for tourists and 'willingness to accept' for locals in the range of IDR200,000-500,000 or GBP10-25 per pax per citizen science trip.
   - The scheme could benefit the species and locals in sustaining research and conservation efforts for RAES while adding economic benefit for the locals, with a potential value of IDR864,000,000 or GBP43,500 annually, pending carrying capacity study to verify the assumption.

b) Filled important bioecology knowledge gaps of RAES:
    - Identified a total of 63 and 97 new individual of epaulette sharks in Yenbuba and Arborek respectively, adding the total individual number to 196 (F:M = 1.03:1) in Yenbuba and 279 (F:M = 1.76:1) in Arborek (2023-2024).
    - Highest relative abundance was identified in the mangrove area near the village in Yenbuba with 0.087 individual/minute (1 ind/12 mins) and in the northern coast in Arborek with 0.26 individual/minute (1 ind/4 mins).
    - Roughly 80% of Yenbuba areas are suitable while roughly only 60% of Arborek areas are suitable as a habitat for RAES, each affected primarily by distance to shelter substrate and bathymetry for Yenbuba and Arborek respectively.
    - Tide, depth, and temperature are assumed to be crucial factors that could affect the presence of RAES.
    - Initial home range of RAES is roughly estimated within the 500 m radius where each individual was found.
    - Slowing growth rate from 13-15 cm for small individuals to 2-6 cm for bigger individuals as well as noticeable pattern changes as each individual grew within the same time frame 400-450 days.
    - Pattern changes were recognizable through photo identification on the proposed fingerprint region.
c) Provided workshops in Arborek Village on citizen science for shark, ray, and RAES, and the protocol to implement RAES citizen science monitoring to a total of 13 participants consisting of representatives from the local community, ADS, village government, BLUD UPTD Raja Ampat MPA. Additionally, the workshop also provided the participants on the integration of the citizen science monitoring with responsible tourism to generate benefit for both the species and the local community while sustaining the research and conservation efforts of RAES in Arborek Village.

3. Explain any unforeseen difficulties that arose during the project and how these were tackled.

a) Data collection from tourists were difficult to gather as few of them rejected to be a participant as they come to Arborek or Yenbuba with the intention to fully focus on vacation and as it was not during the high season, there were not many tourists to begin with, rendering the research to be opportunistic daily to at least secure 20 tourist respondents from each village. Delivering the interview questions to the locals required localised translation of the context in each question which were done through the guidance of the local facilitators the team hired.
b) The use of RFID (BioMark) tag as a new conventional tag was a little bit difficult in the rain as the team needed to make sure the tag scanner remained dry as it was the only mean to identify each tag deployed. The team covered the scanner in a ziplock bag to secure the scanner dry even during heavy rain.
c) Few of the previously (in 2023) tagged individuals had their tag lost or shed, leading to the use of photo identification to verify their ID. However, the team

found it difficult as it was only proven through several experts' opinion that the small individuals recaptured had their patterns grow. Nevertheless, the patterns remained similar which the team successfully used to identify each individual ID.

4. Describe the involvement of local communities and how they have benefitted from the project.

Some of the local community in Yenbuba and Arborek were part of the social science research respondents. More importantly, in Arborek, the workshop given were scaled up (as stated above) where there is an integration of the citizen science monitoring with responsible tourism to generate benefit for both the species and the local community while sustaining the research and conservation efforts of RAES in Arborek Village. With additional co-funding secured through Rumah Foundation and Indonesian Youth Elasmobranch Scholarship (IYES), the project trained eight (8) local youths to be a Kalabia (local name for RAES) Rangers, on citizen science and responsible tourism implementation through a developed scheme. The training consisted of English, hospitality, and direct implementation with foreign guests in the scheme implementation. At the end of the project, the team granted the ADS as our local collaborator some citizen science monitoring equipment to manage for the Kalabia Rangers to use to guide guests in the future. The Rangers and RAES will then benefit from the developed scheme. However, further improvements are still needed for the scheme.

5. Are there any plans to continue this work?

Research on RAES could still be considered limited despite the project result, the recent and latest monitoring of the species by the Konservasi Indonesia and EPI since 2022. Many knowledge gaps are still present, such as their diet, reproduction biology, and primarily potential anthropogenic threats that might differ between regions in Raja Ampat. The lack of a more robust bioecology and social-related scientific information on Kalabia, adding to the species presumed declining population and limited mobility, could lead to the species population to worsen due to negligence of possible unknown threats.

At present time, conducting research and conservation efforts in the Raja Ampat region are still challenging financially, this includes the efforts for RAES. In addition to our plan in continuing the RAES monitoring through the CMR approach in 2025, the EPI team found that the citizen science and responsible tourism scheme introduced could provide a sustainable effort in monitoring and protecting RAES. The scheme relies on active local community participation to safeguard the RAES while contributing to science and their livelihood, increasing both the tourism and conservation value of RAES in Raja Ampat as an iconic and endemic species. However, having conducted an initial workshop and implementation, perfectly establishing the citizen science and responsible tourism scheme requires a thorough capacity building and guidance for the local community. The team plans to continue and put more focus on this aspect in 2025.

6. How do you plan to share the results of your work with others?

EPI has shared the project results to the local communities in Yenbuba and Arborek prior to leaving the field in September 2024. Additionally, the project results were disseminated virtually on December 17th, 2024, to related stakeholders which consisted of the ADS, National Research and Innovation Agency, BLUD UPTD KKP Raja Ampat MPA, Ministry of Marine Affairs and Fisheries, and the IUCN SSC Shark Specialist Group. At the end of the year, the EPI plans to combine the results collected from 2023, this project (2024), and 2025 to draft and submit a scientific article to an international peer-review journal, with several research categories:

- RAES population (abundance, habitat suitability, generalized additive modelling, horizontal movement)
- RAES life history (diet x trophic (isotope), growth (Von Bertalanffy) model, reproduction)
- RAES photo-ID (pattern, approaches used)
- Tourism-based conservation framework (willingness to pay/willingness to accept, carrying capacity, concept)

7. Looking ahead, what do you feel are the important next steps?

The team has considered the financial challenge in continuing the conservation efforts of RAES in Yenbuba and Arborek to be tough in the coming years. Therefore, the team will focus on fully improving and establishing the Kalabia Rangers to be able to implement the citizen science and responsible tourism scheme developed as well as conduct their own monthly monitoring to sustain the conservation efforts locally, starting with Arborek Village.

8. Did you use The Rufford Foundation logo in any materials produced in relation to this project? Did the Foundation receive any publicity during the course of your work?

The Rufford Foundation logo was used in the printed guidebook cover and dissemination presentation produced for the locals and stakeholders.

9. Provide a full list of all the members of your team and their role in the project.

a) Ashma Hanifah – she supported the analysis of the social science data analysis and interpretation as the Community Coordinator for Elasmobranch Project Indonesia.
b) Maula Nadia – she supported the production of all social media and printed media for the project as the Media and Outreach Coordinator for Elasmobranch Project Indonesia.
c) Nyimas Alvynna Keneisha Zahra – she was a research assistant that supported the implementation of all the field work and social engagement.
d) Kinanti Amalia Niloperbowo - she was a research assistant that supported the implementation of all the field work and social engagement.
e) M. Iqbal Herwata – he was the direct advisor to the project from Konservasi Indonesia and helped to ensure the team to implement the field work in accordance to the scientific standard and desired deliverables.

f) Abdy Wunanto Hasan – he was the direct advisor to the project from Konservasi Indonesia. His helped the team to mobilize during field work in accordance to local customary law and cover the desired project area related to the target species.
g) M. Wiralaga Dwi Gustianto – did not participate in the field work due to moving to another organization and replaced by Kinanti Amalia Niloperbowo. However, he helped behind the scene to organize old data to be analysed with the project data.

10. Any other comments?

Based on the project results, the EPI team has provided several recommendations based on each result category:

a) Social science
   - Steady capacity building for the local community in Arborek to increase the conservation value of RAES.
   - Assess replicability to other areas in Dampier Strait and identify factors affecting its feasibility.

b) Bioecology
   - Assessment in other site to indicate/verify population health by sex ratio.
   - Identify factor affecting abundance in certain sites caused by anthropogenic factors.
   - Continuous monitoring to observe temporal changes in abundance.
   - Conduct representative sampling in multiple areas in Raja Ampat → Remote sensing analysis for mangrove → Apply modeling to greater area.
   - Continuous monitoring to observe temporal changes and sharpen assumption
   - Ex-situ experimental study for some variable such as temperature, salinity, etc.
   - Data alignment with acoustic telemetry study by KI to strengthen home range and residency conclusion
   - Continuous monitoring to support horizontal movement data collection and pattern changes (related to the use of Photo-ID)

c) Community engagement
   - More efforts to familiarize the citizen science platform
   - Improve facilities, equipment, and tourism-related skills to local rangers
   - Provide specific capacity building on RAES-related craftmanship for women community
   - Conduct monthly RAES monitoring led by local rangers
   - Develop and establish collaboration for RAES citizen science tourism
   - Scale up and strengthen socialization and engagement to local communities across Raja Ampat
   - Conduct carrying capacity study to establish limitation for citizen science x responsible tourism implementation to support sustain monitoring efforts responsibly