



CONSERVATION
LEADERSHIP
PROGRAMME



Conservation Leadership Programme
Final Report

Project ID: 6894

Threats, Ecology, and Conservation Opportunities of Giant Guitarfish in Karimunjawa, Indonesia

Karimunjawa, Central Java Province, Indonesia

Dates in the field: March – April 2023; July – November 2023



This project aims to collect key socio-ecological information of the Giant Guitarfish to support the species' management and conservation in Karimunjawa National Park

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Table of Contents

<i>Table of Contents</i>	<i>ii</i>
<i>List of Abbreviations</i>	<i>iii</i>
<i>Project Partners and Collaborators</i>	<i>iv</i>
Section 1	1
Summary.....	1
Introduction	2
Project members	3
Section 2	6
Aim and objectives	6
Changes to original plan	6
Methodology	7
Outputs and results	9
Communication and application of results.....	12
Monitoring and evaluation	12
Achievements and impacts.....	13
Capacity development and leadership capabilities	14
Section 3	16
Conclusion	16
Problems encountered and lessons learnt	16
In the future.....	17
Financial Report	18
Section 4	21
Appendices	21
Bibliography.....	25
Address list and web links.....	26
Distribution list	27

List of Abbreviations

AoI	: Area of Interest
BTNKJ	: <i>Balai Taman Nasional Karimunjawa</i> (KJNP Office)
BRIN	: <i>Badan Riset dan Inovasi Nasional</i> (National Research and Innovation Agency)
BRUV	: Baited Remote Underwater Video
BW	: Bottlenose Wedgefish
DKP	: <i>Dinas Kelautan Perikanan</i> (Marine and Fisheries Agency)
EPI	: Elasmobranch Project Indonesia
ETP	: Endangered, threatened, protected species
FGD	: Focus group discussion
GG	: Giant Guitarfish
GPS	: Global Positioning System
ISRA	: Important Shark and Ray Areas
IUCN	: International Union for Conservation of Nature and Natural Resources
KKHL	: <i>Direktorat Konservasi dan Keanekaragaman Hayati Laut</i> (Directorate of Conservation and Marine Biodiversity)
KJNP	: Karimunjawa National Park
LPSPL	: <i>Loka Pengelolaan Sumberdaya Pesisir dan Laut</i>
MMAF	: Ministry of Maritime Affairs and Fisheries Republic Indonesia
NDF	: Non-detrimental finding

Project Partners and Collaborators

Balai Taman Nasional Karimunjawa (BTNKJ) – provide research and activity permit.
National Research and Innovation Agency (BRIN) of Indonesia – provide ethic clearance for research on CITES listed species.

The project was made possible with the support from:

Project advisors:

- Dr. Hollie Booth
- Dr. Andhika Prima Prasetyo
- Muhammad Ichsan
- Nesha Ichida

Elasmobranch Project Indonesia team:

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External Support:

- Mikaela Clarissa – Tamang Dugong

Section 1

Summary

The project aimed to gather socio-ecological information on the critically endangered Giant Guitarfish (*Glaucostegus typus*) in Karimunjawa National Park (KJNP), Indonesia, engage local stakeholders, and develop actions to reduce fishing mortality and support species conservation. We used a baited remote underwater video (BRUV) survey during the day and night to establish baseline data on the species' abundance and distribution. Unexpectedly, we also discovered the presence of Bottlenose Wedgefish (*Rhynchobatus australiae*) and decided to include this rhinoray species in the project as well. Result exhibited low relative abundance of giant guitarfish (0.0032 MaxN/hour) and wedgefish (0.0016 MaxN/hour).

The project assessed that establishing a management policy is the best option to reduce fishing threats for rhinorays in KJNP waters. Four management options are assessed to be the best in terms of their effectiveness and feasibility: 1) size-based, 2) quota, 3) full protection, and 4) gear restriction. A total of 47 youths and fishers attended the workshop on sharks and rays at the end of the project, with 72% of them willing to release catches of rhinorays of various sizes in the future.

Despite current conflicts between the local community and the KJNP office preventing some planned activities, the project successfully met its objectives and achieved its intended results, fostering collaboration for the conservation of rhinoray species.

Introduction

Rhinorays, a group of shark-like rays including the genera of wedgefish (Glaucostegidae) and guitarfish (Rhinidae), are critically endangered according to the IUCN Red List and listed in Appendix II of CITES (Kyne et al., 2020). These species have high economic value, increasing the risk of trade-driven extinctions and creating potential conflicts between conservation efforts and fishers' economic interests (Booth et al., 2021).



Figure 1. Rhinorays species in the project; Giant Guitarfish (*G. typus*) (left) and Bottlenose Wedgefish (*R. australiae*) (right)

In Indonesia, rhinorays are heavily exploited as bycatch by small-scale Northern Java commercial fisheries using gill nets, long lines, and bottom trawls (Yuwanda et al., 2020). A Non-Detriment Finding (NDF) study by the Indonesian Institute of Sciences' Oceanographic Research Center (P2O LIPI, now the National Research and Innovation Agency) highlighted the need for strict fisheries management and protection of critical habitats for rhinorays.

Karimunjawa National Park (KJNP), located in the Northern Java Sea, Jepara Regency, Central Java Province, Indonesia, is a key area between commercial fishing grounds. In 2019, a Giant Guitarfish was encountered as bycatch by a local fisher, leading to further research showing that rhinorays inhabit sandy substrates at depths of 15–26 meters (Alghozali et al., 2023).

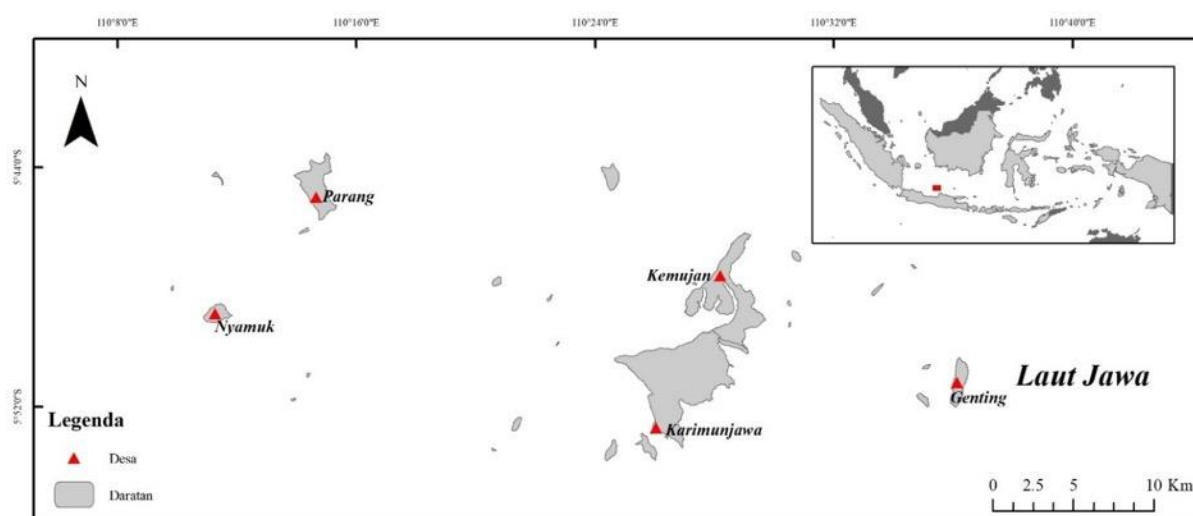


Figure 2. Karimunjawa National Park (KJNP) located in the Northern Java Sea - Indonesia

KJNP has the potential to be a critical habitat for rhinorays, based on ecological and behavioral studies by IUCN (Kyne et al., 2018a; Kyne et al., 2018b). However, there is limited information

on the ecology and distribution of rhinorays in KJNP, and socio-economic data regarding the species is sparse. This poses challenges for formulating and implementing effective conservation management.

The project gathers vital information and provides scientific-based management recommendations for rhinorays, Giant Guitarfish (*G. typus*) and Bottlenose Wedgefish (*R. australiae*), in KJNP. The outputs serve as a foundation for long-term monitoring and help develop inclusive and effective management strategies to ensure species conservation.

The following partner was involved in the project:

Balai Taman Nasional Karimunjawa (KJNP Office) – National Park authority as main institutional partner of the project.

WCS-IP Karimunjawa – support during initiation phase of the project

Project members



Faqih Akbar Alghozali (Project Leader) | 28 years old

Faqih is a marine scientist graduated from Diponegoro University in 2018, focusing his research on shark and rays. He is experienced in leading various research and conservation projects, especially shark and rays, with GAIA Conservation (socio-economic and shark landing), TAKA Foundation (plastic, socio-economic, fisheries, ETP species), WWF Indonesia (NPOA for shark and rays, fisheries, shark and rays landing, and acoustic telemetry), and Elasmobranch Project Indonesia (EPI) (citizen science for shark and rays, BRUVs). In the project, he was the team leader, where he was involved in planning and conducting activities, organize and analyse data, communicate with local stakeholders and publishing the results. Currently, Faqih is the project leader of EPI, leading two species-specific projects: The Rhinorays Project (Giant Guitarfish and Bottlenose Wedgefish) and The Kalabia Project (Raja Ampat Epaulette Shark).



Ashma Hanifah | 28 years old

Hani is a biologist graduated from Syarif Hidayatullah State Islamic University – Jakarta in 2019 and recently completed her MSc from Bogor Institute of Agriculture. She has previous experience in fish biology, sharks and rays research, and social interaction during her studies, internship, and voluntary activities in several communities and organisations, including WWF Indonesia. She was involved in the project as the social research and stakeholder engagement specialist, where she mainly led the social and community engagement activities. However, she was also highly involved in the ecological activities. Currently, Hani is currently the research coordinator of EPI.



Muhammad Wiralaga Dwi Gustianto | 24 years old

Aga graduated as a marine scientist from Diponegoro University in 2021. He had internship and voluntary experience in shark and ray conservation at GAIA Conservation, WWF Indonesia, and EPI. In the project, he was involved as BRUV Research Assistant, where he supported the design and implementation of the BRUV activity. In addition, he partook in collecting socio-economic data from the local fishers and guides. Currently, he is a shark and ray specialist at WWF Indonesia, while continuing his role as research support for EPI.



Maula Nadia | 25 years old

Nadia is a marine scientist graduated from Diponegoro University in 2020 and is now a MSc student in Marine Resources Management program of Wageningen University and Research. Through her previous work in TAKA Foundation, she has experience in project management, communication, and media – publication. Currently, she is supporting EPI as a media and outreach coordinator, focusing her work on EPI's citizen science platform. In the project, she was involved in the awareness activities through designing outreach and publication products, including social media.



Novita Permata Putri | 25 years old

Novi is a marine scientist graduated from Diponegoro University in 2021. She has previous experience in sharks and rays research through her voluntary work in GAIA Conservation, WCS Indonesia, Indonesia Manta Project, and WWF Indonesia. In this project, she was involved as BRUV Research Specialist, where she supported the design of the BRUV activities. Currently, Novi is a researcher at Anambas Foundation, while continuing her role as media support for EPI.



View of Karimunjawa Island, the biggest island within the Karimunjawa National Park (KJNP)

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Section 2

Aim and objectives

The project aims to identify critical threats and ecological information of rhinorays species (Giant Guitarfish / GG and Bottlenose Wedgefish / BW), and to inform and urge local stakeholders to prioritize conservation and management of these species within KJNP, with the following objectives:

- **Objective 1.** Generate feasible conservation approaches to reduce threats to Giant Guitarfish [and Bottlenose Wedgefish] in KJNP, based on baseline information on fishing pressures, local utilization, and historical distribution information collected from 210 fishers from 5 inhabited islands and 20 local dive guides in KJNP.
- **Objective 2.** Generate baseline information on relative abundance and distribution of Giant Guitarfish [and Bottlenose Wedgefish] from 12 sites across different habitats and national park zones in KJNP.
- **Objective 3.** Engage 10 youths as local conservation champions and 50 fishers from 5 inhabited islands and establish a citizen science network across 3 workshops to conduct sighting/bycatch reporting and live release.
- **Objective 4.** Provide a science/evidence-based spatial/fisheries management recommendation to KJNP Agency as local government authority.

Changes to original plan

There were several changes that had to be taken to adapt to the situation and challenges on the field.

- **Objective 2.2:** BRUV surveys were modified to be implemented between day-nighttime. Surveying during the day and night will provide a stronger result as we can compare the species presence between day (16:00-1800) and night (19:00-21:00) with the same number of sites and replications (6 during day, 6 during night).
- **Objective 3.3:** The workshop was simplified to be 1 occurring workshop for each village, as compared to the previous proposed 3 workshops per village. This was due to the difficulty to gather fishers. However, it is still possible to carry out all proposed materials in one workshop session.
- **Objective 3.4:** Discussions, final public consultation, and citizen science network launch were not able to be conducted with the KJNP Office and local communities due to the current conflict situation between the stakeholders involving the protest on 'intensive shrimp farms' practice in KJNP. The project team focused to deliver the priority management option as part of the conservation recommendation on GG-BW to the KJNP Office as the local authority as well as to verbally persuade them to pursue collaborative management goal in the future together with the MMAF. This idea was welcomed well during the result dissemination. The same happened with the MMAF and BRIN.

- **Objective 3.2 and 3.4:** The project was only able to recruit 7 youths and 40 fishers. It was difficult for the project to recruit local youths, because most of them are already fishing starting from a young age, rendering them uninterested and not having the time to be part of the workshop. As for the fishers, it is due to most of them going fishing or working on the day of the workshop.

Methodology

Objective 1.

Formulation of management options

Six management options (full protection, size-based, area-based, season-based, quota, and gear-restriction) were formulated based on information on fishing pressures, local utilization, and historical distribution of both rhinoray species. The proposed management options were further explored through discussion participatory research involving local fishers and village chiefs from the five villages (Karimunjawa, Kemujan, Parang, Nyamuk, and Genting Village) engage active participation in species conservation, gather local perspectives, and collect important opinions. A follow-up discussion was also held separately with the KJNP agency.

Objective 2.

BRUV design

Baited Remote Underwater Videos (BRUVs) were used as a survey method to observe rhinoray species relative abundance and distribution in KJNP waters. BRUV structure was designed in accordance to Alghozali et al. (2023): a pyramid-shaped iron frame with dimensions 50x50 cm (base) x 25x25 cm (roof) x 60 cm (slant height) x 30x30 cm camera foundation (Figure 4). Each BRUV is equipped with a 1" PVC bait pole measuring 100 cm paired with a 3" PVC bait box. The bait used was 1 kg of tuna (*Auxis thazard*, *Euthynnus affinis*, and *Thunnus tonggol*) (Harvey et al., 2007) for each deployment. A GoPro camera (Hero Black 7 or 8) with 1080p, 60 FPS, and linear view settings and equipped with an underwater housing is then mounted on the camera base facing the bait box. A buoy and flag paired with a fishnet light were attached to a rope and attached to the frame to mark the BRUV drop-off point.

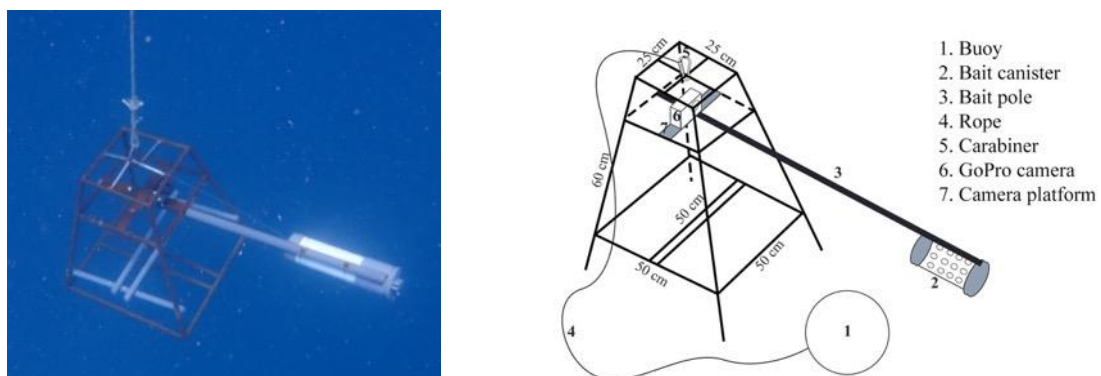


Figure 3. Baited Remote Underwater Video (BRUV) structure

Baseline rhinorays abundance and distribution information

Based on interviews and participatory mapping with local fishers and dive guides, 40 BRUV survey sites were determined across 27 islands of KJNP and its surroundings, considering existing habitats (sand bed, mangroves, coral reef, and seagrass bed) and zones (core, marine

protection, and traditional fisheries). BRUVs were deployed half during the day (08:00 – 15:00) and half at night (19:00 – 21:00), with additional lighting for night deployments. Each BRUV was deployed from a boat and lowered to the seafloor at depths between 10 – 40m, set 300 – 1000m apart, and soaked for 70 minutes. Coordinates and depth of each drop were measured using a GPS and transducer (Phenix et al., 2018; Bond et al., 2012; Rizzari et al., 2014; Beer et al., 2015). Recorded videos were analyzed for rhinorays, other elasmobranchs, and other ETP species' relative abundance and distribution using media players and RStudio.

Objective 3.

Elasmobranch and citizen science workshop

Seven local youths were selected as local champions through open recruitment and village chiefs' recommendations, while 40 fishers were chosen by team members based on village chiefs' recommendations from each of the five inhabited islands. Each workshop covered topics of basic elasmobranch knowledge, species perception discussions, citizen science, bycatch handling, species reporting, citizen science network training, species identification, and movie discussion (documentary by Indonesia Nature Film Society). At the end of the workshop, participants signed a voluntary pledge to release their GG-BW catches of various sizes. *WhatsApp*-based citizen science reporting groups were created for each village, along with the EPI team, as a platform for reporting sightings and catches of GG-BW and other elasmobranch species.

Objective 4.

Species management recommendation formulation

Based on interviews, participatory maps, BRUV survey results, and participatory research with the local community, species management recommendations for rhinorays were formulated with the goal of establishing collaborative management with the KJNP office, MMAF, and local communities. The results were disseminated through two virtual sessions and focus group discussions: one specific to the KJNP and another involving related authorities and organizations.

Outputs and results

Objective 1. Generate feasible conservation approaches to reduce threats to Giant Guitarfish [and Bottlenose Wedgefish] in KJNP

Result

We have identified three management options based on local fishers' preference are: 1) size-based, 2) quota, and 3) season-based, which aligned with fish buyers. Meanwhile, the KJNP Office staffs mostly preferred the gear-restriction management.

Quantifiable outputs

- 139 local people (102 local fishers, 32 fish buyers, 5 village chiefs) and 18 KJNP office staffs were engaged for discussions and participatory research on the management options.

Objective 2. Generate baseline information on relative abundance and distribution of Giant Guitarfish [and Bottlenose Wedgefish]

Result

BRUV survey result shows a low MaxN (3 individuals) and relative abundance were recorded for GG-BW (0.0032 and 0.0016 respectively). Other than the rhinorays species, other elasmobranch and ETP species were recorded (Table 1). The huge finding was the first recorded live juvenile scalloped hammerhead (*Sphyrna lewini*) in KJNP waters. Statistically, there is no significant effect from depth, zonation, and time of deployment to the presence of GG-BW to possibly declining population in Java Sea and limitation of BRUV survey approach.

Quantifiable outputs

- 40 research BRUV sites across KJNP waters (Figure 4).
- 497 BRUV deployments.
- 620.9 hours of video recorded.

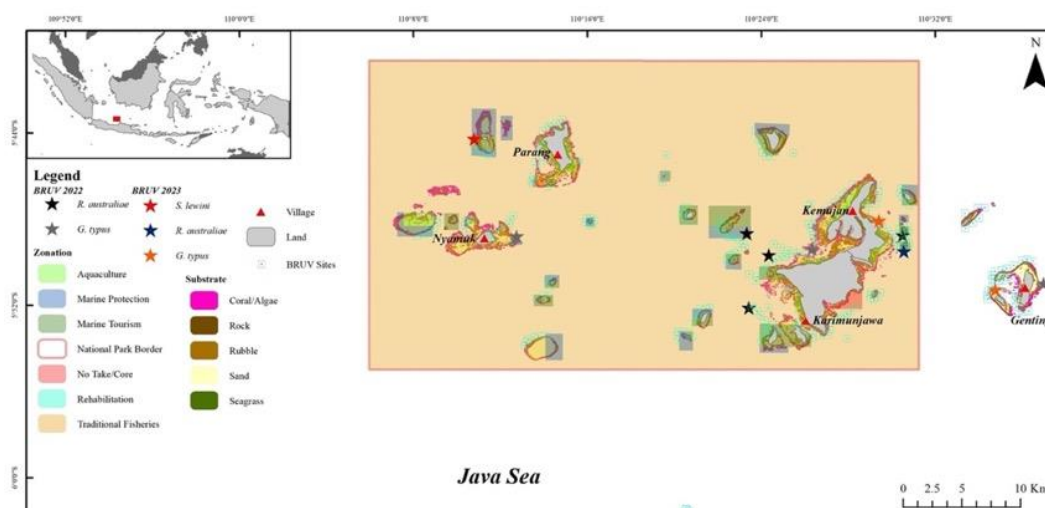


Figure 4. Map of BRUV survey sites and encounter locations with GG-WF in KJNP waters in 2023.

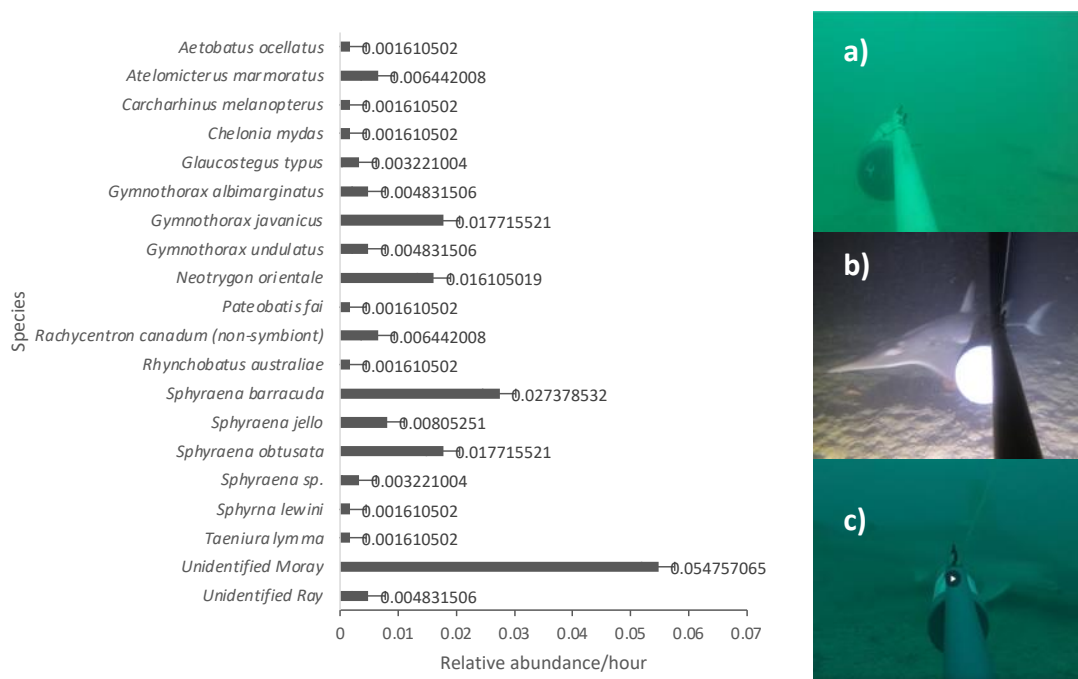


Figure 5. BRUV survey result. Relative abundance of target species, including GG (*Glaucostegus typus*) and BW (*Rhynchobatus australiae*) (left). Encounters with GG (a), BW (b), and scalloped hammerhead shark (*Sphyrna lewini*) (c)

Objective 3. Engage 10 youths as local conservation champions and 50 fishers from 5 inhabited islands and establish a citizen science network across 3 workshops to conduct sighting/bycatch reporting and live release.

Result

The workshop participants learned about elasmobranch basic knowledge and conservation, citizen science, and rhinoray species handling-releasing. All participants have voluntarily signed a personal statement to participate in the implementation of bycatch encounter and release reporting which will be facilitated by EPI's citizen science network (CSN) and as a form of communication between fishers and our project team. A WhatsApp group divided by each village was created with the youths and fishers that possess mobile phone as a platform for elasmobranch sighting or catch report (citizen science).

Quantifiable outputs

- 5 workshops to 40 fishers across 5 villages in KJNP (Karimunjawa, Kemujan, Genting, Nyamuk, and Parang Village)
- 7 local youths were trained and recruited.
- 72% fisher participants signed a pledge on willing to release their GG-WF catches of various sizes voluntarily.



Figure 6. Workshop consists of class-theory session on elasmobranchs (left, Genting Village) and voluntary pledge signing by local fishers to support rhinorays conservation in KJNP (right, Parang Village)

Objective 4. Provide a science/evidence-based spatial/fisheries management recommendation to KJNP Agency as local government authority.

Result

The project team developed a recommendation where further research on the biology (genetic, diet, reproduction, age and growth), ecology (critical habitat and movement), and assessment on priority management options (size-based, quota, full protection, and gear restriction) need to be conducted with the goal of establishing a collaborative management with KJNP Office, MMAF, and local communities.

Quantifiable outputs

- 2 virtual disseminations and FGDs conducted to a total of 27 participants (Table 1).

Table 1. Participants of project dissemination

	Institution	Number of participants
Session 1 (February 21 st , 2024)	KJNP Office	18
Session 2 (March 6 th , 2024)	DKP Jepara	1
	DKP Central Java	2
	KKHL	1
	LPSPL Serang	2
	BRIN	3
	IUCN Shark Specialist Group	2
	Total	29

Communication and application of results

This reported project is a part of the “Rhinorays Project”, which is a collective of activities and research from Elasmobranch Project Indonesia that concerns about rhinorays species (GG – BW) in KJNP.



Figure 7. Logo of the Rhinorays Project

The following means were used to communication project activities and results:

- Elasmobranch Project Indonesia’s social media platforms ([Instagram](#), [Twitter](#), [Facebook](#), [LinkedIn](#))
- Media articles were published about our project:
 - How Can We Save These Weird ‘Shark-Like’ Rays in Indonesia by Andrew Wight ([Link](#))

Furthermore, the team is planning to produce a scientific paper on the results of BRUV survey with the first draft aimed to be written by July 2024.

Monitoring and evaluation

In the beginning of the project, we created a matrix of project workplan containing objectives, expected outcomes, concurring activities, success indicators, Gantt Chart schedule/timeline, along with respective person in charge. Throughout the project period, we used this document to monitor the activities. By using this matrix, we can keep track of planned activities and design appropriate next activities based on the agreed expected outcomes. All activities were planned and evaluated through meetings in the beginning of each month.

Achievements and impacts

- **Identified stakeholder preference for management policy**

Stakeholder involvement in conservation and management plans is crucial. The project assessed that establishing a management policy is the best option to reduce fishing threats to rhinorays in KJNP waters. Six management options were proposed to stakeholders for further assessment. Four options were identified as the most effective and feasible: 1) size-based regulations, 2) quotas, 3) full protection, and 4) gear restrictions. These options provide a clear starting point for creating an inclusive and effective management plan.

- **Recorded presence of Giant Guitarfish and Bottlenose Wedgefish in KJNP**

Historically, the local community was aware of the presence of Giant Guitarfish (GG) and Bottlenose Wedgefish (BW). However, records and publication on the species presence are very limited. Through BRUV surveys, the project successfully recorded evidence of both species at various sites, times, and depths within the national park.

- **Raised local knowledge and awareness on elasmobranch bycatch handling and reporting**

A series of workshops in five villages shared best practices for handling bycaught elasmobranchs, specifically GG and BW. This was the first exposure to this knowledge for many local fishers. Various media, including posters, booklets, and presentation decks, were used (see Bibliography). This is crucial since elasmobranch species are commonly bycaught in local fisheries. Additionally, the concept of citizen science was introduced, encouraging fishers to contribute to conservation by reporting their catches.

- **Established a comprehensive baseline and assessment as a scientific reference for future collaborative management goal for GG-BW in KJNP**

Combining findings from Objective 1 and the BRUV survey in Objective 2, along with the willingness of local fishers to release GG and BW in Objective 3, the project delivered research and management recommendations for GG and BW. These recommendations were verbally agreed upon by the KJNP Office and MMAF, with support from BRIN and the IUCN Shark Specialist Group.

Additional achievements and impacts:

- **Anecdotally managed to record evidence of neonates (1-2 weeks old) and young-of-the-year (less than 1 year old) GG-BW in KJNP**

The result of the BRUV survey have provided recorded evidence of existence of GG-BW and other elasmobranchs in KJNP. This adds to the possibility the project going to be the first to protect GG-WF reproductive areas in Indonesia.

- **KJNP accepted as an Area of Interest (AoI)**

The team proposed KJNP as an Important Shark and Ray Areas (ISRA) as a reproductive area, using the data collected in 2022 and through this project, and it is currently accepted as an Area of Interest (AoI) for future re-assessment by the ISRA team.

Capacity development and leadership capabilities

The team gained experience in formulating, planning, executing, and monitoring a conservation project. As this project combined ecological (i.e., BRUV surveys) and social (i.e., participatory surveys) research activities, all team members developed skills in addressing the different dimensions of conservation. To achieve the project's objectives, we integrated results from all activities to formulate inclusive and feasible management recommendations for KJNP.

The project allowed team members to delve deeper into the human-dimension element of conservation. Each step of the project involved the local community, mainly local fishers, and the government. Often, stakeholders had differing viewpoints and motivations, pushing us to listen and understand fisheries and species conservation from multiple perspectives. The team learned that understanding the perspective of local stakeholders is critical to species conservation. Through this process, we enhanced our ability to communicate science and conservation effectively with diverse groups, which is crucial since fishers often lack prior knowledge in these areas.

Ultimately, we learned how to adapt our project plans and approaches. Major changes to the activities (see Section 2: Changes to Original Plan) were inevitable due to the ongoing dynamics in the local community. As a team, we decided to find common ground between stakeholder relationships and the project's goals.



Bottlenose Wedgefish (*R. australiae*) recorded during night BRUV survey.

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Section 3

Conclusion

The project successfully gathered crucial socio-ecological information on the critically endangered rhinorays (Giant Guitarfish and Bottlenose Wedgefish) in Karimunjawa National Park, Indonesia. The project generated baseline data on species abundance and distribution by collecting records of the species across different islands and zones of the national park. Based on assessments of effectiveness and feasibility to local stakeholders, we identified four management options that need prioritization: 1) size-based restrictions, 2) quotas, 3) full protection, and 4) gear restrictions. Additionally, we conducted workshops and established a citizen science network to strengthen local capacity and support for rhinoray conservation. We provided a comprehensive management recommendation to the KJNP office. These efforts lay a strong foundation for future research, conservation initiatives, and sustainable fisheries management in KJNP.

Problems encountered and lessons learnt

- *Which project activities and outcomes went well and why?*
The research activities went well due to the project team and locals involved were trained and told the importance of each approach and to stick to the method used. The project dissemination went greatly due to the good relationship between the project team and the authorities involved, and the clear vision of the project towards the conservation of the species.
- *Which project activities and outcomes have been problematic and in what way, and how has this been overcome?*
Activities related to gathering and bridging the local authority and communities were either challenging or were not able to be implemented due to an existing issue happening in the national park at the time of the project implementation that persists until now. The project team decided to hold this activity to prevent unwanted irreversible outcome that might hinder the greater goal of the conservation in the future. Instead, the project has provided a solution, by approaching both the local authority (dissemination) and communities (social research and workshop) separately, while still understanding each side's preferences and perspective, and coming up with a common goal to conserve the species in the national park.
- *Important lessons which have been learnt through the course of the project so far.*
 - Implementation of a conservation action involving stakeholders in the field need to adjust to present situation and issue and be able to adapt and not forcing the proposed action.
 - Holding back to achieve better impact in the future is better than recklessly pushing the present goal that may disrupt future approaches for conservation.
 - Research is easy to implement, but maintaining communication with the stakeholders is the most important key to a species conservation effort.

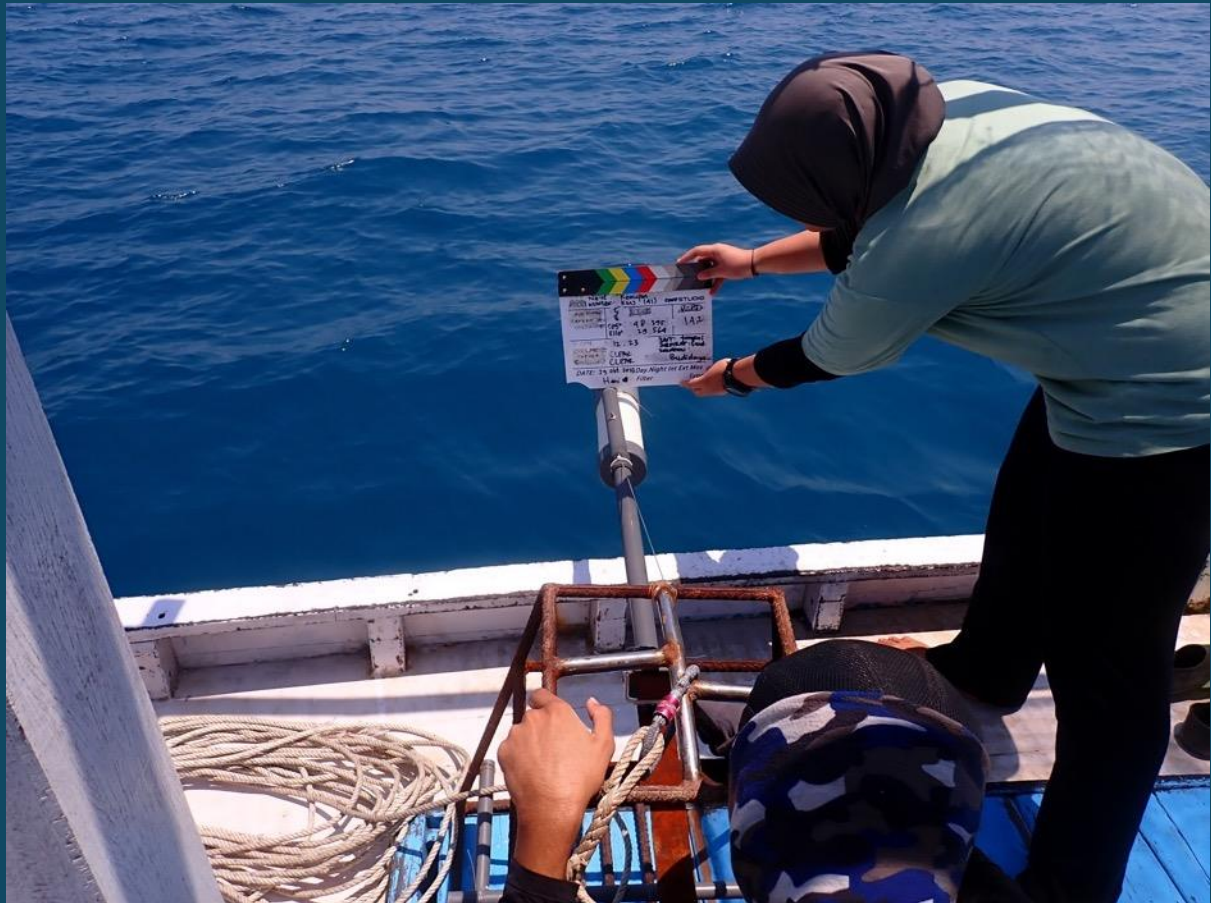
In the future

Based on the project findings, we have clearly identified the main issues affecting rhinoray species in KJNP: bycatch and their value as secondary catches in fisheries both within and outside the national park. The team has mapped out a 5-year plan to further collect data on the species' population and fisheries in Karimunjawa National Park and the greater North Java Sea region. This includes studying their biology (genetics, diet, reproduction, age, and growth), ecology (critical habitat and movement), and further assessing priority management options. The project hopes to improve the conservation status of these rhinoray species population in Karimunjawa National Park (KJNP) - and protect what might be one of the last strongholds for the species in Java Sea - by reducing fisheries threats to create a better environment for the species population to recover.

Financial Report

Itemized expenses	Total CLP Requested (USD)*	Total CLP Spent (USD)	% Difference	Details & Justification (Justification must be provided if figure in column D is +/- 25%)
PHASE I - PROJECT PREPARATION				
Communications (telephone/internet/postage)				
Field guide books, maps, journal articles and other printed materials	59.00	22.68	-62%	Field guide books (for the intern) were distributed online, meant we only need small amount for printed materials
Insurance	324.00	20.92	-94%	no more covid restriction, allocated to general medicine
Visas and permits	7.00	7.25	4%	
Team training	21.00		-100%	no training needed as team are experienced in implementing BRUV approach with over 480 deployments in 2022 prior to the project
Reconnaissance				
Other (Phase 1)	207.00	189.00	-9%	
EQUIPMENT				
Scientific/field equipment and supplies	872.00	1949.08	124%	some equipments from 2022 were retained, except for steel-based equipment that needs to be replaced due to rust or damage from salt residue, allocated to extra payment needed for night survey operational and accommodation
Photographic equipment	2,635.00		-100%	
Camping equipment				
Boat/engine/truck (including car hire)	2,469.00	4378.50	77%	Parallel execution for several activities (BRUV deployment and workshop) were needed to be occurred at the same time by two different teamwork and workplan to avoid the bad weather at the end of the year. Its meant that we need extra budget for boat rent
Other (Equipment)				

Itemized expenses	Total CLP Requested (USD)*	Total CLP Spent (USD)	% Difference	Details & Justification (Justification must be provided if figure in column D is +/- 25%)
PHASE II - IMPLEMENTATION				
Accommodation for team members and local guides	1,949.00	3148.55	62%	Parallel execution for several activities (BRUV deployment and workshop) were needed to be implemented at the same time as the team is racing with time to avoid the west monsoon season at the end of the year and needed more human resources (interns), 1 intern for BRUV deployment, 2 interns and some local facilitators for social research implementation which increase the accommodation cost. Afterwards, we have to expended more homebase rent (1 year), that is more than proposed (9 months)
Food for team members and local guides	3,318.00	3548.43	7%	
Travel and local transportation (including fuel)	957.00	908.84	-5%	The team found cheaper options, thus able to facilitate the transportation for more interns but still cheaper than proposed budget. Most of our activity were occurred at the sea then most of activity at inhabited island were within walking distance. Remaining budget allocated to field operations and accommodation
Customs and/or port duties				
Workshops	361	315.00	-13%	
Outreach/Education activities and materials (brochures, posters, video, t-shirts, etc.)	610.00	511.76	-16%	
Other (Phase 2)	431.00		-100%	This budget were allocated to accommodation and boat rent
PHASE III - POST-PROJECT EXPENSES				
Administration				
Report production and results dissemination	102.00		-100%	Scientific paper will be written and submitted in collaboration of our advisors who have fee waiver to manuscript submission to peer-review journal, the remaining budget was allocated to extra payment needed for night survey operational and accommodation
Other (Phase 3)	678.00		-100%	This contingency budget were allocated to accommodation and boat rent
Total	15,000.00	15,000.00		



Pre-deployment of baited remote underwater
video (BRUV) structure

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Section 4

Appendices

Appendix 4.1. CLP M&E measures

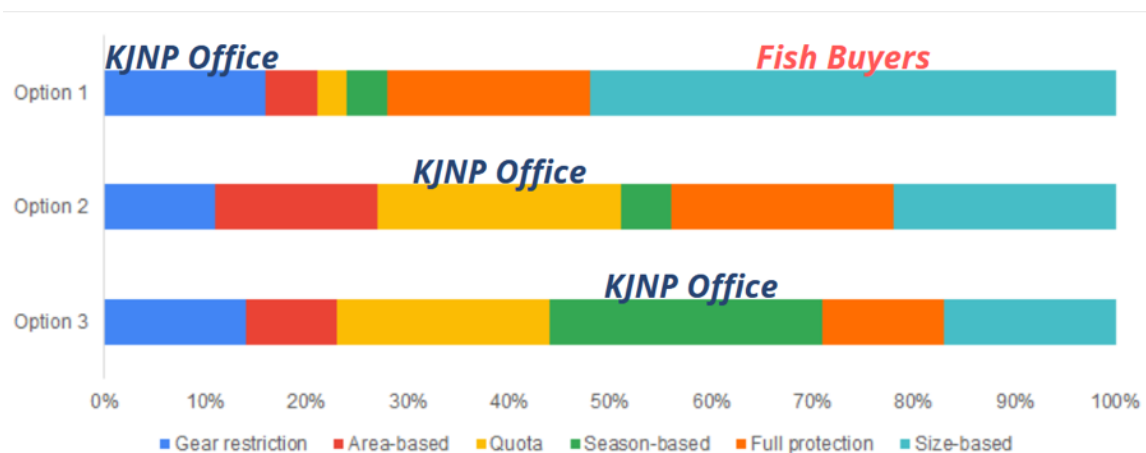
Output	Number	Additional Information
Number of CLP Partner Staff involved in mentoring the Project	1	WCS-IP Karimunjawa
Number of species assessments contributed to (E.g. IUCN assessments)	0	
Number of site assessments contributed to (E.g. IBA assessments)	1	Important Shark and Ray Area – Area of Interest – Karimunjawa Island and Adjacent Waters
Number of NGOs established	0	
Amount of extra funding leveraged (\$)	3	USD1,020 – IDEA WILD, equipment donation EUR20,000 – Conservation Connect, continuation project USD3,500 – MCAF ECOP, continuation project through a student fellowship scheme
Number of species discovered/rediscovered	1	1 st live scalloped hammerhead (<i>Sphyrna lewini</i>) finding in BRUV
Number of sites designated as important for biodiversity (e.g. IBA/Ramsar designation)	1	Important Shark and Ray Area – Area of Interest – Karimunjawa Island and Adjacent Waters
Number of species/sites legally protected for biodiversity	0	
Number of stakeholders actively engaged in species/site conservation management	76	47 – youth and local fishers 29 – authorities and relevant organizations
Number of species/site management plans/strategies developed	1	Conservation recommendation based on the project
Number of stakeholders reached	76	47 – youth and local fishers 29 – authorities and relevant organizations
Examples of stakeholder behaviour change brought about by the project.	0	
Examples of policy change brought about by the project	0	
Number of jobs created	0	
Number of academic papers published	1	BRUV paper on progress
Number of conferences where project results have been presented	0	

Appendix 4.2. Data

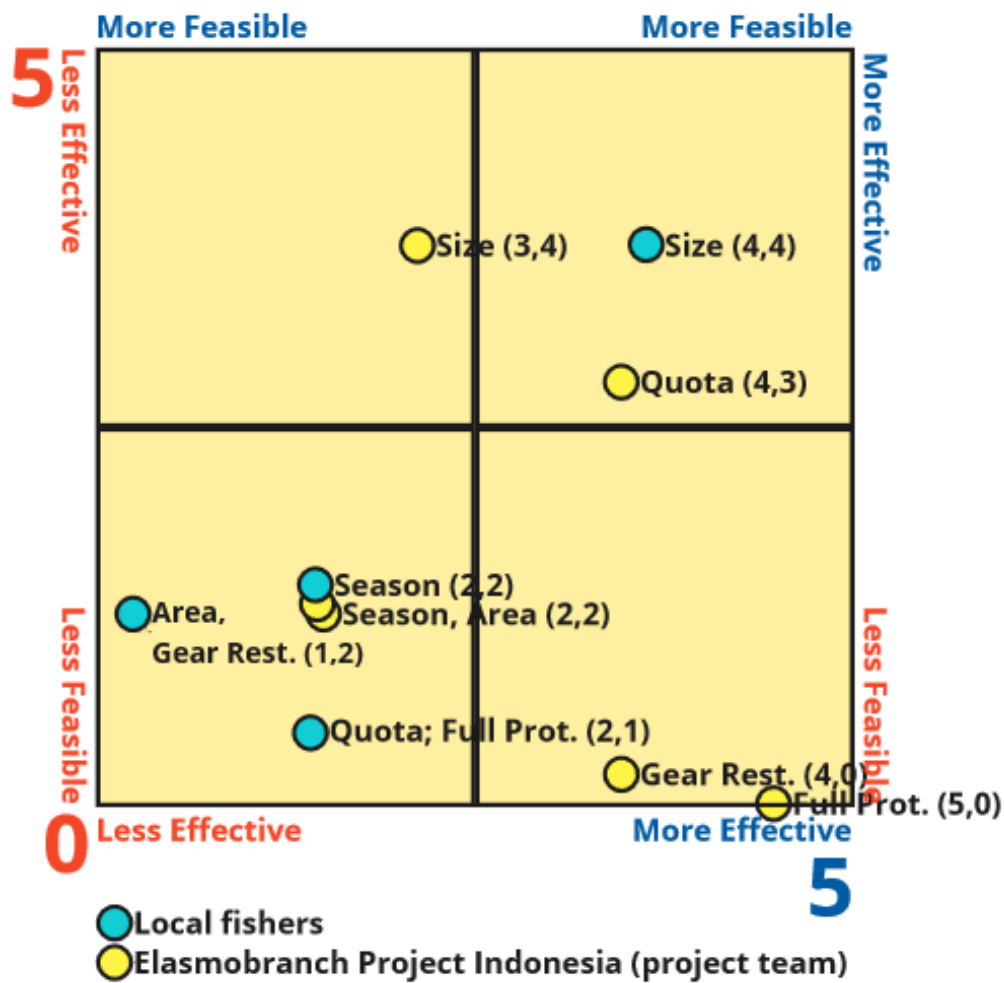
Project team early assessment of priority management type for GG-BW in KJNP. Based on advantage and disadvantages of each type, we mapped the feasibility and priority

Management Type	Advantage	Disadvantage	Feasibility 1-10	Priority 1,2,3 Only
Full Protection	Fishers "will have to" comply anyway Fishers will focus to catch immediately fish only Most fishers don't mind if the species is fully protected GG and WF are not target species with 11 catch probability/year	Limit possible income for fishers Minor protest from fishers hoping to catch GG/WF No "jackpot" income Fishers may not comply?! difficult to enforce reg. with good and thorough communication and background of the policy	5 3 2 3	2 3 3
Size	Protection of juvenile Flexibility to fishers to choose easy to enforce, with evidence Safety for in size range individuals Easier to communicate	maybe no protest? - because there is still feasibility estimate amount of adult fish = spawning stock? Stimulate exploitation? fish collector don't care size of sold fish	High if limit is 1m 8 low if limit is 2m 1 1 1	1 1 1
Area	provide specific area for fishers to fish Easily implemented in the national park zonation Provisional method will be protected, making provisions necessary to continue Protection to all GG/WF size in that area	We don't know where they pup and grow! Spatial based boundaries are hard to set difficult to enforce compliance of fishers to NP zonation is proven to be low potential backlash to authority	9 9 8 5	3 2 2
Season	Easy to enforce Protection to all GG/WF size in that season	We don't know when they pup and grow! GG and WF have no catch season difficult to communicate	5 5	5
Quota				
Gear				

Percentage (%) of the best management type options for GG-BW according to local fishers, fish buyers, and KJNP office staffs. Data were collected through interview and participatory survey



Effectivity and feasibility mapping and comparison between the project team's assessment of priority management options with the local fishers' preferences



Distribution of species group recorded by BRUV survey across different depth, zonation, and substrates

Depth Range	MaxN							
	<i>R. australiae</i> (BW)	<i>G. typus</i> (GG)	Shark	Ray	Cobia	Moray Eel	Sea Turtle	Barracuda
10.1-20 m	-	1	-	2	1	5	-	5
20.1-30 m	1	1	3	8	2	15	1	11
30.1-40 m	-	-	3	6	1	32	-	18
Zonation								
Aquaculture	-	-	1	1	-	-	-	-
Marine Utilization	1	-	2	-	-	21	-	6
Traditional Fisheries	-	1	2	13	3	21	-	13
Marine Protection	-	-	1	1	-	3	-	6
Core Zone	-	-	-	-	-	2	1	-
Outside National Park	-	1	-	1	1	5	-	9
Substrate								
Rock, coral	-	-	-	1	-	4	-	1
Rock, sand, algae	-	-	-	1	-	-	-	-
Rock, sand, coral	-	-	-	-	-	1	-	-
Sand	1	2	6	13	4	45	1	29
Other	-	-	-	1	-	2	-	4

PERMANOVA analysis on site, zonation, depth, day/night, and substrate factors on the presence of GG-BW in BRUV survey results in KJNP

Test	Factor	Permutation N	Total sum of squares	Within-group sum of squares	F	p (same)
<i>G. typus-R. australiae</i>	Site	9999	2.98	2.971	0.7272	0.4306
	Zonation	9999	2.98	2.973	0.5463	0.7571
	Depth	9999	2.98	2.19	0.8165	0.6236
	Day/Night	9999	2.98	2.978	0.3086	0.71
	Substrate	9999	2.98	2.979	0.0192	1
All shark-ray	Site	9999	23.64	23.52	1.147	0.3342
	Zonation	9999	23.64	23.54	0.9115	0.4469
	Depth	9999	23.64	15.88	1.105	0.2927
	Day/Night	9999	23.64	23.36	5.471	0.0208
	Substrate	9999	23.64	22.47	2.309	0.1272

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Communication outputs

- Handbook: Guide on elasmobranch handling and reporting ([link](#))
- Poster: Step-by-step guide on elasmobranch handling ([link](#))
- Workshop presentation deck ([link](#))

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