

K. Bodu Hithi Thila Region Marine Protected Area Conservation Action Plan

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Abbreviations

EPA	Environmental Protection Agency
EPPA	Environment Protection and Preservation Act
ESA	Environmentally Sensitive Area
MMRI	Maldives Marine Research Institute
MMRP	Maldivian Manta Ray Project
MNDF	Maldives National Defense Force
MoTE	Ministry of Tourism and Environment (formerly MoCCEE)
MoCCEE	Ministry of Climate Change, Environment and Energy
MoCHI	Ministry of Construction, Housing, and Infrastructure
MoFOR	Ministry of Fisheries and Ocean Resources
MoTCA	Ministry of Transport and Civil Aviation
MPS	Maldives Police Services

Vision

To protect and conserve K. Bodu Hithi Thila Region for future generations, and to inspire people through exploration and research into this unique ecosystem.

Executive Summary

Lead Management Authority: Ministry of Tourism and Environment (MoTE).

Enforcement Agency: Environmental Protection Agency (EPA).

Name of Marine Protected Area: K. Bodu Hithi Thila Region.

Size: 124.47 Ha.

Location: Bodu Hithi Kandu (channel) located on the western rim of North Malé Atoll.

Protected Area Category: Category VII (Protected area with sustainable use).

Protection Date: Pursuant to Article 4 of Law no. 4/93 (Environmental Protection and Preservation Act) the area was protected on 1st August 2024 in an announcement issued by MoTE (Announcement Number: (IUL)438-ENV/438/2024/282).

Features: Bodu Hithi Thila is a moderately sized submerged pinnacle reef that hosts a variety of protected and threatened species, including different types of sharks and rays. The reef also features a cleaning station for Reef Manta Rays, which are attracted to this area during the northeast monsoon.

Resource uses: Bodu Hithi Thila is frequented by recreational divers, while the surrounding waters are utilized for bait and reef fishing. Additionally, the area's rich population of sharks and rays attracts scientists and researchers who are interested in studying these species and their ecosystems.

Vision: To protect and conserve Bodu Hithi Thila for future generations, and to inspire people through exploration and research into this unique ecosystem.

Constraints: Key constraints in managing this MPA are limited human resources and funding, restricted stakeholder engagement, and insufficient baseline data. These constraints hinder effective conservation efforts and the ability to assess ecological status and management impacts.

Threats: The Bodu Hithi Thila Region several key threats, including climate change impacts and the detrimental effects of dredging and reclamation. Reef manta rays are particularly vulnerable to entanglement in fishing lines and injuries from boating. Additionally, recreational divers cause physical damage and stress to corals and other marine organisms, while marine debris further exacerbates these challenges.

- Management Goals:**
- 1) Conserve and Protect the MPA.
 - 2) Improve the understanding of the MPA through research.
 - 3) Raise public's awareness of the MPA.

Conservation and Protection Conservation and protection will be achieved through practical actions aimed at regulating and enforcing activities within the Marine Protected Area (MPA). This includes collecting baseline data on resource users and integrating the MPA into the MoTE online permitting system. For effective enforcement, we will implement an online reporting system, establish real-time surveillance, create a volunteer program, and engage resource users in stewardship roles. Additionally, regulations and best practices will be distributed to raise awareness among resource users about minimizing negative impacts.

Improve understanding of MPA Engaging and supporting scientific research to further increase understanding of the geology, ecology and socio-economic aspects of this area. In addition, training will be provided to local dive centers to collect data to established monitoring programs.

Raising public awareness Public support is vital for the effective management and success of the MPA. Periodic social media campaigns and meetings are planned to improve the public awareness of this MPA, and measures being implemented to conserve and protect this area.

1 Introduction

1.1 Purpose of this document

The Protected Areas Regulation (2018/R-78) of the Maldives mandates the development of a Management Plan for all designated Protected Areas in the country. This Conservation Action Plan has been prepared in compliance with this regulatory requirement, utilizing the guidance outlined in the Maldives National Management Plan Guidance for Protected and Conserved Areas (Ministry of Climate Change, Environment and Energy, 2024). It is specifically tailored for the Marine Protected Area (MPA) named K. Bodu Hithi Thila Region.

1.2 Background

1.2.1 Location and Size of the Marine Protected Area

K. Bodu Hithi Thila Region is located within Bodu Hithi Kandhu located on the western periphery of the North Malé Atoll and the area spans 127.47 hectares (Figure 1.1).

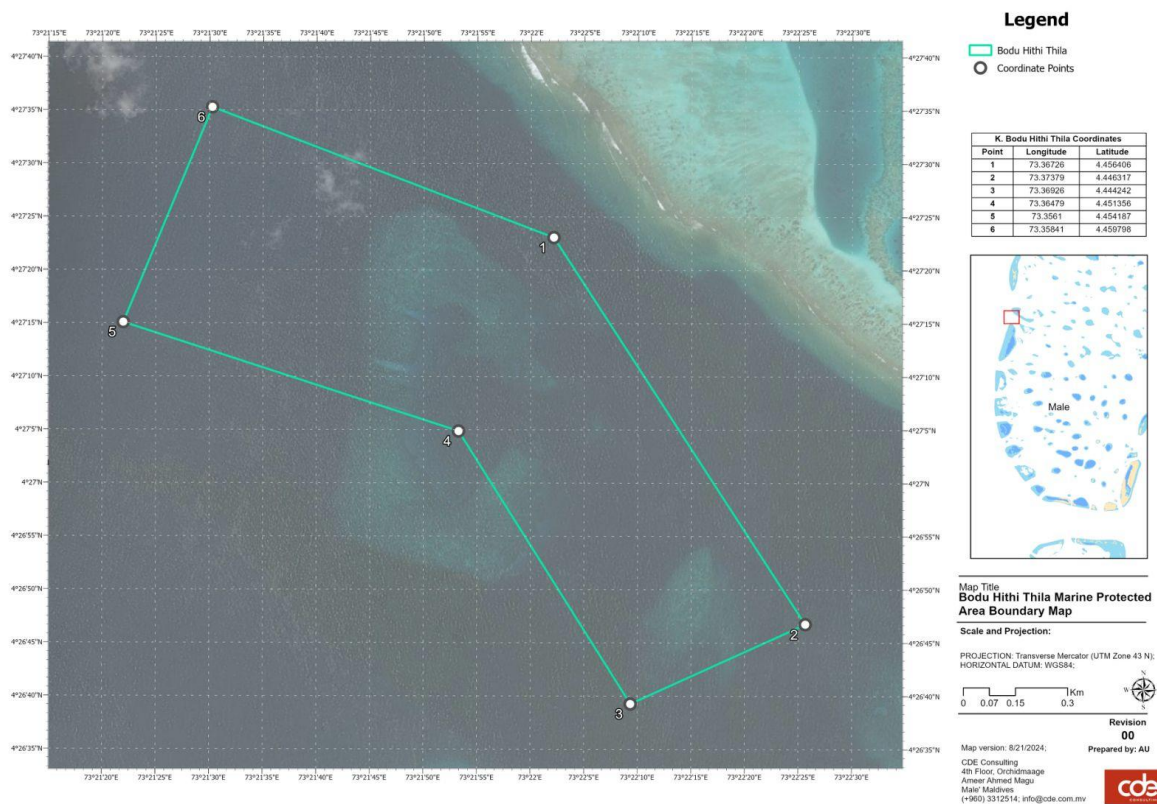


Figure 1.1: Boundary map of K. Bodu Hithi Thila Region MPA

1.2.2 Designation as a Marine Protected Area

Bodu Hithi Thila has been listed as an Environmentally Sensitive Area¹ (ESA) by the Environmental Protection Agency (EPA) of the Maldives. The decision to designate this area for protection stems from a larger initiative aimed at offsetting the biodiversity loss resulting from the Gulhifalhu Land Reclamation Project, overseen by the Ministry of Construction and Infrastructure (MoCI) (CDE Consulting, 2022). The biodiversity offset plan for the project envisions that protecting ESAs in North Malé Atoll will prevent the sites from being developed for human use and will provide biological additionality for perpetuity compared to leaving them unprotected.

K. Bodu Hithi Thila Region was declared as a Category VII (Protected area with sustainable use) Protected Area under the Article 4 of the Environmental Protection and Preservation Act (EPPA) of the Maldives (Law no. 4/93) on 1st August 2024 by the Ministry of Tourism and Environment (MoTE). The management of this area is governed by the Protected Areas Regulation (2018/R-78).

Features that qualified the area for Protection

This area is teeming with live corals and reef fishes, hosting a variety of protected species, and are endangered or threatened. These include Napoleon Wrasse (*Cheilinus undulates*), Reef Manta ray (*Mobula alfredi*), Hawksbill Turtle (*Eretmochelys imbricata*), Grey Reef Shark (*Carcharhinus amblyrhynchos*), Silvertip Shark (*Carcharhinus albimarginatus*), and Oceanic Whitetip Shark (*Carcharhinus longimanus*). Furthermore, this area has a manta ray cleaning station that attracts reef manta rays during the northeast monsoon, as per the MPA designation announcement by MoCCEE (Appendix A).

Prohibited Activities within MPA

The following activities are prohibited within the boundary of the Protected Area under the announcement (Appendix A):

- 1) Mining and exploration for gas, oil, or any type of minerals.
- 2) Dumping any type of waste material.
- 3) Land reclamation and dredging activities.
- 4) Mining rock, sand or rubble.
- 5) Anchoring.
- 6) Construction and infrastructure development activities.
- 7) Releasing pollutants or installing waste discharge outfalls into the area.
- 8) Aquaculture and mariculture activities.
- 9) Harvesting, killing or damage to any marine organisms, except for sustainable bait fishery activities.
- 10) Harvesting eggs or damaging any nests of any organism.
- 11) Introduction of any species to the site.
- 12) Feeding any organisms, including marine or aviary species.
- 13) Utilizing artificial lighting during nighttime in a manner that illuminates the MPA.

¹ List of Environmentally Sensitive Areas (ESA) is maintained by EPA of the Maldives. This list includes area of significant environmental and economical values. But these areas are not Protected, and no management measures are implemented at the ESAs.

- 14) Producing loud noises that may disrupt the natural behavior of species in the area.
- 15) Catching of any juvenile fishes including those used in aquarium trade and caught for reef fishery, except for sustainably harvested bait fish.
- 16) Use of light to attract fishes (exemption for fishing vessels with a valid license under the Fisheries Act (14/2019) of the Maldives that use light to capture bait).

In addition to these activities, under the Land Reclamation and Dredging Regulation (2013/R-15) of the Maldives it is also prohibited to carryout dredging and land reclamation activities within a 200-meter zone of an MPA.

Regulated Activities within MPA

- 1) Visiting.
- 2) Undertaking research and scientific studies.
- 3) Conducting restoration and rehabilitation activities.

1.2.3 Management Structure

MoTE is responsible for the overall management of the MPA. The Environmental Protection Agency (EPA) of Maldives is responsible for the regulation, enforcement and monitoring of this area in collaboration with law enforcement agencies such as the Coast Guard of the Maldives National Defence Force (MNDF). Furthermore, EPA will collaborate with Maldives Marine Research Institute (MMRI) to monitor the health of the ecosystem and conducting essential research activities and training.

2 Description of the Area

2.1 Geography

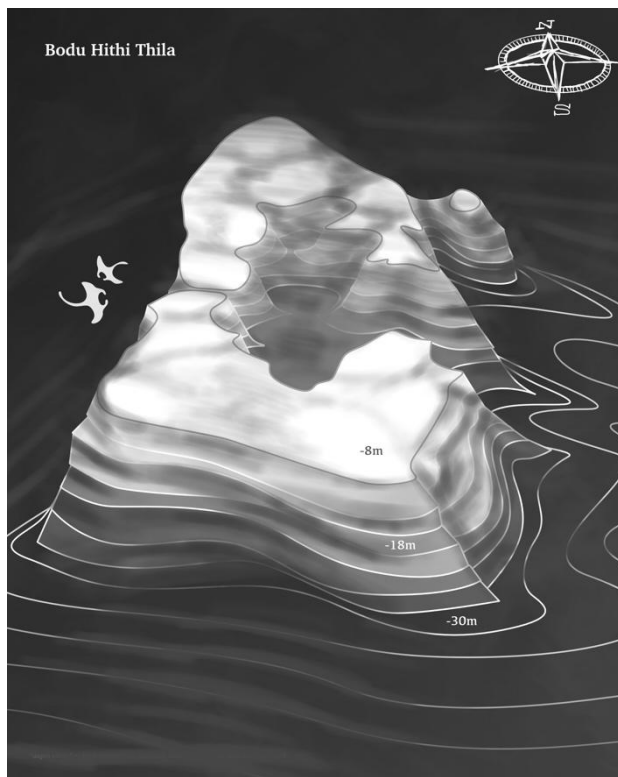


Figure 2.1: Artist rendition of Bodu Hithi Thila (not to scale)

Bodu Hithi Thila is situated at the mouth of Bodu Hithi Kandu, a channel located between Rasfari and Ul'laanee Falhu on the western periphery of North Malé Atoll (Figure 2.2). This channel serves as one of the major connections between the open ocean and the inner lagoon of North Malé Atoll.

Bodu Hithi Thila is a moderately sized pinnacle reef characterized by a depth range from -8 m at its top, to about -30 m at its deepest point. This reef is split into two distinct sections by a narrow channel (Figure 2.1). Majority of the southern half of the reef lies within the confines of the Rasfari Protected Area, while the northern portion falls exclusively within Bodu Hithi Marine Protected Area. The reef comprises of several caves and bays with sandy bottoms. The reef system is exposed to regular oceanic swells, waves and currents.

Located directly south of Bodu Hithi Thila MPA is another Protected Area known as K. Rasfari Region. It had been declared a protected area since 27th September 1995. Estimated to be 984 hectares, it displays attractive reefs that houses large fish and underwater scenery. During the southwest monsoon, grey reef sharks are prominent whereas during the northeast monsoon manta rays are more prominent. Rasfari Island located within this region is also a roosting site for migratory birds and the beaches for sea turtle nesting.

Four kilometers north of Bodu Hithi Thila is a listed ESA known as Madivaru Beyru. This area provides good habitats for eagle rays, mantas, morays, leaf fish, white tips, and nurse sharks.

Within a 5 km radius of the protected area, there are five tourist resorts, the closest being Bodu Hithi Island (Coco Bodu Hithi) located less than 0.5 km southeast, and the farthest being Madivaru Island (VARU by Atmosphere) located about 4 km north. Additionally, a multi-island tourist resort development project underway at Ul'laanee Falhu (CDE Consulting, 2024), about 0.2 km northeast.

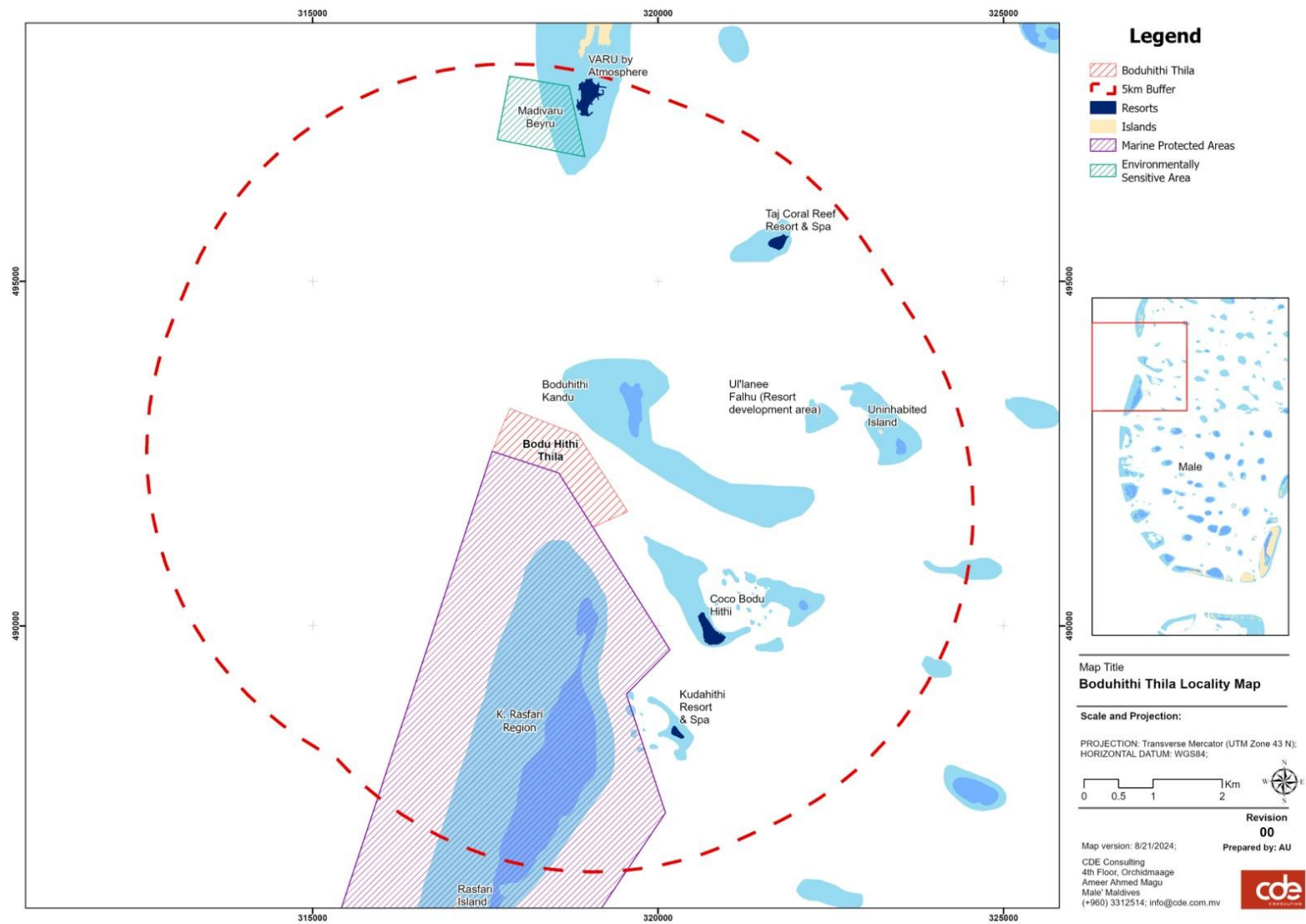


Figure 2.2: Map showing Bodu Hithi Thila Protected Area within North Malé Atoll

2.2 Ecology

Bodu Hithi Kandu (a.k.a. Hithi Kandu) is identified as a key reef manta ray (*Mobula alfredi*) aggregation site with peak sightings reported through January to April during the northeast monsoon (Manta Trust, 2018). Reef manta rays are reported to aggregate on the northern shallow reef crest of Rasfari located outside the atoll and Bodu Hithi Thila. Data collected at this location suggest that the channel serves as a crucial feeding and reproductive area for reef manta rays (IUCN SSC Shark Specialist Group, 2023). This species of rays is listed as Vulnerable in the IUCN Red List (Marshall et al., 2022), indicating a need to actively conserve and protect this species and its habitat. It should be noted that all species of rays are protected under the EPPA of Maldives (4/93).



Figure 2.3: Reef manta ray feeding at Bodu Hithi Thila

Furthermore, besides being a hub for reef manta rays, this site is also recognized as an important location for Whitetip Reef Shark (*Triaenodon obesus*) aggregation. However, additional research is needed to fully understand the characteristics and purposes of these aggregations (IUCN SSC Shark Specialist Group, 2023). This species of shark is listed as Vulnerable in the IUCN Red List (Simpfendorfer et al., 2024).

In addition, Silvertip Shark (*Carcharhinus albimarginatus*), Grey Reef Shark (*Carcharhinus amblyrhynchos*), Blacktip Shark (*Carcharhinus melanopterus*), Tawny Nurse Shark (*Nebrius ferrugineus*), Whale Shark (*Rhincodon typus*) and Spotted Eagle Rays (*Aeotobatus ocellatus*) are also known to use parts of Bodu Hithi Kandu (IUCN SSC Shark Specialist Group, 2023). Further studies are required to understand why these species use this area, their feeding behaviour, migratory patterns and environmental factors in this area that influence their behaviour.



Figure 2.4: Whale Shark (*Rhincodon typus*) observed at Bodu Hithi Thila

As part of the initial site assessment for MPA declaration, a permanent coral reef monitoring site was established on the ocean side of the reef (Appendix B). During this assessment a total 47 reef fish species belonging to 16 different fish families were recorded. Highest number of species was recorded from the Damselfish Family, and most abundant fish species recorded was Blue Triggerfish (*Odonus niger*). This species of fish are plantivores and are known to feed on zooplanktons carried by the current. Live coral cover along the monitoring site was fair (~26%) and was dominated by massive type corals.



Figure 2.5: School of Blue-striped Snappers (*Lutjanus kasmira*) observed at Bodu Hithi Thila

There is much to be explored to understand various ecological, geological and biological aspects of this area.

2.3 Historical and Cultural Background

Bodu Hithi Thila, being a natural pair of closely located seamounts, formed over thousands of years along with the constantly changing and evolving reef forming the foundation of the atoll. The origin of seamounts such as these is made possible by the unique geology of the Maldives. In a process that takes millions of years, flat topped banks of carbonate rocks form atolls through constant exposure to sea level fluctuation from the quaternary glaciation. This led to the eventual dissolution of the interior bank and coral growing vertically on their margins, which rose above sea level (Droxler & Jorry, 2021). Due to the Maldives being essentially a giant carbonate platform in the Indian Ocean (Lüdmann et al., 2013), it is a hotbed for coral reefs and can give rise to karsts. Therefore, with the added factor of sea currents in the deeper ocean manipulating the geology of the seabed and reef, the formation of flat banks or small seamounts such as those Bodu Hithi Thila is comprised of, is a usual phenomenon. There remains a significant opportunity to study and explore to understand the geological history of Bodu Hithi Thila.

The area surrounding Bodu Hithi Thila has historically not been inhabited, leading to a dearth of documented history of the region. While there is no existing literature documenting the historical uses of this area, it can be inferred that it may have been used for fishing since ancient times, given its attraction for a diverse array of reef and pelagic fish.

2.4 Current Resource Uses of Area

Bodu Hithi Thila serves as a multifaceted resource hub, accommodating various uses and activities such as recreational diving, commercial fishing, and scientific research.

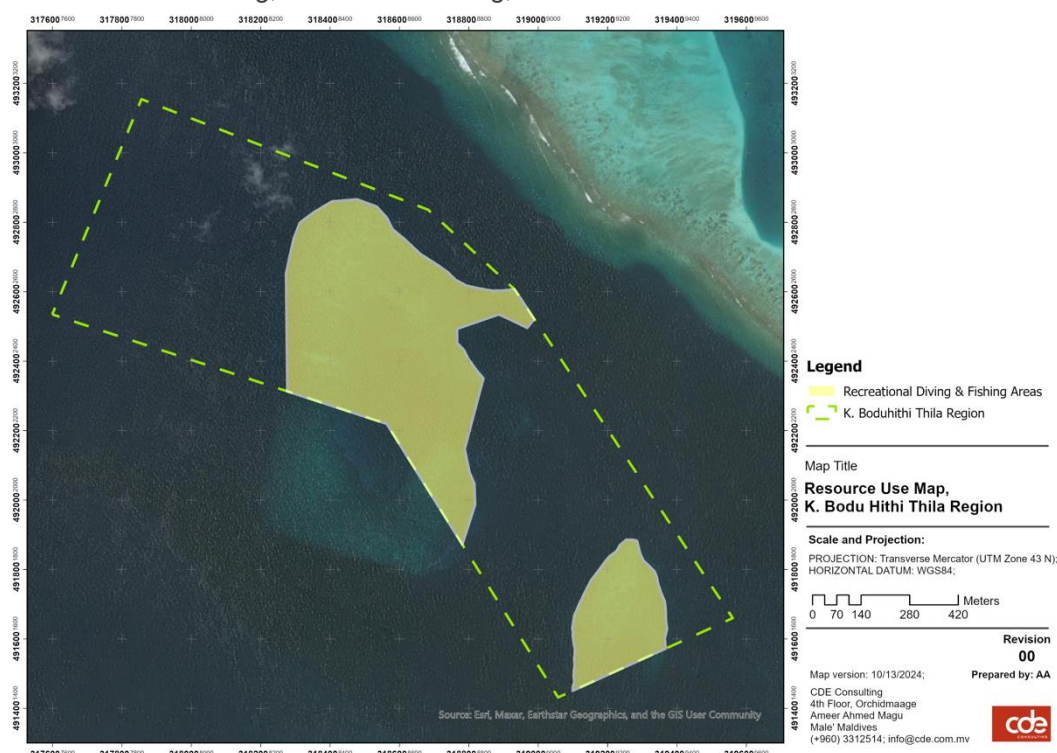


Figure 2.6: Key resource use areas of Bodu Hithi Thila Region

Recreational diving is a popular activity at the site, attracting tourists and local divers to explore its marine life and unique reef formations. Commercial fishing activities, including bait and reef fishery, take place in the waters surrounding Bodu Hithi Thila, supporting the livelihoods of local fishermen. The key areas used for recreational diving and fishing is shown in Figure 2.6. Scientific research, particularly focusing on sharks and rays, is also conducted in the area to study marine biodiversity and ecosystem dynamics.

3 Protection of Key values of the Area

The site's diverse marine life, including sharks and rays, must be safeguarded to uphold the ecological balance and biodiversity that make Bodu Hithi Thila a unique underwater ecosystem. Ensuring the health of these marine populations not only sustains the site's natural beauty but also supports the interconnected ecosystems.

Furthermore, the preservation of Bodu Hithi Thila's pristine water quality is paramount in maintaining its ecosystem and appeal to divers and scientists. Pristine waters provide an ideal environment for underwater exploration and observation, enhancing the experience for visitors. Protecting water quality from pollution, dredging and reclamation activities, and other human-induced threats is crucial to preserving the site's ecological integrity and ensuring the continued health of its marine inhabitants.

The distinctive geological formations found at Bodu Hithi Thila, including narrow channels, underwater caves, overhangs and bays, are key features that contribute to the site's allure and scientific importance. These geological structures provide shelter, breeding grounds, and feeding areas for marine species, adding complexity and diversity to the underwater landscape. Preserving these formations through responsible diving practices and habitat conservation efforts is essential to safeguarding the site's ecological richness and maintaining its unique character.

Effective management strategies, such as the implementation of sustainable fishing practices, enforcement of marine conservation regulations, are crucial for mitigating potential threats and pressures on Bodu Hithi Thila's resources. By promoting responsible stewardship of the site and fostering collaboration among stakeholders, including government agencies, conservation organizations, research institutions, and local communities, Bodu Hithi Thila can continue to thrive as a valuable marine sanctuary with significance at the local, regional, and international levels.

4 Constraints, Threats and Opportunities

This section outlines the constraints, threats, and opportunities in managing the MPA, which were identified during stakeholder consultations (Appendix E) with government agencies and resource users as part of the MPA declaration process and available literature.

4.1 Constraints

- 1. Limited human resources:** Challenges in managing the Protected Area due to lack of personnel such as rangers, researchers, educators, administrators and mediators.
- 2. Limited funding:** Insufficient funds to effectively implement management actions.
- 3. Limited stakeholder availability for engagement:** Difficulty in securing collaboration from key stakeholders for management and conservation efforts.
- 4. Limited baseline data:** Inadequate data to assess the future effectiveness of management actions.

Insufficient data to fully understand current usage of the area i.e. the number of divers, fishers that use the area.

4.2 Threats

Potential threats to the Marine Protected Area (MPA) were identified through initial stakeholder consultations and a review of relevant literature. These threats were subsequently prioritized using a Risk Matrix (Table 4.3) that evaluates both the likelihood and consequence of each threat on a five-point scale, as outlined in the Maldives National Management Plan Guidance for Protected Areas (Ministry of Climate Change Environment and Energy, 2024b). These scales are provided in Table 4.1 and Table 4.2.

Table 4.1: Likelihood scale

Likelihood	Frequency of Threat
Almost Certain	Expected to occur more or less continuously throughout a year.
Likely	Not expected to be continuous but expected to occur one or more times in a year.
Possible	Not expected to occur annually but expected to occur within a 10-year period.
Unlikely	Not expected to occur in a 10-year period but expected to occur in a 100-year period.
Rare	Not expected to occur within the next 100 years.

Table 4.2: Consequence scale

Consequence	Description of Impact
Catastrophic	Impact is clearly affecting, or would clearly affect, the nature of the ecosystem over a wide area. Recovery periods greater than 20 years likely.
Major	Impact is, or would be, extremely serious and possibly irreversible to a sensitive population or community. Recovery periods of 10 to 20 years likely.
Moderate	Impact is, or would be, serious and possibly irreversible over a small area. Recovery periods of 10 to 20 years likely.
Minor	Impact is, or would be, significant to a sensitive population or community at a local level. Recovery periods of five to 10 years likely.
Insignificant	No impact: or if impact is, or would be, present then only to the extent that it has no discernible effect on the overall condition of the ecosystem.

Table 4.3: Risk Matrix

Likelihood					Consequences
Rare	Unlikely	Possible	Likely	Almost Certain	
					Catastrophic
					Major
					Moderate
					Minor
					Insignificant

Legend	Low Risk	
	Medium Risk	
	High Risk	
	Very High Risk	

Table 4.4: Threats identified for K. Bodu Hithi Thila Region

#	Threat	Threat Prioritization			Measures Required
		Likelihood	Consequences	Risk Level	
1	Climate change related impacts: Increased frequency and severity of mass coral bleaching events due to steady increase in sea temperatures, can result in significant losses in coral diversity and cover. Subsequently, this can lead to loss of diversity and change in fish community composition. Moreover, increased frequency of extreme weather events, stronger storm events can result in the destruction of coral reef structure.	Almost certain	Catastrophic	Very High Risk	No specific measures can be implemented at MPA management level to address climate change.
2	Dredging and reclamation related impacts: Depending on the intensity and duration of exposure to elevated levels of turbidity, suspended solids and sedimentation from dredging and reclamation works are known to induce lethal or sublethal stress on corals, potentially leading to loss of coral reef habitat (Erftemeijer et al., 2012). The planned dredging and reclamation project at Ul'lanee Falhu, situated just	Likely	Moderate	High risk	Maintain close coordination with the proponent of the reclamation project to ensure the implementation of sediment plume containment measures. Continue monitoring to identify potential impacts early, allowing for timely actions to mitigate these effects on the MPA.

#	Threat	Threat Prioritization			Measures Required
		Likelihood	Consequences	Risk Level	
	north of Bodu Hithi Thila, raises some concerns due to its proximity to the area.				
3	Entanglement of reef manta rays on fishing lines: The second highest incidences of injuries to reef manta rays from fishing lines and hooks in the Maldives was documented in North Malé Atoll (Strike et al., 2022). Continuous movement is essential for Manta Rays to breath, as they are unable to actively pump water over their gills like other fishes. Hence, entanglements can be fatal.	Possible	Moderate	Medium Risk	Recognizing Bodu Hithi Thila as a key aggregation site for reef manta rays and sharks, it is essential to monitor and regulate fishing activities within the MPA to prevent and minimize injuries to these megafauna.
4	Boating injuries to reef manta rays: Injuries to reef manta rays caused by boat strikes have been documented in North Malé Atoll (Strike et al., 2022). A report by Manta Trust (2018) highlights that jet skis, speedboats, and sea scooters frequently operate over cleaning manta rays. In some cases, vessels are also used to direct manta rays toward tourists.	Possible	Moderate	Medium Risk	Regulate boating activities within the MPA and educate boat operators and tourists on appropriate behaviour around manta rays.
5	Physical damage and stress on corals and other marine lifeforms by	Possible	Minor	Low Risk	To address these issues, it is essential to implement

#	Threat	Threat Prioritization			Measures Required
		Likelihood	Consequences	Risk Level	
	recreational divers: During the initial stakeholder for the designation of this area as a MPA, divers highlighted the need to regulate diving activities to mitigate physical damage to marine ecosystems. Damage includes physical abrasion of coral structures, which can lead to long-term degradation of these vital habitats, as well as stress responses in marine organisms that can disrupt local biodiversity.				comprehensive diver education programs that emphasize best practices for underwater conduct. Such programs should focus on promoting awareness of fragile marine environments, encouraging responsible diving techniques that minimize contact with marine life, and advocating for adherence to established guidelines.
6	Marine debris: Marine debris or marine litter refers to any durable solid material that has been manufactured or processed and has been either intentionally or unintentionally discarded or left in the marine environment (National Oceanic and Atmospheric Administration, 2024). These can harm marine organisms and their habitat. For example, the most common source of injury to sea turtles reported in the Maldives are from	Likely	Minor	Medium Risk	There is a need to enforce regulations against littering at MPA and increasing awareness of resource users on the negative impacts on the marine ecosystem by the littering.

#	Threat	Threat Prioritization			Measures Required
		Likelihood	Consequences	Risk Level	
	entanglements in ghost fishing nets or similar material (Himpson et al., 2023).				

4.3 Opportunities

1. The Protected Area K. Rasfari Region is located adjacent to the K. Bodu Hithi Thila Region, which gives an opportunity to pool resources to manage both these areas. When the Management Plan is prepared for K. Rasfari Region, it is recommended to take this into account and integrate with K. Bodu Hithi Thila Management.
2. As part of the ongoing Maldivian Manta Ray Project, data is being collected on the numbers and behaviour of manta rays in Bodu Hithi Thila and surrounding areas by The Manta Trust. There is an opportunity to collaborate and support this data collection effort within the area.
3. There are three operational tourist resorts (Coco Bodu Hithi, Taj Coral Reef Resort and Spa, and VARU by Atmosphere) within a 5 km radius of the MPA. There is opportunity to collaborate with these resorts to monitor and manage the site.
4. Regulations, Good Practices Guides and Programmes that are available to increase awareness and reduce unnecessary damages to the megafauna and the marine habitat that can be disseminated among stakeholders. These include but not limited to:
 - a. 5th Amendment to the Regulation on Protected Species (2023/R-169) - detailed guideline on proper behaviour around Turtles, and Rays.
 - b. 7th Amendment to the Regulation on Protected Species (2024/R-96) - detailed guideline on proper behaviour around Whale Sharks.
 - c. How to Swim with Manta Rays (Manta Trust, n.d.).
 - d. Maldivian Whale Shark Tourist Encounter Guidelines (Environmental Protection Agency, 2009).
 - e. Guide to Whale Shark & Code of Conduct (Maldives Whale Shark Research Programme, n.d.).
 - f. Green Fins awareness materials and programmes.

5 Governance

5.1 Summary of Relevant Authorities and Organizations

Effective governance is critical for the successful management of the MPA. The overall management structure for the MPA is summarized in Figure 5.1.

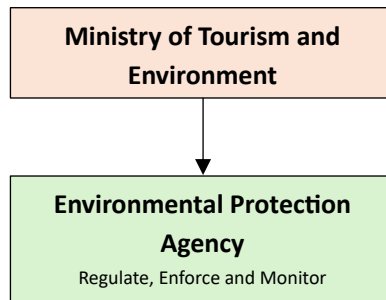


Figure 5.1: Management structure of Bodu Hithi Thila Marine Protected Area

The key roles and responsibilities of different parties involved in the management of the MPA is provided below.

5.1.1 Ministry of Tourism and Environment

The MoTE is the primary government body responsible for formulating and implementing environmental policies, including those related to marine ecosystems. It oversees the overall management of the MPA and ensures alignment with national environmental goals.

Responsibilities:

- Develop and enforce policies and regulations pertinent to the MPA.
- Coordinate with other governmental and non-governmental organizations.
- Facilitate stakeholder engagement and public awareness campaigns.

5.1.2 Environmental Protection Agency (EPA)

The EPA is responsible for environmental regulation and monitoring, ensuring compliance with environmental laws and standards.

Responsibilities:

- Conduct assessments and monitoring of environmental impacts within the MPA.
- Enforce the Environmental Protection and Preservation Act (4/93) and other applicable regulations.

- Provide technical support and guidance for sustainable practices within the MPA.
- Collaborate with law enforcement agencies (e.g. Coast Guard, Maldives Police Services (MPS)) to monitor and enforce regulations.
- Collaborate with research institute (e.g. Maldives Marine Research Institute) to undertake regular monitoring and provide training.

5.2 Management Decision-Making Process

The decision-making process for managing the MPA will be collaborative, involving representatives from all key organizations. The following steps outline the process:

1. **Protected Area Management Unit:** Protected Areas Management Unit of MoTE, will oversee MPA management. This unit will be responsible for high-level decision-making, policy formulation, and strategic planning.
2. **Stakeholder Engagement:** Regular stakeholder meetings will be held to gather input from local communities, fishers, dive operators, NGOs, and other relevant parties. This engagement ensures that diverse perspectives are considered in the decision-making process.
3. **Data-Driven Decisions:** Management decisions will be informed by scientific research conducted, as well as monitoring data collected. This evidence-based approach will help ensure that management strategies are effective and sustainable.
4. **Review and Scrutiny:** Decisions made by the management committee will undergo a review process to ensure accountability and transparency. This may include:
 - a. Public consultations to discuss proposed actions.
 - b. Oversight by the MoTE to ensure compliance with national policies.
 - c. Regular audits by the EPA to assess the effectiveness of implemented strategies.

5.3 Addressing Stakeholder and Community Concerns

A clear procedure will be established to address stakeholder and community concerns regarding the MPA:

1. **Feedback Mechanism:** A dedicated feedback system will be implemented, allowing stakeholders to submit concerns, suggestions, or complaints regarding MPA management. This may include online platforms, suggestion boxes in local communities, and public forums.
2. **Regular Reporting:** The Management Unit will provide regular updates to stakeholders on MPA activities, management decisions, and ongoing research. Transparency in communication fosters trust and encourages stakeholder involvement.

3. **Conflict Resolution:** A structured conflict resolution process will be established to address disputes or grievances. This may involve mediation by a neutral third party and will prioritize finding amicable solutions that consider the interests of all parties involved.
4. **Community Involvement:** Local communities will be actively involved in monitoring and decision-making processes related to the MPA. Training and capacity-building initiatives will empower communities to take an active role in conservation efforts.

By establishing a robust governance framework, the MPA management plan aims to ensure effective stewardship of marine resources while fostering collaboration and engagement with stakeholders and the community.

6 Boundary and Zonation

The boundary of the MPA is shown in Figure 1.1. The GPS coordinates of the key points of the MPA boundary are provided in Table 6.1. As this area is a relatively small area, no further zonation was considered in this plan.

Table 6.1: GPS Coordinates of the K. Bodu Hithi Thila Region

Point	GPS Coordinates	
	Longitude	Latitude
1	73.36726	4.456406
2	73.37379	4.446317
3	73.36926	4.444242
4	73.36479	4.451356
5	73.3561	4.454187
6	73.35841	4.459798

7 Goals and Objectives

This plan outlines three main goals that focuses on conservation, promoting research and monitoring initiatives, and raising public awareness about the MPA. The section provides the objectives to achieve these goals along with details of the actions required. The total costing provided are for the first five years of implementation of the management actions.

7.1 Goal 1: Conserve and Protect K. Bodu Hithi Thila Region

Objective 1: Regulate activities allowed within the MPA

Action		Responsible parties	Timeline	Est. Cost (MVR)
1.1	Gather comprehensive baseline data on the number and frequency of resource users within the MPA, to inform management decisions and enhance conservation efforts.	MoTE	By the end of Q4 of Year 1	90,000.00
1.1.1	Develop a survey tool to quantify the number of fishers and divers using the MPA (include questions to capture the frequency of use, type of activities, and seasonal patterns)	MoTE	By the end of Q1 of Year 1	10,000.00
1.1.2	Brief/Inform fishing and diving communities to explain the importance of data collection for MPA management.	MoTE	By the end of Q1 of Year 1	10,000.00
1.1.3	On-site interviews at Bodu Hithi Thila and/or distribution of questionnaires to gather detailed information.	MoTE	By the end of Q2 of Year 1	30,000.00
1.1.4	Prepare a comprehensive report summarizing findings and recommendations for Management based on user patterns	MoTE	By the end of Q4 of Year 1	40,000.00

Action		Responsible parties	Timeline	Est. Cost (MVR)
1.2	Add K. Bodu Hithi Thila MPA into the online Permitting System ² , enabling issuance and tracking of permits for Visitation, Research and Restoration/Rehabilitation Activities.	MoTE	By the end of Q4 of Year 1	-
1.2.1	Distribute the Step-by-Step Guide/Instructions ³ for the Permitting Process to all identified Stakeholders.	MoTE	By the end of Q4 of Year 1	-
1.3	Decide on the necessity of installing a mooring buoy to ensure safe and easy access for visitors and to control visitor numbers, based on the outcomes of the baseline survey (Action 1.1), and proceed with installation if deemed necessary.	MoTE	By the end of Q4 of Year 2	1,200,000.00
1.3.1	Conduct baseline survey to identify suitable locations to install mooring buoy, considering factors such as water depth, current conditions, marine traffic patterns, and proximity to sensitive marine habitats. Based on the findings, make a decision on the installation location.	MoTE	By the end of Q1 of Year 1	30,000.00
1.3.2	Design, construct, and install the mooring buoy in accordance with all regulatory requirements, ensuring it includes specific features to prevent the entanglement of rays.	MoTE	By the end of Q4 of Year 2	450,000.00
1.3.3	Monitoring and maintenance of mooring buoy	MoTE	Ongoing upon installation of Mooring Buoy	720,000.00 (240,000.00 per year)

² Maldives Protected Areas Website: <https://protectedareas.environment.gov.mv/>

³ Maldives Protected Areas Website: <https://protectedareas.environment.gov.mv/en/permits-instructions>

Objective 2: Develop a participatory and practical MPA regulations enforcement program

Action		Responsible parties	Timeline	Est. Cost (MVR)
2.1	Utilize existing working group to share and discuss issues related to enforcing MPA regulations, involving representatives from MoTE, EPA and MNDF (Coast Guard) to develop actionable solutions as needed.	MoTE	By the end of Q4 of Year 1	-
2.2	Integrate a simple user-friendly reporting system into the Protected Areas Website, allowing fishers, dive operators and other users to submit observations of prohibited activities within MPA.	EPA	By the start of Q4 of Year 2	100,000.00
2.3	Setup a real-time surveillance system with data storage facility at Rasfari Island to monitor activities at and around the MPA. <i>Note: This system is designed to effectively monitor not only the Bodu Hithi Region but can also be utilized to oversee the adjacent protected area, K. Rasfari Region.</i>	EPA	By the end of Q4 of Year 2	1,957,000.00
2.3.1	Purchase a surveillance system with data storage facility to monitor the site in real-time.	EPA	By the end of Q2 of Year 2	715,000.00
2.3.2	Setup the surveillance system.	EPA	By the end of Q3 of Year 2	30,000.00
2.3.3	Establish remote feed to the surveillance system.	EPA	By the end of Q3 of Year 2	432,000.00 (12,000.00 per month)
2.3.4	Maintenance of the surveillance system.	EPA	Ongoing upon installation of Surveillance System	60,000.00

Action			Responsible parties	Timeline	Est. Cost (MVR)
					(20,000.00 per year)
	2.3.5	Hire two operators who will be responsible for ensuring that the system is fully functional, that videos are being recorded and stored, and for alerting EPA in a timely manner if prohibited activities are observed within the MPA.	EPA	By the end of Q3 of Year 2	504,000.00 (14,000.00 per month)
2.4	Establish a Volunteer Program aimed at undergraduate students, targeting the recruitment of at least 2 participants annually. The program will include training sessions, hands-on experience in monitoring and management activities of the MPA.		MoTE and EPA	By the end of Q1 of Year 4	71,000.00
	2.4.1	Develop training plan to prepare volunteers for their tasks.	MoTE and EPA	By the end of Q1 of Year 3	50,000.00
	2.4.2	Partner with the Maldives National University (MNU) to promote the program.	MoTE and EPA	By the end of Q1 of Year 3	10,000.00
	2.4.3	Develop Application Form and announce the volunteer program on the Ministries website and also on platforms used by MNU to communicate with the students.	MoTE, EPA and MNU	By the end of Q2 of Year 3	5,000.00
	2.4.4	Interview and select candidates fit for the program, and selected volunteers to sign an agreement with the Ministry as per the Civil Service Regulation 2014 (2014/R-311).	MoTE and EPA	By the end of Q3 of Year 3	-
	2.4.5	Train the recruited volunteers for the program.	MoTE and EPA	By the end of Q4 of Year 3	-
	2.4.6	Schedule volunteer activities/tasks and assign.	MoTE and EPA	By the end of Q4 of Year 3	-

Action			Responsible parties	Timeline	Est. Cost (MVR)
	2.4.7	Award a certificate to recognize participants of the program.	MoTE and EPA	By the end of Q1 of Year 4	6,000.00
	2.4.8	Gather feedback from participants and incorporate findings to improve the program.	MoTE and EPA	By the end of Q1 of Year 4	-
2.5	Engage with at relevant resource users to actively take on stewardship role in caring for and conserving the area.		MoTE	By the end of Q4 of Year 3	40,000.00
	2.5.1	Host a workshop to raise awareness resource users about the protected area, conservation measures and monitoring protocols/activities.	MoTE	By the end of Q1 of Year 3	40,000.00
	2.5.2	Invite resorts to participate or contribute to the monitoring effort of the site.	MoTE and EPA	By the end of Q1 of Year 3	-

Objective 3: Raise awareness of resource users to avoid and reduce negative impacts on the area.

Action		Responsible parties	Timeline	Est. Cost (MVR)
3.1	Distribute the relevant Regulations, Best Practices Guides ⁴ (both in Dhivehi and English) to at least 80% of Dive Operators, Liveaboards and Fishers in North Malé Atoll, aiming to reduce negative impacts on Manta Rays, Sharks and other marine life.	MoTE	By the end of Q4 of Year 1	-

⁴ Note: there are several guides already available such as "How to Swim with Manta Rays" (Manta Trust, n.d.), "Maldivian Whale Shark Tourist Encounter Guidelines" (Environmental Protection Agency, 2009), "Guide to Whale Shark & Code of Conduct" (Maldives Whale Shark Research Programme, n.d.)

7.2 Goal 2: Improve understanding of the MPA

Objective 4: Support and promote scientific research in the MPA in collaboration with scientists, NGOs, Universities etc.

Action	Responsible parties	Timeline	Est. Cost (MVR)
4.1 MoTE will engage with relevant researchers and/or NGOs to support ongoing and/or planned research and monitoring activities at and around Bodu Hithi Thila MPA.	MoTE	By the end of Q4 of Year 1	450,000.00
4.2 Provide training to local dive centre operators in North Malé Atoll that uses the MPA on data collection and submission protocols to existing monitoring programs. - The Coral Database by MMRI - o Photo quadrat collection protocol: Random (PQRA)⁵ - o Point Intercept Transect: Coral reef benthos⁶ - o Belt transect: Reef and Reef Associated Fish⁷ - o Bleaching Severity Assessment (Simple)⁸ - Data collection protocol for Manta and Devil Rays⁹	EPA in collaboration with MMRI	By the end of Q4 of Year 2	200,000.00

⁵ <https://coraldocsproduction.blob.core.windows.net/docs/b5f11bbc-42b6-43c6-af28-b25d74884f79.pdf>

⁶ <https://coraldocsproduction.blob.core.windows.net/docs/592e2c50-5fe9-46c8-bafe-70ef5b250584.pdf>

⁷ <https://coraldocsproduction.blob.core.windows.net/docs/ad2cd476-2bc4-489c-a313-612017552b4f.pdf>

⁸ <https://coraldocsproduction.blob.core.windows.net/docs/8e9a86fd-9d9b-4131-ad0b-808ec3d92378.pdf>

⁹ https://www.mantatrust.org/s/Manta-Trust_Guide-to-the-Manta-Devil-Rays-of-the-World_Data-Collection-Protocols.pdf

7.3 Goal 3: Raise public's awareness of K. Bodu Hithi Thila Region

Objective 5: Increase public involvement and awareness

Action		Responsible parties	Timeline	Est. Cost (MVR)
5.1	Develop and launch a comprehensive media campaign to educate resource users and the public about the significance of K. Bodu Hithi Thila MPA. The campaign will include at least 12 monthly posts featuring information on key species, habitats, ecosystems and conservation efforts, aiming for a minimum engagement rate of 10% across platforms. <i>Note: This campaign can be carried out with the awareness raising activities for the MPAs in North Malé Atoll.</i>	MoTE	By the end of Q2 of Year 1	60,000.00

8 Monitoring and Evaluation

The purpose of this Monitoring and Evaluation Plan is to specify the requirements to reasonably measure the implementation and the results of the management actions to conserve, promote research initiatives, and raise public awareness about the MPA.

Table 8.1: Monitoring and Evaluation Plan

Objective	Action	Purpose	Key Performance Indicator(s)	Timeline	Data Collection Method
1	1.1	Understand the number and frequency of resource users to inform management decisions	Detailed Report on Resource Users at the MPA	By the end of Q4 of Year 1	Document of the report.
	1.2	Enable issuance and tracking of permits for permitted activities within the MPA (visitation, research and restoration/rehabilitation activities).	K. Bodu Hithi Thila Region is added to the online permitting system of MoTE	By the end of Q4 of Year 1.	Check and record the online permitting system of MoTE.
			Number of permits issued.	Ongoing activity upon adding this MPA to the Online Permitting System for the first 4 years.	Record of permits issued by category and review every 6 months.
			Satisfaction rate among users that applied for permit(s).	By the end of Q1 of Year 2.	Online Survey among permit applicants.
	1.2.1	Increase awareness among stakeholders on the permitting process.	Awareness level among stakeholders on the permitting process.	By the end of Q1 of Year 2.	Online Survey among stakeholders.
	1.3	Prevent anchoring and control number of visitors to site.	Installation of mooring buoy	By the end of Q4 of Year 2	Record of mooring buoy installation.

Objective	Action	Purpose	Key Performance Indicator(s)	Timeline	Data Collection Method
2	2.1	Improve coordination among MPA management and enforcement authorities.	Documentation of the Working Group meetings.	Ongoing activity.	Monitor whether Minutes of Meetings are recorded and distributed.
			Implementation of coordinated actions agreed by Working Group.		Count the number of agreed-upon items that are completed following each meeting.
	2.2	Enable resource users to report illegal activities within MPA to the authorities, and actively participate in the monitoring of the area.	Reporting System launched	By the start of Q4 of Year 2	Record whether the reporting system is developed and launched within the planned timeline.
			User engagement	Every 6 months for the first 3 years after launching the reporting system.	Track number of users who access the reporting system
			Number of reports submitted	Every 6 months for the first 3 years after launching the reporting system.	Count the number of illegal activities reported by category, review every 6 months.
			Resolution rate	Every 6 months for the first 3 years after launching the reporting system.	Track percentage of reported incidents that are investigated and resolved or acted upon.

Objective	Action	Purpose	Key Performance Indicator(s)	Timeline	Data Collection Method
	2.3	Monitor the site remotely in real-time and alert enforcement agencies in a timely manner.	Surveillance system is installed and operational	By the end of Q4 of Year 2.	Check and record if the surveillance system is operational within the set timeframe.
			Incident detection rate	Every 3 months for the first 3 years of setting up the surveillance system.	Track the number of incidents detected by the system.
			Response time to incidents	Every 3 months for the first 3 years of setting up the surveillance system.	Measure and record the average response time taken to respond to the incidents detected by the surveillance system.
	2.4	Establish a pool of volunteers to assist in monitoring and managing the MPA via a Volunteer Program.	Establishment of the Volunteer Program.	By the start of Q1 of Year 5	Document establishment of the Volunteer Program.
			Number of volunteers recruited.	Ongoing activity upon establishment of the Volunteer Program.	Track and record the number of
	2.4.1	Ensure volunteers are trained for the tasks.	Training Plan	By the start of Q2 of Year 3	Document of the Volunteer Training Plan.
	2.4.5		Number of Volunteers that attended training sessions	On completion of each training session.	Attendance sheet.

Objective	Action	Purpose	Key Performance Indicator(s)	Timeline	Data Collection Method
	2.4.8	Gather feedback from participants and improve the program	Skills and knowledge gained by Volunteers	By the end of Q1 of Year 4	Online survey
	2.5	Encourage Resource Users to take up stewardship role of the MPA.	Number of Resource Users participating in the workshop	By the end of Q1 of Year 3	Track and record the number of Resource Users that participated in workshop.
			Number of monitoring reports submitted by the Resource Users	Ongoing after the completion of the workshop for 4 years.	Record of the Monitoring Reports submitted Record of number of Resource Users contributing to the monitoring.
3	3.1	Prevent and reduce damage to the MPA through awareness raising.	Number of Dive Operators and Fishers that received the Regulations, and Best-Practices-Guides	By the end of Q4 of Year 1	Record of number of Dive Operators and Fishers that received Regulations and Best-Practices-Guide
			Awareness level on the Regulations and Best-Practices	Prior to distribution of the guides and within 3 months after the distribution of the guides.	Conduct a survey before and after distribution of the guides to the Dive Operators and Fishers
			Implementation of the regulations and best practices	Annually for 2 years after distribution of the regulations and guides.	Annually review implementation of practices by the Dive Operators and Fishers.

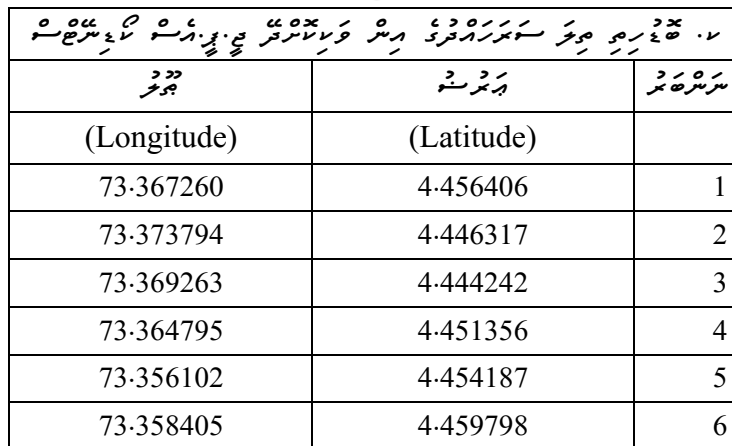
Objective	Action	Purpose	Key Performance Indicator(s)	Timeline	Data Collection Method
4	4.1	Contribute to ongoing research and monitoring at the MPA	Engagements with relevant researchers and/or NGOs. Monitoring reports submitted.	By the end of Q4 of Year 1 Ongoing activity.	Record of the engagements. Record of the monitoring reports submitted.
	4.2	Promote Citizen Science and improve quality and quantity of monitoring data collected by the dive community.	Number of training sessions organized for Dive Centres/Divers Number of participants in the training sessions	By the end of Q1 of Year 3	Record of training sessions, and number of participants in each training session.
			Monitoring data submitted by Dive Centres/Divers	Ongoing activity upon completion of the training sessions.	Record of number of monitoring data submitted by the Dive Centres/Divers.
5	5.1	Increase public's awareness about the MPA	Number of media posts published.	By the end of Q2 of Year 2	Record of number of media posts about the MPA
			Engagement rate with the media posts.	By the end of Q2 of Year 2	Record of engagement rate per media post regarding the MPA.

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Appendix A: Protected Area Declaration Announcement

 www.environment.gov.mv

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Appendix B: Ecological Baseline Report

ECOLOGICAL BASELINE CONDITION AT BODUHITHI THILA

April 2024

Prepared for



Ministry of Construction and Infrastructure

Prepared by



CDE Consulting
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1 INTRODUCTION

This document was prepared as part of the ongoing Biodiversity Offset Management Plan (BOMP) for the land reclamation for the development of a new port in Gulhifalhu, Maldives. One of the Biodiversity Offset actions is to improve the protection status of a listed Environmentally Sensitive Area (ESA) to a Marine Protected Area (MPA).

The purpose of this document is to present the baseline ecological condition at the following Environmentally Sensitive Area: Boduhithi Thila (Figure 2.1).

2 METHODOLOGY

The Guidelines for coral reef and small island vegetation surveys in Maldives (Dryden & Basheer, 2021) and methods in Survey Manual for Tropical Marine Resources (English et al., 1997) was used for this assessment. The following is a description of the detailed assessment methodology.

Surveys were carried out on 1st February 2024.

2.1 Reef Fish Community and Invertebrates

Fish species assemblages and abundance was estimated within a belt of 50 m by 5 m area of the reef at approximately 8 m depth.

The surveyor swam along the transect area and recorded the number and different species of fish observed within the belt. Fish species abundance was estimated on a cumulative Log 4, abundance scale from 1 to 8 (Table 2.1).

Table 2.1: Fish Abundance categories

Log 4 Abundance Categories	Number of Fishes
1	1
2	2 - 4
3	5 - 16
4	17 - 64
5	65 - 256
6	257 - 1024
7	1025 – 4096
8	4097 - 16384

Belt transect method was used to estimate invertebrate community at the survey sites. For this survey, 20 m section of the same transect area for the Reef Fish Abundance was used. Surveyor counted in the number of invertebrates within a 20 m by 5 m belt.

2.2 Benthic Community

Benthic community refers to the biotic and abiotic composition at a specific location.

2.2.1 Photo Quadrat Method

The surveyor swam within the same area used for the Reef Fish Survey (at 15 depth), taking an image, every five kicks of the fin. Eleven high-resolution images was taken, one approximately every 5 m (pictures covering 0.5 m² of the seabed) along the transect.

The images were analyzed using CPCe (Kohler & Gill, 2006). CPCe, or Coral Point Count with excel extension, developed by the National Coral Reef Institute. This is a software designed to determine coral community coverage and diversity using transect photographs. Underwater photographic frames will be overlaid by a matrix of randomly generated points, and the fauna/flora of species or substrate type lying beneath each point is identified. A total of 25 random points per picture will be analyzed to characterize the substrate composition (sample size: 275 points per transect).



Figure 2.1: Location of Boduhithi Thila

3 Results

3.1 Fish and Invertebrate Census

A total of 47 fish species of 16 fish families were recorded during the fish census. Highest number of fish species were recorded from Damselfish (*Pomacentridae*) family (11 species). Damselfish mainly feed on algae, benthic invertebrates and zooplankton. The most abundant fish species recorded here was Blue Triggerfish.

Four species belonging to the family *Scaridae* (Parrotfish) were recorded from the fish census surveys. Parrotfish are protected in the Maldives. No threatened species in the IUCN Red List were observed at this site during the survey.

Table 3.1: Summary of fish and invertebrate census along Transect (Boduhithi Thila)

Species	Common Name	IUCN Red List Status	Abundance
<i>Acanthurus nigricauda</i>	Eye-line Surgeonfish	Least Concern	2
<i>Acanthurus nigrofusus</i>	Dusky Surgeonfish	Least Concern	2
<i>Ctenochaetus striatus</i>	Fine-lined Bristletooth	Least Concern	2
<i>Zebbrasoma scopas</i>	Brown Tang	Least Concern	2
<i>Balistapus undulatus</i>	Striped Triggerfish	Least Concern	2
<i>Odonus niger</i>	Blue Triggerfish	Least Concern	6
<i>Sufflamen bursa</i>	Boomerang Triggerfish	Least Concern	2
<i>Chaetodon collare</i>	Head-band Butterflyfish	Least Concern	2
<i>Chaetodon falcata</i>	Double-saddle Butterflyfish	Least Concern	2
<i>Chaetodon guttatissimus</i>	Spotted Butterflyfish	Least Concern	2
<i>Chaetodon kleinii</i>	Brown Butterflyfish	Least Concern	2
<i>Chaetodon lunula</i>	Raccoon Butterflyfish	Least Concern	2
<i>Chaetodon meyeri</i>	Meyer's Butterflyfish	Least Concern	2
<i>Chaetodon xanthocephalus</i>	Yellow-head Butterflyfish	Least Concern	2
<i>Hemitaurichthys zoster</i>	Black Pyramid Butterflyfish	Least Concern	2
<i>Paracirrhites forsteri</i>	Forster's Hawkfish	Least Concern	2
<i>Plectorhinchus vittatus</i>	Oriental Sweetlips	Least Concern	3
<i>Myripristis murdjan</i>	Crimson Soldierfish	Least Concern	2
<i>Sargocentron caudimaculatum</i>	White-tail Squirrelfish	Least Concern	2
<i>Gomphosus caeruleus</i>	Bird Wrasse	Least Concern	2
<i>Halichoeres hortulanus</i>	Checkerboard Wrasse	Least Concern	2
<i>Halichoeres vrolikii</i>	Vroliks's Wrasse	Least Concern	2
<i>Labroides dimidiatus</i>	Bluestreak cleaner wrasse	Least Concern	2

Species	Common Name	IUCN Red List Status	Abundance
<i>Thalassoma lunare</i>	Moon Wrasse	Least Concern	2
<i>Scolopsis bilineata</i>	Monocle Bream	Least Concern	2
<i>Centropyge multispinis</i>	Many-spined Angelfish	Least Concern	2
<i>Pomacanthus imperator</i>	Emperor Angelfish	Least Concern	2
<i>Amphiprion clarkii</i>	Clark's Anemonefish	Least Concern	2
<i>Amphiprion nigripes</i>	Maldivian Anemonefish	Least Concern	4
<i>Chromis dimidiata</i>	Two-tone Puller	Least Concern	2
<i>Chromis opercularis</i>	Double-bar Puller	Least Concern	2
<i>Chromis viridis</i>	Green Puller	Least Concern	4
<i>Dascyllus trimaculatus</i>	Three-spot Humbug	Least Concern	2
<i>Plectroglyphidodon lacrymatus</i>	Jewel Damsel	Least Concern	2
<i>Pomacentrus caeruleus</i>	Blue-yellow Damsel	Least Concern	3
<i>Pomacentrus chrysurus</i>	White-tail Damsel	Least Concern	2
<i>Pomacentrus indicus</i>	Indian Damsel	Least Concern	2
<i>Pomacentrus philippinus</i>	Philippine Damsel	Least Concern	2
<i>Cetoscarus bicolor</i>	Two-colour Parrotfish	Least Concern	2
<i>Chlorurus sordidus</i>	Shabby Parrotfish	Least Concern	2
<i>Chlorurus strongylocephalus</i>	Sheephead Parrotfish	Least Concern	2
<i>Scarus tricolor</i>	Three-colour Parrotfish	Least Concern	2
<i>Pseudanthias squamipinnis</i>	Orange Basslet	Least Concern	5
<i>Epinephelus spilotoceps</i>	Foursaddle Grouper	Least Concern	2
<i>Siganus stellatus</i>	Starry Rabbitfish	Least Concern	2
<i>Canthigaster valentini</i>	Saddled Pufferfish	Least Concern	2
<i>Zanclus cornutus</i>	Moorish Idol	Least Concern	2

3.2 Photo Quadrat Survey

This survey was carried out at 8 m depth on the western side of Boduhithi Thila in North Male' atoll (Figure 3.3).

Dominant benthic substrates recorded here were rocky pavement ($34.55\% \pm 5.77\text{SE}$), live coral ($26.32\% \pm 4.98\text{SE}$) and sand ($20.20\% \pm 6.53\text{SE}$). Summary of the survey is presented in Figure 3.1.

The most abundant coral genus along the transect was *Porites* with massive species accounting for 83% of the coral cover. Summary of the coral genera composition is provided in Figure 3.2

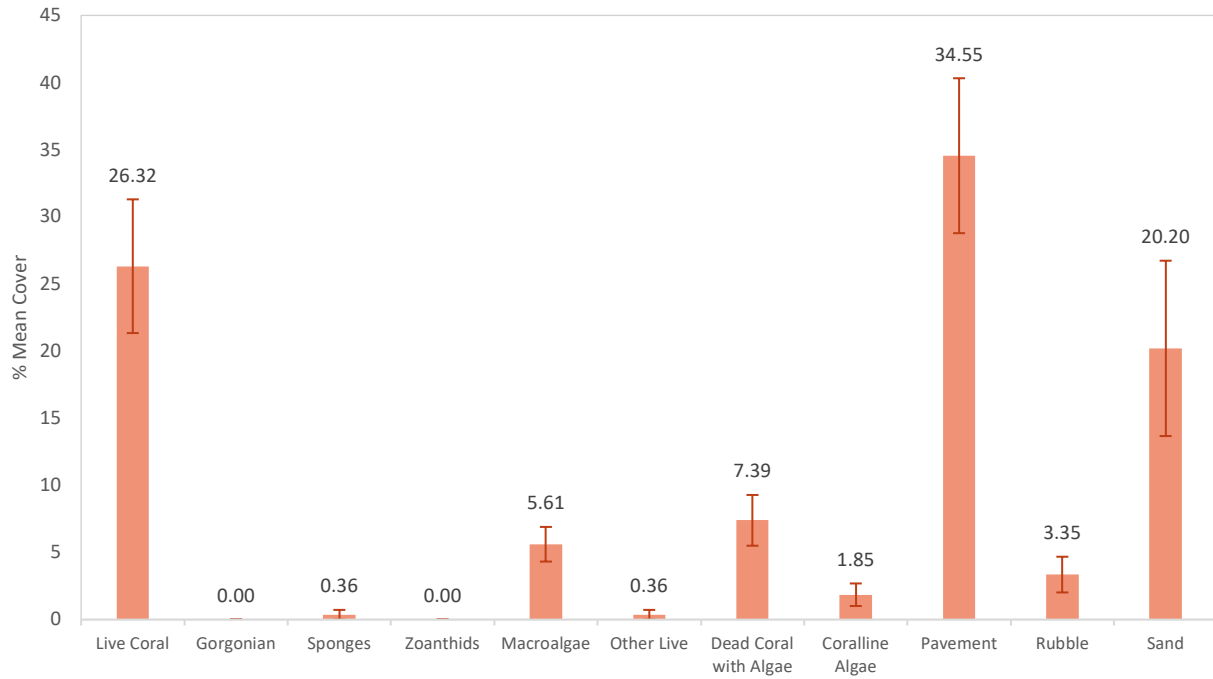


Figure 3.1: Benthic substrate composition along Transect (Boduhithi Thila)

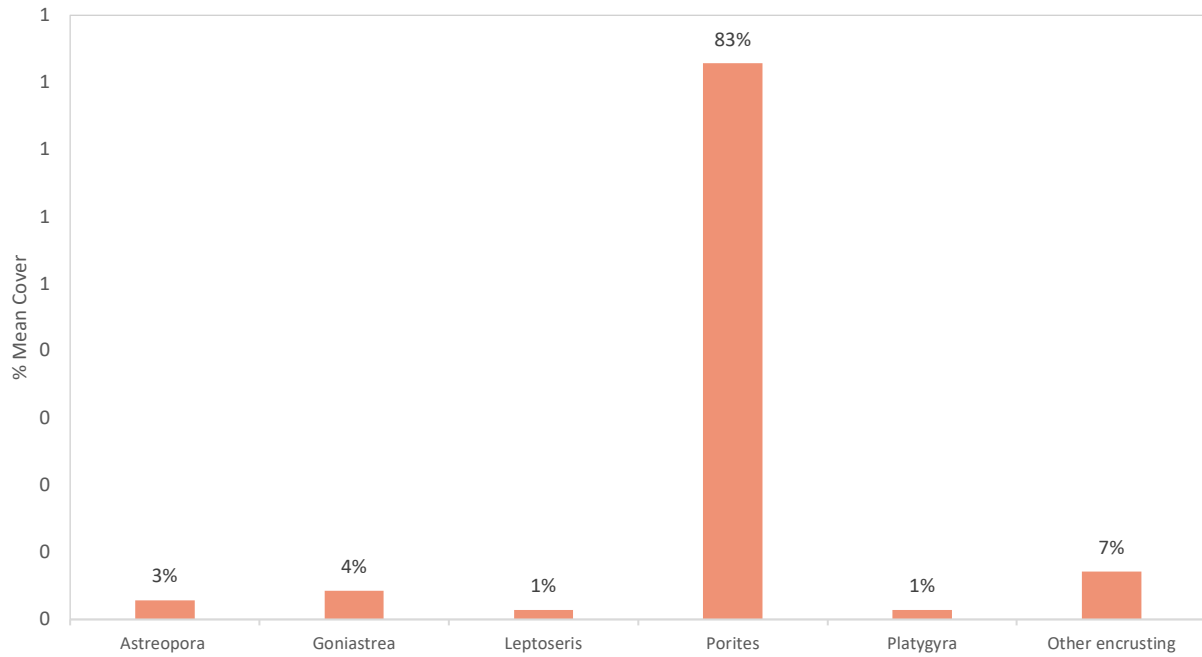
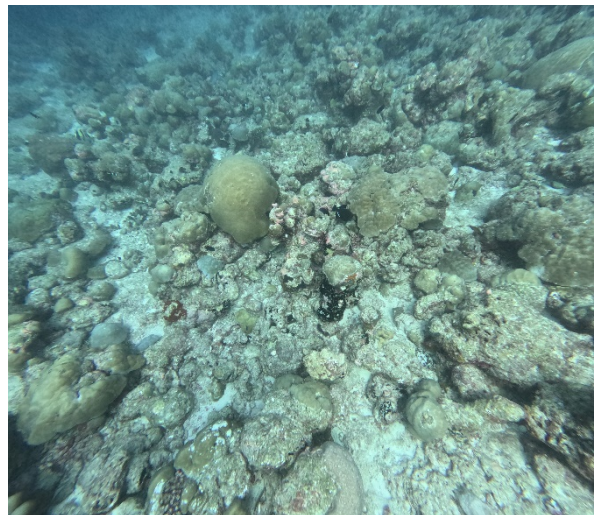
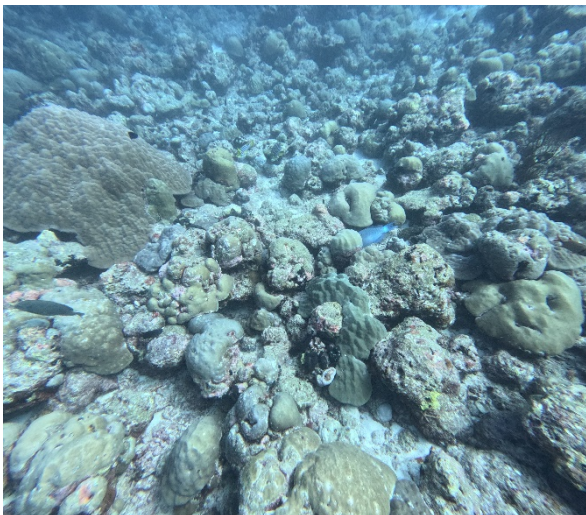
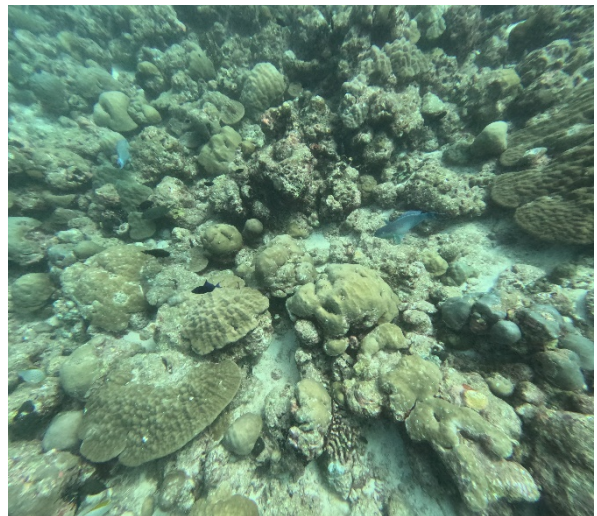
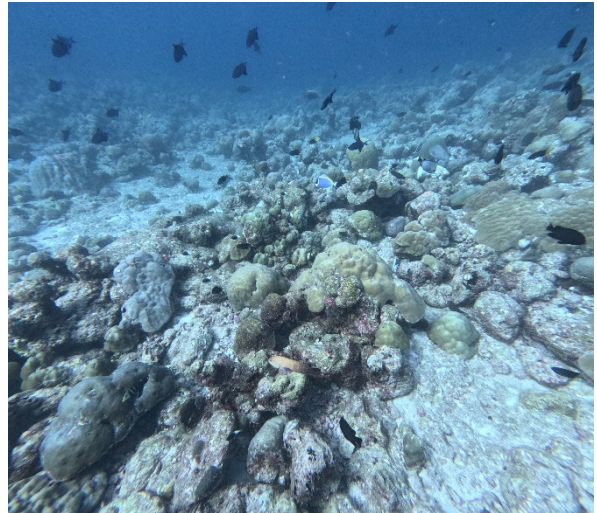


Figure 3.2: Composition of live corals along the transect by Genus



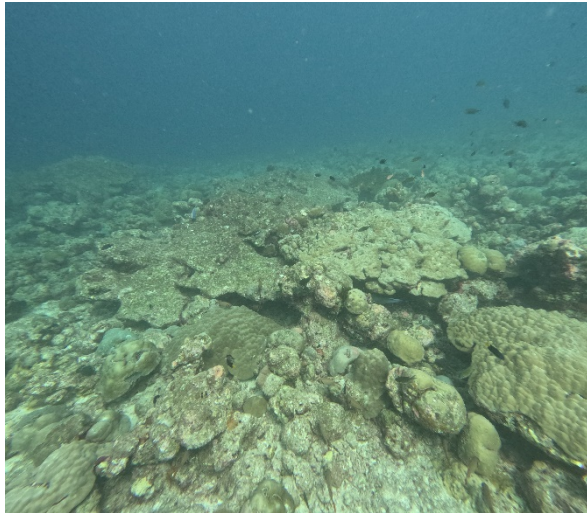


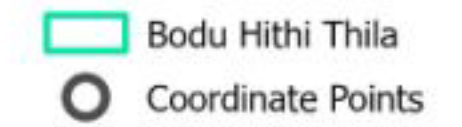
Figure 3.3: Select images showing the Boduhithi Thila

References

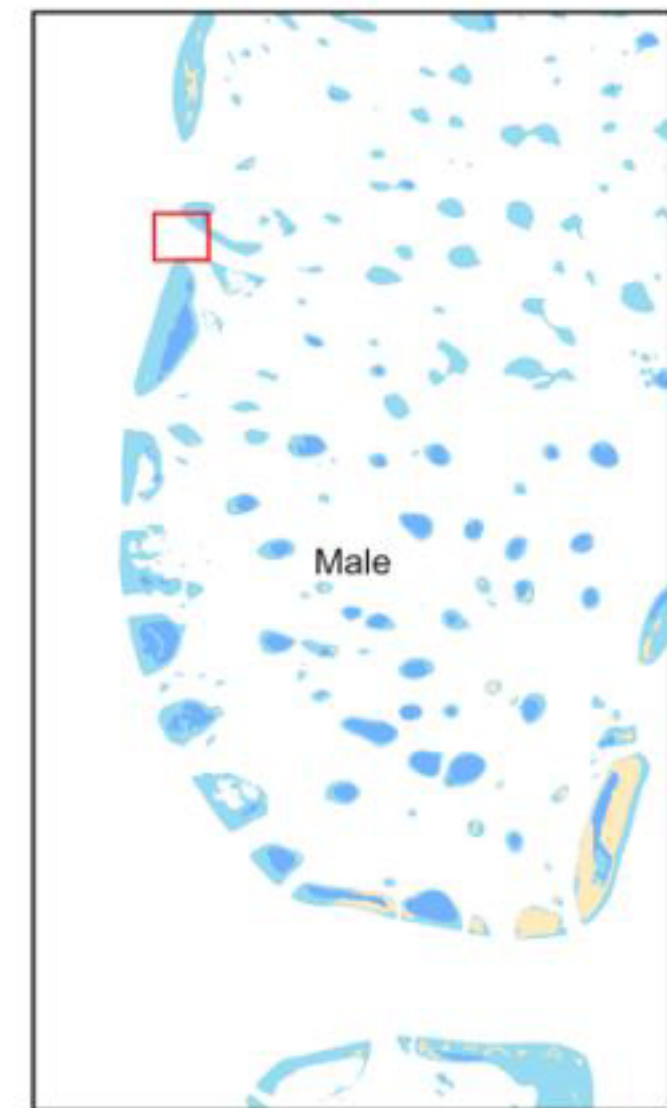
- Dryden, C., & Basheer, A. (2021). *Guidelines for coral reef and small island vegetation surveys in the Maldives*. <https://www.environment.gov.mv/v2/en/download/14746>
- English, S. A., Wilkinson, C., & Baker, V. (1997). *Survey Manual for Tropical Marine Resources*. Australian Institute of Marine Science.
- Kohler, K. E., & Gill, S. M. (2006). Coral Point Count with Excel extensions (CPCe): A Visual Basic program for the determination of coral and substrate coverage using random point count methodology. *Computers and Geosciences*, 32(9), 1259–1269. <https://doi.org/10.1016/j.cageo.2005.11.009>

Appendix C: Boundary Map

Legend



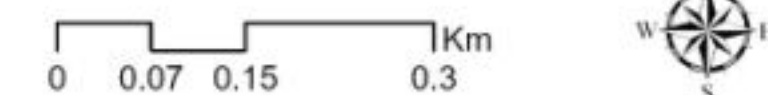
K. Bodu Hithi Thila Coordinates		
Point	Longitude	Latitude
1	73.36726	4.456406
2	73.37379	4.446317
3	73.36926	4.444242
4	73.36479	4.451356
5	73.3561	4.454187
6	73.35841	4.459798



Map Title
**Bodu Hithi Thila Marine Protected
Area Boundary Map**

Scale and Projection:

PROJECTION: Transverse Mercator (UTM Zone 43 N);
HORIZONTAL DATUM: WGS84;

Revision
00

Prepared by: AU

Map version: 8/21/2024;

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Appendix D: Inventory of IUCN and Maldives Red List Species

To identify probable distribution of Critically Endangered and Endangered Species within and around the protected area, a preliminary screening was carried out using Integrated Biodiversity Assessment Tool (IBAT). Additionally, specific studies for this area, including a report by IUCN SSC Shark Specialist Group (2023) and the National Red List of threatened species of the Maldives¹⁰ was used to create this inventory.

Sea Turtles

#	Species (Common Name)	IUCN Red List	Maldives Red List
1	<i>Eretmochelys imbricata</i> (Hawksbill Turtle)	Critically Endangered	Critically Endangered
2	<i>Chelonia mydas</i> (Green Turtle)	Endangered	Endangered

Sharks

#	Species (Common Name)	IUCN Red List	Maldives Red List
1	<i>Carcharhinus longimanus</i> (Oceanic Whitetip Shark)	Critically Endangered	-
2	<i>Sphyrna lewini</i> (Scalloped Hammerhead)	Critically Endangered	-
3	<i>Sphyrna mokarran</i> (Great Hammerhead)	Critically Endangered	-
4	<i>Rhina ancylostoma</i> (Bowmouth Guitarfish)	Critically Endangered	-
5	<i>Rhynchobatus australiae</i> (Bottlenose Wedgefish)	Critically Endangered	-
6	<i>Carcharhinus obscurus</i> (Dusky Shark)	Endangered	-
7	<i>Rhincodon typus</i> (Whale Shark)	Endangered	-
8	<i>Isurus oxyrinchus</i> (Shortfin Mako)	Endangered	-
9	<i>Carcharhinus amblyrhynchos</i> (Grey Reef Shark)	Endangered	-
10	<i>Eusphyra blochii</i> (Winghead Shark)	Endangered	-
11	<i>Negaprion acutidens</i> (Sharptooth Lemon Shark)	Endangered	-
12	<i>Stegostoma tigrinum</i> (Zebra Shark)	Endangered	-
13	<i>Centrophorus tessellatus</i> (Mosaic Gulper Shark)	Endangered	-

¹⁰ <https://www.environment.gov.mv/v2/en/maldives-red-list>

Rays

#	Species (Common Name)	IUCN Red List	Maldives Red List
1	<i>Aetomylaeus vespertilio</i> (Ornate Eagle Ray)	Endangered	-
2	<i>Aetobatus ocellatus</i> (Spotted Eagle Ray)	Endangered	-
3	<i>Mobula tarapacana</i> (Sicklefin Devil Ray)	Endangered	-
4	<i>Mobula thurstoni</i> (Bentfin Devil Ray)	Endangered	-
5	<i>Mobula kuhlii</i> (Short horned Pygmy Devil Ray)	Endangered	-
6	<i>Mobula birostris</i> (Oceanic Manta Ray)	Endangered	-
7	<i>Mobula mobular</i> (Spinetail Devil Ray)	Endangered	-

Mammals

#	Species (Common Name)	IUCN Red List	Maldives Red List
1	<i>Balaenoptera musculus</i> (Blue Whale)	Endangered	-

Invertebrates

#	Species (Common Name)	IUCN Red List	Maldives Red List
1	<i>Holothuria scabra</i> (Golden Sandfish)	Endangered	-
2	<i>Holothuria lesson</i> (Golden Sandfish)	Endangered	-
3	<i>Holothuria nobilis</i> (Black Teatfish)	Endangered	-

Corals

#	Species (Common Name)	IUCN Red List	Maldives Red List
1	<i>Acropora rudis</i>	Endangered	Critically Endangered

Other Bony Fish

#	Species (Common Name)	IUCN Red List	Maldives Red List
1	<i>Lethrinus mahsena</i> (Sky Emperor)	Endangered	-

Appendix E: Stakeholder Consultations

Minutes of Meeting

Stakeholder Consultations

1. Ministry of Fisheries and Ocean Resources

Date	26-05-2024
Time	13:00 – 13:30

Participants of the meeting

#	Name	Desigation	Organization
1	Munshida Ibrahim	Director of Fisheries Management	Ministry of Fisheries and Ocean Resources
2	Mohamed Faizan	Consultant	CDE Consulting

Summary of comments by the Stakeholder

#	Details
1	Bodu Hithi Thila is a potential bait fishery ground. Since the number of bait fishing grounds are few in Malé Atoll we recommend protecting this area under Category 7 “Protected with Sustainable Use”

2. Ministry of Transport and Civil Aviation

Date	28-08-2023
Time	14:00 – 14:15

Participants of the meeting

#	Name	Role	Organization
1	Asrar	Civil Engineer	Ministry of National Planning, Housing and Infrastructure
2	Hussain Nazeer	Director	Ministry of Transport and Civil Aviation
3	Mohamed Faizan	Consultant	CDE Consulting

Summary of comments by the Stakeholder

#	Details
1	The Ministry has no objections against the protection of this area.

3. Ministry of Tourism

Meeting 1

Date	14-05-2024
Time	14:00 – 14:30

Participants of the meeting

#	Name	Designation	Organization
1	Mohamed Sinan	Environmental Officer	Ministry of Tourism
2	Mohamed Faizan	Consultant	CDE Consulting

Summary of comments by the Stakeholder

#	Details
1	The Ministry has no objections against the protection of this area

Meeting 2

Date	07-11-2024
Time	10:30 – 11:30

Participants of the meeting

#	Name	Designation	Organization
1	Mohamed Sinan	Environmental Officer	Ministry of Tourism
2	Mohamed Faizan	Consultant	CDE Consulting
3	Aishath Huma	Environmental, and Social Safeguard Specialist	MoCI

Summary of comments by the Stakeholder

#	Details
1	Tourist Resorts are unaware of Protected Areas or their boundaries. There is a need to make the resort operators more aware of these areas. The Watersports or Dive Centre's in Resorts are usually operated by third parties, and since they usually arrange trips to these sites it is important to also make them aware of Protected Areas, and activities permitted within these areas.
2	In addition to resorts, local guesthouse operators are also key resource users of these MPAs. Guesthouse operators also need to be made aware of MPAs and activities permitted within these areas.
3	Large scale land reclamation in Malé Atoll is a major threat to MPAs and coral reefs. There is an ongoing land reclamation project north of Bodu Hithi Thila Region. The Ministry of Environment and EPA should work closely with the developer of that area and make them aware of the MPA and issues related to the development that may affect the protected area. Furthermore, even if you engage with the Proponent the Contractors of the Projects may not be aware of issues so it is important to engage with the Contractors and make them aware as well.
4	Recommend including Guesthouse Association, MATI, and Liveboards in the discussions and consultations.

4. Environmental Protection Agency

Date	18-09-2023
Time	09:00 – 09:30

Participants of the meeting

#	Name	Designation	Organization
1	Yousuf Rilwan	Director, Environmental Research and Conservation Unit	Environmental Protection Agency
2	Ahmed Leevan	Surveyor, Environmental Research and Conservation Unit	Environmental Protection Agency
3	Mohamed Faizan	Consultant	CDE Consulting

Summary of comments by the Stakeholder

#	Details
1	This Agency has no objections against the protection of this area.

5. Maldives Marine Research Institute

Meeting 1

Date	26-05-2024
Time	13:00 – 13:30

Participants of the meeting

#	Name	Role	Organization
1	Khadheeja Ali	Senior Research Officer	MMRI
2	Mohamed Faizan	Consultant	CDE Consulting

Summary of comments by the Stakeholder

#	Details
1	Bodu Hithi Kandu has been identified as an Important Shark and Ray Area (ISRA), this include the entirety of Bodu Hithi Channel and not just the Pinnacle Reef (Bodu Hithi Thila).

Meeting 2

Date	27-10-2024
Time	11:00 – 12:00

Participants of the meeting

#	Name	Role	Organization
1	Khadheeja Ali	Senior Research Officer	MMRI
2	Mohamed Faizan	Consultant	CDE Consulting
3	Eamaan Rasheed	Conservation Officer	MoCCEE
4	Aishath Huma	Environmental, and Social Safeguard Specialist	MoCI

Summary of comments by the Stakeholder

#	Details
1	The Threat Level of Dredging and Reclamation activities is now set at Medium Risk Level, which is also the risk level identified for damage caused by recreational divers. Hence, we recommend revising the threat levels in the Plan.
2	To enhance the understanding of Marine Protected Areas (MPAs), we propose setting a monitoring plan for protected areas. This plan should include established monitoring protocols from The Coral Database, such as Point Intercept Transect surveys, Reef and Reef-associated Fish Surveys, and Invertebrate Surveys. Additionally, we recommend establishing at least 2 to 3 permanent monitoring sites within each protected area at two different depths, with monitoring conducted every 2 to 3 years. It is also crucial to allocate a budget for government employees responsible for monitoring, as MMRI is currently struggling to retain quality staff due to low salaries. Introducing a special allowance could serve as an effective incentive to improve staff retention.
3	The proposed surveillance system for the Marine Protected Area (MPA) under Objective 2 requires a significant budget. Such systems are crucial for protected areas of specific categories or those within biosphere reserves. Given the presence of multiple protected areas in Malé Atoll, it may be more feasible to establish surveillance systems at strategic locations that can monitor several sites simultaneously.

#	Details
	However, we must consider whether there will be sufficient funding to implement a surveillance system for each MPA.

6. Maldives National Defence Force (MNDF) and Coast Guard

Meeting 1

Date	18-09-2023
Time	09:00 – 09:30

Participants of the meeting

#	Name	Role	Organization
1	Asrar	Civil Engineer	Ministry of National Planning, Housing and Infrastructure
2	Mohamed Faizan	Consultant	CDE Consulting
3	Mariyam Yumna	Project Manager	Ministry of National Planning, Housing and Infrastructure
4	Ibrahim Ali Jaleel	-	Ministry of National Planning, Housing and Infrastructure
5	Mohamed Fahumy	Director of Plans & Policy Department	MNDF
6	Hassan Saeed	Director of Plans, Policy & Resource Management	MNDF
7	Rayya Hussain	Environmental Analyst	Ministry of Environment, Climate Change and Technology
8	Eeman Rasheed	Environmental Management & Conservation	Ministry of Environment, Climate Change and Technology

Summary of comments by the Stakeholder

#	Details
1	MNDF and Coast Guard have no comments regarding this issue.

Meeting 2

Date	27-10-2024
Time	11:00 – 12:00

Participants of the meeting

#	Name	Role	Organization
1	Yoosuf Nishan	Officer	MNDF Coast Guard
2	Mohamed Faizan	Consultant	CDE Consulting
3	Eamaan Rasheed	Conservation Officer	MoCCEE
4	Aishath Huma	Environmental, and Social Safeguard Specialist	MoCI

Summary of comments by the Stakeholder

#	Details
1	Awareness raising among dive operators, safari vessel or liveaboard operators about the prohibited activities within the MPA is important to reduce negative impacts on the sites. Recommend adding safari vessel and/or liveaboard operators to the Action 3.1 under Objective 3, as this group is an important resource user of both the protected areas.

7. International Union of Conservation of Nature (IUCN) Maldives

Date	03-09-2023
Time	14:00 – 14:30

Participants of the meeting

#	Name	Role	Organization
1	Asrar	Civil Engineer	Ministry of National Planning, Housing and Infrastructure
2	Mohamed Faizan	Consultant	CDE Consulting
3	Mariyam Yumna	Project Manager	Ministry of National Planning, Housing and Infrastructure
4	Najfa Shaheem Razy	Chief Technical Officer	IUCN Maldives
5	Shihany Habeeb	Senior Social Science Officer	IUCN Maldives
6	Ibrahim Liraar	Administrative Officer	IUCN Maldives
7	Rayya Hussain	Environmental Analyst	Ministry of Environment, Climate Change and Technology
8	Afa Hussain	Conservation Officer	Ministry of Environment, Climate Change and Technology
9	Eeman Rasheed	Environmental Management & Conservation	Ministry of Environment, Climate Change and Technology

Summary of comments by the Stakeholder

#	Details
1	IUCN have not done any research on this area, and have no plans to further research the K atoll area

8. Maldives Association for Tourism Industry (MATI)

Meeting 1

Date	17-03-2024
Time	10:00 – 10:30

Participants of the meeting

#	Name	Role	Organization
1	Ifham Zareer	Consultant	CDE Consulting
2	Mohamed Faizan	Consultant	CDE Consulting
3	Rafil Mohamed	Secretary General	MATI

Summary of comments by the Stakeholder

#	Details
1	MATI is supportive of protecting areas, and all popular dive sites in the Atoll should be protected.
2	The management plan should be custom made for the area, with realistic plans that can achieve the objectives of protection. Given our lack of resources it might be best to develop a set of guidelines to follow, and let the users self-regulate so that everyone works collectively to protect this area.

Meeting 2

Date	12-11-2024
Time	13:00 – 14:00

Participants of the meeting

#	Name	Role	Organization
1	Rafil Mohamed	Executive Director	MATI
2	Mohamed Faizan	Consultant	CDE Consulting
3	Aishath Huma	Environmental, and Social Safeguard Specialist	MoCI

Summary of comments by the Stakeholder

#	Details
1	Recommend consulting with PADI and SSI to get more information on the protected sites as they would be able to provide more insights as well as historical conditions of these sites.
2	We will also need the draft plan to provide our comments. We also would like more information on any restrictions on number of vessels that can use the area, and any fees that may be imposed on the visitors to the sites.

9. Fishermen in Malé Atoll

Consultation 1

Date	January and February 2024
------	---------------------------

Participants

#	Name	Role
1	Ali Rafiu	Reef Fishermen
2	Ismail Simal	Reef Fishermen
3	Fawaaz Shaukath	Reef Fishermen
4	Mohamed Rasheed	Reef Fishermen
5	Ibrahim Waheed	Reef Fishermen
6	Abdulla Shareef	Reef Fishermen
7	Abdulla Rasheed	Reef Fishermen
8	Ibrahim Faiz	Reef Fishermen
9	Abdulla Didi	Reef Fishermen
10	Hassan Adhham	Reef Fishermen
11	Muraafiu Zubair	Reef Fishermen

Summary of comments by the Stakeholder

#	Details
1	Some fishermen are concerned that the protection of such areas is only in name-sake. Other fishermen are concerned that the protection will make it more difficult to obtain bait.

Consultation 2

Date	13-11-2024
------	------------

Participants

#	Name	Role
1	Mohamed Ibrahim	Reef Fisher (Himmafushi)
2	Arshaadh Athif	Reef Fisher (Himmafushi)
3	Abdhulla Asad	Reef Fisher (Thulusdhoo)
4	Musthafa Yoosuf	Reef Fisher (Thulusdhoo)
5	Ali Zahir	Reef Fisher (Thulusdhoo)
6	Ahmed Rashaadh	Reef Fisher (Thulusdhoo)
7	Abdhulla Abbas	Reef Fisher (Thulusdhoo)
8	Ahmed Saamy	Reef Fisher (Villingili)
9	Ahmed Ashfam	Reef Fisher (Villingili)
10	Easa Khaleel (Baabe)	Reef Fisher (Villingili)
11	Abdullah Abdu Rahman	Reef Fisher (Villingili)
12	Mohamed Yamin	Reef Fisher (Villingili)
13	Nazim Ahmed	Reef Fisher (Villingili)
14	Inaz Shirufan	Reef Fisher (Villingili)
15	Ahmed Ibrahim	Reef Fisher (Villingili)
16	Ismail Shahil Rafeeu	Sports Fisher (Villingili)
17	Mohamed Moosa	Reef Fisher (Villingili)
18	Abdulla Anees	Reef Fisher (Villingili)

#	Name	Role
19	Mohamed Rafeeu	Reef Fisher (Villingili)
20	Ahmed	Reef Fisher (Villingili)
21	Falaah	Billfish Fisher (Villingili)

Summary of comments by the Stakeholder

#	Details
1	These area is usually very turbid due to dredging and reclamation works ongoing in nearby resorts, need a way to mitigate this.
2	Waste is dumped into these areas by resorts, need to stop dumping waste.
3	Strict monitoring is required in these area.
4	People should be made aware of boundary or protected areas, otherwise people will go into these areas.
5	Don't think it is practical for everyone to inform Ministry before visiting these sites.
6	Support the decision to protect the area, but government should also consider the benefits to fishers when making decisions. For example the growth of Shark population is making fishery very difficult, but catching sharks is banned.

10. Dive Centres in Malé Atoll

Consultation 1

Date	April 2024
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#	Name of Dive Centres that participated
1	Zoona Naseem, Moodhu Bulhaa Dive Centre
2	Hamid Haleem, Sea Star Dive Centre

Summary of comments by the Stakeholders

#	Details
1	Bodu Hithi Thila has a lot of various types of sharks and reef manta rays
2	When protecting places, it is important to protect them so that the rules made for them are enforced, rather than just being “protected” on paper. Diving rules and good practices must be followed when diving.

Consultation 2

Date	12-11-2024
Time	13:00 – 14:00

Participants of the meeting

#	Name	Role	Organization
1	Faariu Ahmed	Managing Director	Himmafushi Scuba Adventure
2	Mohamed Faizan	Consultant	CDE Consulting
3	Aishath Huma	Environmental, and Social Safeguard Specialist	MoCI

Summary of comments by the Stakeholder

#	Details
1	We also recommend consulting with PADI and SSI to get more information on the protected sites.

11. Tourist Resorts in Malé Atoll

Date	12-11-2024
Time	13:00 – 14:00

Participants of the meeting

#	Name	Role	Organization
1	Mei P Pun	General Manager	VARU by Atmosphere
2	Nitin Walia	Resort Manager	Taj Cora Reef Resort and Spa

Summary of comments by the Stakeholders

#	Details
1	VARU by Atmosphere: There are ongoing reclamation projects around Bodu Hithi Thila Protected Area. The plan needs to take into account these projects and their cumulative impacts on the area.
2	Taj Coral Reef Resort and Spa: We will provide our comments to the draft management actions after reviewing those with our Dive Team and get back via email.