



Naf Marine Protected Area (MPA) Management Plan 2026-2040



Sustainable Coastal and Marine Fisheries Project (SCMFP)

Department of Fisheries (DoF)

Ministry of Fisheries and Livestock (MoFL)

October 2025



Naf Marine Protected Area (MPA) Management Plan

Department of Fisheries Team

Md. Zia Haider Chowdhury
Monish Kumar Mondal
Dr. Mohammed Shariful Azam
Aminul Islam

IUCN Bangladesh Team

A B M Sarowar Alam
Sk Md Saeef Ul Hoque Chishty

Technical Experts

Dr. Subrata Sarker
Dr. Alifa Bintha Haque

Published by

Department of Fisheries, Government of the People's Republic of Bangladesh
and IUCN Bangladesh

Copyright © 2025

Department of Fisheries of Bangladesh and IUCN Bangladesh

Acknowledgement

We gratefully acknowledge all individuals who contributed to the development of this Naf MPA Management plan, including personnel from the Ministry of Fisheries and Livestock, the Department of Fisheries, and the many experts who generously shared their knowledge and insights. Special appreciation is extended to the local communities and fishers who dedicated their time and actively participated in stakeholder consultations. This management plan was developed under the Marine Protected Areas (MPA) Management Plan Development and Implementation of Sustainable Coastal and Marine Fisheries project, a collaboration between the Department of Fisheries and IUCN.

We are sincerely thankful to Department of Fisheries and World Bank for funding the Marine Protected Areas (MPA) Management Plan and Development project, as well as Sustainable Coastal and Marine and Fisheries project for this initiative.

We also extend our thanks to Mr. Zia Haider Chowdhury, Project Director, Mr. Monish Kumar Mondal, Deputy Project Director and Dr. Mohammed Shariful Azam, Deputy Project Director, Sustainable Coastal and Marine Fisheries Project (SCMFP), Department of Fisheries, Dr. Subrata Sarker, Team leader, MPA project, Dr. Alifa Bintha Haque, MPA specialist and Mr. Md. Shahad Mahabub Chowdhury, Environmental Specialist, The World Bank Office, Dhaka, for their invaluable contributions to the technical editing and finalization of the plan.

Table of Contents

Acknowledgement	i
Table of Contents.....	iii
Executive Summary	vi
1. Introduction.....	1
2. Management Plan.....	3
3. Key Management Recommendations	25
4. Alternative livelihood for impacted community	34
5. Monitoring of Naf MPA	36
6. Interagency cooperation.....	37
7. Infrastructure and Equipment.....	38
8. Adaptive Co-management.....	39
9. Re-Evaluation of MPA Boundaries and Zoning Plans	40
10. Sustainable Financing for Naf MPA	41
11. Programs for implementing MPA objectives.....	43
Programs to Achieve Objective 1: Protect Juvenile Fisheries in the Naf River Estuary and Adjacent Waters.....	43
Programs to Achieve Objective 2: Enhance Fisheries Resources through Sustainable Ecosystem- Based Management.....	43
Programs to Achieve Objective 3: Protect Megafauna Diversity around the Naf River Estuary and Adjacent Areas	44
Programs to Achieve Objective 4: Conserve the Nesting Grounds of Sea Turtles and Shorebirds	44
Programs to Achieve Objective 5: Improve the Livelihood Resilience of Fishers Around the Naf River Estuary and Adjacent Marine Ecosystems	45
12. Priority Biological Resources	45
13. Socio-economic Conditions	52
14. Fishing Gears Used in the Area	55
15. Environmental Conditions and Stressors	58
16. Data Collection	65
Annex I: Gazette notification of Naf MPA by the Ministry of Fisheries and Livestock of Bangladesh government.....	69
Annex II: Indicators for Naf MPA monitoring	71
Biophysical Indicators	71
Socio-Economic Indicators	72
Governance Indicators	72
Annex III: List of ministries of Bangladesh government to support MPA related activities.....	74

Annex 4: List of donors to support and implement MPA management related activities.....	76
Annex V: Programs to achieve objective 1: Protect Juvenile Fisheries in the Naf River Estuary and Adjacent Waters.....	85
Annex VI: Programs to achieve objective 2: Enhance Fisheries Resources Through Sustainable Ecosystem-Based Management	87
Annex VII: Programs to achieve objective 3: Protect Megafauna Diversity Around the Naf River Estuary and Adjacent Areas.....	88
Annex VIII: Programs to achieve objective 4: Conserve the Nesting Grounds of Sea Turtles and Shorebirds	89
Annex IX: Programs to achieve objective 5: Improve the Livelihood Resilience of Fishers around the Naf River Estuary and Adjacent Marine Ecosystems	90
Annex X: List of species available in Naf MPA.....	92

List of Figures

Figure 1 Geographical location of Naf MPA as per gazette notification.....	1
Figure 2 Schematic diagram showing the management goal and objectives, and key management components of Naf MPA	2
Figure 3 Organogram for implementation of Naf MPA management plan	4
Figure 4 Working process of the Naf MPA management plan.....	5
Figure 5 An indicative/conceptual marine spatial plan for the Naf MPA based on preliminary mapping of data	27
Figure 6 Outline of zonal management plan for Naf MPA.....	29
Figure 7 Potential options to support the livelihood of impact community.....	35
Figure 8 Overall structure of integrated and cost-effective monitoring strategy for the Naf MPA	36
Figure 9 Interagency cooperation framework for Naf MPA management	38
Figure 10 Adaptive co-management strategies for Naf MPA.....	40
Figure 11 Overall financing strategy for Naf MPA management.....	42
Figure 12 Juveniles of different commercially important fish species found in the Naf River estuary	46
Figure 13 Distribution of juvenile fish habitat at the Naf MPA	47
Figure 14 Fish species diversity and fish catch in the coastal ecosystem of Bangladesh. Data are derived from the research survey of RV Meen Sandhani, Department of Fisheries (2022-2023).....	48
Figure 15 Habitat of cetaceans (top left), elasmobranch (top right), shorebird (bottom left) and sea turtle (bottom right) with frequent observations in the Naf MPA	49
Figure 16 Spatial distribution of ecological habitats of species.....	50
Figure 17 The overall biodiversity hotspots within the Naf MPA based on species presence data from locations with higher observation frequencies. The blank areas do not indicate an absence of species but represent regions with lower observation frequencies compared to the highlighted zones. This analysis integrates data from various taxa and habitats, including cetaceans, elasmobranchs, mangroves, shorebirds, overall fisheries diversity, and sea turtles. These groups were selected in alignment with the management objectives of the Naf MPA. The combined dataset underwent density estimation to identify areas of significant species presence, ensuring a comprehensive representation of biodiversity across the MPA.....	52
Figure 18 Fisheries related livelihood activities in Teknaf.....	53

Figure 19 Diversity of net in the Naf – Saint Martin’s Peninsula (thela jal , Bata jal, current jal, tana jal, chappa jal, fohilla jal, teilla jal, ESNB net, Chani Jal, Raja jal, Ilish jal, Vasa jal, lakka jal).....	56
Figure 20 Spatio-temporal distribution of SST at the Naf MPA	59
Figure 21 Spatio-temporal distribution of chlorophyll a at the Naf MPA	59
Figure 22 Seasonal distribution of temperature at the Naf MPA.....	60
Figure 23 Seasonal distribution of salinity at the Naf MPA	61
Figure 24 Seasonal distribution of DO at the Naf MPA	62
Figure 25 Seasonal distribution of phosphate at the Naf MPA.....	63
Figure 26 Seasonal distribution of nitrate at the Naf MPA.....	63
Figure 27 Seasonal distribution of silicate at the Naf MPA.....	64
Figure 28 Stakeholder consultation meeting at Teknaf Upazilla	67

List of Tables

Table 1: Composition of the proposed Union MPA Co-management Committee (UCC)	11
Table 2: Proposed members of UMCC.....	15
Table 3: Proposed members of DMCC.....	18
Table 4: Proposed members for NMCC	19
Table 5: Members of Technical Committee for MPA (TC-MPA).....	23
Table 6: Occurrence of commercially important juvenile fish species and their food items in the Naf River estuary	48
Table 7 Seasonal calendar of occurrence of different biotic groups at the Naf MPA.....	52
Table 8 Fishing gears used by in by the fishers from Teknaf	57

Executive Summary

Naf Marine Protected Area (MPA) officially declared in May 2024 under the Marine Fisheries Act 2020, encompasses 734.17 square kilometers in the Teknaf Upazila of Cox's Bazar, Bangladesh. It was established to conserve critical marine biodiversity and support sustainable resource use. The MPA is categorized under IUCN Protected Area Category VI, which emphasizes the integration of conservation objectives with the sustainable use of natural resources. The management plan is designed to protect key species including juvenile and adult fisheries, cetaceans, sea turtles, shorebirds, and elasmobranchs while enhancing the resilience and livelihoods of local communities dependent on these marine ecosystems.

The overarching goal of the management plan is to ensure the long-term ecological health of the Naf River Estuary and adjacent waters through a structured, participatory, and adaptive co-management approach. Key management objectives include protecting juvenile and adult fish populations and megafauna diversity, enhancing fisheries through ecosystem-based practices, conserving critical nesting grounds for sea turtles and shorebirds, and improving the socio-economic conditions of local fishers. The plan will be implemented over a 15-year period, divided into three phases (2026–2030, 2031–2035, and 2036–2040).

A four-tier institutional framework has been established to ensure effective governance and stakeholder involvement. At the local level, Union Conservation Committees (UCCs) will engage community members in decision-making and alternative livelihood programs. The Upazila MPA Co-management Committee (UMCC) and District MPA Co-management Committee (DMCC) will oversee implementation and coordination at sub-district and district levels, respectively. The National MPA Coordination Committee (NMCC) chaired by the Secretary, Ministry of Fisheries and Livestock will provide high-level policy guidance and inter-ministerial coordination. Zonal management is a cornerstone of the plan with the MPA divided into four distinct zones: a Cetacean and Elasmobranch Conservation Zone where fishing is prohibited; a Sustainable Fishing Zone for regulated artisanal fishing; a Juvenile and Megafauna Conservation Zone with seasonal fishing restrictions; and a Sustainable Tourism Zone to promote eco-friendly visitor activities. This zoning strategy is supported by a conceptual spatial plan, which will be refined through scientific and participatory processes. Community engagement and livelihood development are central to the plan's success. Local fishers will be involved in monitoring through citizen science initiatives, using Android applications and low-cost sensors to collect biodiversity and environmental data. Alternative livelihood programs such as mariculture, eco-tourism, handicrafts, and vocational training will be promoted to reduce dependence on fishing and enhance economic resilience. Financial inclusion mechanisms, including microfinance and cooperative models, will support these transitions. Enforcement, monitoring, and surveillance will be conducted through Fisheries Monitoring Center (FMC) of DoF and strengthened by its Joint Monitoring Cell (JMC) through partnerships with law enforcement agencies, community patrols, and modern technology such as vessel monitoring systems. A sustainable financing strategy will diversify funding sources, including government allocations, international grants, tourism fees, and payments for ecosystem services, ensuring long-term operational viability. The Naf MPA is ecologically rich, hosting 845 documented species, including 210 finfish and 114 megafauna species. It supports approximately 9,000 fishers across five unions, where fishing is the primary livelihood. The region faces significant pressures from overfishing, habitat degradation, pollution, and climate change, which threaten both biodiversity and community wellbeing. The management plan addresses these challenges through an integrated approach that combines conservation action with socio-economic development, aiming to achieve a balance between ecological sustainability and human prosperity. Through collaborative governance, adaptive management, and sustained stakeholder engagement, the Naf MPA is poised to become a model for effective marine conservation in Bangladesh.

1. Introduction

The Naf Marine Protected Area (MPA; Figure 1) covers an area of 734.17 square kilometers and was officially declared by Statutory Regulation Order (SRO) No. 132-Law/2024, dated 21 May 2024, under clause 19 of the Marine Fisheries Act, 2020 (Annex I). This declaration was further formalized with a gazette notification on 28 May 2024. The management plan for the Naf MPA has been developed in accordance with the legislative boundaries outlined in the Marine Fisheries Act, 2020, and will be implemented under the oversight of this fisheries legislation.

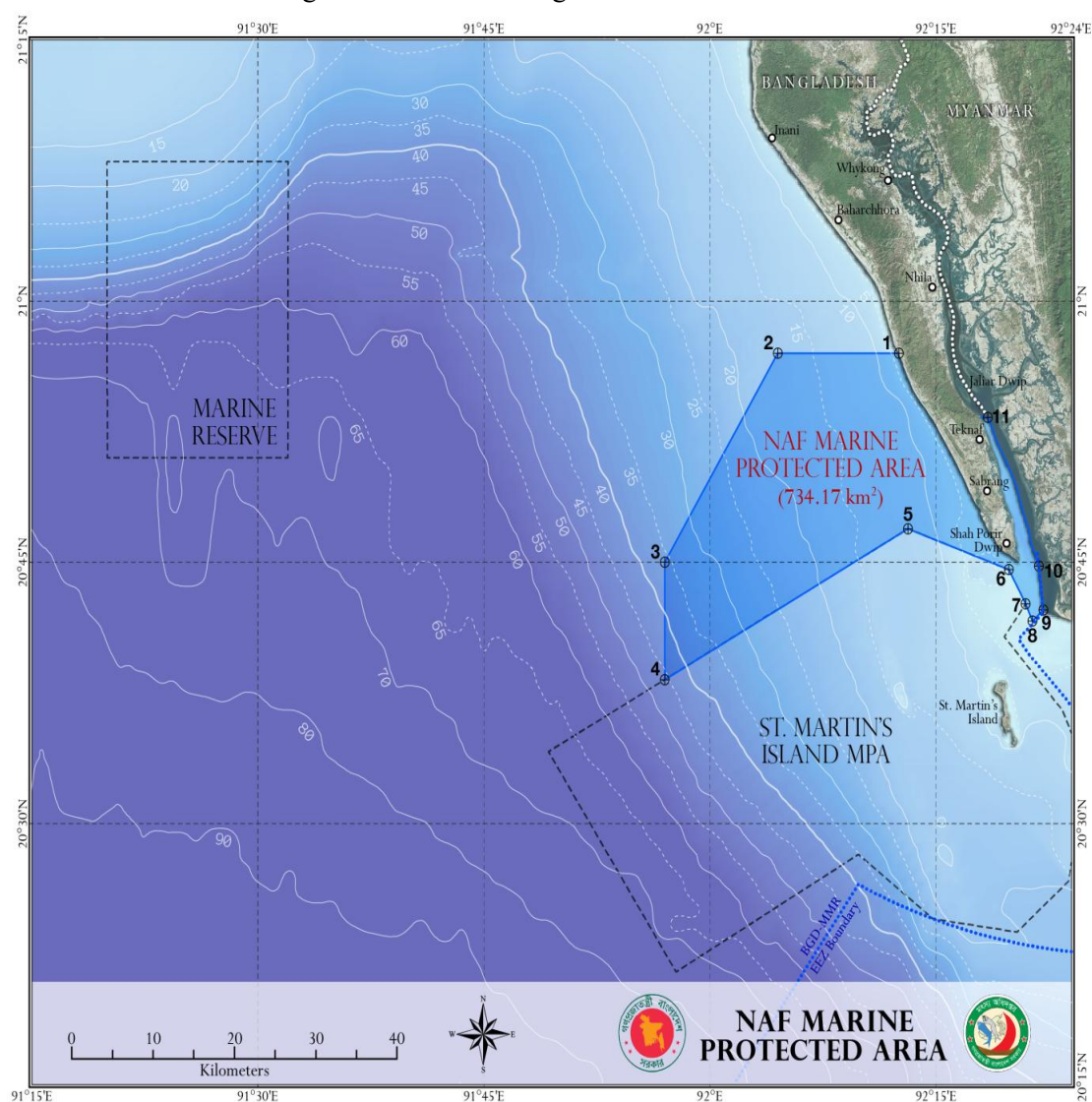


Figure 1 Geographical location of Naf MPA as per gazette notification

The overarching goal of the Naf MPA management plan is to foster sustainable conservation while promoting community involvement and local stakeholder engagement. The plan emphasizes collaborative decision-making and co-management by working closely with local communities and other stakeholders. It incorporates the development of a spatial plan that ensures the sustainable use of resources, striking a balance between conservation objectives and economic activities such as fisheries and eco-tourism.

A key component of the management plan is the formulation of strategies to provide alternative livelihoods for local communities, including opportunities in eco-tourism and sustainable fisheries practices. This aims to reduce the pressures on marine resources and promote long-term environmental sustainability. To ensure effective implementation of these strategies, robust enforcement, monitoring, and surveillance systems will be established, complemented by interagency cooperation to enhance coordination across relevant stakeholders.

Additionally, the plan prioritizes the development of infrastructure and equipment necessary to support the monitoring, patrolling, and emergency response activities within the MPA. Adaptive co-management will be employed to address evolving challenges, ensuring the plan remains flexible and responsive to changing circumstances. Success will be evaluated through key performance indicators that measure progress toward conservation objectives, with a focus on continuous improvement. Finally, a sustainable finance strategy will be implemented to secure long-term funding for the MPA, drawing on diverse sources such as eco-tourism, partnerships, and payment for ecosystem services.

The Management Plan for the Naf MPA is aligned with the conservation goals and objectives of this protected area. This plan focuses on several key management components and programs (Figure 2). Achieving the goals and objectives of the Naf MPA will require close coordination among relevant ministries. The management plan will be implemented in three phases over a 15-year period: 2026-2030, 2031-2035, and 2036-2040.

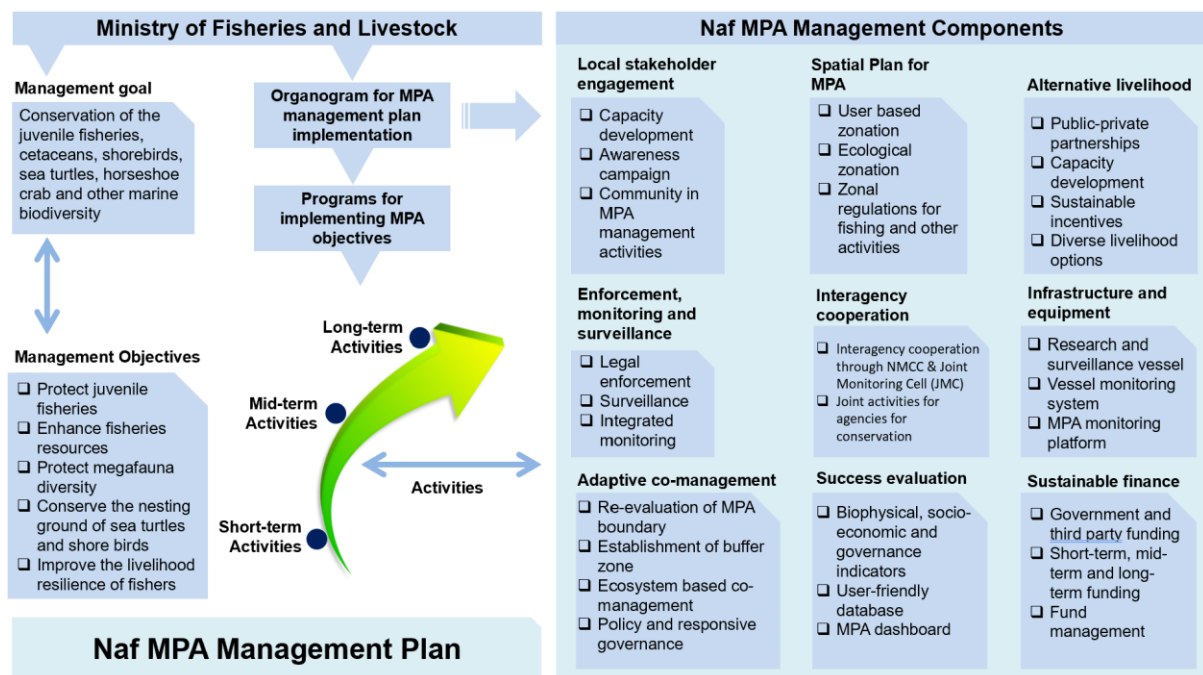


Figure 2 Schematic diagram showing the management goal and objectives, and key management components of Naf MPA

1.1 Administrative Boundary and Direct Impact Area (DIA)

The Naf MPA is situated in the Teknaf Upazila of the Cox's Bazar district, in the southeastern coastal zone of Bangladesh. To the east, it is bounded by the maritime area of Myanmar, while to the south it is adjacent to the Saint Martin's MPA. Teknaf Upazila is composed of six unions (Teknaf Sadar, Sabrang, Baharchara, Whykong, Nhila, and Saint Martin's Island). The communities directly impacted by the MPA are the fishers from Teknaf Sadar, Sabrang, and Baharchara unions, as these areas are dependent on fishing activities within and around the MPA. Additionally, fishers from Whykong, Nhila

Union, and Saint Martin's Island also experience partial impacts due to their involvement in marine resource utilization in the region.

2. Management Plan

2.1 Management Goal

The overall goal of the Naf MPA management plan is the conservation of the fisheries resources across all life stages (juvenile and adult), with particular emphasis on both commercially and non-commercially important species, alongside the protection of cetaceans, shorebirds, sea turtles, horseshoe crab and other marine biodiversity and habitat around the Naf River Estuary and adjacent water areas of Bangladesh.

2.2 Management Objectives

The management objectives of the Naf MPA include:

- To protect fisheries resources across all life stages (juvenile and adult), including the conservation of broodstock and critical spawning and breeding grounds in the Naf River Estuary and adjacent waters. To enhance fisheries resources around the Naf River Estuary and its adjacent marine ecosystems through sustainable ecosystem-based management.
- To protect megafauna diversity around the Naf River Estuary and the adjacent areas, focusing on sharks, skates, rays, turtles and estuarine dolphins.
- To conserve the nesting ground of sea turtles and shorebirds
- To improve the livelihood resilience of fishers around the Naf River Estuary and adjacent marine ecosystems of the Bay of Bengal.

2.3 Potential Category of IUCN Protected Area

The Naf MPA is the best categorized under IUCN Category VI: Protected Area with Sustainable Use of Natural Resources, as it aligns with both conservation and community-based management objectives. This category is ideal for areas where biodiversity conservation is pursued alongside the sustainable use of natural resources, such as fisheries and eco-tourism.

The management plan for the Naf MPA seeks to protect critical marine biodiversity, including fisheries resources across all life stages (juvenile, broodstock, and spawning grounds), sea turtles, shorebirds, and megafauna such as sharks, rays, skates, and estuarine dolphins (Irrawaddy and Indo-Pacific humpback dolphins). At the same time, it emphasizes the conservation of nesting grounds for sea turtles and shorebirds, ensuring the protection of key habitats that underpin the ecological integrity of the estuary and adjacent marine ecosystems. By promoting sustainable fishing practices, habitat protection, and alternative livelihoods, the MPA aims to enhance both ecosystem health and the livelihood resilience of local fishing communities who depend on these resources. This balanced approach ensures long-term ecological sustainability while meeting the socio-economic needs of surrounding communities, making Category VI the most appropriate designation for the Naf MPA.

2.4 Institutional Setup and Governance

The management plan for the Naf MPA adopts and strengthens the institutional setup and governance structure originally developed for the Nijhum Dwip MPA. The organogram for the implementation of the Naf MPA management plan is shown in figure 3. The overall authority for policy and governance

rests with the Ministry of Fisheries and Livestock (MoFL), working through the Department of Fisheries (DoF) under the framework of the Marine Fisheries Act 2020. At the national level, the National MPA Coordination Committee (NMCC) provides strategic policy direction, inter-ministerial coordination, and oversight of all MPA-related initiatives. To complement this body, a Technical Committee for MPAs is proposed in a parallel position to the NMCC, bringing together technical experts from DoF, academic and research institutions, and conservation partners to ensure that management and policy decisions are informed by scientific evidence, ecosystem monitoring, and best practices. Operationally, two dedicated units of the DoF are envisioned. The MPA Management Wing will serve as the central body for administration, coordination, and community-based management of the Naf MPA, while the Fisheries Monitoring Center (FMC) will be responsible for Monitoring, Control, and Surveillance (MCS) activities to ensure compliance with fisheries regulations and conservation rules. Together, these units will provide the backbone of day-to-day MPA management, linking high-level policy with on-the-ground implementation.

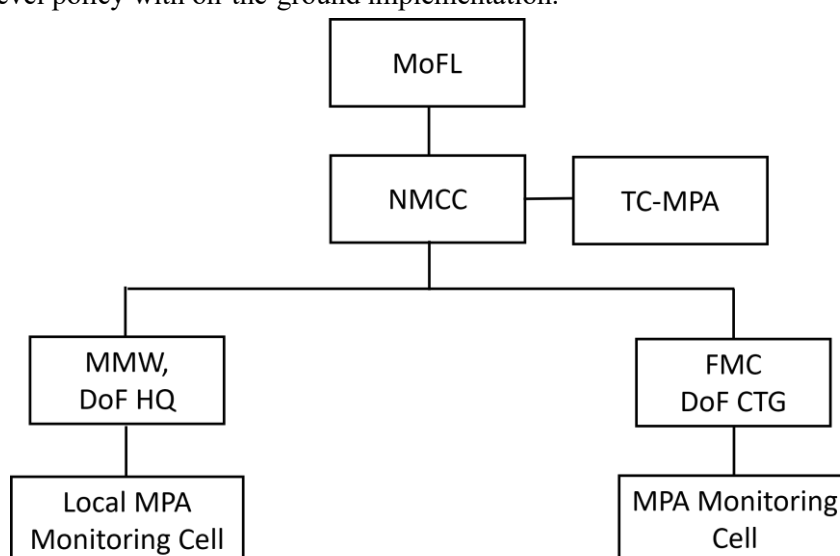


Figure 3 Organogram for implementation of Naf MPA management plan

At the field level, a four-tier co-management structure will be established to ensure the participation of stakeholders at multiple levels of governance (Figure 4). This structure includes the Union MPA Co-management Committee (UCC), which engages local communities and professional groups at the grassroots level; the Upazila MPA Co-management Committee (UMCC), which coordinates MPA activities at the sub-district level; and the District MPA Co-management Committee (DMCC), which integrates local agencies, law enforcement, civil society organizations, and community representatives at the district scale.

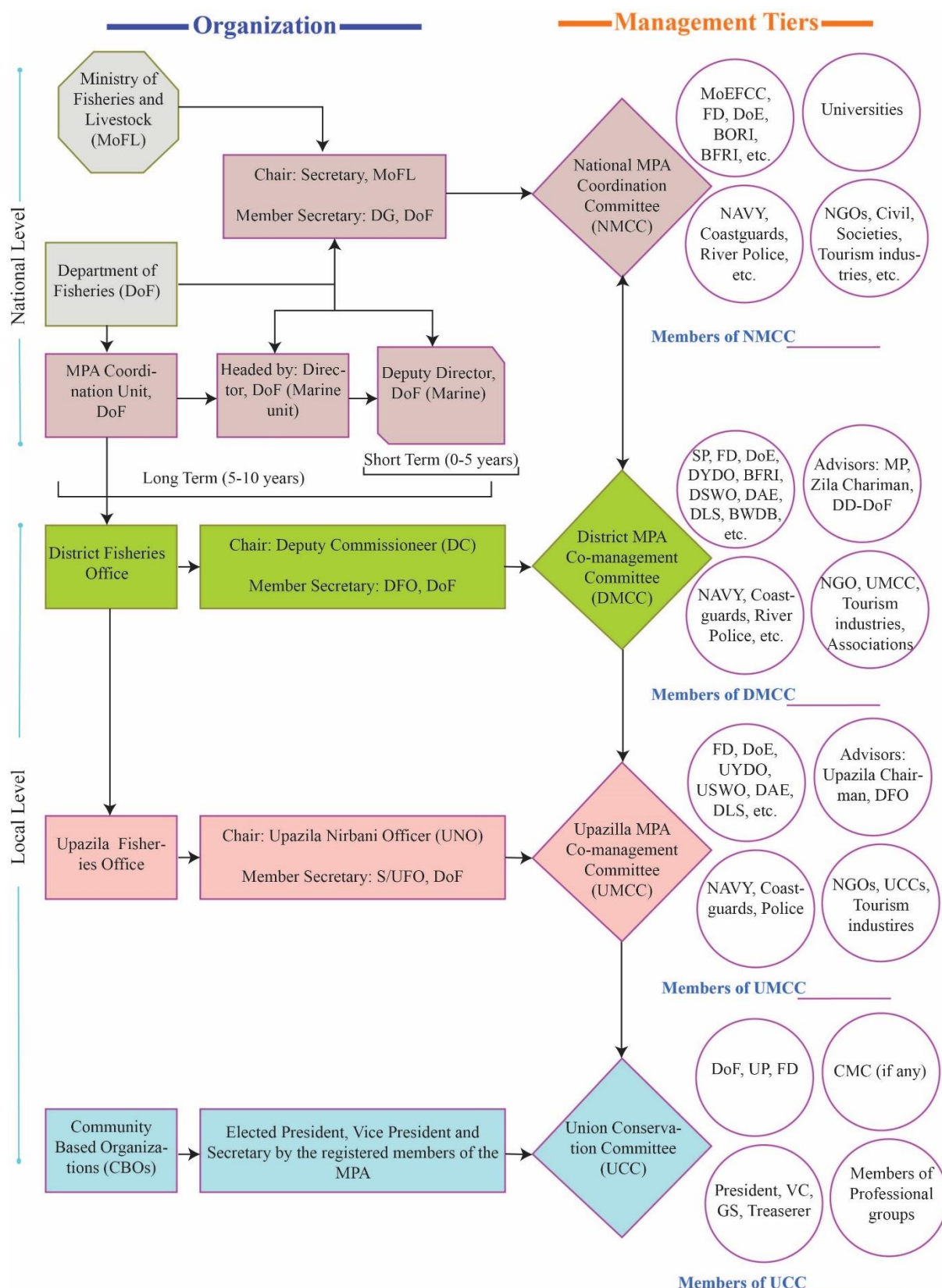


Figure 4 Working process of the Naf MPA management plan

These bodies work in close collaboration with the DoF's MPA Management Wing and FMC, ensuring that conservation actions, livelihood support, and enforcement activities are well aligned. This integrated governance framework establishes a clear flow of authority and accountability: policy

guidance from MoFL and NMCC, scientific input from the Technical Committee, operational execution by the DoF through its MPA Management Wing and FMC, and participatory management at district, upazila, and union levels.

2.5 Union MPA Co-management Committee

The Union MPA Co-management Committee (UCC) for the Naf MPA is designed to serve as the grassroots institution for participatory management. Its primary role is to reduce fishing pressure within the MPA and to provide livelihood support for communities affected by conservation measures. The UCC will be established across three unions of Teknaf (Teknaf Sadar, Sabrang, and Baharchara) ensuring broad local representation. Membership will be open to one or more adult members from each household, selected through a democratic process during the implementation of the MPA management plan.

The Naf MPA is officially declared and will be managed under the Marine Fisheries Act, 2020, which provides the legal mandate for establishing marine protected areas and for adopting community-based co-management approaches. However, as a membership-based grassroots body, the UCC also requires its own legal personality to manage funds, open and operate bank accounts, and enter into partnerships with government and non-government actors. For this purpose, the most practical option is to register the UCC under the Co-operative Societies Act, 2001, while continuing to operate within the policy and regulatory framework of the Marine Fisheries Act, 2020. This dual arrangement ensures that the UCC has both a clear legal mandate for MPA management and the necessary institutional strategy for financial and organizational functions.

Each UCC will have an Executive Committee (EC), elected by its general members, to oversee daily activities and to formulate demands and plans that are submitted to the Upazila MPA Co-management Committee (UMCC) (Table 1). Financial management will be handled through a separate bank account, operated jointly by the President, General Secretary, and Treasurer, with additional financial assistance available from the UMCC when required. Leadership positions (President, Vice President, General Secretary, and Treasurer) will be elected by registered members, with the Vice President position specifically reserved for a female candidate to promote gender inclusivity. Sector-specific representatives will also be elected by their groups, such as Member-Fisheries, Member-Agriculture and Member-Livestock, Member-Handicrafts, Member-Eco-Tourism, and Member-Small Business. A special position of Member-Youth Affairs will be elected by youth between the ages of 18 and 35. In addition, key stakeholder representation will be ensured through nominations from the Department of Fisheries, Bangladesh Forest Department, Department of Agricultural Extension and Department of Livestock Services, given their important role in livelihoods, resource use, and food security along with the Union Parishad.

The primary functions of the UCC include reducing fishing pressure, preventing destructive fishing, facilitating alternative livelihood initiatives, and mobilizing community participation in conservation activities. To address the challenge of monitoring capacity, the UCC will adopt citizen science-based monitoring mechanisms that are already in practice in Bangladesh. Fishers will be supported to use Android-based mobile applications to upload geo-referenced photographs of species and habitats, providing valuable data on biodiversity, habitat health, and fishing activity. In addition, low-cost environmental sensors (piloted on fishing boats in coastal Bangladesh) can automatically record vertical profiles of environmental conditions such as temperature, salinity, and dissolved oxygen. These methods enable fishers to contribute to monitoring in a cost-effective and large-scale manner, without

requiring technical expertise. Through this blend of legal recognition, inclusive representation, and innovative community-based monitoring, the UCC will play a key role in ensuring that conservation objectives are achieved while enhancing the socio-economic resilience of local communities. Over time, it will contribute to the long-term sustainability of the Naf MPA by linking national policy with grassroots action.

2.6 Terms of Reference for UCC

2.6.1 Governance and Leadership

- Ensure the UCC operates as a membership-based, democratic community organization, with active participation from local community members.
- Formulate and implement action plans for the conservation and sustainable management of the Naf MPA.
- Elect an EC to oversee the operations, decision-making, and implementation of UCC activities.
- Ensure the Vice President position is reserved for female candidates, promoting gender inclusivity in leadership roles.
- Nominate representatives from key institutions, such as the lead agency for Naf MPA management—the Department of Fisheries—and other relevant departments including the Bangladesh Forest Department, Department of Agricultural Extension, Department of Livestock Services, and the Union Parishad. The Forest Department has local field offices and beats offices in coastal areas, particularly in Cox’s Bazar–Teknaf, where it manages Teknaf Wildlife Sanctuary, mangrove plantations, and coastal forest belts. Field staff (Beat Officers, Range Officers, and local Foresters) are present and already work closely with Union Parishads and communities. Their involvement is therefore necessary for habitat conservation and reducing land-based pressures on the marine ecosystem. In contrast, the Department of Environment (DoE) is not included at the Union level because its mandate is primarily exercised at district and national scales, focusing on environmental clearance, pollution control, and regulation. Nevertheless, the DoE will be actively represented in the higher co-management tiers particularly the District MPA Co-management Committee (DMCC) and the National MPA Coordination Committee (NMCC) where its regulatory and policy functions can be more effectively integrated into MPA governance.

2.6.2 Livelihood and Sustainable Development

- Implement livelihood schemes that cater to the specific needs of different professional groups (e.g., fisheries, agriculture, livestock, handicrafts, eco-tourism, and small businesses) ensuring inclusivity for women, youth, and marginalized households.
- Develop and support alternative income-generating opportunities that directly contribute to reducing fishing pressure and dependence on MPA resources, while promoting climate-resilient livelihoods. Monitor, evaluate, and adapt livelihood schemes to assess their effectiveness in improving household income and community resilience, while ensuring that activities remain consistent with conservation and sustainable resource management goals.

2.6.3 Financial Management

- Maintain a separate bank account for the UCC, jointly managed by the President, General Secretary, and Treasurer, with dual/multiple signatory authority to ensure accountability.

- Seek funds and grants from diverse sources, including government, non-government, national, international, private, and public sectors, to support UCC activities and community-based conservation initiatives.
- Ensure that all financial activities are carried out in compliance with the guidelines and constitution of the UCC and are subject to review and approval by the UMCC.
- Monitor and record financial expenditures systematically to ensure the proper and efficient utilization of funds for conservation and livelihood, and community development programs.
- Establish transparent financial procedures, including quarterly reporting to members and UMCC, and periodic independent audits, to ensure funds are used effectively and equitably for the benefit of both the community and conservation objectives.

2.6.4 Annual Planning and Reporting

- Prepare an annual work plan and budget through a participatory process involving UCC members, professional groups, and local stakeholders, and submit to the UMCC for review and approval.
- Submit quarterly and annual reports on financial status, activities, achievements, and challenges to the UMCC.
- Adapt and revise the annual work plan based on monitoring results, feedback from stakeholders, and changing ecological and socio-economic conditions, ensuring the UCC actions remain responsive and effective in meeting the objectives of the Naf MPA.
- Share key reports and progress updates with the wider community to build trust, encourage engagement, and strengthen co-management accountability.

2.6.5 Conflict Resolution and Law Enforcement

- Facilitate the resolution of conflicts related to natural resource use, fishing access, and conservation activities by promoting dialogue, mediation, and consensus-building among community members, in collaboration with the DoF and other relevant authorities.
- Assist law enforcement agencies (e.g., Bangladesh Coast Guard, Bangladesh Navy, and River Police), DoF and Forest Department by providing local intelligence, community insights, and logistical support to strengthen compliance with rules and regulations.
- Support the enforcement of government laws and regulations related to fisheries, marine biodiversity conservation, and megafauna protection, ensuring that destructive or illegal activities are promptly reported and addressed.
- Promote a zero-tolerance approach to illegal fishing practices within the MPA, including destructive gear use, fishing in restricted zones, or harvesting of protected species, while ensuring that penalties are applied fairly and consistently.
- Establish community-based grievance and conflict-resolution mechanisms within the UCC to ensure that disputes are addressed early, transparently, and equitably, reducing the likelihood of escalation.

2.6.6 Capacity Building and Community Engagement

- Organize capacity-building programs to strengthen leadership skills, organizational management and conservation knowledge of UCC members.

- Conduct training sessions and workshops on sustainable practices, including sustainable fishing, FAO code of conduct for responsible fisheries (CCRF), marine conservation, citizen science-based monitoring, and eco-tourism development, and climate change adaptation.
- Foster active participation of local communities in the management of the Naf MPA by creating inclusive forums where members can be engaged in decision-making, planning and implementation of conservation and livelihood activities.
- Encourage peer-to-peer learning exchanges between UCC members, local fishers, women's groups, and youth to spread awareness, share best practices, and build trust in co-management processes.

2.6.7 Incentive Mechanisms and Community Mobilization

- Create incentive mechanisms (recognition awards, livelihood support packages, eco-tourism opportunities, and access to small grants or microcredit) to encourage community participation in conservation activities and adopt sustainable practices.
- Promote community mobilization through awareness campaigns, cultural events, and educational programs that highlight the ecological and livelihood benefits of protecting the Naf MPA.
- Ensure that local communities are actively involved in monitoring the health of the Naf MPA and in tracking the impacts of conservation activities, by linking their participation to tangible benefits (e.g., training, and alternative livelihood opportunities).
- Encourage youth and women's groups to take leading roles in mobilization activities.

2.6.8 Monitoring and Evaluation

- Regularly monitor the Naf MPA to assess the success of conservation actions and their impact on the local environment and community livelihoods. Monitoring will be based on a combination of citizen science tools (e.g., mobile apps for geo-referenced species reporting, logbooks, and low-cost sensors on fishing boats) and technical support from the Department of Fisheries, NGOs, and research partners.
- The impact of livelihood schemes and conservation activities will be reviewed using Key Performance Indicators (KPIs). These indicators may include reduction in fishing effort within restricted zones, compliance with fishing regulations, number of households adopting alternative livelihoods, changes in household income, participation of women and youth, and community-reported sightings of key indicator species (e.g., dolphins, turtles, horseshoe crabs).
- Periodic self-evaluations of the UCC activities will be conducted, complemented by external reviews facilitated by UMCC/DoF, to ensure that plans remain relevant, effective, and responsive to evolving ecological conditions and community needs.

2.6.9 Institutional Development and Constitution

- Develop a guideline and constitution that will define the UCC's operational structure, including the roles and responsibilities of office bearers and members.
- Ensure the constitution and guidelines are followed for internal governance, decision-making, and accountability within the organization.
- Establish a clear institutional structure, including roles for the President, General Secretary, Treasurer, and other sector-specific members, to ensure effective leadership and coordination.

2.6.10 Decision-Making and Meetings

- Hold regular meetings (quarterly) to review progress, evaluate challenges, and make necessary adjustments to action plans.
- Organize an Annual General Meeting (AGM) to review the activities of the previous year, elect new leaders, and set goals for the upcoming year.
- Ensure that decisions are made democratically with input from all registered members, with a quorum of at least 50% of members required for validity.

2.6.11 External Collaboration and Partnerships

- Collaborate with external stakeholders such as core government agencies, NGOs, and private sector partners to support the implementation of UCC activities.
- Facilitate communication and coordination between the UCC and national or international organizations to bring in technical expertise, funding, and resources.
- Promote partnerships with academic institutions and research organizations for the monitoring and management of marine resources.

2.6.12 Legal and Regulatory Compliance

- Ensure that UCC actions comply with all national laws and regulations related to conservation, marine fisheries, and environmental protection.
- Support the implementation of government regulations related to the protection of the Naf MPA's ecosystem, including the protection of fish stocks and megafauna species.
- Assist in the development of guidelines or regulations needed to enhance the protection of natural resources within the MPA.

2.6.13 Sustainability and Long-Term Planning

- Develop a long-term sustainability plan for the UCC, ensuring that conservation and livelihood activities continue beyond the initial funding or intervention phase.
- Assess the potential for scaling up successful programs or models to other areas or communities in the region.
- Work towards securing long-term funding from diverse sources to ensure the financial stability and success of the UCC's activities.

2.6.14 Dissolution and Asset Distribution

- In the event of dissolution, the Executive Committee will be responsible for distributing assets in accordance with legal frameworks and guidelines.
- Ensure that any remaining funds are allocated for the benefit of the Naf MPA and its long-term conservation, either by returning funds to donors or redirecting them to other conservation initiatives in the region.

Table 1: Composition of the proposed Union MPA Co-management Committee (UCC)

Position	Description
President	President will be elected by UCC General Body from registered fishers. Oversees overall operation of the UCC, represents the committee at official events, ensures effective implementation of plans, policies and strategies.
Vice President	Vice President will be elected by UCC General Body; reserved for female member. Assists the President, assumes leadership duties in their absence, and promotes gender inclusivity in decision-making.
General Secretary	General secretary will be elected by UCC General Body from fishers. Responsible for managing records, organizing meetings, preparing minutes, and facilitating communication between members and the EC.
Treasurer	Treasurer will be elected by UCC General Body from fishers. Manages the financial accounts of the UCC, oversees budgeting, fund management, and ensures financial transparency and compliance.
Member - Fisheries	Nominated by Department of Fisheries from registered fishers of the community, represents the interests of fishers, and leads efforts to promote sustainable fishing practices and reduce fishing pressure.
Member - Agriculture	Nominated by Department of Agricultural Extension from the community who represents agricultural sectors, promotes sustainable agricultural practices, and supports livelihood schemes for affected communities.
Member- Livestock	Nominated by Department of Livestock Services from the community who represents livestock sector, promotes sustainable livestock farming practices, and supports livelihood schemes for affected communities.
Member – Handicrafts	Elected by registered female handicraft members, supports handicraft businesses, promotes sustainable practices, and provides alternative livelihoods.
Member - Eco-Tourism	Elected by eco-tourism stakeholders. Promotes eco-tourism initiatives, ensures sustainable tourism practices, and develops opportunities for the local community to benefit from eco-tourism.
Member - Small Business	Elected by small business owners. Represents small business owners, helps facilitate alternative livelihoods through small businesses, and supports transitioning to diversified income sources.
Member - Youth Affairs	Elected by registered youth members (aged 18-35), ensures youth participation in UCC activities, and encourages their involvement in sustainable development and conservation.
Representative - Union Parishad	Nominated by the respective Union Parishad Chairman, ensures UCC's activities align with local government policies, and coordinates with local authorities.
Representative - Department of Fisheries	Nominated by the Department of Fisheries, provides technical support on fisheries conservation & management, sustainable practices, and legal compliance.
Representative - Forest Department	Nominated by the Forest Department, provides technical expertise on forest conservation and ensures alignment with forest protection goals.

2.7 Upazila MPA Co-management Committee (UMCC)

The Upazila MPA Co-management Committee (UMCC) is headed by the Upazila Nirbahi Officer (UNO) and the member secretary is the Upazila Fisheries Officer (UFO) of Teknaf (Table 2). The primary responsibilities of the UMCC include regulating MPA activities at the Upazila level, improving the livelihoods of Naf MPA-dependent communities, ensuring sustainable use of natural resources, and conserving biodiversity and ecological resources through collective action. The committee will be composed of representatives from all relevant local government departments, civil society organizations, public representatives, professional groups from the Union Conservation Committee (UCC), and fisheries association representatives.

The UMCC will maintain a bank account, operated jointly by the UNO, SUFO, and a representative from the UCC nominated by the SUFO. Meetings will be held at least four times a year, where key decisions and progress updates will be discussed. To fund its activities, the UMCC will seek financial support from government sources and donor organizations, while also exploring self-revenue generation strategies.

The members of the UMCC will include representatives from a broad spectrum of stakeholders. This includes all relevant local government departments, such as the Upazila Agriculture Office and Upazila Livestock Office, as well as civil society organizations, public representatives, and professional groups from the UCC. Additionally, representatives from various professional sectors, including fisheries associations will be included as members. This diverse composition ensures that the UMCC incorporates multiple perspectives and expertise in managing the Naf MPA, fostering collaborative decision-making and effective implementation of conservation and livelihood strategies.

2.8 Terms of Reference for UMCC

2.8.1 Governance and Leadership

- Ensure the UMCC operates as a collaborative, multi-stakeholder committee focused on the sustainable management of the Naf MPA.
- Prepare an annual work plan and budget, incorporating the inputs of local stakeholders and ensuring alignment with conservation and livelihood objectives.

2.8.2 Biodiversity Conservation and Regulation

- Take initiatives for biodiversity conservation within the Naf MPA.
- Engage stakeholders in biodiversity conservation efforts and MPA management.
- Ensure compliance with existing fisheries regulations and the use of allowed fishing gears.

2.8.3 Livelihood and Sustainable Development

- Support the UCC in implementing alternative income-generating activities and building the capacity of local fishers to transition to sustainable livelihoods.
- Encourage the development of livelihood schemes that reduce dependence on MPA resources while promoting socio-economic resilience.
- Organize outreach and capacity-building activities to increase awareness of sustainable practices in both natural resource utilization (e.g., responsible fishing, climate-smart agriculture, eco-friendly livestock management) and alternative livelihoods (e.g., aquaculture, handicrafts, eco-tourism, small business enterprises).

2.8.4 Financial Management

- Gather funds for the operation of management activities through government sources, donor organizations, private sector contributions, and self-generated revenue (e.g., eco-tourism fees, community contributions).
- Ensure that all financial activities are carried out according to the approved UMCC budget, following national financial regulations, donor requirements, and UMCC's own financial guidelines.
- Maintain transparency and accountability by keeping proper records, conducting quarterly financial reporting to members and higher committees (DMCC/DoF).

2.8.5 Monitoring and Enforcement

- Support regular monitoring and surveillance of the MPA to ensure that biodiversity conservation and regulatory measures are being followed.
- Provide necessary guidelines and support for the operation of the UCC, including the formation and approval of community fish guards (CFGs). CFGs will be formed by the UMCC with the support from the UCC and formally recognized by the DoF under the Marine Fisheries Act 2020 (Section 29 (2)). The members of the CFGs will be drawn from the registered fishers, with priority for the respected community members who demonstrate compliance with fisheries rules. The CFG will be trained by DoF, Coast Guard, and Navy in basic patrolling, safety, and reporting protocols. CFGs will patrol the Naf MPA in partnership with DoF and law enforcement agencies (Coast Guard, Navy, River Police) using community boats supported with fuel and safety gear from UMCC/DoF; They will also participate in joint patrols where CFGs representative accompany Coast Guard/Navy officers at sea; and use digital tools such as GPS-enabled devices, Android apps, and VHF radios to record and report violations. The UMCC will establish a Standard Operating Procedure (SOP) for patrolling, ensuring that CFGs act only as community monitors and informants, while enforcement authority remains with the DoF and law enforcement agencies.

2.8.6 Capacity Building and Stakeholder Engagement

- Enhance the capacity of local communities and the UCC in MPA management and biodiversity conservation through training, peer learning, and exposure visits (e.g., workshops on sustainable fishing, eco-tourism, and citizen science tools).
- Facilitate community engagement in the monitoring of the Naf MPA and participation in decision-making processes will be facilitated through a range of inclusive and participatory approaches. Regular community meetings and consultations will be organized at union and village levels to ensure meaningful representation of fishers, women, and youth groups. Community forums within UCCs will serve as platforms where grievances, proposals, and feedback on MPA management can be formally raised and recorded. Participatory monitoring methods, such as citizen science apps, logbooks, and low-cost environmental sensors, will enable fishers to directly contribute valuable data on biodiversity, habitat health, and fishing activity. To encourage sustained involvement, incentives such as recognition awards, small grants, and livelihood support will be introduced. Engagement will also be strengthened by integrating local cultural events (e.g. World Oceans Day and National Fish Week) as awareness-raising platforms.

Furthermore, communities will be actively involved in zoning decisions and enforcement support, giving them a tangible stake in rule-making and compliance while fostering trust and ownership in the management of the Naf MPA.

2.8.7 Community Resilience and Climate Change Adaptation

- The UMCC will undertake activities that enhance the resilience of coastal communities to climate change and environmental shocks. These activities may include strengthening natural coastal defenses through mangrove planting, dune stabilization, and beach vegetation restoration to protect against storms and erosion. At the same time, the UMCC will promote climate-resilient livelihoods such as seaweed farming, cage aquaculture, eco-tourism, and climate-smart agriculture, reducing dependence on vulnerable fishing resources. Disaster preparedness will be improved through training on early warning systems, cyclone drills, and community response planning, while resilient infrastructure—such as cyclone shelters and improved landing sites—will be supported to reduce risks from flooding and extreme weather events.
- The UMCC will support the UCC in engaging the local community in climate adaptation efforts and sustainable resource use. This will be facilitated through participatory planning workshops, community awareness programs, and the promotion of environmentally friendly practices such as efficient water use, reduced reliance on firewood, and adoption of low-impact fishing gear. By involving communities directly in both adaptation planning and resource management, these efforts will strengthen ownership, increase compliance, and ensure that conservation measures are aligned with the long-term needs and resilience of local households.

2.8.8 Support for Spatial Planning (SP) of MPA

- Provide necessary support for implementation of Spatial Plan to ensure that the MPA's spatial planning and zoning are consistent with conservation and livelihood objectives.

2.8.9 Collaboration and External Partnerships

- Engage with external stakeholders such as local government, NGOs, and private sector partners to strengthen the MPA's management capacity.
- Facilitate partnerships with academic institutions and research organizations to enhance monitoring and assessment of the MPA's resources.

2.8.10 Regulatory Compliance and Law Enforcement

- Ensure the compliance of all stakeholders with national and international regulations related to fishing, conservation, and environmental protection.
- Collaborate with law enforcement agencies to support the effective implementation of MPA related rules and regulations.

2.8.11 Sustainability and Long-Term Planning

- Develop a long-term sustainability plan for the UMCC, ensuring that its activities continue beyond initial funding phases.
- Explore diverse funding sources to ensure the financial stability of the UMCC's operations and activities.

2.8.12 Regular Meetings and Reporting

- Hold at least four meetings annually to review progress, evaluate challenges, and adjust action plans.
- Ensure regular reporting on financial activities, conservation efforts, and community engagement to the DMCC and other stakeholders.

Table 2: Proposed members of UMCC

Sl.	Organization	Designation	Status
1	Upazila Parishad	Upazila Parishad Chairman	Adviser
2	Upazila Administration	Upazila Nirbahi Officer	Chairman
3	Forest Department	DFO, FD will nominate a representative	Member
4	Department of Youth Development	Upazila Youth Development Officer	Member
5	Department of Social Services	Upazila Social Welfare Officer	Member
6	Department of Agricultural Extension	Upazila Agriculture Officer	Member
7	Department of Environment	Representative	Member
8	Department of Livestock Service	Upazila Livestock Officer	Member
9	Bangladesh Police/River Police	Respective Officer in charge	Member
10	Bangladesh Coast Guard	Coast Guard station commander	Member
11	Bangladesh Navy	Representative of Navy	Member
12	NGO	Representative from Local NGO (UFO/SUFO will finalize)	Member
13	Union Conservation Committee	Nominated Representative Fisherman Professional Group of UCCs (UFO/SUFO will finalize)	Member
14	Union Conservation Committee	Nominated Representatives one from each of the other Professional Groups of UCCs (UFO/SUFO will finalize)	Member
15	Representative from the fishermen society	President/Secretary of the Upazila fishermen society/association (UFO/SUFO will finalize)	Member
16	Fish trader association	Representative from the fish trader associations	Member
17	Department of Fisheries	Upazila Fisheries Officer	Member Secretary

2.9 District MPA Co-management Committee (DMCC)

The DMCC operates at the district level for Cox's Bazar district and is headed by the Deputy Commissioner (DC) (Table 3).

The District Fisheries Officer (DFO) will be the member secretary for the committee. At the local level, the DMCC will serve as the highest decision-making authority for the Naf MPA, overseeing its implementation and ensuring effective management of the area. The committee will meet formally at least twice every year to review the progress of the MPA's activities, resolve challenges, and provide necessary directions. The DMCC will also be responsible for coordinating with the Upazila MPA Co-management Committee (UMCC) and Union MPA Co-management Committee (UCC) and can copy any members from the UMCC as required.

The DMCC will be a multi-disciplinary body consisting of representatives from various government, law enforcement, environmental, and community organizations, all working collaboratively towards a common objective. The committee is chaired by the Deputy Commissioner of the district, with the Member of Parliament concerned serving as the advisor. Key government departments involved include the Department of Environment, Forest Department, Department of Agriculture Extension, Department of Livestock Services, and the Department of Women Affairs, each represented by relevant district-level officers such as deputy directors and district officers. Additionally, the Bangladesh Police, Bangladesh Navy, Bangladesh Coast Guard, Bangladesh River Police, and Border Guard Bangladesh (BGB) are all represented, contributing law enforcement expertise. The committee also includes members from local business and professional associations, such as the Fish Traders Association and the Fishers' Association/Boat Owners Association, ensuring that the interests of local industries are represented. Two members from the Upazila MPA Co-management Committees (UMCC), elected from the UCCs, also participate as community representatives. Furthermore, NGOs and the Department of Fisheries, represented by the District Fisheries Officer as the member secretary, bring in expertise from civil society and fisheries management. This broad composition ensures a holistic approach to the committee's objectives, integrating environmental, social, and economic perspectives in decision-making processes.

2.10 Terms of Reference for DMCC

2.10.1 Planning and Budgeting

- The DMCC will be responsible for developing and approving the annual plan and budget for the UMCC, ensuring that all proposed activities are consistent with the overarching objectives of the Naf MPA management.
- The DMCC will involve reviewing priority actions, aligning financial allocations with conservation and livelihood goals, and setting clear performance targets for the UMCC. In addition, the DMCC will provide necessary guidelines, technical inputs, and resources to facilitate the proper implementation of the Naf MPA management plan. By ensuring that planning and budgeting are both participatory and transparent, the DMCC will strengthen accountability and enable more effective delivery of management outcomes across the MPA.

2.10.2 Fund Generation and Financial Support

- Assist the UMCC and UCC in generating funds for the Naf MPA management through government sources, donor organizations, and other potential revenue-generating initiatives.
- Oversee the allocation and utilization of funds to ensure that the resources are being used effectively.

2.10.3 Policy Direction and Guidance

- Take directives from the National MPA Coordination Committee (NMCC) and provide directives to the UMCC to guide the management and conservation efforts for the Naf MPA.
- Ensure that the UMCC is following the strategic priorities and guidelines set by the NMCC.

2.10.4 Support to MPA Spatial Plan (MSP)

- Provide necessary support for implementation of Marine Spatial Plan (MSP) in collaboration with the UMCC and UCC to ensure that the MPA's zoning and spatial planning are effective in promoting conservation and sustainable livelihoods.

2.10.5 Capacity Building of UMCC and Stakeholders

The DMCC will take actions to strengthen the capacity of the UMCC by providing technical, financial, and organizational support to ensure its effective functioning. In parallel, the DMCC will facilitate capacity-building programs for stakeholders including government agencies, NGOs, community representatives, and local user groups to equip them with the knowledge and skills required for effective MPA management. Training sessions will focus on biodiversity conservation, sustainable resource use, and participatory governance, while exposure visits and peer-learning exchanges will be encouraged to share best practices. Through this combined approach, both the UMCC and its wider network of stakeholders will be better prepared to implement the Naf MPA management plan in a coordinated and sustainable manner.

2.10.6 Monitoring and Surveillance

- Ensure regular monitoring and surveillance of the Naf MPA to track the progress of conservation activities and ensure compliance with legal framework.
- Coordinate with the UMCC, law enforcing agencies and other stakeholders for effective implementation of monitoring and enforcement activities.

2.10.7 Overall MPA Management

- Monitor and oversee the overall activities of the Naf MPA to ensure that conservation and livelihood objectives are being met.
- Address emerging challenges, evaluate the effectiveness of strategies, and adjust management plans as needed.

2.10.8 Livelihood Support

- Take necessary steps to support the livelihoods of communities impacted by conservation activities in the Naf MPA.
- Work closely with the UMCC and UCC to develop alternative livelihoods for local communities that minimize pressure on MPA resources.

2.10.9 Collaboration and Coordination

- Facilitate collaboration between the UMCC, UCC, NMCC, and other stakeholders to ensure effective management and conservation of the Naf MPA.
- Promote partnerships with academic institutions, NGOs, government agencies, and local communities to strengthen MPA management capacity.

2.10.10 Reporting and Accountability

- Ensure regular reporting on the implementation of MPA management activities to higher authorities such as the NMCC and other relevant stakeholders.
- Ensure that all activities are conducted transparently and in accordance with established regulations.

Table 3: Proposed members of DMCC

Sl.	Organization	Designation	Status
1	Public Representative	Concerned MP/s	Adviser
2	District Administration	Deputy Commissioner	Chairman
3	Department of Environment	Deputy Director	Member
4	Forest Department	DFO, FD	Member
5	Bangladesh Police	Superintendent of Police	Member
6	Department of Agriculture Extension	Deputy Director	Member
7	Department of Livestock Service	District Livestock Officer	Member
8	Bangladesh Water Development Board	Executive Engineer	Member
9	Department of Women Affairs	District Woman Affairs Officer	Member
10	Department of Cooperatives	District Cooperative Officer	Member
11	Department of Youth Development	Deputy Director	Member
12	Upazila Administration	Concerned Upazila Nirbahi Officer (UNO)	Member
13	Bangladesh Navy	Representative of Navy Police	Member
14	Bangladesh Coast Guard	Representative of Coast Guard	Member
15	Bangladesh River Police	Representative of River Police	Member
16	Border Guard Bangladesh (BGB)	Representative of BGB	Member
17	Business Association	Representative from Local Fish Traders Association (Nominated by DFO, DoF)	Member
18	Representatives from UMCC	Two UMCC member representatives from the “Upazila MPA Co-management Committees” (Nominated by UMCC).	Member
19	NGO	Representative of NGO (Nominated by DFO, DoF)	Member
20	Professional Representative	Representative from Fishers Association/ Boat Owners Association (Nominated by DFO)	Member
21	Department of Fisheries	District Fisheries Officer	Member Secretary

2.11 National MPA Coordination Committee (NMCC)

The National MPA Coordination Committee (NMCC) operates under the Ministry of Fisheries and Livestock (MoFL) and serves as the single governing body for all MPAs under the jurisdiction of the Department of Fisheries (DoF) (Table 4). It is chaired by the Secretary, MoFL, with the Minister of MoFL acting as Adviser, and the Director General (DG) of the DoF serving as the Member Secretary. The NMCC provides strategic and policy-level guidance for the selection, designation, implementation, and management of MPAs in Bangladesh. Working within the framework of the Marine Fisheries Act 2020 and related laws, the NMCC ensures that MPA governance adheres to the principles of sustainable fisheries management, biodiversity conservation, and blue economy objectives. Its functions include approving MPA selection and zoning, overseeing national MPA policy formulation, reviewing research and monitoring results, providing guidance and directives to DMCC through DoF and coordinating across relevant ministries and agencies.

Membership of the NMCC consists of senior representatives from key government institutions, including the Ministry of Environment, Forest and Climate Change (MoEFCC), Department of Environment (DoE), Bangladesh Forest Department (BFD), Ministry of Power, Energy and Mineral Resources, Ministry of Foreign Affairs, Ministry of Home Affairs (Bangladesh Coast Guard and River Police), Ministry of Shipping, and the Armed Forces Division (Bangladesh Navy) and . The DoF's Director (Marine) and Director (Blue Economy) are also permanent members, ensuring that specialized fisheries expertise is included in decision-making.

The NMCC thus acts as the highest-level inter-ministerial platform, ensuring that all MPAs are managed in a coordinated, transparent, and nationally consistent manner. It draws upon technical support from specialized institutions such as the Bangladesh Fisheries Research Institute (BFRI), Bangladesh Oceanographic Research Institute (BORI) and SPARRSO, while maintaining final authority for approving MPA policies and strategies.

Table 4: Proposed members for NMCC

SL	Organization	Designation	Status
1	Ministry of Fisheries and Livestock (MoFL)	Minister	Adviser
2	Ministry of Fisheries and Livestock (MoFL)	Secretary	Chairman
3	Ministry of Fisheries and Livestock (MoFL)	Joint Secretary (BE)	Member
4	Department of Fisheries (DoF)	Director (Marine)	Member
5	Department of Fisheries (DoF)	Director (Blue Economy)	Member
6	Ministry of Environment, Forest and Climate Change	Joint Secretary	Member
7	Department of Environment (DoE)	Director General	Member
8	Bangladesh Forest Department	Chief Conservator of Forests (CCF)	Member
9	Ministry of Power, Energy and Mineral Resources	Joint Secretary	Member

10	Maritime Affairs Unit, Ministry of Foreign Affairs	Representative	Member
11	Armed Forces Division	Representative	Member
12	Ministry of Home Affairs	Representative	Member
13	Ministry of Shipping	Joint Secretary	Member
14	Bangladesh Navy	Representative	Member
15	Bangladesh Coast Guard	Representative	Member
16	Bangladesh Fisheries Research Institute (BFRI)	Representative	Member
17	Bangladesh Space Research and Remote Sensing Org. (SPARRSO)	Representative	Member
18	Bangladesh Oceanographic Research Institute (BORI)	Representative	Member
19	Department of Fisheries (DoF)	Director General	Member Secretary

2.12 Specific Functions of the National MPA Coordination Committee (NMCC)

- a) Declare and officially notify new MPAs to protect key ecosystems and species diversity.
- b) Provide guidance and capacity-building support for the DoF and MoFL, more specifically for the DMCC, to effectively manage established MPAs.
- c) Act as the National Council for MPAs in Bangladesh and coordinate local-level MPA committees across different tiers (district, upazila, union, etc.).
- d) Assign a designated officer/focal point (not below grade 5, DFO or equivalent) through DG, DoF to coordinate management of each MPA.
- e) Establish a MPA Management Wing (MMW) within the DoF to manage and coordinate management of all MPAs.
- f) Regularly review and recommend updating MPA frameworks, management plans, and related rules and regulations. Suggest new rules and regulations if needed.
- g) Provide overall strategic policy and management direction to government agencies and stakeholders involved in MPA management.
- h) Review MPA activities annually to assess progress, challenges, and effectiveness. Adjust management strategies and plans as needed.
- i) Annually review and approve the work plans for each MPA and any necessary changes to these plans in accordance with MPA frameworks and IUCN Protected Area guidelines.
- j) NMCC will approve allocations and mobilize resources from government and non-government sources. Funds will be channeled through the Department of Fisheries, which will be distributed to UMCCs, DMCCs, and other local MPA institutions. This ensures financial support is aligned with national priorities while enabling effective local implementation.

- k) Facilitate and support the process of MPA Spatial Planning, including zoning, in collaboration with local MPA committees.
- l) Facilitate regional and national coordination between MPA initiatives and other relevant projects to ensure effective management.
- m) Collaborate with the Technical Committee for MPAs (TC-MPA) to ensure that all NMCC decisions and policies are informed by scientific evidence, technical assessments, and best practices in biodiversity conservation and fisheries management.

2.13 Terms of Reference for NMCC

- a) Conserve MPAs and surrounding areas by introducing an Ecosystem Approach to Fisheries Management (EAFM) with emphasis on nationally important and indicator species, while ensuring the protection of broader marine biodiversity.
- b) Restore, protect, and sustainably manage coastal ecosystems and prevent pollution and destructive activities.
- c) Protect fish, megafauna and other marine living resources, ensuring the restoration of habitat and maintenance of biodiversity.
- d) Manage and restore mangrove habitats to improve biodiversity and increase mangrove coverage.
- e) Assist in the spatial planning of MPAs, including zoning, to ensure alignment with conservation objectives and sustainable fisheries management goals
- f) Reduce the discharge of untreated sewage and wastewater into rivers, coastal, and marine environments.
- g) Ensure the use of environmentally friendly fishing gears and equipment across the MPA network.
- h) Facilitate scientific research to identify new fishing grounds and improve fisheries management.
- i) Reduce or minimize solid waste and marine litter in MPAs and surrounding areas.
- j) Control nutrient loading in coastal waters to protect marine ecosystems from eutrophication.
- k) Reduce vulnerability to climate change and natural hazards while increasing the resilience of coastal ecosystems and communities.
- l) Improve the livelihoods of coastal fishing communities through sustainable resource management and alternative income-generating activities.
- m) Empower coastal communities to participate in and benefit from the sustainable management of marine resources.
- n) Undertake any other tasks deemed necessary by the committee to further the conservation and sustainable management of MPAs in Bangladesh.

2.14 Frequency of Meetings

- The NMCC will meet at least twice a year.
- Meetings will be scheduled by the Member Secretary in consultation with the Chairman, and additional meetings may be arranged as needed.
- Members will also communicate through e-mail and other forms of communication for ongoing coordination.

2.15 Administrative Matters

- The NMCC will be assisted by the Director General (DG) of the DoF.

- The committee may decide to break into subcommittees or co-opt additional members as necessary to carry out specific tasks.
- A MPA Management Wing (MMW) will be established within the DoF, headed by a director, to manage and coordinate all MPAs across Bangladesh.

2.16 MPA Operation (Administration)

- The NMCC will assign designated officer/focal point (not below Grade 5) through the DG, DoF to administer each of the MPAs.
- The MPA Management Wing (MMW) will work closely with the existing Fisheries Monitoring Center (FMC) of DoF to ensure effective monitoring and enforcement of MPA regulations.
- The MMW will also coordinate with the Training and IT Units of the DoF and concerned section of BFRI for capacity building, research, and database management.

2.17 Technical Committee for MPA (TC-MPA)

To support the NMCC in carrying out its mandate, a Technical Committee for MPA (TC-MPA) will be established as a parallel advisory body under MoFL (Table 5). The Technical Committee will provide the NMCC with scientific, technical, and operational expertise to ensure that decisions are based on the best available evidence.

The TC-MPA will include representatives from the Department of Fisheries (Experts from DoF technical wings, including the MPA Management Wing, Marine Fisheries Survey Management Unit, and Fisheries Monitoring Center – FMC), Bangladesh Fisheries Research Institute (BFRI), Bangladesh Oceanographic Research Institute (BORI), SPARRSO, universities and other research institutions, and specialized NGOs and international organizations (such as IUCN Bangladesh and WCS). These members will contribute cutting-edge research, monitoring data, and field-level experience to guide MPA zoning, Spatial Planning (MSP), biodiversity monitoring, and sustainable livelihood strategies.

The role of the TC-MPA includes prepare technical inputs and scientific recommendations for NMCC consideration; review and validate MPA management plans, monitoring frameworks, and enforcement protocols; facilitate participatory research and capacity-building activities with local communities; and provide adaptive management guidance based on ecological and socio-economic monitoring.

2.17.1 Linkage Between NMCC and TC-MPA

The NMCC and TC-MPA will operate in parallel but complementary roles, with a clear hierarchy that ensures both effective governance and strong technical backing. The NMCC will serve as the superior policy and decision-making body, responsible for approving MPA strategies, management plans, and inter-ministerial actions. In support of this, the TC-MPA will function as the technical and advisory arm, providing scientific evidence, operational insights, and expert recommendations to ensure that NMCC decisions are well-informed, practical, and grounded in the best available knowledge.

Recommendations, research outputs, and monitoring results generated by the TC-MPA will be formally submitted to the NMCC for consideration. In turn, the NMCC will provide directives to the TC-MPA on priority areas requiring technical assessment or review. This ensures a two-way exchange - policy needs to drive technical work, and technical outputs shape policy decisions.

Together, this structure guarantees that Bangladesh's MPAs are governed through a balanced system where high-level policy authority (NMCC) is reinforced by strong technical expertise (TC-MPA), enabling effective, science-based, and participatory marine resource management.

Table 5: Members of Technical Committee for MPA (TC-MPA)

SL	Organization	Designation	Status
1	Department of Fisheries (DoF)	Director (Marine)	Chair
2	Department of Fisheries (DoF)	Director (Blue Economy)	Co-Chair
3	Bangladesh Fisheries Research Institute (BFRI)	Senior Scientist	Member
4	Bangladesh Oceanographic Research Institute (BORI)	Senior Scientist	Member
5	Bangladesh Space Research and Remote Sensing Org. (SPARRSO)	Senior Scientist	Member
6	Department of Environment (DoE)	Technical Specialist	Member
7	Bangladesh Forest Department	Technical Specialist	Member
8	Two representatives from Universities (Marine/Fisheries/Environmental Science)	Academic Experts	Member
9	International Organizations (IUCN, WorldFish, WCS, etc.)	Representative	Member
10	Bangladesh Navy / Coast Guard	Technical representative for MCS	Member
11	Marine Fisheries Survey Management Unit (MFSMU) of DoF	Nominated by Director (MFSMU)	Member
12	Department of Fisheries (DoF)	Deputy Director (Marine/Blue Economy)	Member Secretary

2.17.2 Specific Functions of the TC-MPA

- Provide scientific and technical advice to the NMCC on MPA selection, management, and policy development.
- Conduct technical reviews of MPA management plans, zoning, and monitoring frameworks of existing MPAs and proposed MPAs before submission to the NMCC for approval.
- Support biodiversity assessments, ecological monitoring, and fisheries research to guide evidence-based decision-making.
- Develop and recommend technical standards, methodologies, and indicators for evaluating MPA effectiveness.
- Facilitate collaboration with universities, research organizations, and international partners to strengthen the knowledge base for MPA management.
- Advise on the integration of climate change adaptation and ecosystem-based management approaches into MPA planning and operations.

- Provide technical support for capacity-building activities at national, district, and community levels.
- Review new scientific findings and global best practices to update and refine MPA policies in Bangladesh.
- Serve as a technical review body for proposals on MPA spatial planning and enforcement mechanisms.
- Prepare technical reports and recommendations for the NMCC to support its policy and management functions.

2.17.3 Terms of Reference for TC-MPA

- Ensure all NMCC decisions are grounded in scientific evidence, operational feasibility, and best practices in fisheries and biodiversity management.
- Act as a formal platform for engagement between government technical agencies (DoF, BFRI, BORI, DoE), academia, and international research partners.
- Promote innovation in monitoring (e.g., citizen science, remote sensing, digital logbooks) to strengthen MPA data systems.
- Ensure technical inputs align with the Marine Fisheries Act 2020 and IUCN guidelines for MPAs.
- Provide technical vetting of budgets, capacity-building plans, and enforcement strategies before implementation.
- Advise on the design and implementation of pilot projects to test new approaches in MPA management.
- Ensure stakeholder voices (fishers, women, youth, NGOs) are considered in technical evaluations.
- Undertake any technical or advisory task assigned by the NMCC to support the national MPA agenda.

2.17.4 Frequency of Meetings

- The TC-MPA will meet at least twice a year and as required by NMCC requests.
- Meetings will be convened by the Chairperson in consultation with the Member Secretary.
- Technical working groups may be formed for specific tasks (e.g., conservation, habitat restoration, climate, monitoring, socio-economics).

2.17.5 Administrative Matters

- The TC-MPA will be chaired by the Director (Marine), DoF, with the Director (Blue Economy), DoF as Co-Chair.
- The Member Secretary will be a senior technical officer from DoF.
- Members will include representatives from BFRI, DoE, BORI, Bangladesh Navy, Coast Guard, IUCN Bangladesh, WCS, and relevant universities.
- The committee may co-opt additional experts and organizations on a case-by-case basis.

1.10.6 Relationship with NMCC

- The TC-MPA will function as the technical and advisory arm of the NMCC.

- All recommendations, reviews, and technical assessments from the TC-MPA will be submitted to the NMCC for policy approval and implementation.
- The TC-MPA will ensure that NMCC decisions are scientifically sound, feasible, and aligned with international best practices.

3. Key Management Recommendations

3.1 Engaging local communities and fishers

Stakeholder engagement is crucial for the successful management of the Naf MPA because it fosters collaboration, builds trust, and ensures that the voices of all affected parties are heard and considered. By involving local communities, government agencies, NGOs, and other stakeholders, engagement enhances the legitimacy and effectiveness of conservation efforts while addressing the diverse needs and priorities of the region.

It encourages shared ownership, reduces conflicts, and promotes compliance with regulations, thereby improving enforcement and sustainability. Furthermore, inclusive engagement integrates local knowledge and expertise, strengthens capacity, and creates economic and social incentives, ensuring long-term commitment to the MPA's goals.

Local communities from the six unions of Teknaf will be engaged in managing the Naf MPA. Capacity-building trainings will be offered to stakeholders on marine conservation, MPA regulations, and alternative livelihoods, while local leaders and representatives will be trained to disseminate information and build capacity within their communities. Multi-stakeholder advisory committees, such as the Union Conservation Committees (UCC) and Upazila Marine Conservation Committee (UMCC), will provide input on management and monitoring, and agreements between the government and local communities will formalize shared responsibilities.

Awareness-raising initiatives will include the use of posters, brochures, and local media to spread knowledge about the MPA's importance, supplemented by social media platforms to keep stakeholders informed and engaged. Community participation will extend to surveillance and monitoring through the formation of Community Fish Guards (CFG), while a formal system at UCC and UMCC will allow stakeholders to raise concerns or complaints. Local cultural events will be integrated with conservation awareness activities, and occasions like World Oceans Day and National Fish Week will be celebrated with stakeholders to enhance ocean literacy and conservation of ecosystem and biodiversity. CFGs will be formed under the UCCs with approval from the UMCC, comprising local fishers and community representatives. They will operate as community-based surveillance groups, reporting violations to UCC/UMCC and supporting enforcement agencies such as the DoF and Coast Guard. CFGs will be financed through DoF's MPA Management Wing (MMW), supplemented by donor support for training and operational expenses.

Local communities, including fishers, will play a central role in citizen science-based monitoring of the Naf MPA. They will be trained to collect ecological and fisheries data using logbooks, mobile applications, and simple monitoring tools. To strengthen surveillance, Community Fish Guards (CFGs) will be formed under the Union Conservation Committees (UCCs) and supervised by the UMCC. CFGs will serve as community-based patrol groups, reporting violations and ecological observations to the UCC/UMCC, who in turn will forward the information to the Department of Fisheries (DoF) and enforcement agencies.

All data collected from citizen science initiatives and CFG patrols will be compiled through the Naf MPA Monitoring Desk at the DoF, managed under the national MPA Implementation Unit (MIU). This avoids duplication and ensures that monitoring is integrated into a centralized national MPA database. The Monitoring Desk for Naf will function as a dedicated focal point within MIU rather than as a separate cell, thereby aligning local monitoring with national reporting and evaluation systems. To increase community awareness and participation in monitoring, innovative programs will be introduced to highlight the MPA's biodiversity value and sustainable fishing practices. These will include interactive tools such as games and role-playing, as well as practical aids like illustrated plastic rulers showing fish size restrictions and laminated calendars and maps indicating fishing time and area closures.

3.2 Conceptual Zoning

A conceptual and indicative zoning of Naf MPA is provided (Figure 5), based on the overlap among key habitats of species, and consultation meetings with the local stakeholders. These includes:

Zone 1: Cetacean and elasmobranch conservation zone (161.44 km²).

Zone 2: Sustainable Fishing Zone (360.82 km²).

Zone 3: Juvenile and Megafauna Conservation Zone (200.51 km²).

Zone 4: Sustainable Tourism Zone (11.37 km²)

The DoF will initiate a science-based, participatory zoning process to refine and finalize the zoning of Naf MPA. The indicative zoning already developed is grounded in scientific surveys conducted since 2020, combined with citizen science-based monitoring data and consultations with local stakeholders. This ensures that proposed zones reflect both ecological priorities (such as key habitats of cetaceans, elasmobranchs, and juvenile fish) and the socio-economic realities of fishing and tourism use. The DoF will oversee technical aspects and the vetting process throughout the plan's development. The boundary lines of the Naf MPA, including its various zonation boundaries, will be integrated into a digital mapping system. All registered fishing boats will be required to install a tracking device specified by DoF's Vessel Monitoring System (VMS) that can load these digital maps with GPS functionality. This device will enable fishers and DoF to identify their exact location within the MPA zones and understand the specific regulations for each area. The DoF will organize training sessions to educate fishers on how to use these devices effectively.

and trade of one genus and 29 species, provided their catch does not detrimentally affect wild populations.

3.4 Zonal Management

The Spatial Plan for Naf MPA is the zonation for different activities at the Naf MPA. This zonation is developed based on the analysis of socio-ecological data collected from the Naf MPA. In addition, data collected through FGDs, KIIs and consultation workshops were also incorporated in this plan. Existing rules and regulations of the Bangladesh government are incorporated to develop the zonal management strategy. Based on the current ecological data (described in biodiversity section), potential zones for the Naf MPA can be Megafauna conservation zone, Juvenile fish species conservation zone, Eco-tourism zone, and Sustainable fishing zone. Overall zonal management scheme for the Naf MPA is highlighted in Figure 6.

The Naf River Estuary and adjacent waters in southeastern Bangladesh are biodiversity-rich ecosystems, supporting fish, mollusks, megafauna, shorebirds, sea turtles, crabs, and mangroves (details are given in priority species section). Scientific surveys conducted by the DoF's RV Meen Sandhani since 2020, supplemented by citizen science and local ecological knowledge, confirm the estuary as a hotspot for juvenile fish species. Seventeen species of juveniles—including *Coilia* spp., *Epinephelus* spp., *Sillago* spp., *Lepturacanthus* spp. and *Pomadasys* spp.—were frequently recorded between April and July, reflecting the estuary's role as a nursery ground. Probability of juvenile occurrence exceeds 70% within the estuary and declines offshore due to reduced nutrient supply. Megafauna are well represented, with six species of marine mammals (Irrawaddy dolphins, Indo-Pacific humpback dolphins, finless porpoises, bottlenose dolphins, pantropical spotted dolphins, and spinner dolphins) observed year-round. Elasmobranchs (sharks, rays, and sawfish) are widely distributed across the coastal and offshore zones. The Teknaf Peninsula also lies on two major migratory bird flyways, serving as a critical stopover and feeding ground for numerous shorebirds. In addition, the eastern beaches of Teknaf support nesting of globally threatened sea turtles (*Chelonia mydas*, *Eretmochelys imbricata*, and *Caretta caretta*). Other key habitats include mangroves (about 1,460 ha planted, dominated by *Sonneratia* and *Avicennia* spp.), intertidal areas that support crabs and horseshoe crabs, and shallow offshore waters with high species diversity. Environmental monitoring shows relatively homogeneous conditions spatially within the estuary, but strong seasonal variation: higher temperatures during the southwest monsoon (peaking at 31.2°C in July), salinity peaks during the northeast monsoon, dissolved oxygen fluctuating bimodally (6.3–6.8 mg/L), and marked seasonal patterns of turbidity and nutrients (silicate, nitrite, phosphate). These data provide a robust scientific basis for zoning the Naf MPA, ensuring that designated areas reflect the ecological distribution of key habitats, species, and life stages.

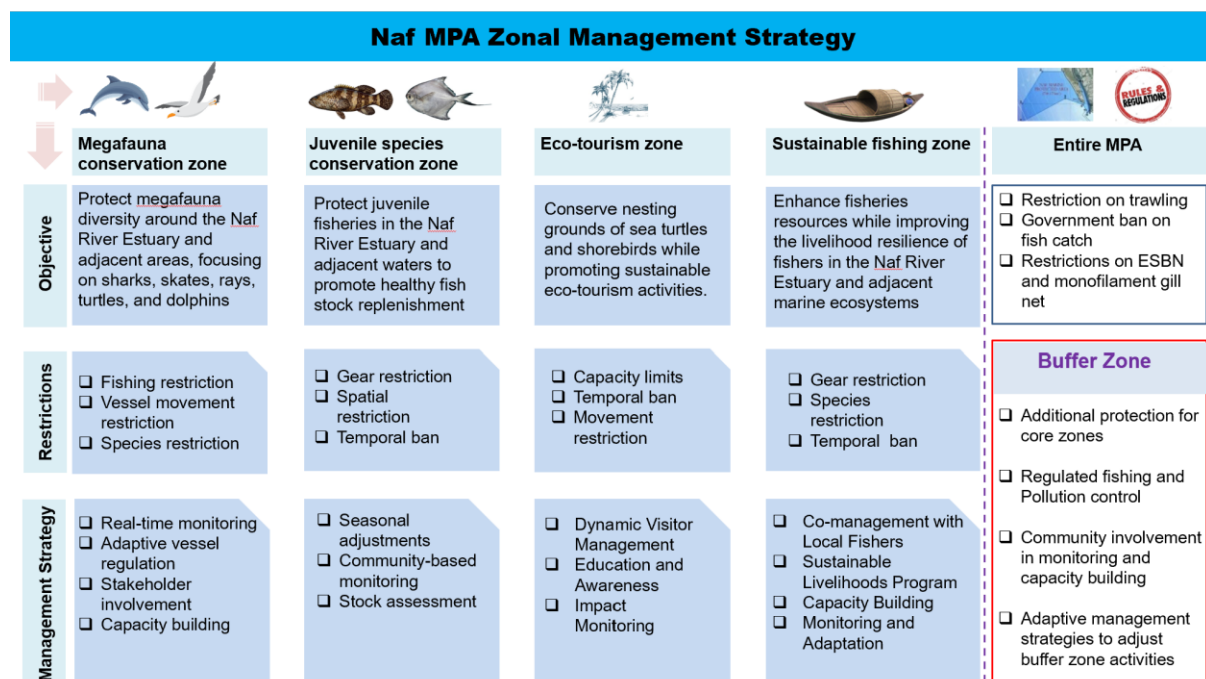


Figure 6 Outline of zonal management plan for Naf MPA

3.5 Zonal Management Guideline Entire Naf MPA

The management plan for the Naf MPA will adhere to all existing rules and regulations set by the Bangladesh government. In terms of fishing regulations, the use of trawl nets will be strictly prohibited below a depth of 40 meters to protect the seabed and prevent overfishing. Ban is enforced on the fishing, transportation, marketing, and selling of jatka (hilsa juveniles, less than 25 cm) from November 1st to June, lasting eight months each year. To protect hilsa during its breeding season, a 22-day ban on catching, selling, and transporting hilsa is applied in the country, typically between October and November. However, unlike other regions of Bangladesh, the Naf Estuary does not really host jatka (juvenile Hilsa), meaning that local regulations will instead focus on protecting other estuarine juvenile species. Furthermore, the use of ESBN and monofilament gill nets will be prohibited, as these types of nets pose a risk to fish populations and cause significant bycatch. Additionally, gill nets with mesh sizes smaller than 6.5 cm will be banned to ensure that juvenile fish are not unintentionally caught. The management plan will also impose a 58-day fishing closure during April to June to protect fish during their breeding season. To enforce these regulations, patrol capacities of DoF will be enhanced. Monitoring and surveillance will be strengthened by bringing all vessels fishing at and adjacent to Naf MPA under vessel monitoring system of DoF. Artisanal fishing boats will be allowed to fish within the permitted fishing zone. Catch of eight genera and 23 shark and ray species will be strictly protected as per the provision of Wildlife Conservation Act 2012 while allowing the sustainable exploitation, consumption, and trade of one genus and 29 species, provided their catch does not detrimentally affect wild populations.

The Naf River Estuary is also unique as a transboundary ecosystem, sharing waters with Myanmar and supporting migratory species such as dolphins, turtles, and shorebirds that move across national boundaries. In recognition of this, the MPA will implement transboundary-sensitive management practices, such as increased patrols near border waters, restrictions on vessel speeds in dolphin hotspots to reduce ship strikes, and the designation of dolphin corridors to minimize disturbances. These

regulatory measures are not common in other MPAs of Bangladesh and reflect the special ecological and geopolitical character of the Naf system.

The MPA will further introduce locally adapted fisheries regulations. All artisanal fishing vessels operating in and adjacent to the MPA will be required to obtain a Letter of Permission (LoP) from the Department of Fisheries, and the number of licensed vessels will be adjusted annually based on catch rate trends and scientific monitoring. This adaptive licensing system, combined with a real-time Vessel Monitoring System (VMS) that integrates MPA zoning maps, will allow for dynamic regulation of fishing effort and gear use, tailored to the ecological condition of the estuary. Such adaptive co-management, implemented with strong fisher involvement, will be a distinct regulatory measure of the Naf MPA compared to other coastal areas.

Tourism regulations will also be uniquely tailored to the Naf context. Given the estuary's globally important turtle nesting beaches and its role in the East Asia–Australasian Flyway for migratory shorebirds, eco-tourism activities will be strictly regulated. Visitor numbers will be capped during sensitive seasons, and all tour operators will require licensing to ensure compliance with environmental standards. Fishing will be prohibited in designated eco-tourism areas to minimize disturbance to nesting and roosting sites, while community members will be encouraged to participate as licensed eco-guides, creating an incentive-based conservation approach.

Finally, the Naf MPA will adopt special regulatory measures to enhance both biodiversity protection and national security. The Restricted Zone within the MPA, which overlaps with areas prone to drug smuggling and illegal trafficking across the border, will be under strict no-fishing rules and enhanced law enforcement. This dual-purpose regulatory approach—protecting biodiversity while addressing national security concerns—is unique to the Naf MPA and sets it apart from other protected areas in the country.

Zone 1: Cetacean and Elasmobranch Conservation Zone

This zone is designated exclusively for the protection of cetaceans, including dolphins, and elasmobranch species, including sharks and rays, which are highly vulnerable to fishing pressure and habitat disturbance. To ensure their survival, all forms of fishing and extractive activities will be strictly prohibited throughout the year, thereby eliminating risks of bycatch, entanglement, and noise disturbance from fishing vessels. The area will function as a safe refuge for these species, supporting critical life processes such as feeding, breeding, and migration. In addition to enforcing no-fishing rules, specialized patrols by law enforcement agencies will be conducted in collaboration with the DoF, supported by real-time vessel monitoring of DoF to detect and deter violations. To strengthen conservation outcomes, community-based awareness and education programs will be initiated to highlight the ecological and cultural significance of dolphins, sharks, and rays within the Naf River Estuary. Local fishers will be engaged in citizen science initiatives, such as participatory monitoring of strandings and sightings, fostering stewardship while reducing conflicts. The establishment of this zone marks a unique step, as it represents one of the very few dedicated cetacean and elasmobranch sanctuaries in Bangladesh's marine waters, giving the Naf MPA a distinctive role in national and regional biodiversity conservation.

Zone 2: Sustainable Fishing Zone

This zone is designated to support the livelihoods of MPA-dependent communities while ensuring that fishing remains ecologically sustainable. Artisanal fishing will be permitted for local fishers from Teknaf Sadar, Sabrang, and Baharchara unions, with conditional access extended to fishers from

Whykong, Nhila Union, and Saint Martin's Island. Only approved gear types will be allowed, and destructive or non-selective gears such as monofilament synthetic nylon nets and gill nets with mesh sizes smaller than 6.5 cm will be strictly prohibited. The use of marine set bag nets (MSBN) presents a management challenge: while legally permitted beyond the 10 m depth zone, this area falls within 15–25 m depth, requiring special regulation for fishing within MPA using set bag net. To minimize ecological impacts, MSBN use will be reviewed under strict controls, and its authorization, if any, will be tied to compliance with bycatch reduction measures and seasonal restrictions.

Two nationwide seasonal fishing closures—the 58-day ban (April to June) and the 22-day ban (October–November)—will be fully enforced in this zone, providing protection for spawning and brood fish. In addition, species-specific restrictions such as the prohibition of juvenile catch will also apply across this zone to reduce recruitment overfishing. Since artisanal boats do not maintain logbooks, catch monitoring will rely on systematic landing data collection at designated landing centers, which will provide essential information on species composition, catch volumes, and effort levels. The number of vessels permitted to operate in this zone will be restricted and adjusted dynamically based on stock assessment results and observed catch rate trends. In addition, data will be also retrieved from the citizen science-based monitoring.

Capacity-building workshops and awareness campaign will be conducted for fishers to promote responsible fishing practices, enhance compliance, and increase awareness of the long-term benefits of sustainable harvests. By combining regulated access with active monitoring and fisher education, the zone aims to strike a balance between sustaining local livelihoods and maintaining healthy fish stocks. This tailored approach makes the Naf MPA's sustainable fishing zone distinct from broader national regulations, as it introduces locally adapted measures that respond to the ecological characteristics and fishing practices of the area.

Zone 3 : Juvenile and Megafauna Conservation Zone

This zone is crucial for the protection of juvenile fish species and megafauna such as sea turtles and migratory shorebirds. Research since 2020 shows that at least 17 juvenile fish species—including *Coilia* spp., *Epinephelus* spp., *Terapon* spp., *Sillago* sp., *Alectis* sp., *Pomadasys* sp., *Mugil* sp., *Lepturacanthus* sp. and *Pampus* sp.—are most abundant during April to July, making this period essential for nursery ground protection. To conserve these species, fishing will be prohibited in this zone during the peak juvenile season (April–July). Additionally, the beaches of the Teknaf coast serve as important nesting grounds for *Chelonia mydas*, *Eretmochelys imbricata*, and *Caretta caretta* turtles between November and April. During this period, restrictions will be applied to minimize disturbance to nesting females and hatchlings.

Fishing can be permitted from August to October but only under strict gear regulations. Prohibited gears include estuarine set bag nets (ESBN), fine-mesh gill nets (<6.5 cm), and monofilament nets, all of which cause high juvenile bycatch. The use of Marine Set Bag Nets (MSBNs) presents a management challenge: while they are legally permitted beyond the 10 m depth zone, this zone lies up to 13 m depth where juveniles are concentrated. To minimize ecological impacts, MSBN use will not be automatically authorized but instead reviewed under strict controls, including mandatory bycatch reduction devices, seasonal restrictions, and compliance with catch monitoring. If these measures cannot be ensured, MSBNs will be disallowed altogether.

Special measures will be implemented to reduce disturbance to sea turtles and shorebirds. Management will focus on controlling human interference, boat-repair activities, and dog predation on nesting

beaches. Seasonal beach patrols will be organized by trained community groups in collaboration with DoF, to protect nests and relocate eggs when necessary. Guidelines will also be introduced to regulate beach-based tourism and fishing-related activities during the nesting period.

Monitoring in this zone will adopt a non-destructive and participatory approach. Monitoring will rely on scientific in-situ surveys (plankton tows, juvenile fish sampling with scientific nets, and visual transects) combined with fisher-reported catch composition data for legal-sized fish. For megafauna, turtle nesting patrols, shorebird counts, and opportunistic sightings of dolphins and sharks will be systematically recorded. These activities will be coordinated by the DoF and supported by UCCs and CFGs, ensuring compliance with legal requirements and promoting community participation.

Fishing in the Naf River Estuary area was previously completely banned by the Government of Bangladesh, but this restriction has now been lifted under regulated conditions. Fishing is allowed only between August and October, during which strict gear regulations will apply to minimize impacts on juvenile species and megafauna. These regulations include the prohibition of certain gears, such as estuarine set bag nets (ESBN) and fine-mesh gill nets, which are known to cause high bycatch. Additionally, the use of non-selective fishing gears, such as small mesh size nets, will also be prohibited to ensure the protection of juvenile species. Given its sensitive geopolitical location, surveillance and patrols by both the Department of Fisheries (DoF) and law enforcement agencies will remain active, ensuring that fishing activities proceed sustainably while security concerns are continuously monitored.

Zone 4: Sustainable Tourism Zone

This zone covers the beach and adjacent intertidal areas of Teknaf, which are used by local communities and hold potential for small-scale, eco-friendly tourism. The emphasis will be on locally appropriate and innovative activities that provide both income opportunities for communities and incentives for conservation. Instead of large-scale or wildlife-centric tourism such as dolphin watching, the zone will promote activities that align with the everyday environment and traditions of the area.

Possible attractions include guided mangrove walks and mudflat explorations, where visitors can learn about crabs, mollusks, and intertidal ecology; shorebird observation points, with simple hides or viewing decks for migratory birds; and cultural and fisheries-linked tourism, such as visiting landing centers during safe, designated times to learn about traditional fishing practices, or short community-led tours showcasing local crafts and food. These attractions highlight the direct connection between local culture and coastal biodiversity, making tourism more accessible and meaningful to visitors.

Seasonal closures will be important to ensure tourism does not disturb sensitive habitats. Access to beaches will be restricted during turtle nesting and hatching season (November to April), while use of intertidal areas will be limited during peak juvenile fish season (April to July) to prevent trampling of nursery habitats. These temporal restrictions will be coordinated and enforced by the Union Conservation Committees (UCCs), Community Fish Guards (CFGs), and DoF field staff.

Fishing activities will not be allowed in this zone to avoid conflicts with tourism and to preserve the integrity of habitats used for educational and cultural activities. Instead, fishers may benefit indirectly through community-based eco-tourism initiatives, such as acting as guides, storytellers, or providing local homestay experiences.

The plan envisions a community-led eco-tourism system. Local youth and fishers' families will be trained and certified as guides, developing skills in visitor management, safety, and ecological

interpretation. Over time, DoF and relevant tourism authorities can formalize a licensing mechanism to ensure that tourism operators adhere to conservation safeguards.

To minimize impacts, waste management measures will be installed at entry points and tourist sites. In addition, interpretive signs, educational programs, and community awareness campaigns will highlight the ecological and cultural significance of Teknaf's beaches and estuaries, promoting responsible tourism behavior.

Buffer Zone for the Naf MPA

The Buffer Zone in the Naf MPA (about 494.17 square km area) will serve as a protective buffer surrounding the core conservation zones, such as the Juvenile Conservation Zones and Restricted Zones, to minimize human impact while still allowing for some regulated activities. This zone is designed to safeguard the integrity of the MPA by acting as a transitional area where limited human activities, such as sustainable fishing, tourism, or other managed resource use, can take place without compromising the ecological health of the core zones. The buffer zone acts as a protective boundary that ensures critical habitats within the MPA are shielded from surrounding human pressures like overfishing, pollution, and habitat destruction.

The selection of areas for the buffer zone was based on several key considerations, particularly the proximity to sensitive habitats and areas with high ecological value. In the case of the Naf MPA, the buffer zone was strategically established around the Juvenile and Megafauna Conservation Zones, where juvenile fish species and marine megafauna, including turtles and dolphins, rely on specific habitats for breeding and feeding. These zones are highly sensitive to disturbances, and the surrounding buffer zone will help reduce threats from nearby activities such as illegal fishing, pollution runoff, and tourism. Additionally, the buffer zone also extends around the Restricted Zone, which is designated for high-priority conservation efforts where human activity is severely limited. The buffer helps to reduce encroachment from surrounding areas and serves as a protective layer that minimizes potential negative impacts.

The management strategy for the buffer zone is designed to balance ecological protection with sustainable human activities. Activities like fishing, tourism, and local resource use will be allowed in the buffer zone but will be subject to strict regulations. For example, only sustainable fishing practices will be permitted, with restrictions on gear types such as small-mesh gill nets or destructive fishing methods. Fishing will be limited to specific seasonal windows to prevent overfishing and protect juvenile species during critical growth periods. The DoF (Department of Fisheries), in collaboration with local communities and enforcement agencies, will monitor fishing activities in this zone to ensure compliance with these regulations.

The buffer zone management will also include measures for pollution control, with a focus on preventing the discharge of waste or pollutants from nearby settlements, industries, or fishing activities. This includes active monitoring of water quality and implementing best practices for waste management. The Department of Environment (DoE) will play a critical role in regulating and monitoring pollution within the buffer zone, including efforts to control oil spills, effluent discharge, and solid waste. In terms of tourism, the buffer zone will be managed to promote eco-tourism activities, with clear guidelines for visitor behavior and sustainable tourism practices. This will include restrictions on the number of visitors and regulated access to sensitive sites during breeding seasons or key migration periods for species.

Furthermore, community involvement is crucial to the success of the buffer zone. Local fishers, through community-based monitoring systems and the use of tools like mobile applications for data collection, will play a pivotal role in gathering information on biodiversity, fishing efforts, and habitat conditions. Capacity-building programs will be introduced to educate local communities on sustainable practices and conservation priorities, ensuring that they remain engaged and informed about the buffer zone's management goals. These efforts will contribute to improving the socio-economic conditions of local populations while also ensuring their participation in conservation activities.

The buffer zone around the Naf MPA is an essential part of the overall management framework, providing additional protection to critical ecosystems while allowing for regulated human activities. Its design and management are rooted in the need to maintain the ecological integrity of the MPA's core zones while promoting sustainable use of the surrounding areas. The combined efforts of governmental agencies, local communities, and NGOs will ensure that the buffer zone functions effectively as a critical layer of protection, contributing to the long-term sustainability of the MPA's diverse ecosystems.

4. Alternative livelihood for impacted community

Alternative livelihood initiatives should be designed to provide long-term economic stability and reduce dependency on fishing. For the Naf MPA-dependent communities, viable options include mariculture initiatives like seaweed farming, cage culture of Seabass, raft-based Oyster and green mussel aquaculture, artemia culture in salt-bed, which offer sustainable income opportunities while minimizing environmental impact (Figure 7). Skill-based training or vocational training programs should be introduced in areas such as mechanical work (e.g., boat engine repair, motor-bike repair), mobile repair, handicrafts, tailoring, and driving to equip community members with transferable skills that align with their capabilities. Additionally, eco-tourism ventures such as guided marine tours, fish barbeque experiences, and cultural showcases can create income opportunities linked to conservation efforts. Union Coordination Committees (UCCs) will play a vital role in motivating members to transition into sustainable livelihoods and will actively seek support from Upazila and District MPA Management Committees for technical and financial assistance.

Eco-tourism development is a key component of alternative livelihoods, directly linking conservation with income generation. Public-private partnerships (PPP) should be encouraged to support responsible eco-tourism initiatives in the Naf MPA. Guided marine tours, including dolphin spotting, bird watching, and showcasing marine biodiversity, can attract eco-conscious tourists while raising awareness about conservation. Fish barbeque experiences along the coast, operated by local communities, provide a unique cultural and culinary attraction. To ensure sustainable tourism development, investment in essential infrastructures such as eco-friendly lodging, visitor centers, and transport facilities—must be prioritized. These efforts should ensure that the economic benefits are equitably shared with local communities.

Strengthening the value chains of fishing and mariculture-related products can maximize economic returns for the Naf MPA-dependent communities. Training programs on hygienic fish processing methods, such as improved drying, salting, and packaging, can significantly enhance product quality and market value. Developing value-added products, including surimi-based fish products, seaweed-based products, fish-n—Chips, Oyster and green mussel-based products, and packaged crab snacks, offers potential for higher economic returns.

For the Naf MPA-dependent communities, viable mariculture options include seaweed farming, green mussel farming, shrimp farming, crab fattening, cage culture of seabass, raft-based oyster aquaculture, and artemia culture in salt beds. These initiatives offer sustainable income opportunities while minimizing environmental impact and directly contribute to reducing fishing pressure.

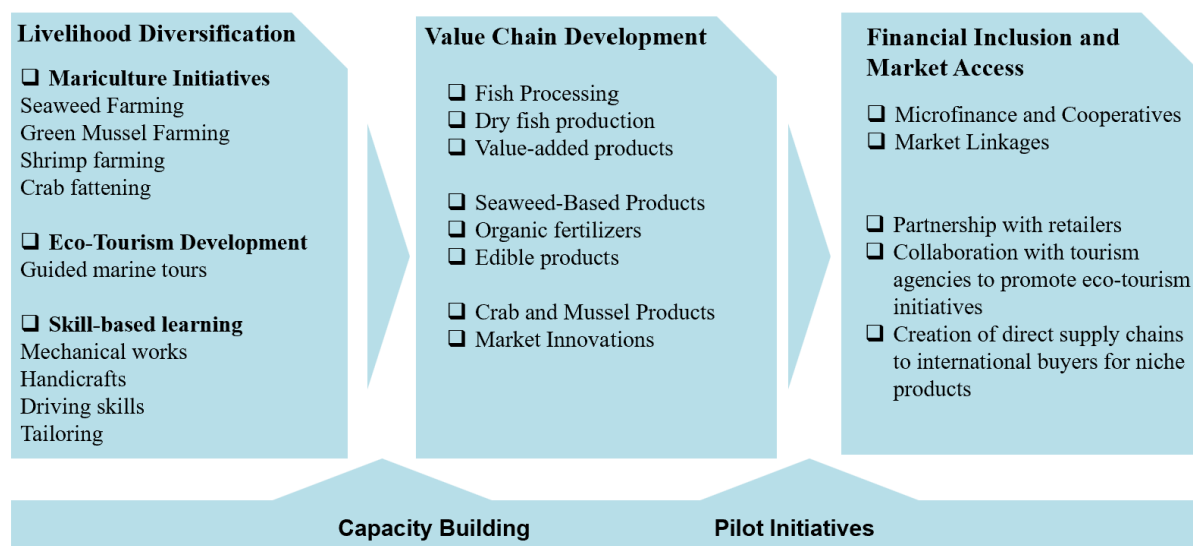


Figure 7 Potential options to support the livelihood of impact community

Resource subsidies are critical to support fishers during the transition to alternative livelihoods and encourage the adoption of sustainable practices. To alleviate the financial burden during closed fishing seasons, cash and kinds of allowances should be provided to affected families.

Distribution of LP gas can help reduce reliance on firewood, thereby protecting local biodiversity. Furthermore, mariculture tools such as nets, ropes, and floating racks should be subsidized to promote environmentally friendly aquaculture practices.

Capacity building is essential to ensure the successful implementation of alternative livelihoods and conservation initiatives. Training programs on sustainable mariculture techniques can empower fishers to adopt new practices confidently. Eco-tourism management workshops focusing on hospitality, tour guiding, and operations will enable communities to tap into tourism opportunities. Financial literacy programs are also critical, equipping community members with the skills to manage small businesses effectively and access microfinance opportunities. Additionally, conservation awareness campaigns will educate communities on the benefits of MPA management and sustainable resource use, fostering a sense of stewardship for the marine environment.

Financial inclusion is key to the sustainability of alternative livelihoods for the Naf MPA-dependent communities. Providing microfinance loans or grants can help individuals start small businesses or invest in mariculture ventures. Establishing cooperatives will facilitate collective investment, reduce market risks, and enhance the bargaining power of local producers. Market linkages should also be developed by partnering with retailers and tourism boards to promote products and services derived from alternative livelihoods.

5. Monitoring of Naf MPA

To effectively achieve the objectives of the Naf MPA, a comprehensive and integrated monitoring and evaluation (M&E) strategy is essential. This strategy builds upon the principles of systematic data collection, stakeholder collaboration, and adaptive management to ensure the long-term ecological and socio-economic health of the MPA (Figure 8).

The MPA Management Wing (MMW) of DoF will oversee all monitoring and evaluation activities in collaboration with the Fisheries Monitoring Center (FMC) and Co-management Committees. The MMW will manage the collection, storage, and analysis of data, while disseminating findings to stakeholders, including government agencies, local communities, and international partners. The Naf MPA Monitoring Cell, located within the District Fisheries Office, serves as the technical arm of the DoF, responsible for the day-to-day monitoring and reporting activities at the site level. This cell will work closely with both the MMW and FMC, ensuring that the monitoring data collected at the field level directly informs management decisions.

Collaboration with relevant ministries, universities, research institutes, NGOs, and donor organizations will ensure an integrated approach that leverages the expertise and resources of all involved parties. The MMW will remain the overall authority for coordinating and implementing the Naf MPA management plan, ensuring that monitoring protocols are consistent and harmonized across all MPA zones.

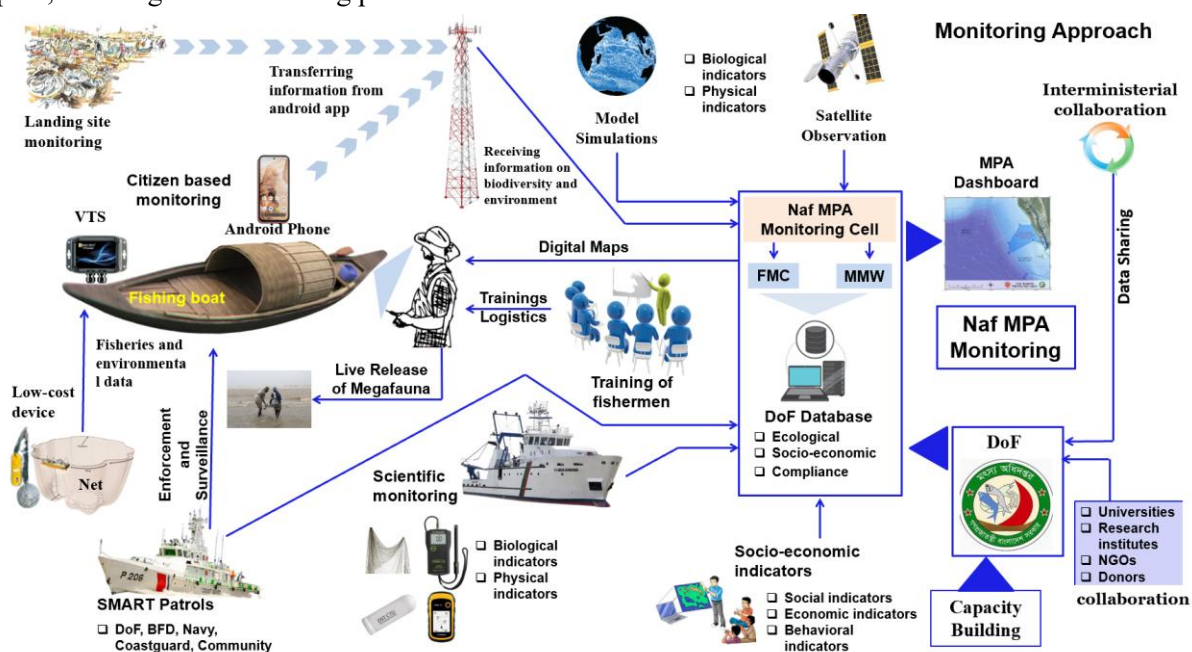


Figure 8 Overall structure of integrated and cost-effective monitoring strategy for the Naf MPA

A low-cost monitoring strategy will be implemented for the Naf MPA, utilizing a citizen science-based approach to engage local fishers in data collection. Fishermen will be trained to use an Android application designed specifically for biodiversity monitoring within the MPA. This app will allow fishers to capture photographs of various species, which will be directly uploaded to the DoF database for further analysis. Additionally, low-cost sensors attached to fishing gear will automatically record environmental data such as temperature, salinity, and turbidity. This real-time data will be transmitted directly to the DoF database, providing a continuous stream of valuable information.

Landing sites will be monitored using either DoF's existing land-based catch monitoring system or the citizen science approach, with fishers actively participating in reporting activities. Length-frequency data will be collected to track recruitment and spawning potential ratio (SPR). Scientific monitoring will be conducted on a seasonal basis, with monthly monitoring recommended if additional funding is available.

Training programs will also focus on equipping fishers with the skills to safely release threatened species, including megafauna, that may be accidentally caught. As part of this strategy, fishers will receive vital information through the Android app, including updates on storm surges, potential fishing zones, digital maps of the MPA boundary, and information about fishing ban periods.

Regular monitoring and surveillance will be conducted by the Fisheries Monitoring Center (FMC) and law enforcement agencies, including DoF officials, the Coast Guard, and the local administration. A dedicated MPA dashboard will be developed to provide real-time data about the status of the MPA and ensure that stakeholders are kept informed of key monitoring outcomes. A list of indicators which needs to be monitored for the Naf MPA is given in Annex II.

6. Interagency cooperation

The DoF will act as the lead agency, overseeing the overall management of the MPA, with support from other governmental and non-governmental stakeholders. Interagency cooperation will be coordinated by MoFL through the National MPA Coordination Committee (NMCC), which will be the supreme authority for coordinating efforts at both local and national levels (Figure 9).

To strengthen the institutional framework, MoFL will provide policy-level oversight and ensure that adequate resources are mobilized through the national budget. The DoF, as the lead agency, will implement fisheries zoning regulations, oversee enforcement, operate the Fisheries Monitoring Center (FMC), and coordinate community-based monitoring systems. These activities directly contribute to outcomes such as reduced fishing pressure, improved spawning habitats, and reduced biodiversity threats.

The Department of Environment (DoE) will take the lead in regulating and monitoring pollution, including effluent discharge, oil spills, and solid waste management, ensuring reductions in marine pollution and improving ecosystem health. By explicitly linking the activities of MoFL, DoF, and DoE to core ecological outcomes, the interagency cooperation framework follows the theory of change and ensures accountability in achieving conservation goals.

The DoF will work to secure regular budget allocations from the Ministry of Finance to ensure sustainable funding for the MPA's management. To enforce MPA spatial zones, DoF will establish joint enforcement and monitoring patrols in collaboration with the Bangladesh Coast Guard (BCG), Bangladesh Navy, Border Guard Bangladesh (BGB), Bangladesh Police (BP), and the Department of Forest (BFD). These patrols will regulate fisheries activities, protect marine biodiversity, and prevent illegal, unreported, and unregulated (IUU) fishing, along with the illegal trade of marine wildlife, particularly sharks and rays.

A species conservation and protection plan will be developed in collaboration with the Department of Forest (BFD) and Department of Environment (DoE), focusing on overfished species of fish and shrimp, endangered marine wildlife, including dolphins, porpoises, sharks, rays, and marine turtles. Special attention will be given to addressing the issue of bycatch mortality caused by entanglement in

fishing gear. The plan will include habitat monitoring, population studies, and community awareness programs to reduce threats to these species, ultimately contributing to their long-term survival.

The Ministry of Shipping (MoS) and the Bangladesh Inland Water Transport Authority (BIWTA) will play a critical role in ensuring sustainable navigation within the MPA. They will establish guidelines for commercial vessel traffic to prevent collisions and reduce pollution, including oil spills and waste discharge. These measures will minimize habitat disturbance and enhance the environmental health of the MPA.

Similarly, the Ministry of Civil Aviation and Tourism (MoCAT), along with the Bangladesh Parjatan Corporation (BPC), will focus on developing sustainable tourism initiatives. These will include ecotourism plans and visitor management guidelines to promote responsible tourism practices that support conservation goals and create alternative livelihoods for local communities.

The Bangladesh Fisheries Research Institute (BFRI), Bangladesh Oceanographic Research Institute (BORI), and universities will conduct scientific research to monitor biodiversity, assess fisheries health, and evaluate ecosystem conditions. Findings from these studies will be shared with the DoF to inform adaptive management strategies and policy decisions.

To support communities impacted by MPA regulations, the Ministry of Social Welfare (MoSW), in collaboration with NGOs, will implement livelihood interventions. These will include skills training, capacity-building programs, and financial support for sustainable small-scale enterprises. The goal is to improve the socio-economic conditions of local populations, encouraging compliance with conservation measures and fostering long-term community engagement in the MPA's success.

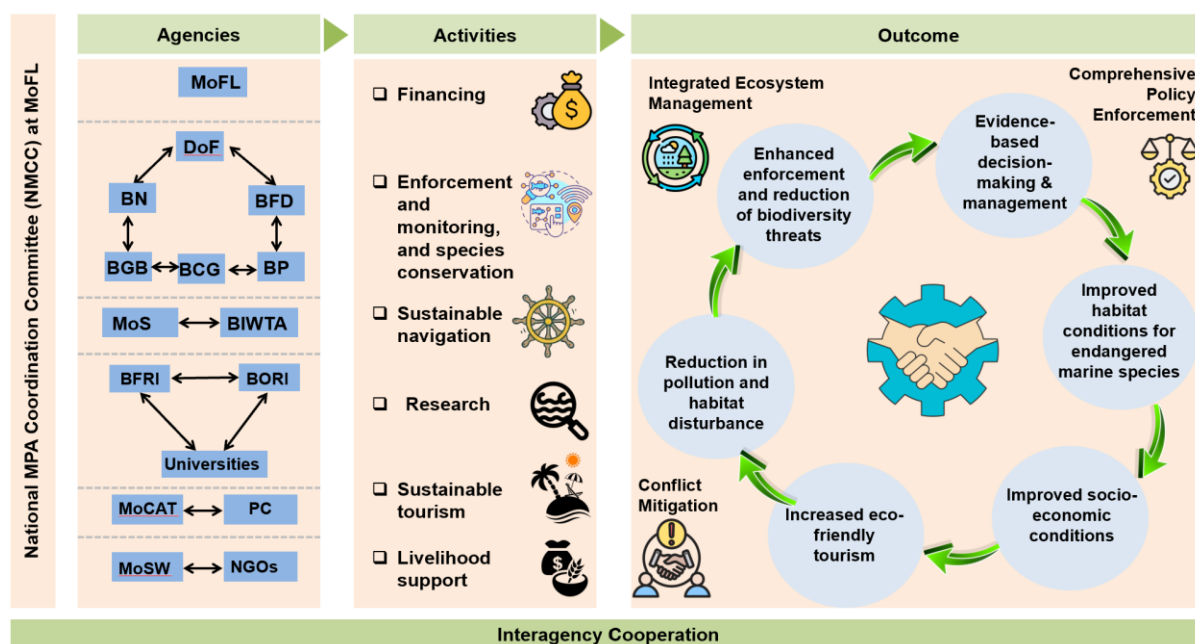


Figure 9 Interagency cooperation framework for Naf MPA management

7. Infrastructure and Equipment

Infrastructure development will be a crucial element for the successful conservation and management of the Naf MPA. The DoF is well-positioned to assess and determine the specific infrastructure requirements necessary for the effective administration of the Naf MPA, including establishing offices

or stations. The recommendations outlined below emphasize the at-sea infrastructure and equipment essential for the efficient management and enforcement of conservation measures within the Naf MPA. The MPA Management Wing with server facilities will be established at DoF or the FMC of DoF will have a dedicated cell for MPA monitoring. The unit or cell will be responsible for data management, analysis and reporting to NMCC through DG, DoF. One digital MPA dashboard will be installed at DoF and one dashboard will be installed at the Upazilla Fisheries Office at Teknaf. Low-cost sensors will be installed in the fishing boats to collect the data on water quality variables.

Fishers will be provided android phones with the application which will help them to get information incentives from the DoF. These incentives include digital map of MPA which will help to identify their live locations, information on fisheries management, early warnings and potential fishing zone.

At least two sea-worthy small patrolling vessels, each of which can accommodate a team of at least fifteen staff from the DoF, community and other law enforcement agencies, will be acquired for conducting to enforce and monitor compliance with fishery laws and rules. Patrolling teams will be provided with basic equipment for conducting community patrols including CyberTracker equipped smart phones, drones, VHF radios, binoculars, life jackets, rain jackets, etc.

8. Adaptive Co-management

Adaptive co-management is a dynamic, iterative approach where management actions are evaluated based on their ability to achieve defined objectives, and future actions are modified according to lessons learned. For the MPA, adaptive co-management integrates key components such as re-evaluation of boundaries and zoning plans, buffer zone establishment, stakeholder engagement, and dynamic zoning adjustments to address the complexities of marine conservation (Figure 10). The framework incorporates community-driven strategies, sustainable livelihood programs, and adaptive financing mechanisms to balance conservation goals with socio-economic needs. It also emphasizes collaborative governance, ensuring policies are flexible and responsive to evolving challenges. Given the expected ecological shifts in the Bay of Bengal due to climate change and increasing pressure on marine resources, adaptive co-management leverages real-time monitoring and multi-stakeholder involvement to guide effective decision-making. By integrating these elements within the proposed framework, the Naf MPA management plan ensures resilience and sustainability while promoting biodiversity conservation and enhancing community well-being.

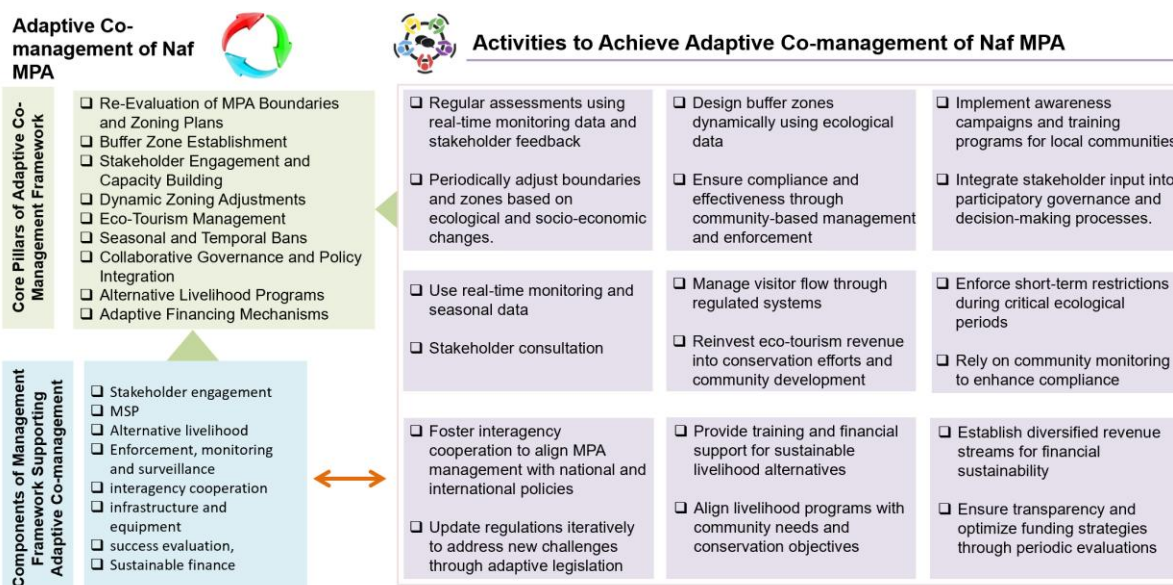


Figure 10 Adaptive co-management strategies for Naf MPA

9. Re-Evaluation of MPA Boundaries and Zoning Plans

The existing framework emphasizes periodic reviews and re-evaluation of MPA boundaries and zoning plans. These adjustments will be guided by a broad set of ecological and socio-economic data that collectively track ecosystem health and measure the effectiveness of conservation interventions over time. Ecological data should include information on seasonal catch composition and fishing effort, which will help to evaluate fishing pressure and changes in species exploitation patterns. Monitoring of species abundance, biomass, and distribution will provide insight into the status of both commercially important and threatened species. Length-frequency data will be recorded to track recruitment success and to calculate spawning potential ratios, which are essential indicators of population recovery. Water quality will be monitored to detect changes in temperature, turbidity, salinity, dissolved oxygen, nutrient levels, and pollutants, as these parameters directly influence habitat condition and biodiversity health. Habitat-specific assessments will also be conducted to document the extent and condition of seagrass beds, the status of coral reefs where present—including live coral cover, bleaching incidence, and structural complexity—mangrove canopy cover and regeneration potential, as well as erosion and sedimentation patterns in sandy and mudflat habitats. Biodiversity indicators, including sightings of megafauna such as dolphins, turtles, sharks, and rays, will further serve as proxies for ecosystem health. These data will be collected through an integrated monitoring system that combines multiple approaches. Citizen scientists, data enumerators and fisher-based monitoring, supported through mobile applications, will be used to collect catch composition, species records, catch & effort data, and bycatch information in real time. Scientific surveys, including underwater transects, benthic habitat mapping, water quality sampling, and acoustic or satellite-based remote sensing, will provide robust datasets on habitat and species condition. Low-cost automated sensors attached to fishing gear will log vertical environmental profiles such as temperature, salinity, and turbidity, which will be directly transmitted to the Department of Fisheries' database. In addition, collaborative research programs with national institutions such as BFRI and BORI, as well as universities and NGOs, will ensure regular scientific monitoring of biodiversity, habitat condition, and ecosystem processes.

To ensure that these data directly inform adaptive management, a set of key performance indicators (KPIs) will be generated from the monitoring framework. These KPIs will measure both ecological and socio-economic outcomes, providing a clear basis for evaluating the effectiveness of conservation efforts. Ecological KPIs will include improvements in the biomass of target species, reductions in bycatch mortality of threatened species, recovery of critical habitats such as seagrass and coral reefs, and measurable improvements in water quality indices. Management KPIs will include compliance with zoning restrictions, reduction in illegal fishing activities, and the establishment of effective enforcement patrols. Socio-economic KPIs will assess the adoption of alternative livelihoods, reduction in household dependence on fishing, and improvements in community income stability. By linking data collection to well-defined indicators, the monitoring framework will provide both accountability and transparency in tracking conservation progress.

Re-evaluation of zoning will occur every ten years as part of the long-term management cycle, but interim reviews may be conducted every five years if significant ecological or socio-economic changes are detected. This iterative and evidence-based approach ensures that zoning remains adaptive to habitat shifts, species migration, and changing community needs, while remaining consistent with broader MSP–MPA strategies. In this way, boundary and zoning adjustments will be grounded in robust scientific data, stakeholder engagement, and measurable conservation outcomes.

10. Sustainable Financing for Naf MPA

Sustainable financing is essential for the effective management and long-term conservation of the Naf MPA. The financial needs assessment identifies key areas requiring investment, including operational costs for staff salaries, community fish guards, monitoring, patrolling & surveillance, enforcement, and routine maintenance. Conservation activities, such as biodiversity monitoring, habitat protection, and the protection of juvenile fisheries and megafauna, are also significant financial priorities. Logistics and infrastructure development, including acquisition of patrol vessel, monitoring and patrolling system development and maintenance requires funding to enhance management capabilities and tourism experiences. Additionally, resources must be allocated for community engagement initiatives, such as training programs, alternative livelihoods, and stakeholder participation. Routine data collection is mandatory to monitor biodiversity, ecosystem health, stock rebuilding, species abundance and distribution, and water quality parameters. Research and education, focusing on scientific data collection and awareness campaigns, are vital for informed decision-making and community support. All these activities require adequate funding.

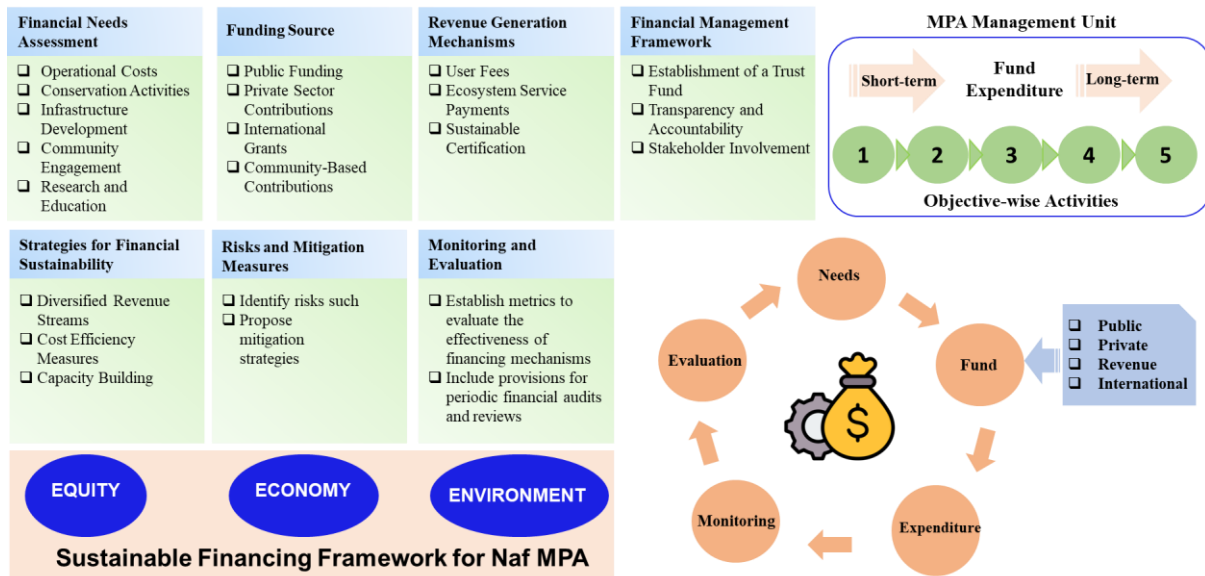


Figure 11 Overall financing strategy for Naf MPA management

In the short term, financial support will rely on government budget allocations, bilateral donor funding, and international grants (Figure 11). Over the longer term, these funds may be supplemented or replaced by revenue from diversified sources. Public-private partnerships (PPPs) and corporate social responsibility (CSR) contributions from private companies can provide additional funding. Community-based contributions, such as cooperatives formed by fishers, can further strengthen financial resources. The introduction of revenue-generation mechanisms will also play a critical role. User fees from tourism, such as entrance fees or activity permits, can provide sustainable income. This is particularly feasible given the proximity of the Naf MPA to Teknaf, a gateway to the popular tourist destination of Saint Martin’s Island. Additionally, ecosystem service payments, such as blue carbon credits or biodiversity offsets, can tap into global funding mechanisms to finance conservation efforts. Sustainable certification programs, such as Marine Stewardship Council (MSC) certification for fisheries, can create market incentives for environmentally responsible practices while generating income.

To ensure financial transparency and long-term sustainability, a robust financial management framework will be established. This includes the creation of a trust fund to manage and allocate resources effectively. Systems for monitoring financial flows and ensuring accountability will be implemented, with the active participation of local communities, government, and private stakeholders. Diversified revenue streams will be developed to reduce reliance on any single source of funding, while cost-efficiency measures will optimize the use of available resources. Capacity-building programs will train staff and local communities to manage funds and generate income sustainably. A dedicated trust fund will be established as a long-term financing mechanism for the Naf MPA. It will be legally constituted under national frameworks and governed by a Board of Trustees comprising representatives from government, local communities, civil society, and the private sector. Initial capitalization will come from government allocations, donor contributions, and international partners, while future revenues will be generated from tourism fees, CSR contributions, blue carbon credits, and ecosystem service payments. The fund will operate with strict financial transparency, including independent audits, annual reporting, and community participation in oversight. Part of the resources will be invested in secure financial instruments to create an endowment, ensuring stable income for core activities such as

patrolling, biodiversity monitoring, and community programs. This model will guarantee long-term sustainability, reduce reliance on external grants, and provide a reliable financial base for the effective management of the Naf MPA.

Potential risks, such as fluctuations in tourism revenue, over-reliance on external grants, and challenges in community acceptance, will be mitigated by maintaining emergency reserves and diversifying funding sources. Monitoring and evaluation systems will be introduced to assess the effectiveness of financing mechanisms, with periodic financial audits and reviews ensuring transparency. While the short-term focus will remain on government and donor support, the long-term strategy will prioritize sustainable revenue generation through tourism contributions, ecosystem service payments, and community-driven initiatives. These efforts will support the implementation of programs designed to achieve the conservation and management objectives of the Naf MPA, ensuring ecological sustainability and community resilience. A list of ministries who can potentially contribute in MPA financing and list of donors are given in Annex III and IV, respectively.

11. Programs for implementing MPA objectives

Programs to Achieve Objective 1: Protect Juvenile Fisheries in the Naf River Estuary and Adjacent Waters

Juvenile fisheries are critical for enhanced recruitment, maintaining fish stocks, ensuring sustainability, and supporting local livelihoods. Protecting nursery areas and managing overfishing of juveniles is essential for effective conservation. Below are programs designed to achieve this objective (See also Annex V):

Juvenile Fish Conservation: Juvenile fish conservation is crucial to prevent overfishing of young fish before they reach reproductive maturity. Despite regulations, illegal fishing practices continue, leading to a significant loss of juvenile fish. Awareness campaigns, stricter monitoring, and enforcement measures will target this issue to improve compliance.

Seasonal Fishing Bans: Seasonal fishing bans are introduced during critical breeding and nursery periods to protect fish populations. Specific no-fishing zones will be identified, and bans will be enforced with community collaboration. These measures aim to ensure the natural life cycle of key fish species.

Pollution Control and Habitat Restoration: Pollution in critical habitats and blocked migration routes due to siltation pose major threats to juvenile fisheries. Programs will focus on restoring lost habitats, cleaning estuarine and adjacent waters, and reducing pollution to tolerable levels.

Programs to Achieve Objective 2: Enhance Fisheries Resources through Sustainable Ecosystem-Based Management

A sustainable ecosystem-based management approach ensures the balance between fishery resource use and ecological health. It involves systematic and adaptive management plans that are informed by scientific research and active stakeholder participation. Below are the key programs under this objective (See also Annex VI):

Stock Assessment Studies: Regular stock assessment is essential for understanding fish population dynamics and adjusting fishing quotas or total allowable catch. These studies will form the scientific basis for fisheries management decisions, contributing to the overall health of the ecosystem.

Adaptive Management Techniques: Adaptive management will address dynamic changes in fish populations, ensuring sustainable harvesting practices. This includes monitoring no-fishing zones and adjusting them as necessary, based on stock health and environmental conditions.

Habitat Restoration: Regular data collection on environmental condition, key habitat including juvenile fish nursery grounds, sea turtle nesting and foraging areas, and shallow reef-associated systems will enable in assessing the status of key habitats in Naf MPa. Based on scientific information programs will focus on restoring lost habitats to acceptable levels.

Capacity Building for Fishers: Training fishers in sustainable fishing practices, including the use of selective gear, will reduce ecosystem damage. Awareness campaign and educational workshops will enhance their understanding of sustainable resource use and long-term benefits.

Programs to Achieve Objective 3: Protect Megafauna Diversity around the Naf River Estuary and Adjacent Areas

Conserving threatened megafauna such as dolphins, turtles, sharks, and rays requires integrated efforts to address habitat degradation and bycatch. Below are the programs to protect biodiversity and megafauna in the Naf MPA (See also Annex VII):

Restoration of Critical Habitats: Critical habitats negatively impacted by human activities, such as feeding and nesting areas, will be identified and restored. Restoration activities will involve local communities to promote a sense of ownership and responsibility.

Bycatch Reduction Initiatives: Bycatch Reduction Devices (BRDs) can be introduced and promoted among fishers to minimize accidental capture of megafauna. Training programs will ensure proper use of these devices, and compliance will be monitored regularly.

Awareness Campaigns and Monitoring: Community-driven awareness campaigns will educate locals about the importance of megafauna conservation. Monitoring programs using modern technology like drones and acoustic devices will track population trends and threats to megafauna.

Programs to Achieve Objective 4: Conserve the Nesting Grounds of Sea Turtles and Shorebirds

Protecting nesting areas for sea turtles and shorebirds is vital to preserving biodiversity and supporting the ecological balance of the Naf MPA. Below are programs aimed at achieving this goal (See also Annex VIII):

Nesting Beach Protection: Access to critical nesting beaches will be restricted during breeding seasons. Local community members will be employed as monitors to safeguard these areas from human disturbances.

Artificial Lighting Regulations: Artificial light pollution is a significant threat to nesting turtles. Regulations will be developed to ensure turtle-friendly lighting in nesting areas, reducing disruption to nesting and hatching processes.

Community Involvement and Habitat Restoration: Engaging local communities in monitoring and protecting nesting sites is critical for long-term conservation success. Beach cleanup drives and restoration of degraded areas will ensure suitable habitats for nesting.

Programs to Achieve Objective 5: Improve the Livelihood Resilience of Fishers Around the Naf River Estuary and Adjacent Marine Ecosystems

Strengthening the socio-economic resilience of fishing communities is crucial for ensuring compliance with MPA regulations and reducing overfishing pressure. Below are the programs under this objective (See also Annex IX):

Alternative Livelihood Programs: Programs such as ecotourism, aquaculture, and handicrafts will provide fishers with sustainable income alternatives. Vocational training sessions will equip them with skills to diversify their livelihoods.

Microfinance Support: Collaboration with microfinance institutions will enable fishers to access small loans for transitioning to alternative livelihoods. Financial literacy workshops will ensure proper use of funds.

Community-Based Cooperatives and Ecotourism Initiatives: Community cooperatives will promote resource sharing and economic resilience. Ecotourism initiatives, such as guided tours and cultural programs, will offer supplementary income opportunities while promoting the MPA as a sustainable destination.

12. Priority Biological Resources

12.1 Overall species diversity of Naf MPA

The biodiversity of the Naf MPA is notably rich, with a total of 845 species. These species span from primary producers to top predators, including 150 species of phytoplankton and 125 species of zooplankton. In terms of fauna, this MPA has about 210 species of finfish, 180 species of mollusks, 21 species of shrimp, 13 species of crabs, and 5 species of lobsters. Among the megafauna, 114 species were identified, including 95 species of shorebirds, 6 species of dolphins, 5 species of sea turtles, 5 species of sharks, and 3 species of rays. The survey also recorded 4 species of seaweed.

One dolphin species, 5 finfish, 5 mollusk, 2 shrimp, 2 crab, 1 lobster, and 1 seabird species were found to be endangered. Vulnerable species included 17 mollusk, 12 fish, 3 shrimp, 2 lobster, 2 shark, 2 sea turtle, 1 crab, 1 ray fish, and 1 dolphin species. Nearly threatened species included 4 finfish and 2 mollusk species, while nearly endangered species included 13 fish, 13 shrimp, 6 crabs, 3 seabirds, and 2 mollusk species. Despite the challenges, a significant portion of the species, including 196 fish, 154 mollusks, 91 seabirds, 4 crabs, 3 shrimp, 1 lobster, 3 sharks, and 2 ray fish, were classified as least concerned. A list of species is given in Annex X.



Figure 12 Juveniles of different commercially important fish species found in the Naf River estuary

12.2 Juvenile fish species of Naf MPA

The Naf MPA is one of the most productive ecosystems in Bangladesh, supported by a rich diversity of phytoplankton and zooplankton. The zooplankton community includes mysids, copepods, chaetognaths, hydromedusae, lucifers, acetes, amphipods, crab larvae, fish larvae, mollusk larvae, isopods, polychaetes, and shrimp larvae. Phytoplankton in the estuary is also diverse, with diatoms being the most dominant group. Key species include *Skeletonema spp.*, *Chaetoceros spp.*, *Nitzschia spp.*, *Rizosolenia spp.*, *Thalassiosira spp.*, and *Ditylum spp.* Despite having a relatively small catchment area, the Naf MPA experiences higher salinity than other estuaries in Bangladesh, which, combined with the rich food availability, makes it a crucial habitat for juvenile marine fish.

More than 30 species of commercially important juvenile fish were recorded in the Naf River Estuary (Figure 12 and Table 6). The presence of around 17 species was particularly frequent from April to July. These species include *Coilia spp.*, *Epinephelus spp.*, *Terapon spp.*, *Sillago sp.*, *Alectis sp.*,

Parastromateus sp., *Selene sp.*, *Lobotes sp.*, *Pomadasys sp.*, *Acanthopagrus sp.*, *Johnius sp.*, *Polynemus sp.*, *Drepane sp.*, *Scatophagus sp.*, *Eupleurogrammus sp.*, *Pampus sp.*, *Lepturacanthus sp.* and *Mugil sp.* These juvenile fish rely on the abundant phytoplankton and zooplankton in the estuary and thrive in the shallow coastal waters with moderate salinity, making the Naf MPA one of the key hotspots for juvenile marine fish in the region.

Since Naf Estuary is characterized by shallow well mixed coastal water with high phytoplankton and zooplankton abundance, and moderate salinity, estuarine ecosystem of Naf River is considered as one of the hotspots for marine juvenile fish species. Naf Estuary and its offshore area found that Naf Estuarine ecosystem is a hotspot of juvenile marine fish species. Occurrence probability of juvenile fish species in the Naf River Estuary is >70% (Figure 13). The occurrence probability of juvenile fish species decreased towards the offshore area. This is due to much transparent water with reduced nutrient supply and productivity.

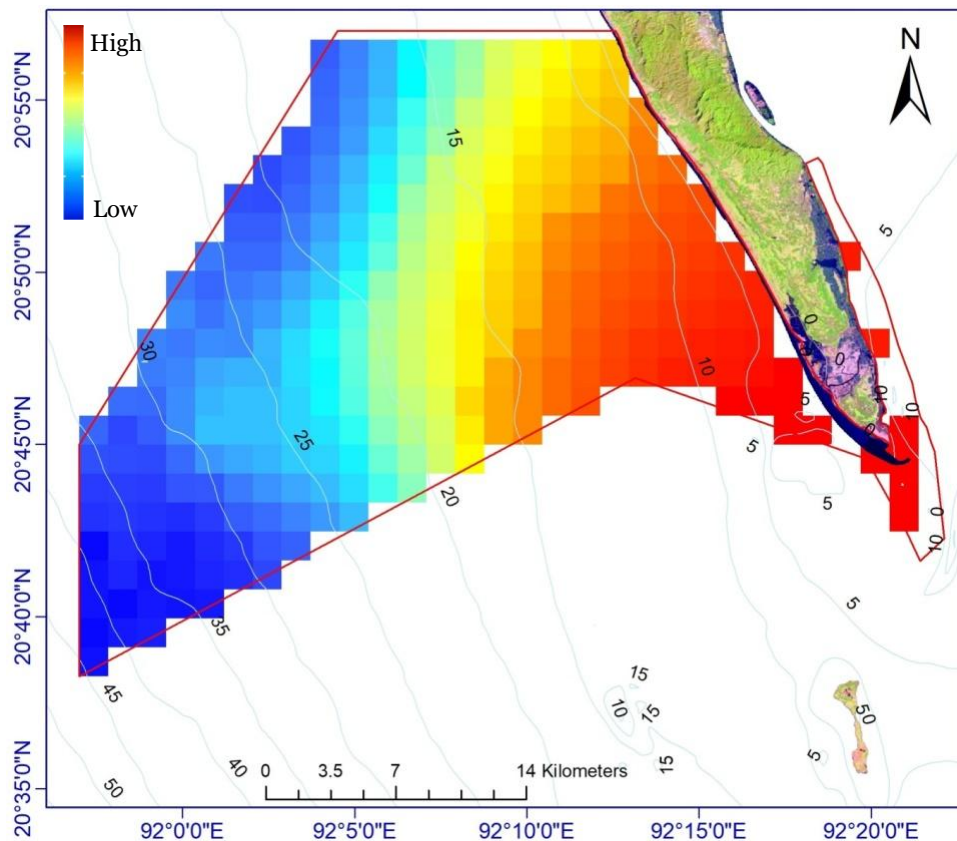


Figure 13 Distribution of juvenile fish habitat at the Naf MPA

Important Fish species of Naf MPA

The fisheries resources in the Naf MPA include a variety of species, with fish, shrimp, prawns, crabs, and mollusks being particularly common. Among the identified species, finfish represented about 12% of the total, while shrimps and crabs made up approximately 35%. Mollusks and crabs accounted for 8% and 2%, respectively, with other categories comprising around 43% of the total identified species. The fish species identified in the estuary included both commercially and non-commercially important species, with dominant species including *Mugil spp.*, *Liza spp.*, *Lates calcarifer*, *Raja spp.*, *Penaeus japonicus*, *P. monodon*, *P. indicus*, *P. merguensis*, *Acetes spp.*, *Macrobrachium rosenbergii*, *Sagitta spp.*, *Loligo spp.*, *Oliva spp.*, *Scylla spp.*, *Harpadon nehereus*, *Pampus argenteus*, *P. chinensis*, *Lepturacanthus spp.*, *Octopus spp.*, *Sepia spp.*, *Squilla spp.*, *Arius spp.*, *Mystus gulio*, *Gymnothorax*

punctatus, *Tetraron spp.*, *Pangasius pangasius*, *Paraplagusia bilineata*, *Panna microdon*, *Sillago domina*, *Coilia spp.*, *Stipinna tatty*, *Sardinella spp.*, *Ilisha megalopa*, *Hilsha kelee*, and *Cynoglossus spp.* Research survey of RV Meen Sandhani, DoF shows that (Figure 14) Naf MPA is rich in fisheries resources.

Table 6: Occurrence of commercially important juvenile fish species and their food items in the Naf River estuary

Species	Month						Food items
	Mar	Apr	May	Jun	Jul	Aug	
<i>Coilia spp.</i>							Copepod, mysids, isopods, sagitta, larval fish
<i>Epinephelus spp.</i>							Fish, crabs, cephalopods
<i>Terapon spp.</i>							Fish, insects, algae
<i>Sillago sp.</i>							Small benthic organisms
<i>Alectis sp.</i>							Fish, squids and crustaceans
<i>Parastromateus sp.</i>							Zooplankton
<i>Selene sp.</i>							Small crabs, shrimps, fishes and worms
<i>Lobotes sp.</i>							Crustaceans and small fish
<i>Pomadasys sp.</i>							Crustaceans and small fish
<i>Acanthopagrus sp</i>							Worms, mollusc and crustaceans
<i>Johnius sp</i>							Benthic worms
<i>Polynemus sp</i>							Crustaceans and small fish
<i>Drepane sp</i>							Benthic invertebrates
<i>Scatophagus sp</i>							Algae and invertebrates
<i>Eupleurogrammus sp</i>							Crustaceans, squid and small fishes
<i>Pampus sp</i>							Plankton and benthic organisms
<i>Mugil sp</i>							Detritus and plankton

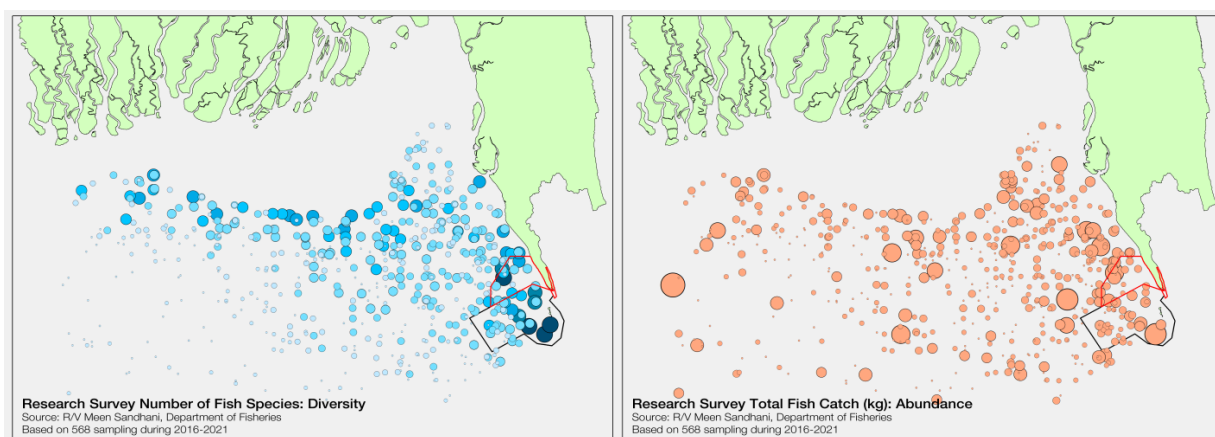


Figure 14 Fish species diversity and fish catch in the coastal ecosystem of Bangladesh. Data are derived from the research survey of RV Meen Sandhani, Department of Fisheries (2022-2023)

Megafauna of the Naf MPA

The Naf MPA and its surrounding areas support a diverse range of megafauna, including sharks, rays, sea turtles, cetaceans, and shorebirds (Figure 15 and 16). The spadenose shark (*Scoliodon laticaudus*) is the most common shark species found in the estuary. Recently, juvenile and adult tiger sharks (*Galeocerdo cuvier*) have also been regularly spotted in the area. Tiger sharks are classified as nearly threatened by the IUCN due to overfishing, highlighting the need for conservation efforts.

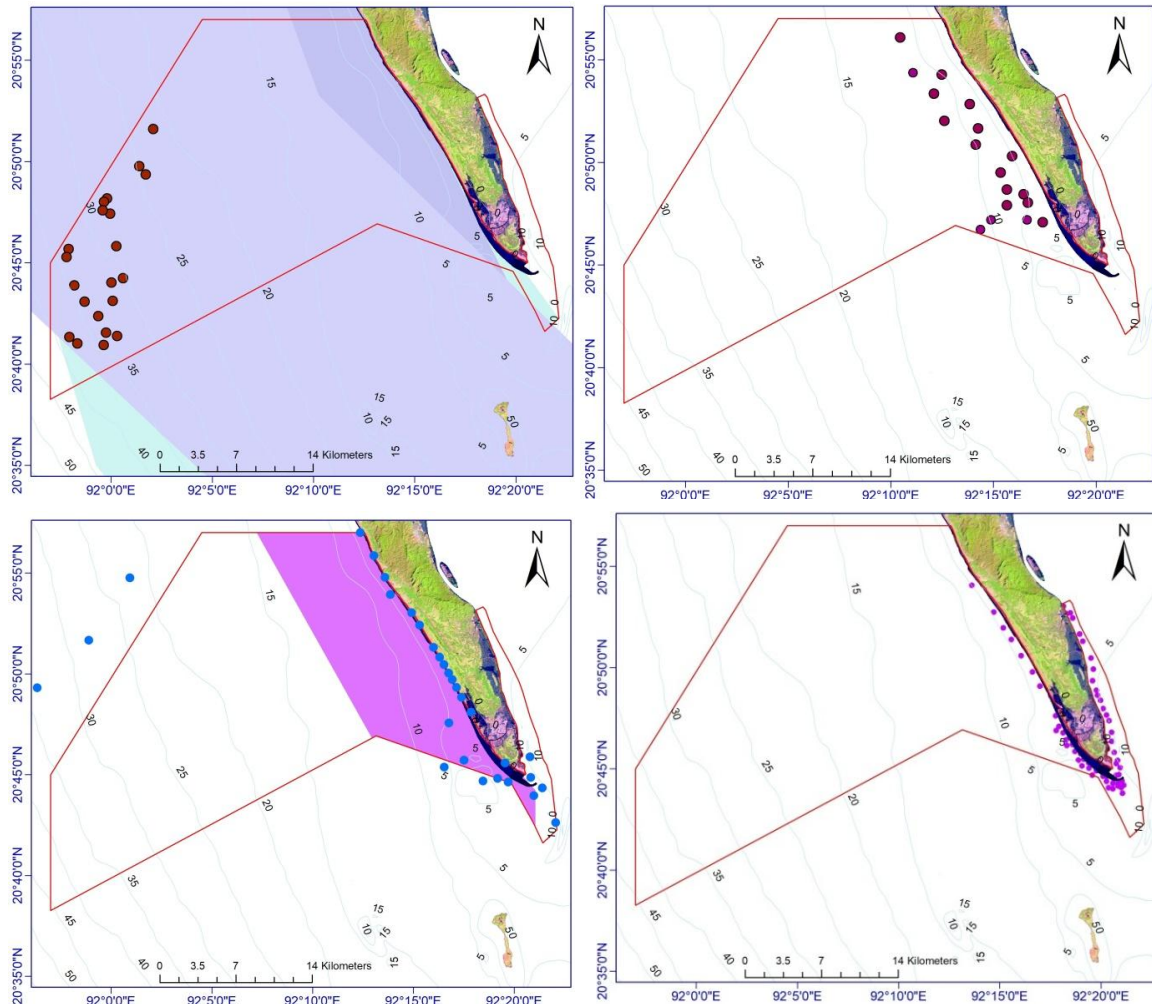


Figure 15 Habitat of cetaceans (top left), elasmobranch (top right), shorebird (bottom left) and sea turtle (bottom right) with frequent observations in the Naf MPA

Among the rays, several species with vulnerable or endangered status have been recorded. Notably, the scaly whipray (*Brevitrygon walga*) is classified as near threatened (NT), while the spotted numbfish (*Narcine timlei*) is listed as vulnerable (VU), and both the granulated guitarfish (*Glaucostegus granulatus*) and the widenose guitarfish (*Glaucostegus obtusus*) are critically endangered (CR). The estuary is also a significant habitat for sea turtles, particularly the olive ridley sea turtle (*Lepidochelys olivacea*) and the green sea turtle (*Chelonia mydas*), both of which are considered vulnerable and endangered, respectively. The Teknaf coast, located in the estuary, is known as an important nesting ground for these species. However, the beach profile survey indicates that more than half of the beaches in the area are affected by anthropogenic disturbances, which pose a threat to turtle ecology.

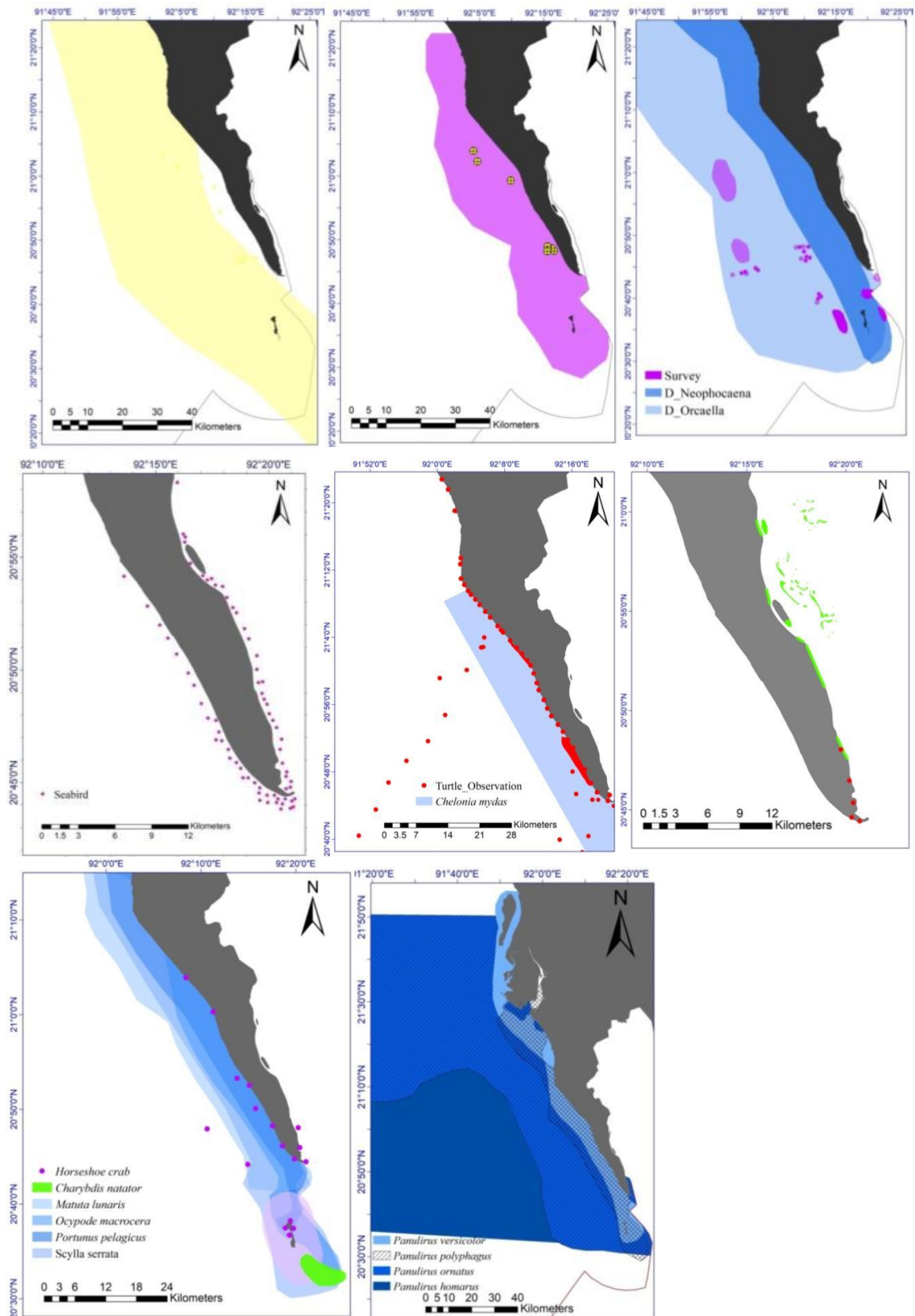


Figure 16 Spatial distribution of ecological habitats of species

The estuary is also home to a variety of cetacean species. Year-round observations and stakeholder surveys have documented the presence of the Indo-Pacific humpbacked dolphin (*Sousa chinensis*),

Indian Ocean finless porpoise (*Neophocaena phocaenoides*), Irrawaddy dolphin (*Orcaella brevirostris*), Indo-Pacific bottlenose dolphin (*Tursiops aduncus*), pantropical spotted dolphin (*Stenella attenuata*), and spinner dolphin (*Stenella longirostris*) in the aquatic ecosystem of the Naf River Estuary.

Additionally, the presence of the red-footed booby, an open ocean bird species, has been recorded in the intertidal zone of Teknaf. Red-footed boobies spend most of their lives at sea and come to land for breeding, suggesting that Teknaf may be an important breeding ground for sea bird species. The diversity and vulnerability of these megafauna species underscore the ecological importance of the Naf River Estuary and highlight the need for continued conservation efforts in the region.

Elasmobranchs (i.e. ray fish, saw fish) and cetaceans (i.e. sharks, dolphins) are widely distributed in the coastal and offshore waters of south eastern coastal zone of Bangladesh. Sharks and ray fishes are widely found during the study. Six species of marine mammals (i.e. Indo-Pacific Humpbacked Dolphin *Sousa chinensis*, Indian Ocean Finless Porpoise *Neophocaena phocaenoides*, Irrawaddy Dolphin *Orcaella brevirostris*, Indo-Pacific Bottlenose Dolphin *Tursiops aduncus*, Pantropical Spotted Dolphin *Stenella attenuata* and Spinner Dolphin *Stenella longirostris*) are found around the Naf River Estuary (Saif, 2010).

Teknaf Peninsula is an important ecological habitat for several globally threatened species of migratory birds. Teknaf Peninsula lies on the boundary of the East Asia-Australasian Flyway and the Central Asian Flyway. Thus, provides a stepping stone for a number of migratory shorebird species (Saif, 2010). Seabirds are widely distributed in the eastern and western side of Teknaf. Saif (2010) found a number of near-threatened seabird species in Teknaf. Sea turtles are distributed in the coastal waters of Teknaf. Eastern coast of the Teknaf is found as the nesting ground for sea turtles. Important turtle species *Eretmochelys imbricata*, *Caretta caretta* and *Chelonia mydas* are distributed around the Teknaf Peninsula. In the Naf MPA, beach area is an important turtle nesting ground. In addition, tourism activities create extra pressure on the beach environment. Fishing boats are often repaired in the beach and thus beach environment warrants conservation initiative.

Crabs are abundantly found in the coastal waters including the mangrove ecosystems and adjacent areas (Chandra et al. 2012). This study found that crabs are abundantly distributed in the Naf River Estuary. In addition, Naf river estuarine area was identified as one of the key habitat for horseshoe crab.

Mangrove forests are important habitats for their special role as nursery grounds for many coastal and marine species. Both natural and planted mangroves occur in the Teknaf peninsula and are mostly found in the intertidal zone, while mangrove afforestation is generally found in the supra-littoral and littoral zones. About 1460 ha of euryhaline mangroves have been planted, including *Sonneratia spp.* (70%) and *Avicennia spp.* (20%). Rest 10% includes other types of plant species. The shallow and offshore areas exhibit a high density of biodiversity, indicating critical zones for various species (Figure 17). These areas are characterized by higher observation frequencies of species presence, suggesting their ecological importance. Seasonal calendar of occurrence of different biotic groups at the Naf MPA is shown in Table 7.

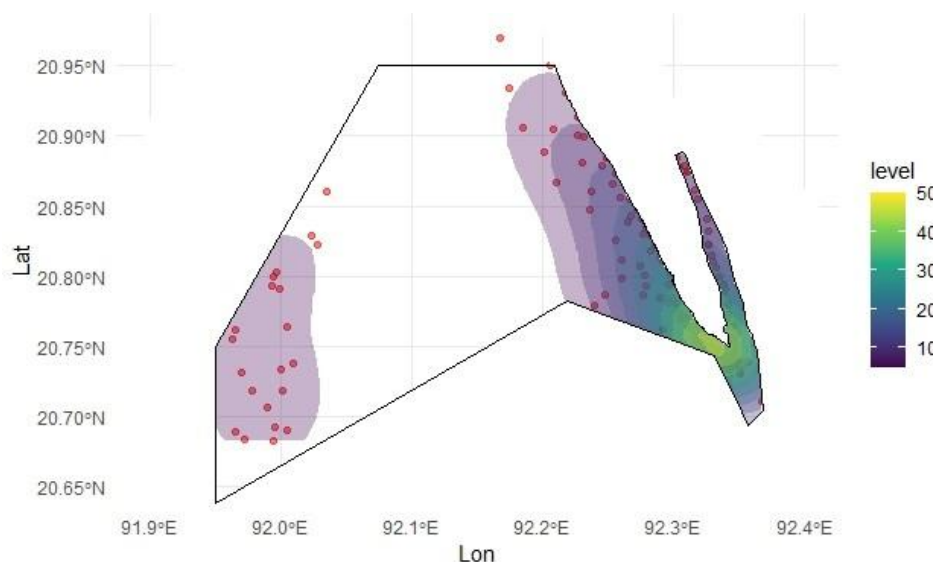


Figure 17 The overall biodiversity hotspots within the Naf MPA based on species presence data from locations with higher observation frequencies. The blank areas do not indicate an absence of species but represent regions with lower observation frequencies compared to the highlighted zones. This analysis integrates data from various taxa and habitats, including cetaceans, elasmobranchs, mangroves, shorebirds, overall fisheries diversity, and sea turtles. These groups were selected in alignment with the management objectives of the Naf MPA. The combined dataset underwent density estimation to identify areas of significant species presence, ensuring a comprehensive representation of biodiversity across the MPA.

Table 7 Seasonal calendar of occurrence of different biotic groups at the Naf MPA

Group	Month											
	J	F	M	A	M	J	J	A	S	O	N	D
Cetacean												
Shorebird												
Elasmobranchs												
Juvenile fish												
Sea turtle												

13. Socio-economic Conditions

The Naf MPA plays a vital role in supporting the socio-economic fabric of the local communities that reside in its vicinity. The MPA encompasses five unions in Teknaf Upazila, Cox’s Bazar—Baharchara, Sabrang, Teknaf Sadar, Hnila, and Whykong. The total population of these unions is 178,507, with 93,108 males and 85,399 females, reflecting a relatively balanced gender distribution across the area. Among these, Sabrang Union has the highest population at 46,512, while Baharchara Union has the lowest at 19,682. The populations in Whykong, Hnila, and Teknaf Sadar are 39,874, 37,902, and 34,537, respectively.

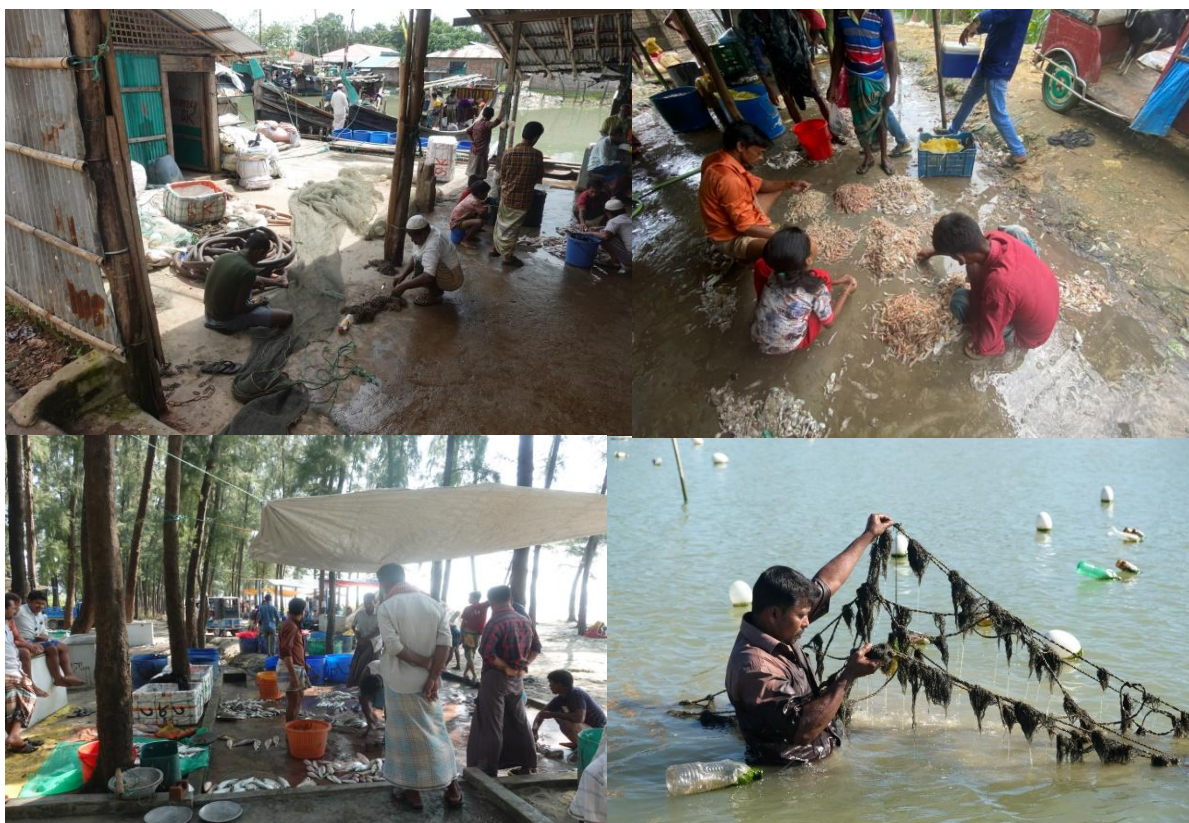


Figure 18 Fisheries related livelihood activities in Teknaf

Fishing is the primary livelihood for the majority of the population in these unions (Figure 18). Approximately 9,000 fishermen rely directly on the Naf MPA for their daily subsistence and income generation. Monthly incomes in the fishing communities vary, ranging from BDT 8,000 to BDT 45,000, depending on factors such as the fisher's role, fishing technique, and the seasonality of the fish catch. The income disparity within the fishing community often correlates with the type of fishing activities pursued, with sea fishing generally yielding higher returns compared to river and coastal fishing.

Fishing-related occupations are particularly concentrated in Sabrang Union, where the local economy is primarily dependent on marine resources. On the other hand, Teknaf Sadar shows a more diversified set of livelihoods, with residents engaged in various activities such as agriculture, salt production, non-fishing labor, and small-scale business ventures. This diversification highlights the importance of the Naf Estuary not only as a source of marine resources but also as a key economic zone that connects different livelihoods. Moreover, the Naf Estuary is an essential transport route for travelers heading to Saint Martin's Island, a major tourist destination in Bangladesh. Consequently, many local communities are also involved in tourism-related services, such as boat transportation, hospitality, and small-scale trade, contributing to their economic resilience.

The fishing practices in the Naf MPA are diverse, with local fishers using a variety of fishing gear, including gillnets, set bag nets, current jal, beach seine nets, and chapila jal. The majority of fishers use engine-powered boats, with horsepower ranging between 22 and 70, enabling them to operate efficiently in the challenging conditions of both sea and river. While fishing remains a year-round activity for many, the peak fishing seasons occur during the summer and monsoon months, which correspond to the highest fish catches.

The local fishing community, particularly in the coastal unions like Sabrang, faces considerable challenges related to overfishing, habitat degradation, and the seasonal availability of fish. The concentration of fishing effort in certain areas of the Naf Estuary—primarily at sea—also poses risks to marine biodiversity, with some species being caught in unsustainable quantities. Furthermore, climate change is beginning to affect the predictability of fish catches, altering the migration patterns of several fish species and increasing the vulnerability of local fishers who rely on these natural cycles for their livelihood.

In terms of the gender distribution of the fishing community, the data shows a significant gender imbalance, with only 20 female fishers recorded across the five unions. The vast majority of fishers (6,945 males) are involved in sea and river fishing, with men predominantly engaging in the more physically demanding and commercially viable fishing activities. Women's participation in fishing is minimal, with most involved in ancillary activities, such as fish processing, selling, or managing household chores. This gender gap reflects broader societal norms and the gendered division of labor in the fishing industry.

The species caught in the Naf MPA are diverse, including hilsa, chapila, loitta, churi, chingri, poa, rupchanda, and several other commercially important fish and shellfish species. These marine resources form the backbone of the local economy and are a significant source of protein for the local population. As such, the ecological health of the Naf Estuary is directly linked to the socio-economic well-being of the communities that depend on it.

The demographic breakdown in the region underscores the importance of understanding local population dynamics to better address the socio-economic challenges faced by the communities. Sabrang Union has the highest total population (46,512), while Baharchara Union has the smallest population (19,682). These numbers illustrate the varying degrees of resource demands and the distribution of fishing and other livelihood activities in different unions. The male-to-female ratio is relatively even across the unions, with males generally outnumbering females in all but one union. This data provides a comprehensive picture of the human resources available in the Naf MPA region, which is critical for planning and policy-making efforts aimed at managing both the human and ecological resources.

Beyond fishing, the Naf MPA dependent communities also rely on agriculture, salt production, non-fishing labor, and services, such as tourism and trade. The estuary serves not only as a fishing ground but also as a conduit for trade and transportation, particularly for tourists visiting Saint Martin's Island. This reliance on multiple sources of livelihood has helped some communities diversify their income streams, although the fishing profession remains dominant. However, like many coastal and rural economies, the region faces challenges such as poor infrastructure, limited access to markets, and low levels of education and skills training, which constrain the potential for economic diversification.

The challenges facing the Naf MPA are complex, including overfishing, pollution, habitat destruction, and the impacts of climate change, such as rising sea levels and changing weather patterns. These issues threaten the very resources that local communities depend on for their livelihoods. Additionally, there is a limited understanding of the MPA concept among local fishermen, many of whom are not fully aware of the regulations or long-term benefits of marine conservation. This lack of awareness hinders the implementation of effective management strategies and sustainable practices.

To address these challenges, it is critical to engage local communities in the management and conservation of the Naf MPA. Community involvement in decision-making processes and the adoption of co-management approaches are essential for balancing the needs of different stakeholders.

Ecosystem-based fisheries management practices that promote sustainable resource use are needed to protect marine biodiversity while ensuring that the livelihoods of local communities are preserved. Furthermore, providing livelihood improvement measures, such as cash and rice support, skill development training, and alternative livelihood options, will help reduce dependency on fishing alone and ensure the economic resilience of local communities.

14. Fishing Gears Used in the Area

The coastal and riverine fisheries around employ a diverse range of gears, each designed to exploit particular species and habitats (Figure 19 and Table 8). This variety reflects both the ecological richness of the Bay of Bengal and the adaptive strategies of fishing communities who depend heavily on aquatic resources for their livelihoods. Gears in this region include gill nets, bag nets, trawls, seines, longlines, cast nets, traps, and a host of indigenous fishing devices locally named and tailored to species such as shrimps, croakers, and small pelagic fishes. It is important to note that the response were recorded from the fishers who also do fishing outside of Naf MPA.

Gill nets are perhaps the most dominant type of gear across the coastal waters. Drift gill nets are deployed throughout the entire coast of Bangladesh, at depths ranging from 8 to 10 meters. Fixed gill nets, on the other hand, are set near the seabed and are used to capture sharks at depths of up to 30 meters. Mullet gill nets, with finer meshes, are employed in shallower waters between 5 and 10 meters to harvest grey mullet. Similarly, bottom set nets operate at comparable depths and are used to capture shrimps, croakers, ribbonfish, and Bombay duck. In addition, trammel nets are widely used in Teknaf, Moheshkhali, and Cox's Bazar, primarily targeting shrimp species such as *Penaeus monodon*, *P. indicus*, and *Metapenaeus monoceros*, alongside a broad range of other commercially valuable species like catfish, sardines, ribbonfish, anchovies, and Bombay duck.

Bag nets form another important category, with both estuarine and marine set bag nets contributing significantly to the local fishery. Estuarine set bag nets (*ESBN*), also called *Behundi Jal*, are operated in relatively shallow waters, often less than 10 meters, to capture shrimps, croakers, and small fish species. Marine set bag nets, however, extend offshore and are mainly used to catch small pelagic fish such as clupeids and anchovies, operating at depths between 10 and 30 meters. These bag nets are complemented by push nets, drag nets, and fixed bag nets that are employed primarily for collecting shrimp post-larvae in shallow coastal areas, generally within 5 meters depth.

Trawl nets are another major gear type, largely concentrated in Teknaf. These include shrimp trawl nets, which are dedicated to capturing commercially valuable prawns, and general trawl nets, which bring in mixed catches of finfish and crustaceans. Alongside these, bamboo set gill nets are also used in the same areas to catch species such as Datina, tangra, and Brad fish, further diversifying the fishing methods.

Seine nets are used both in marine and freshwater environments. Beach seines are common along the entire coast, capturing clupeids, croakers, anchovies, and ribbonfish in shallow waters up to 10 meters. In the Matamuhuri River, seine nets are specialized to target freshwater fish such as *Corica soborna*, *Opsarius barna*, *Barilius barila*, and a range of *Labeo* species. Cast nets are also widely utilized, with large mesh varieties in the river to catch larger fishes like *Neolissochilus spp.* and small mesh varieties to capture smaller species such as *Glossogobius giuris*, *Puntius spp.*, and *Pethia spp.*

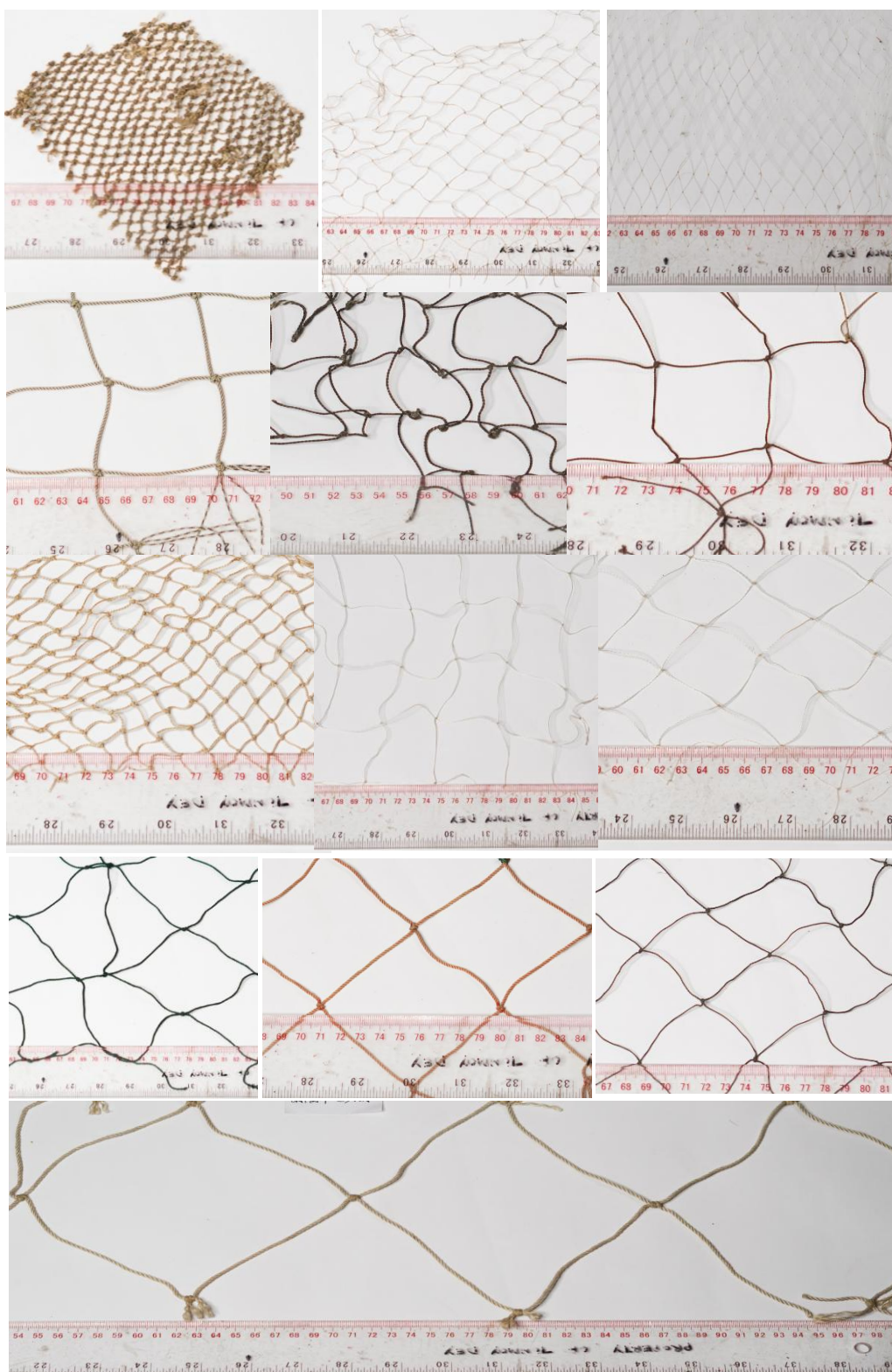


Figure 19 Diversity of net in the Naf – Saint Martin’s Peninsula (thela jal , Bata jal, current jal, tana jal, chappa jal, fohilla jal, teilla jal, ESNB net, Chani Jal, Raja jal, Ilish jal, Vasa jal, lakka jal)

Longline fishing is another significant method in the area. Bottom longlines are used to capture croakers at depths of up to 10 meters along the coast. Baited longlines, used around Teknaf coast, target a wider variety of species including lobster, tangra, and Loitta, while unbaited longlines are specialized for rays

and guitarfish. In addition, *Hazari borshi*—a type of multiple-hook line—is traditionally employed to catch rays and guitarfish at depths ranging from 1 to 15 meters. Simple hook and line techniques are also popular in the Matamuhuri River, where artisanal fishers catch species such as *Mystus cavasius*, *Wallago attu*, and *Mastacembelus pancalus*.

In the riverine systems, traps remain important artisanal gears where they target species such as *Opsarius barna* and *Opsarius barila*. These traditional methods are simple but effective, reflecting long-standing fishing practices adapted to riverine habitats.

\Gears such as *Doba Jal*, *Bhasha Jal*, *Sutar Jal*, *Sada Jal*, *Lasher Jal*, *Chandi Jal*, *Ber Jal*, *Laal Jal*, *Tong Jal*, and *Khuta Jal* are all variants designed to capture fishes at different depths and locations. Their operation ranges from shallow surface waters (as in *Ber Jal*) to very deep waters exceeding 150 meters (as in *Lasher* and *Laal Jal*). Other specialized nets include *Vingi Jal* for small fishes, *Chingri Jal* for shrimps, and *Lakkha Jal* for species such as *Datina* and *Ghol mach*. These traditional nets demonstrate the intricate knowledge that local fishers hold about fish behavior, seasonality, and habitat distribution.

Table 8 Fishing gears used by in by the fishers from Teknaf

Gear Types	Targeted Fish species	Depth (m)
Drift gill net	Small fishes	8–10
Fixed net	Sharks	Down to 30
Bottom set net	Shrimps, Croakers, Ribbon fish, Bombay duck	5–10
Mullet gill net	Grey mullet	5–10
Estuarine set bag net	Shrimps, Croakers, Ribbon fish, Bombay duck	10–30
Marine set bag net	Clupeids, Anchovies, etc.	10–30
Large set bag net, Gillnet, stake net, single hook and line, Drag net	Asian Sea bass (<i>Lates calcarifer</i>)	10–30
Trammel net	Tiger shrimp (<i>P. monodon</i>), Indian white shrimp (<i>P. indicus</i>), brown shrimp (<i>M. monoceros</i>), catfish (<i>Arius</i> spp.), Bombay duck (<i>H. nehereus</i>), sardine, bigeye shad (<i>H. illecebs</i>), salmon, ribbonfish (<i>L. savala</i>), anchovy (<i>Stolephorus</i> spp.), hairtail (<i>Trichiurus lepturus</i>), whiting (<i>Sillago sihama</i>), grunts (<i>Pomadasys</i> spp.)	8–10
Bottom long line	Croakers	Down to 10
Beach seine	Clupeids, Croakers, Anchovies, Ribbonfish	Down to 10
Char Pata net	Shrimps	Down to 10
Cast net	Bata (<i>Labeo bata</i>), Tapashi (<i>Polymerus paradiseus</i>), Baim (<i>Mastacembelus armatus</i>), Koi (<i>Anabas testudineus</i>), Poa (<i>Otolithoides pama</i>)	Down to 5

Push net, Fixed bag net, Drag net	Shrimps (<i>P. monodon</i> larvae)	Down to 5
Seine net	Corica soborna, Opsarius barna, Barilius barila, Salmostoma phulo, Amblypharyngodon mola, Cirrhinus reba, Labeo bata, Opsarius barna, Labeo gonius, Labeo calbasu, Labeo rohita, Labeo boga, Labeo pangusia, Labeo angra, Labeo kurita, Labeo boga, Labeo mirgalu	8–10
Hook and Line	Mystus cavasius, Mastacembelus pancalus, Wallago attu, Barbonymus gonionotus, Glossogobius giuris	-
Trap	Opsarius barna, Opsarius barila	-
Large mesh cast net	Neolissochilus spp., Labeo bata, Labeo gonius, Cirrhinus reba, Barbonymus gonionotus	1.5-3
Trawl net	Mix	-
Baited longline	Lal, Khotka, Dhela, med, tangra, lobster, Golpata, Loitta	-
Prawn trawl net	Chingri	-
Bamboo set gill net	Datina, Brad fish, tangra, Poma	-
Unbaited longline	Ray, Guitar	-
Small mesh cast net	Glossogobius giuris, Crossocheilus latius, Puntius spp., Pethia spp., Amblypharyngodon mola, Salmostoma phulo, Gagata youssoufi	1.2-3.6
ESBN/ Behundi Jal	All types of small fishes	Less than 10
Doba Jal	Kata, Poa	10-15
Bhasha Jal	Kata, Poa	7-150
Sutar Jal	Kata, Poa	7-20
Sada jal	Kata, Poa	7-150
Vingi Jal	Small fishes	5-15
Hajari borshi	Ray, Guitar	1-15
Lakkha Jal	Lakkha, Datina, Med, Ghol mach	15-25
Poka Jal	Kata, Poa	5-10

15. Environmental Conditions and Stressors

Spatial and temporal variability in environmental conditions (i.e. temperature, salinity, DO, turbidity, silicate, nitrite and phosphate concentrations) are shown in Figure 20 - 27. There was no significant spatial variability observed in the environmental conditions in the Naaf river estuary. This suggests the homogenous environmental condition of the estuarine ecosystem.

However, a significant temporal variability over the nine months of the sampling period was observed. The seasonal distribution of temperature exhibits a uni-modal distribution.

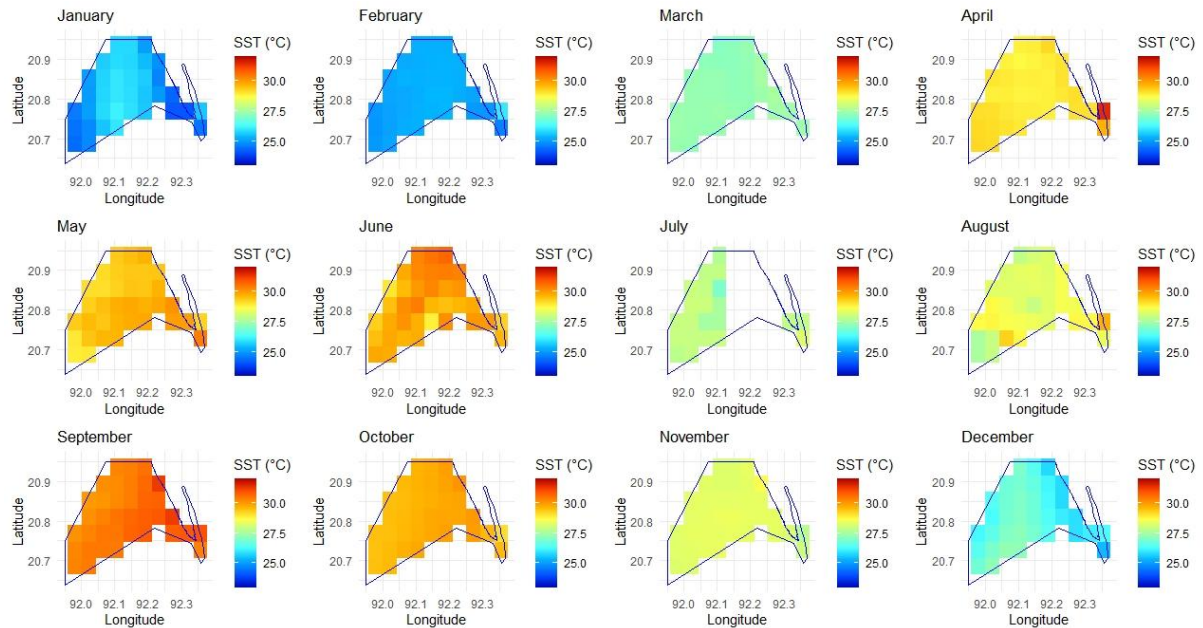


Figure 20 Spatio-temporal distribution of SST at the Naf MPA

The distribution of temperature was the highest during the Southwest monsoon (March-September) and lowest during the Northeast monsoon (October-February). The temperature started to rise from March and reached to the peak during July with a mean of 31.2°C while the maximum and minimum temperature during March were 30.5°C and 31.3°C respectively.

The seasonal distribution of salinity shows a reversed dome shape pattern, a significant variability, completely opposite of temperature. Salinity was observed maximum during the Northeast monsoon (October-February) and minimum during the Southwest monsoon (March-September).

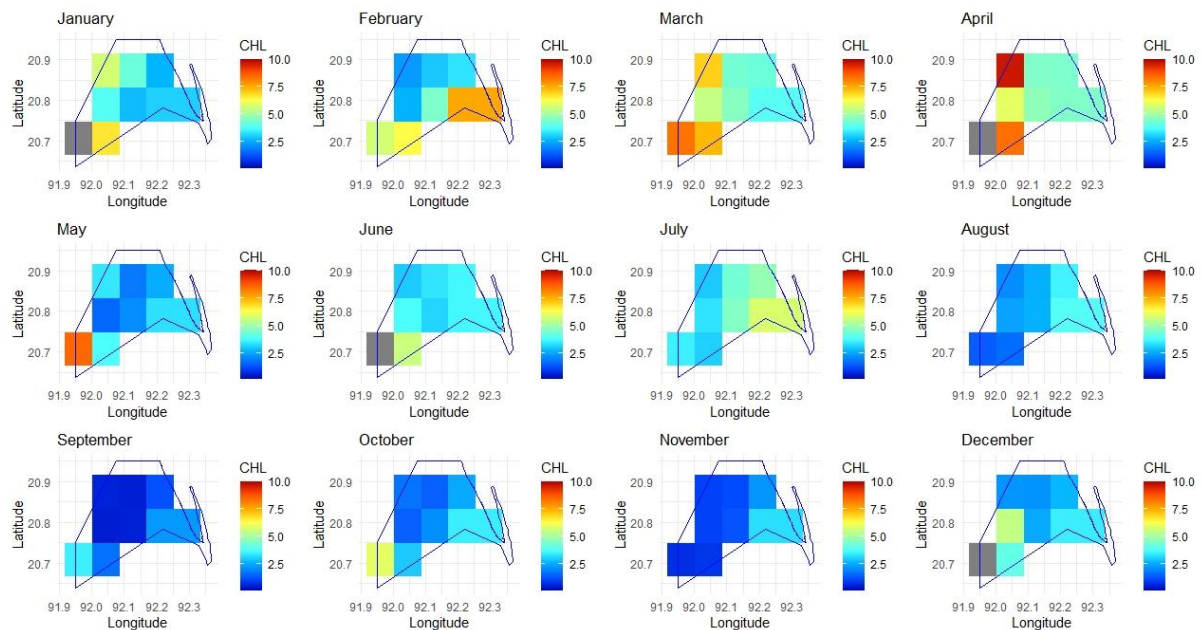


Figure 21 Spatio-temporal distribution of chlorophyll a at the Naf MPA

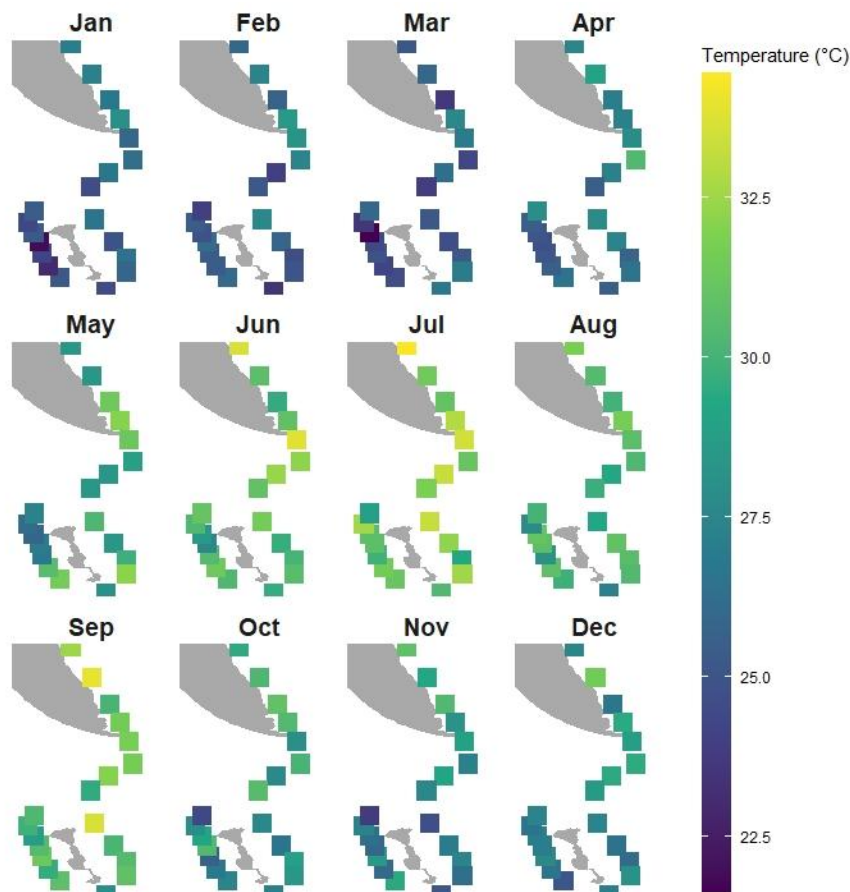


Figure 22 Seasonal distribution of temperature at the Naf MPA

The mean salinity was found approximately 32.5PSU with a maximum of 32.7PSU and minimum of 31.3PSU during February. Salinity reached to the minimum during September. The seasonal variability of DO shows a bimodal distribution. The concentration of DO shows the primary peak during June with a mean of approximately 6.3mg/l whereas the maximum and minimum concentrations were from 6.4mg/l to 6.7mg/l. The secondary peak was observed during September with a mean of about 6.6mg/l while the maximum and minimum concentration varied from 6.3mg/l to 6.8mg/l. DO reached to its minimum concentration during October. Seasonal distribution of Turbidity in the Naf river estuary shows that the turbidity was the highest during July with the maximum and minimum value between 29FTU and 27FTU while the mean concentration was found 28FTU. Turbidity started to rise from June and reached to its minimum during September with a mean of 3FTU. After September, turbidity again started to rise from October and continued till December.

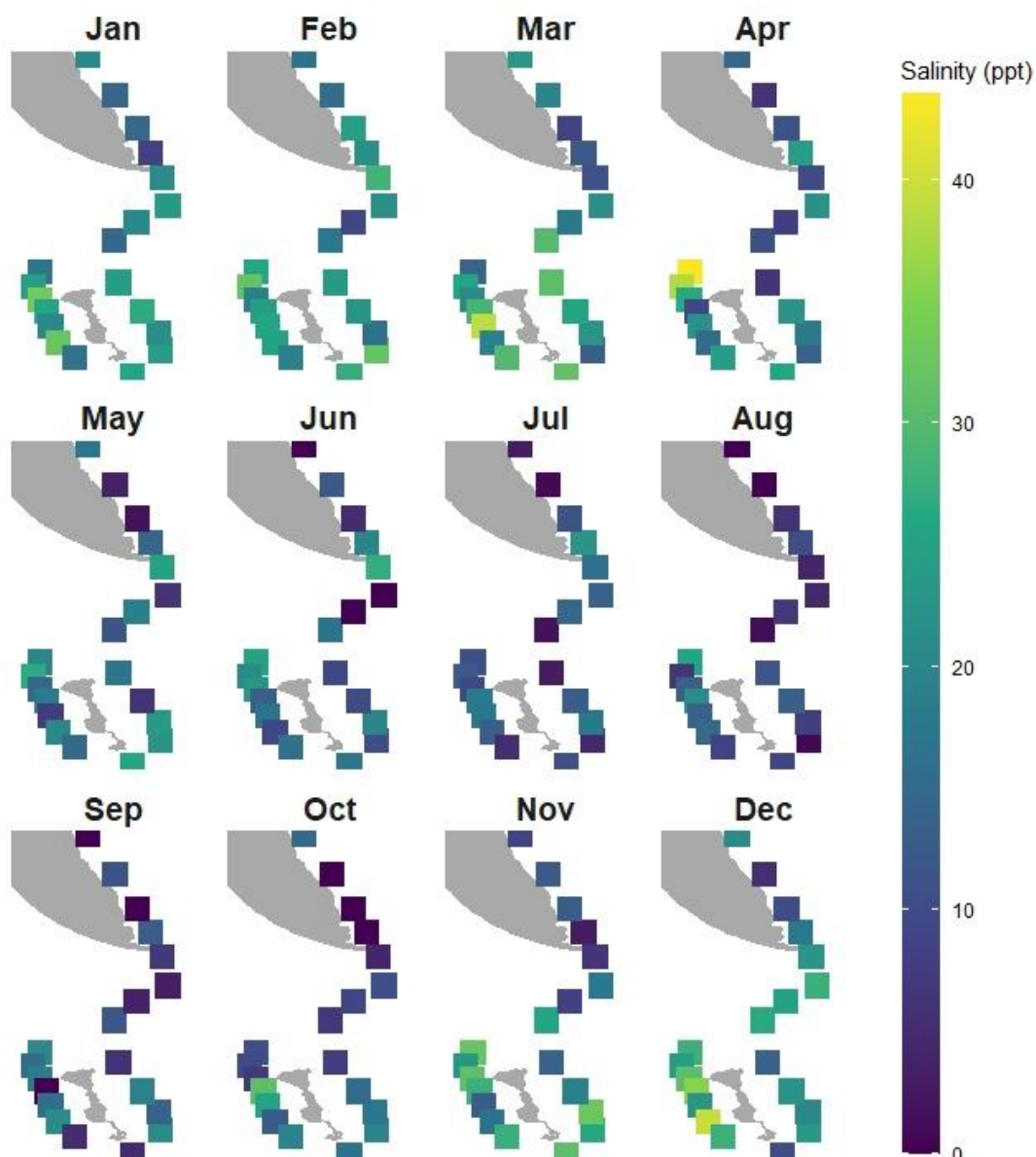


Figure 23 Seasonal distribution of salinity at the Naf MPA

The seasonal variation of nutrients (i.e. silicate, nitrite and phosphate) was recorded in the study area. Silicate concentration shows a reverse dome shape distribution pattern from February to March. The highest concentration was observed during the Northeast monsoon (October-February) and lowest during the Southwest monsoon (March-September). The silicate concentration started to drop from March and followed the same till October and reached to the peak in December with a mean concentration of about 540ug/l while the maximum and minimum concentration were observed from 530ug/l to 580ug/l. The silicate concentration was lowest during August with a mean concentration of about 475ug/l. The nitrite concentration in the estuarine ecosystem shows somewhat a similar seasonal trend as silicate. The concentration reached to the peak during February with a mean of about 6ug/l whereas the maximum and minimum concentration were 2.54ug/l and 7.3ug/l respectively. The nitrite concentration started to decrease from March and continued till September and reached to the peak again in December. The seasonal distribution of phosphate concentration exhibits the highest peak during November with the maximum and minimum value ranged from 2.8ug/l to 3.6ug/l while the mean

concentration was found about 3.3ug/l. The phosphate concentration reached to the minimum during July with a mean of 1.1ug/l.

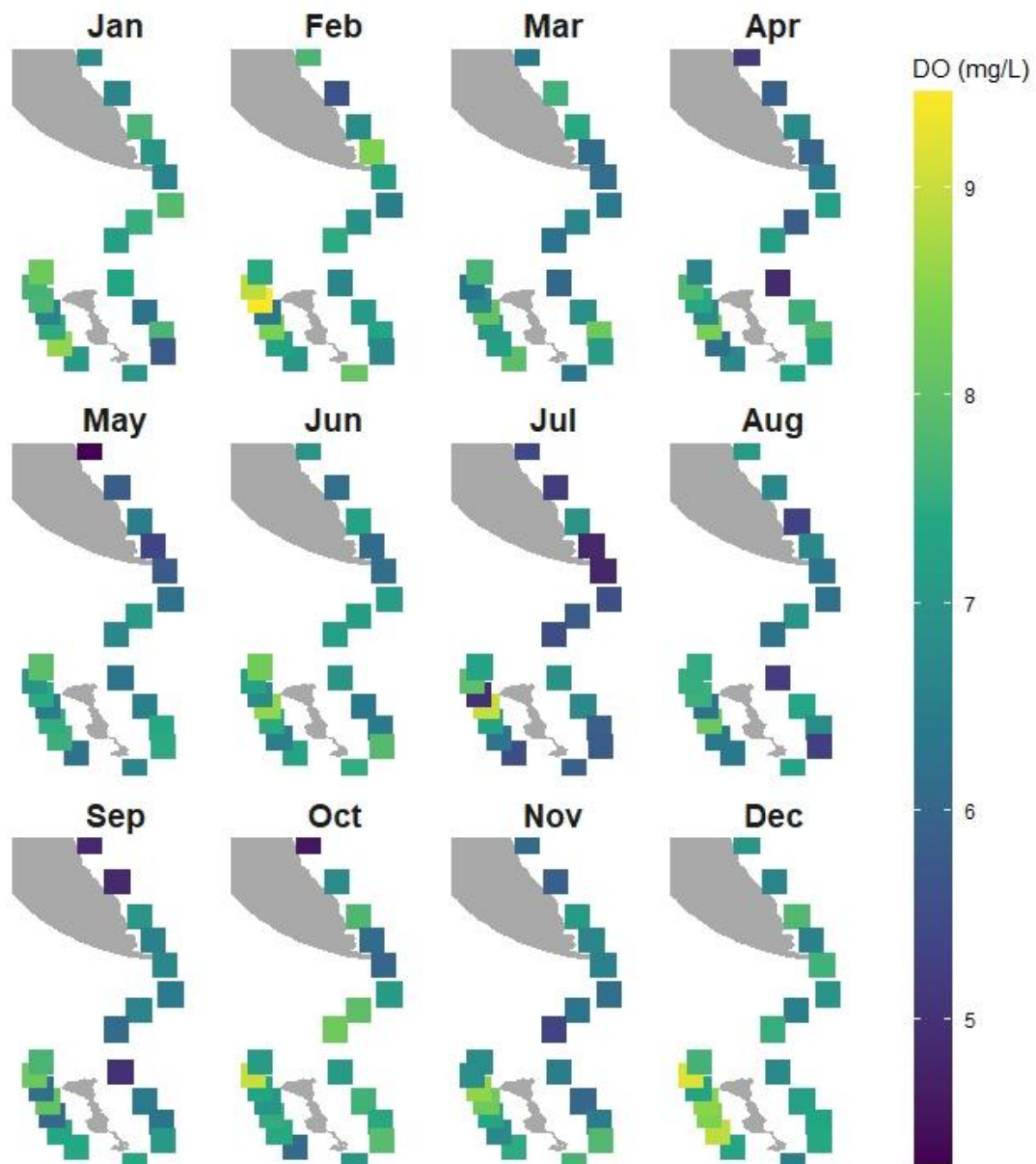


Figure 24 Seasonal distribution of DO at the Naf MPA

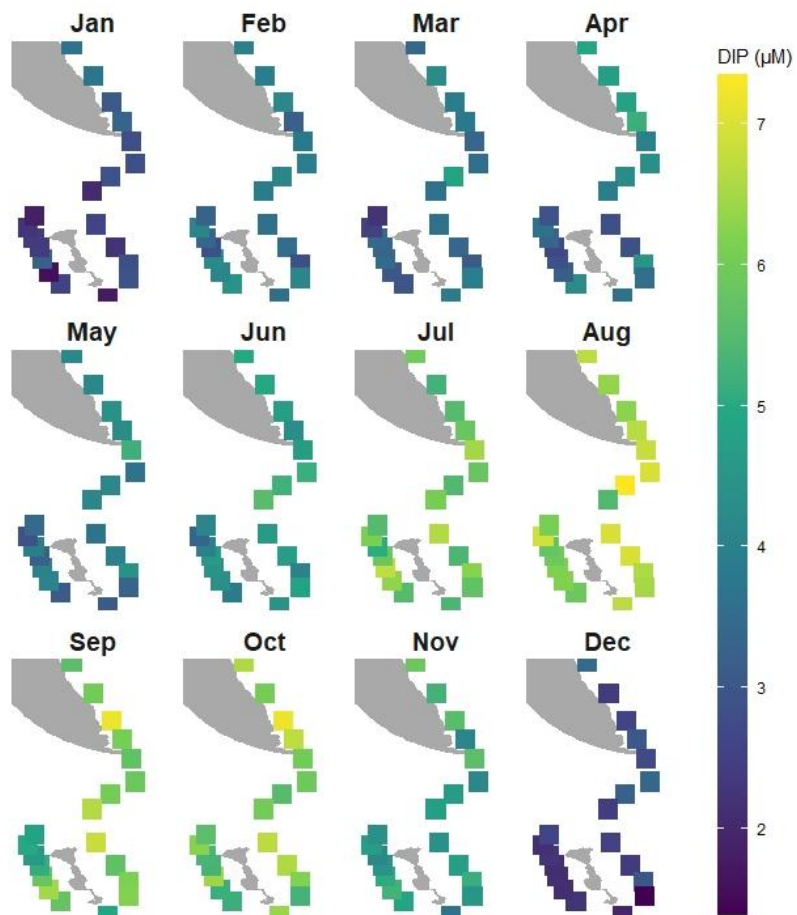


Figure 25 Seasonal distribution of phosphate at the Naf MPA

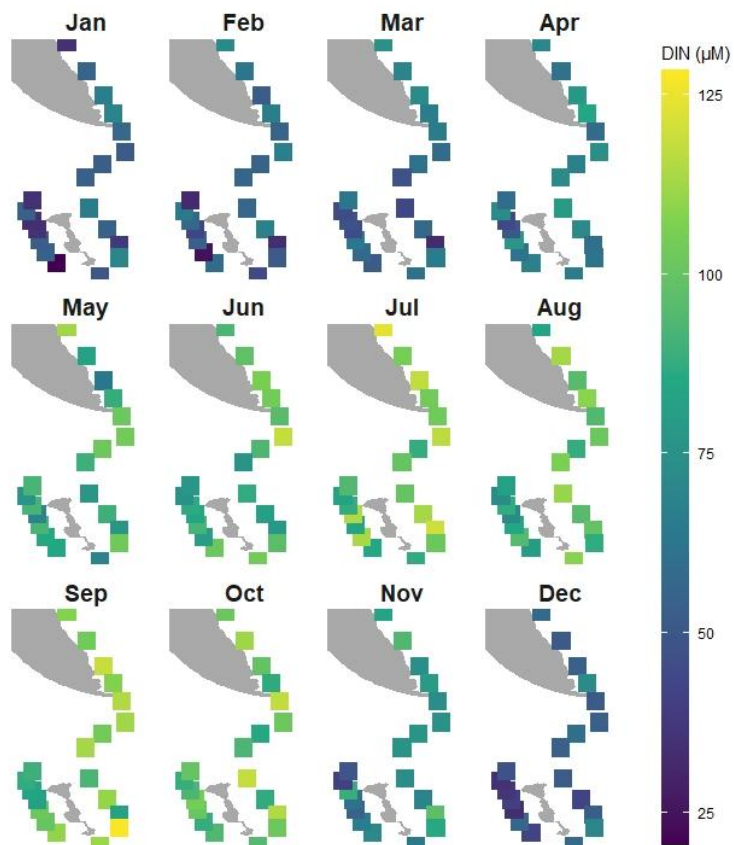


Figure 26 Seasonal distribution of nitrate at the Naf MPA

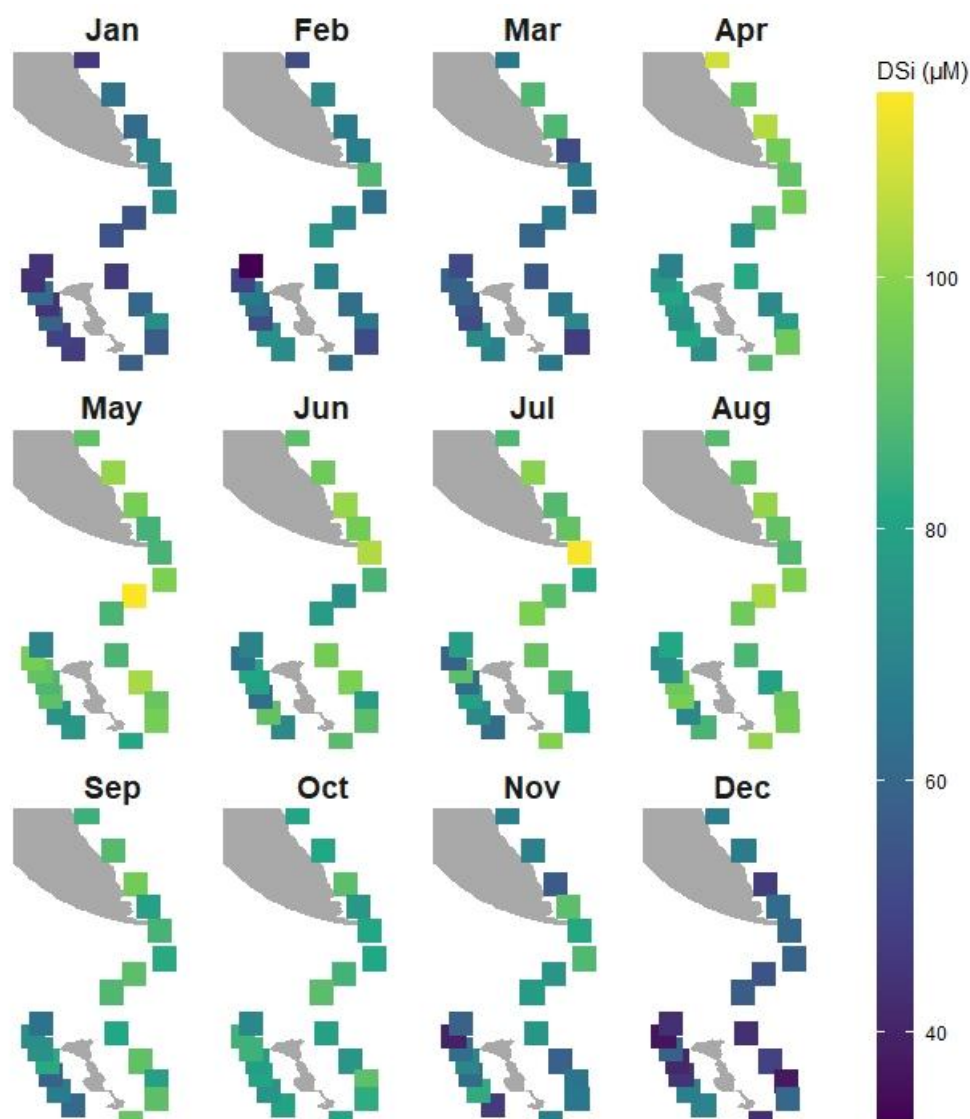


Figure 27 Seasonal distribution of silicate at the Naf MPA

The Naf MPA faces several significant stressors that are impacting its marine and coastal ecosystems. Climate change has led to a marked increase in water temperature, exacerbating coral bleaching risks, as observed in both long-term temperature data and similar studies. Human activities, particularly tourism and fishing, have introduced multiple forms of pollution into the ecosystem. The Teknaf Peninsula, a critical transportation route to Saint Martin's Island, sees high tourist traffic, contributing to pollution and disturbances. Plastic pollution is widespread in the Naf River Estuary, with plastics found in fish, water, and sediment samples. Moreover, ghost nets, abandoned fishing gear, exacerbate the problem, impacting marine life by entangling and killing fish. The presence of oil spills from fishing boats and heavy metal contamination, including cadmium (Cd) and nickel (Ni), further compounds environmental degradation. Oil and grease (OG) pollution levels in the MPA are notably high, attributed to waste discharge from municipalities, fishing activities, and industrial processes. Microplastics, especially polyethylene (PE), are another growing concern, with significant contamination of both water and sediment, posing risks to marine biodiversity. These anthropogenic stressors, coupled with the ongoing effects of climate change, highlight the urgent need for effective pollution control and mitigation strategies to safeguard the Naf MPA's ecosystem.

16. Data Collection

Biophysical data collection

The biophysical variables considered for this study include temperature, salinity, dissolved oxygen (DO), chlorophyll-a (chl-a), and nutrients such as total nitrogen (TN), total phosphorus (TP), and total silica (TSi). Surface data for temperature, salinity, DO, and chl-a were collected in-situ from the Naf MPA. For vertical data collection, a Conductivity-Temperature-Depth (CTD) profiler (Model: CTD90M, Sea & Sun Technology), equipped with additional sensors for DO and chl-a, was deployed from a fishing boat at each sampling location. The CTD profiler provided data on water temperature, salinity, DO, and chl-a at various depths. Water samples for macronutrient analysis (TN, TP, and TSi) were collected from the surface using a bucket, stored in plastic bottles, and kept in an ice box until transferred to the laboratory. In the lab, samples were stored at -4°C until further analysis. The macronutrient analysis was conducted using an automated analyzer (Model: EASYCHEM 200, SYSTECA), which employed the molybdosilicate method for measuring TSi, semi-automated colorimetry for TP, and automated hydrazine reduction methods for TN. Additionally, satellite data for temperature and chlorophyll-a were collected from the MODIS satellite.

Biodiversity assessment and habitat mapping

The methods used to monitor biodiversity and habitat mapping at the Naf MPA involved both regular field surveys and secondary data analysis. Species diversity and habitat data were collected through a combination of in-situ field sampling and fisher surveys. Habitat data for crabs, lobsters, seaweeds, and sea turtles were gathered through field sampling and surveys with local fishers. During these in-situ observations, the geospatial locations of each monitored site were recorded to provide accurate spatial context for the data. Habitat data for mangroves was collected through a combination of direct in-situ observations and satellite data analysis, utilizing Landsat TM imagery for this study to monitor the mangrove distribution over time.

To assess the biodiversity status of the Naf MPA, monthly data on various biotic communities were collected over the course of a year. These biotic communities included phytoplankton, zooplankton, fish, mollusks, crustaceans, and megafauna. Fish samples were collected from the study area every month through collaboration with local fishermen. Recognizing that non-target fish species are often discarded by fishermen, a strategy was implemented to collect these species as well. Fishermen were asked to provide non-target species, and approximately 10% of the total catch was collected and frozen in ice boxes for laboratory analysis. These samples were subsequently identified to the species level for further assessment of fish biodiversity in the area.

For coral and coral-associated species habitat mapping, both primary and secondary data were utilized. Primary data was gathered through field sampling and surveys, while secondary data was collected through an intensive literature review. This review provided valuable insights into the distribution of different coral species and their associated fauna. The research team used both field observations and surveys to monitor fish catch data, with regular field visits to the study areas to collect data. The team also monitored fishing boats during their trips, recording the spatial locations of fish catches and taking photographs of the catch for further species identification and diversity assessment.

Additionally, a citizen science-based approach was employed to involve the general public in scientific activities and broaden the scope of data collection. This strategy was particularly useful for gathering biodiversity data from areas not frequently visited by researchers.

Surveys were conducted twice a month at fish landing centers and local fish markets, where citizens provided information on fish catches and local biodiversity. By combining field sampling, fisher surveys, satellite data, and citizen science, a comprehensive approach was taken to monitor the biodiversity and habitat mapping of the Naf MPA.

Stakeholder consultation meetings

The field visit to Cox's Bazar, Bangladesh, was conducted from August 27 to 29, 2024, with the primary aim of engaging stakeholders, understanding community perspectives, and gathering insights on the challenges and opportunities related to the Naf MPA. A combination of meetings, focus group discussions (FGDs), and key informant interviews (KIIs) was employed to collect data from various stakeholders. The visit involved meetings with government officials, including the District Fisheries Officer (DFO) of Cox's Bazar, the Senior Upazila Officer (SUFO) of Teknaf, and representatives from WorldFish, Teknaf. Four FGDs were conducted in Kacchapia, Moheshkhaliapara, Shahporirdwip, and Naitongpara to gather feedback from local communities, primarily fishermen, on their experiences and concerns regarding the MPA. Additionally, five KIIs were carried out with key stakeholders, including personnel from the Department of Fisheries (DoF), local fishermen, and WorldFish representatives. The method allowed for an in-depth understanding of the socio-economic conditions, stakeholder interactions, and the challenges faced in the management and conservation of the Naf MPA.

The field visit revealed several key findings regarding the socio-economic conditions and challenges of the Naf MPA. Fishing is the primary livelihood for approximately 9,000 fishermen residing in and around the MPA, with income levels varying from BDT 8,000 to BDT 45,000 per month, depending on the type of stakeholder. The predominant fishing gear includes gillnets, set bag nets, current jal, and seine nets, and most fishermen use engine boats with horsepower ranging from 22 to 30. The fishing season peaks during the summer and monsoon months, with major fish species including hilsa, chapila, loitta, and various types of shrimp and crab. Despite the importance of fishing, fishermen expressed the need for additional livelihood support, such as cash assistance, rice support, and skill development training to improve their economic well-being.

Stakeholder interactions (Figure 28) within the Naf MPA were found to be complex, involving a range of actors, including fishermen, crab harvesters, salt producers, and tourists. The level of influence of each stakeholder group varies, with local fishermen and their families exerting the greatest influence. The diverse range of interests often leads to collaboration, competition, and conflict, highlighting the need for a balanced approach to management. Key challenges for the MPA include overfishing, habitat destruction, pollution, and the lack of local understanding about the MPA concept. Community engagement and a co-management approach were emphasized as crucial for addressing these challenges, with stakeholders recommending ecosystem-based fisheries management, sustainable livelihoods, and good governance practices.



Figure 28 Stakeholder consultation meeting at Teknaf Upazilla

Training and monitoring also emerged as key components for effective MPA management. Few fishermen had knowledge of the MPA concept, but there was a strong interest in learning more. Providing training on MPA management and conservation is essential to building local capacity. Furthermore, local fishermen could play a crucial role in monitoring MPA activities, offering a community-based approach to conservation. The findings also pointed to the potential for promoting sustainable livelihoods, such as small-scale businesses and value chain development, to reduce dependency on fishing and improve the economic well-being of local communities.

A series of consultation meetings for the Naf MPA management plan were conducted by the IUCN Bangladesh team between September 22 and 26, 2024, in Teknaf, Cox's Bazar. The meetings involved a wide range of stakeholders, including government representatives, local fishers, boat owners, NGOs, law enforcement agencies, and community leaders. The consultations were held through a series of key discussions and key informant interviews (KIIs) aimed at gathering feedback on the proposed management plan, identifying priorities for zonation, discussing alternative livelihoods for fishing communities affected by restrictions, and ensuring the long-term financial sustainability of the MPA. Stakeholders participated in discussions on various aspects of the MPA, including zoning strategies, biodiversity conservation, income-generating alternatives, co-management, stakeholder collaboration, education, and infrastructure development. The information gathered was used to form a set of key recommendations for the MPA's management plan.

The consultation meetings for the Naf MPA management plan gathered diverse stakeholders to discuss the ecological and socio-economic aspects of managing the newly declared MPA. Key recommendations included implementing a zonation plan to balance biodiversity conservation with fishing activities, restricting fishing in deeper areas to protect marine species like dolphins and sea turtles. Stronger enforcement of illegal fishing restrictions, such as bans on specific nets and commercial fishing vessels, was also emphasized. To support local communities, alternative income-generating activities, including eco-tourism, mariculture, and skill development programs, were proposed, along with subsidies to compensate for fishing restrictions and fund MPA management.

Collaboration among stakeholders was identified as essential, with the establishment of adaptive co-management committees to involve local fishers, boat owners, and other community members in decision-making. Additionally, infrastructure improvements at fish landing centers and the inclusion of biodiversity education in local school curricula were recommended to foster long-term community sustainability and marine conservation awareness.

On October 29, 2024, IUCN Bangladesh, in collaboration with the Department of Fisheries (DoF), organized a progress-sharing meeting in Dhaka to review the "Marine Protected Areas (MPA) Management Plan Development and Implementation" project under the World Bank-funded Sustainable Coastal and Marine Fisheries (SCMFP) initiative. The meeting brought together 34 participants, including DoF officials, IUCN staff, and World Bank representatives. The discussions primarily focused on the management plans for Nijhum Dwip MPA and Naf MPA. Key topics included the need for effective zoning, clear boundary definitions, and the involvement of stakeholders to improve livelihoods, especially for women. The meeting emphasized the importance of a coordinated approach with other relevant projects, such as BOBLME II, and the necessity of updating legal frameworks for both MPAs. Organizational structures for managing the MPAs were also discussed, with a proposal to strengthen existing co-management committees and ensure financial sustainability. A focus on capacity-building through training manuals for Nijhum Dwip MPA and the development of short-, mid-, and long-term plans for both MPAs was highlighted. Key decisions included revisiting GPS coordinates for boundary clarifications, updating the gazette notification for Nijhum Dwip MPA, and consulting local stakeholders, particularly in Teknaf and Cox's Bazar, regarding tourism and financial strategies. The meeting underscored the importance of a comprehensive, community-driven management plan to ensure the sustainable conservation of these MPAs.

The workshop on the Naf MPA management plan, held on November 19, 2024, was organized by IUCN Bangladesh in collaboration with key stakeholders, including government bodies, local communities, and environmental organizations. The event aimed to refine a draft management plan for the newly established MPA, covering 734.17 square kilometers of marine and coastal ecosystems in the Bay of Bengal. The discussions focused on several key aspects, including zonal management, biodiversity conservation, alternative livelihoods, and stakeholder collaboration. Participants recommended dividing the MPA into three zones to balance conservation with sustainable use, with fishing activities allowed at depths of 10m to 30m and restricted in deeper waters to protect marine megafauna. The workshop also highlighted the need to enforce stricter regulations on illegal fishing methods that threaten juvenile fish populations, along with enhanced monitoring to control commercial fishing in deeper waters. Eco-tourism, mariculture, and skill development were proposed as alternative livelihoods to reduce the pressure on fishing, with subsidies for those complying with fishing restrictions and training programs to help fishers transition to new occupations. The importance of an adaptive co-management approach, involving local communities and government agencies, was emphasized, along with the establishment of co-management committees at fish landing centers. Participants also called for coordinated fishing ban periods with neighboring countries to protect breeding grounds and prevent overfishing. Education on biodiversity conservation was recommended, especially for children from families dependent on the MPA, to ensure long-term sustainability. Lastly, the workshop stressed the need for infrastructure improvements at fish landing centers to enhance fish quality and support sustainable fishing practices. The discussions concluded with a commitment to refine the management plan based on these recommendations, aiming for a balanced approach that protects marine biodiversity while supporting the livelihoods of local communities.

Annex

Annex I: Gazette notification of Naf MPA by the Ministry of Fisheries and Livestock of Bangladesh government

রেজিস্টার্ড নং ডি এ-১

বাংলাদেশ



গেজেট

অতিরিক্ত সংখ্যা
কর্তৃপক্ষ কর্তৃক প্রকাশিত

মঙ্গলবার, মে ২৮, ২০২৪

গণপ্রজাতন্ত্রী বাংলাদেশ সরকার
মৎস্য ও প্রাণিসম্পদ মন্ত্রণালয়
প্রজ্ঞাপন

তারিখ : ০৭ জ্যৈষ্ঠ, ১৪৩১ বঙ্গাব্দ/২১ মে, ২০২৪ খ্রিষ্টাব্দ

এস, আর, ও নম্বর ১৩২-আইন/২০২৪।—সামুদ্রিক মৎস্য (Marine Fisheries) আইন, ২০২০ (২০২০ সনের ১৯ নং আইন) এর ধারা ২৯ এ প্রদত্ত ক্ষমতাবলে সরকার, বাংলাদেশের সামুদ্রিক জলসীমার মধ্যে নিম্ন তফসিলে বর্ণিত এলাকাকে এতদ্বারা “সামুদ্রিক সংরক্ষিত (Protected) এলাকা” হিসাবে ঘোষণা করিল, যথা :—

তফসিল

স্থানের নাম	সামুদ্রিক সংরক্ষিত এলাকার বিবরণ		
	সামুদ্রিক সংরক্ষিত এলাকার নাম	জলসীমার পরিমাণ	জলসীমার গভীরতা
(১)	(২)	(৩)	(৪)
বাংলাদেশের দক্ষিণ-পূর্ব উপকূলীয় অঞ্চলে অবস্থিত সামুদ্রিক মৎস্য জলসীমা ও তদসংলগ্ন নাফ নদীর মোহনা	নাফ সামুদ্রিক সংরক্ষিত এলাকা (Naf Marine Protected Area)	৭৩৪.১৭ বর্গ কি.মি.	৪৬ মিটার পর্যন্ত

চৌহদ্দি:

উত্তর	: বঙ্গোপসাগর এবং টেকনাফ উপদ্বীপ (Peninsula)
দক্ষিণ	: বঙ্গোপসাগর
পূর্ব	: বাংলাদেশ ও মিয়ানমারের মধ্যবর্তী নাফ নদীর মধ্যরেখা ও টেকনাফ উপদ্বীপ (Peninsula)
পশ্চিম	: বঙ্গোপসাগর

(১৮২৩১)

মূল্য : টাকা ৪০০

ভৌগলিক অবস্থান : নাফ সামুদ্রিক এলাকার অক্ষাংশ ও দ্রাঘিমাংশ

কৌণিক বিন্দু নম্বর	অক্ষাংশ	দ্রাঘিমাংশ
(১)	(২)	(৩)
১	২০° ৫৭' ০০.০০"	৯২° ১২' ৩৪.৩৪"
২	২০° ৫৭' ০০.০০"	৯২° ০৪' ২৯.৯৯"
৩	২০° ৪৫' ০০.০০"	৯১° ৫৬' ৬০.০০"
৪	২০° ৩৮' ১৫.৫৬"	৯১° ৫৬' ৬০.০০"
৫	২০° ৪৬' ৫৫.৭৪"	৯২° ১৩' ০৮.৮৮"
৬	২০° ৪৪' ৩৪.৩৮"	৯২° ১৯' ৫১.১০"
৭	২০° ৪২' ৩৭.২৫"	৯২° ২০' ৫৬.৯৮"
৮	২০° ৪১' ৩৬.৬০"	৯২° ২১' ২৪.৮০"
৯	২০° ৪২' ১৫.৮০"	৯২° ২২' ০৭.২০"
১০	২০° ৪৪' ৪৬.৬৭"	৯২° ২১' ৫০.৫১"
১১	২০° ৫৩' ১৯.২৪"	৯২° ১৮' ২৭.০৬"

রাষ্ট্রপতির আদেশক্রমে

ড. আবু নঈম মুহাম্মদ আবদুছ ছবুর
যুগ্মসচিব (ব্লু ইকোনোমি)।

মোঃ তাজিম-উর-রহমান, উপপরিচালক (উপসচিব), বাংলাদেশ সরকারী মুদ্রণালয়, তেজগাঁও, ঢাকা কর্তৃক মুদ্রিত।
মোঃ নজরুল ইসলাম, উপপরিচালক (উপসচিব), বাংলাদেশ ফরম ও প্রকাশনা অফিস, তেজগাঁও,
ঢাকা কর্তৃক প্রকাশিত। website: www.bgpress.gov.bd

Annex II: Indicators for Naf MPA monitoring

Biophysical Indicators

Indicator	Method	Measurable Units
Abundance, diversity and population trend of Focal Species	Commercially important species: Fish visual census (FVC) Marine Turtles: Direct count, tagging, nest surveys, eggs surveys, nesting adults survey, bycatch surveys Cetaceans: Line transect, photo identification, marine megafauna surveys Shorebirds: Waterbird surveys, direct count Top predators: Megafauna surveys, bycatch count, fisherman interview	Biomass, Abundance, Area size, Number of individuals, Local information, Unit area coverage
Fishing Efforts	Random sampling at known fish landing locations	Number of species and size, Fishing methods, Boat/gear dimensions, Number of fishermen, Fishing periods, Total weight of catch, Monetary valuation of catch
Community Composition and Structure	Mangroves/Mudflats: Quadrat/transect surveys Fish: FVC surveys Shorebirds: Direct count, waterbird surveys Marine megafauna: Line transect surveys	Percentage cover of habitats, Species count, Population and biomass, Abundance and unit area
Habitat Distribution	Mangroves, Sandy Beaches, Mudflats: GIS and remote sensing maps	GIS and remote sensing maps to understand changes and disturbances
Water Quality	Temperature logger, refractometer, secchi disk, chlorophyll and plankton sampling, random waste collection & weighing of waste	Temperature, Biological Oxygen Demand, Dissolved Oxygen, Turbidity, Chlorophyll, Phaeopigment, Pollutants, Biological diversity, Benthos density
Area of Recovery	Point intercept methods, quadrat surveys for	Temporal changes in habitat percentage cover; Number

	mangroves, sandy beaches, and mudflats	and density of indicator species
Monitoring Effects of Climate Change	Climate vulnerability assessments, satellite imagery, and oceanographic data collection	Temporal changes in habitat loss; Rate of sea level rise and its effects; Changes in ocean temperature

Socio-Economic Indicators

Indicator	Method	Measurable Units
Livelihood Dependency and Income Levels	Household surveys, socio-economic assessments, market studies	Percentage of households dependent on fishing, annual income levels, adoption of alternative livelihoods
Patterns in the Use of Marine Resources	Literature reviews, FGDs, KIIs, HH surveys	Assessment of resource-related activities, stakeholder involvement, seasonal patterns of resource use
Degree of Understanding of Anthropogenic Impacts	FGDs, KIIs, HH surveys	Threat assessments of natural resources, stakeholder perceptions of environmental impacts
Household Income Distribution by Source	Socio-economic surveys and income mapping	Income by occupation, distribution of earnings across communities
Food Security	Dietary surveys and analysis of fish availability in local markets	Fish consumption patterns, protein availability, changes in access to marine resources
Number, Type, and Characteristics of Markets	Market surveys, key informant interviews, economic data collection	Number of markets and products sold, revenue generated, market channels
Knowledge Dissemination and Awareness	Surveys, FGDs, training programs	Number of awareness activities, stakeholder understanding, satisfaction

Governance Indicators

Indicator	Method	Measurable Units
Stakeholder Participation in Decision-Making	Meeting records, stakeholder analysis, interviews	Number of consultations held, diversity of groups, engagement levels

Effectiveness of Management Plan Implementation	Annual reviews, external evaluations, progress tracking	Percentage of management actions implemented, success rates
Transparency and Accountability	Analysis of reports, feedback surveys	Availability of management and financial reports, stakeholder trust levels
Law Enforcement Capacity	Review of enforcement activities, patrol reports, interviews	Number of patrols conducted, violations recorded, actions taken
Conflict Resolution Mechanisms	Stakeholder interviews, documentation of conflict cases	Number of conflicts resolved annually, time required for resolution
Level of Interaction Between Formal and Informal Stakeholders	Meeting records, stakeholder evaluations	Frequency of interactions and collaborations, stakeholder satisfaction, inclusiveness

Annex III: List of ministries of Bangladesh government to support MPA related activities

Ministry	Relevant Programs	Funding phase	Funding Process
Ministry of Fisheries and Livestock	- 1.1 Identification of Major Fishing Grounds - 1.2 Conservation of Breeding & Nursery Ground & Protection of Brood, Fry & Juveniles - 1.3 Stock Assessment, MCS & Implementation of Adaptive Management Techniques - 1.4 Raise Awareness Among Stakeholders - 1.6 Alternative Livelihood Support - 2.1 Declaring Specific Zones Through Comprehensive Study & Community Consultations - 2.2 Reduction of Threats to Biodiversity - 2.3 Identification and Restoration of Priority Habitat Negatively Impacted - 3.1 Ensuring the Sustainable Use of Fisheries and Other Natural Resources	1 to 15 years	- Government grants for fisheries research and conservation. - International organization support. - Collaboration with NGOs.
Ministry of Environment, Forest and Climate Change	- 1.2 Conservation of Breeding & Nursery Ground - 1.3 Implementation of Adaptive Management Techniques - 1.5 Control of All Kinds of Pollution in the MR Areas - 2.1 Declaring Specific Zones Through Comprehensive Study & Community Consultations - 2.2 Reduction of Threats to Biodiversity - 2.3 Identification and Restoration of Priority Habitat Negatively Impacted - 3.1 Ensuring the Sustainable Use of Natural Resources	1 to 15 years	- National environmental protection funds. - Green Climate Fund and international environmental grants. - Partnerships with conservation organizations. - Government funding for pollution control and biodiversity conservation.
Ministry of Water Resources	- 1.2 Conservation of Breeding & Nursery Ground - 1.5 Control of All Kinds of Pollution in the MR Areas - 2.2 Reduction of Threats to Biodiversity - 2.3 Identification and Restoration of Priority Habitat Negatively Impacted	1 to 5 years	- Government funds for water resource management and coastal protection. - International grants for water conservation and pollution control. - Collaboration with other ministries.

Ministry of Local Government, Rural Development and Co-operatives	- 1.2 Conservation of Breeding & Nursery Ground - 1.4 Raise Awareness Among Stakeholders - 1.6 Alternative Livelihood Support - 2.2 Reduction of Threats to Biodiversity - 3.2 Promotion of Sustainable Eco-Tourism	1 to 15 years	- Local government funds for community-based programs. - Grants for rural development and livelihood improvement. - Support from national and international NGOs.
Ministry of Planning	- 1.6 Alternative Livelihood Support - 2.1 Declaring Specific Zones Through Comprehensive Study & Community Consultations - 2.2 Reduction of Threats to Biodiversity - 2.3 Identification and Restoration of Priority Habitat Negatively Impacted - 3.1 - 3.2 Promotion of Sustainable Eco-Tourism	1 to 15 years	- Allocation of national development funds. - Support for blue economy initiatives. - Collaboration with international development agencies.
Ministry of Science and Technology	- 3.1 Ensuring the Sustainable Use of Fisheries and Other Natural Resources - short-term research activities - long-term monitoring station	1 to 5 years	- NST Research Grant for small-scale scientific research. - Advanced research grants - Funding for innovative projects related to marine and environmental sciences.
Ministry of Social Welfare	- 1.4 Raise Awareness Among Stakeholders - 1.6 Alternative Livelihood Support - 2.2 Reduction of Threats to Biodiversity	1 to 15 years	- Social welfare funds for community development. - Grants for education and awareness programs. - Collaboration with NGOs for community engagement.
Ministry of Civil Aviation and Tourism	- 3.2 Promotion of Sustainable Eco-Tourism	1 to 15 years	- Tourism development funds for eco-tourism infrastructure. - Grants for sustainable tourism initiatives. - Support for community-based tourism projects.
Ministry of Industries	- 1.5 Control of All Kinds of Pollution in the MR Areas - 1.6 Alternative Livelihood Support	1 to 10 years	- Industry pollution control grants. - Support for sustainable industrial practices.

			- Collaboration with the private sector for blue economy projects.
Ministry of Youth and Sports	- Vocational training to young fishers - Alternative livelihood support	1 to 10 years	
Ministry of Education	- 1.4 Raise Awareness Among Stakeholders	1 to 5 years	- Higher research grants through BANBEIS.

Annex 4: List of donors to support and implement MPA management related activities

Organization	Focus Areas	Funding Opportunities	Link	Funding Range (EURO)	Funding Duration	Process to Get the Fund	Who Can Apply
Global Environment Facility (GEF)	Biodiversity conservation, climate change, sustainable fisheries, pollution control, habitat restoration, eco-tourism development	Large-scale grants for environmental projects, including MPA management	https://www.thegef.org/	€500,000 - €10 million	2-5 years	Submit a project proposal through GEF implementing agencies (e.g., UNDP, World Bank)	Ministries, NGOs, Research Institutes, Universities, Research Consortia
World Bank	Blue economy development, fisheries management, mariculture development, community livelihood improvement, spatial planning, infrastructure development	Loans and grants for sustainable development projects	https://www.worldbank.org/	€1 million - €50 million	2-7 years	Apply through World Bank's country offices, follow the project proposal process	Governments, Ministries, NGOs, Research Institutes, Universities

United Nations Development Programme (UNDP)	Sustainable livelihoods, biodiversity conservation, habitat restoration, pollution control, community-based natural resource management	Supports projects aligned with the SDGs	https://www.undp.org/	€100,000 - €5 million	1-4 years	Submit a proposal through UNDP country offices or global funding programs	Governments, Ministries, NGOs, Research Institutes, Universities
United Nations Environment Programme (UNEP)	Environmental protection, pollution control, biodiversity conservation, spatial planning, habitat monitoring	Funding and technical assistance for marine and coastal environment protection	https://www.unep.org/	€200,000 - €3 million	1-5 years	Submit a project proposal through UNEP's grant programs	Governments, Ministries, NGOs, Research Institutes, Universities
Food and Agriculture Organization (FAO)	Fisheries management, aquaculture, mariculture development, sustainable livelihoods	Technical expertise and funding for sustainable fisheries and aquaculture	http://www.fao.org/	€50,000 - €2 million	1-3 years	Apply through FAO country offices or specific program calls	Governments, Ministries, NGOs, Research Institutes, Universities
World Wildlife Fund (WWF)	Biodiversity conservation, habitat restoration, sustainable fisheries, eco-tourism development, community livelihood improvement	Grants for conservation projects, focusing on community engagement	https://www.worldwildlife.org/	€10,000 - €500,000	1-3 years	Submit a proposal through WWF's grant programs and regional offices	NGOs, Research Institutes, Universities

The Nature Conservancy (TNC)	Marine conservation, habitat restoration, spatial planning, sustainable fisheries	Funding and technical support for marine habitat protection	https://www.nature.org/en-us/	€100,000 - €1 million	1-5 years	Apply through TNC's regional offices or specific funding programs	NGOs, Research Institutes, Universities, Research Consortia
Conservation International (CI)	Biodiversity conservation, habitat restoration, alternative livelihoods, eco-tourism development	Supports biodiversity hotspot protection and sustainable livelihood projects	https://www.conservation.org/	€50,000 - €2 million	1-4 years	Submit a proposal through CI's global or regional programs	NGOs, Research Institutes, Universities, Research Consortia
International Union for Conservation of Nature (IUCN)	Biodiversity conservation, habitat monitoring, spatial planning, policy development	Grants and technical assistance for conservation and habitat protection projects	https://www.iucn.org/	€20,000 - €1 million	1-3 years	Apply through IUCN's project funding calls or partnerships	Governments, Ministries, NGOs, Research Institutes, Universities
Ocean Foundation	Marine conservation, pollution control, habitat restoration, community engagement	Supports initiatives that protect ocean environments and enhance community resilience	https://oceanfdn.org/	€10,000 - €300,000	1-3 years	Submit a project proposal through their grant application process	NGOs, Research Institutes, Universities, Community Organizations
Blue Action Fund	Marine conservation, sustainable fisheries, eco-tourism development, community livelihoods	Grants for marine biodiversity and coastal community livelihood projects	https://www.blueactionfund.org/	€100,000 - €5 million	2-5 years	Apply through Blue Action Fund's calls for proposals	NGOs, Research Institutes, Universities, Governments

European Union (EU)	Blue economy development, marine conservation, pollution control, eco-tourism	Funding through programs like the European Maritime and Fisheries Fund (EMFF)	https://ec.europa.eu/	€100,000 - €10 million	1-6 years	Apply through the relevant EU funding programs and calls for proposals	Governments, Ministries, NGOs, Research Institutes, Universities, Research Consortia
Global Ocean Biodiversity Initiative (GOBI)	Marine biodiversity conservation, spatial planning, habitat monitoring, MPA management	Technical and financial support for marine biodiversity conservation	https://gobi.org/	€50,000 - €1 million	1-3 years	Apply through GOBI's project calls and partnerships	Governments, NGOs, Research Institutes, Universities
International Maritime Organization (IMO)	Shipping activities, pollution control, maritime safety	Funding for projects enhancing maritime safety and environmental sustainability	https://www.imo.org/	€100,000 - €3 million	1-5 years	Apply through IMO's technical cooperation programs	Governments, Ministries, NGOs, Research Institutes, Universities
Packard Foundation	Ocean conservation, fisheries management, sustainable livelihoods	Grants for marine ecosystem protection and sustainable fisheries	https://www.packard.org/	€50,000 - €2 million	1-4 years	Apply through the Foundation's ocean conservation grant programs	NGOs, Research Institutes, Universities
Save Our Seas Foundation	Marine conservation, biodiversity protection, education, awareness	Grants for marine conservation research and outreach projects	https://saveourseas.com/	€5,000 - €100,000	1-2 years	Apply through the foundation's online grant application portal	NGOs, Research Institutes, Universities, Individual Researchers

Ocean Born Foundation	Marine conservation, pollution control, community engagement	Supports projects focused on ocean health and sustainable community practices	https://oceanbornfoundation.org/	€10,000 - €500,000	1-3 years	Submit a project proposal through their application process	NGOs, Research Institutes, Universities, Community Organizations
Society for Conservation Biology	Biodiversity conservation, marine conservation, research, education	Small grants and scholarships for conservation research and initiatives	https://conbio.org/	€2,000 - €50,000	1-2 years	Apply through SCB's grant and scholarship programs	NGOs, Research Institutes, Universities, Students, Individual Researchers
Ocean Conservation Trust	Marine conservation, education, outreach, habitat restoration	Supports conservation projects focused on public engagement and habitat restoration	https://oceanconservationtrust.org/	€5,000 - €100,000	1-2 years	Submit a project proposal through their grant application portal	NGOs, Research Institutes, Universities, Community Organizations
Ocean Grants	Marine conservation, habitat restoration, community projects	Grants for small-scale marine conservation projects	https://oceangrants.org/	€5,000 - €50,000	1-2 years	Apply through their online grant application process	NGOs, Community Organizations, Small Research Institutes
Earthwatch	Environmental research, conservation, biodiversity, education	Funds citizen science and research projects focused on conservation	https://earthwatch.org/	€10,000 - €200,000	1-3 years	Submit a project proposal through Earthwatch's funding calls	NGOs, Research Institutes, Universities, Citizen Science Groups

WorldFish	Sustainable aquaculture, fisheries management, food security	Funding for sustainable aquaculture and fisheries management projects	https://www.worldfishcenter.org/	€50,000 - €1 million	1-4 years	Apply through WorldFish's project funding calls	NGOs, Research Institutes, Universities, Governments
Wildlife Conservation Society (WCS)	Biodiversity conservation, habitat restoration, community-based conservation	Funds projects protecting wildlife and habitats with a focus on community engagement	https://www.wcs.org/	€50,000 - €2 million	1-5 years	Submit a proposal through WCS's conservation funding programs	NGOs, Research Institutes, Universities, Governments
Marine Mammal Commission	Marine mammal conservation, research, policy development	Grants for marine mammal research and conservation efforts	https://www.mmc.gov/	€10,000 - €200,000	1-3 years	Apply through their online grant application process	NGOs, Research Institutes, Universities, Individual Researchers
Marine Conservation Social Fund	Marine conservation, social development, community engagement	Supports projects integrating social and environmental goals	https://www.mcsf.org/	1-2 years	Submit a project proposal through their application process	NGOs, Community Organizations, Small Research Institutes	
Oceans 5	Marine conservation, overfishing prevention, pollution control, habitat protection	Grants for large-scale marine conservation projects	https://www.oceans5.org/	€100,000 - €5 million	1-5 years	Apply through Oceans 5's grant application process	NGOs, Research Institutes, Universities, Governments

Waite Foundation	Marine protected areas, sustainable fishing, ocean conservation	Grants for ocean conservation projects focusing on MPAs	https://waitefoundation.org/	€50,000 - €1 million	1-4 years	Submit a proposal through their online grant application portal	NGOs, Research Institutes, Universities
Sea-Change Marine Conservation Grant	Marine conservation, habitat restoration, pollution control, community projects	Small grants for grassroots marine conservation projects	https://www.sea-changers.org.uk/	€1,000 - €25,000	1 year	Apply through their online application portal	NGOs, Community Organizations, Small Research Institutes
Gordon and Betty Moore Foundation	Environmental conservation, ocean conservation, sustainable development	Funds large-scale environmental sustainability projects	https://www.moore.org/	€100,000 - €5 million	2-5 years	Apply through the foundation's environmental conservation grant programs	NGOs, Research Institutes, Universities, Research Consortia
Future for Nature	Wildlife conservation, marine conservation, community engagement	Awards and grants for young conservationists	https://futurefornature.org/	€ 50,000	1 year	Apply through their annual award application process	Individual Young Conservationists, NGOs, Research Institutes
Sea of Change Foundation	Marine conservation, habitat restoration, education	Grants for habitat restoration and community engagement projects	https://seaofchange.com/	€5,000 - €50,000	1-2 years	Submit a project proposal through their online application process	NGOs, Research Institutes, Universities, Community Organizations

Ocean Reef Conservation Association	Marine conservation, habitat protection, education	Supports conservation projects focused on marine ecosystems	https://oceanreef.org/	€5,000 - €50,000	1-2 years	Apply through their online application process	NGOs, Community Organizations, Small Research Institutes
Ocean Wise (Ocean Action Grant)	Marine conservation, sustainable practices, pollution reduction	Grants for initiatives promoting ocean health and sustainable practices	https://ocean.org/	€10,000 - €100,000	1-3 years	Submit a proposal through their grant application portal	NGOs, Research Institutes, Universities
UK Research and Innovation (UKRI)	Environmental research, marine science, sustainable development	Funding for scientific research projects in marine conservation	https://www.ukri.org/	€100,000 - €5 million	1-5 years	Apply through UKRI's research funding calls	Research Institutes, Universities, Research Consortia
AMRTC (Applied Marine and Renewable Energy Technology Centre)	Marine renewable energy, sustainable development, marine technology	Funding for projects focused on marine renewable energy	https://amrtc.org/	€50,000 - €2 million	1-3 years	Submit a project proposal through their funding calls	NGOs, Research Institutes, Universities, Industry Partners
Lipman Family Prize	Social impact, innovation, environmental sustainability	Awards and grants for innovative social and environmental impact projects	https://lipmanfamilyprize.wharton.upenn.edu/	€50,000 - €250,000	1-2 years	Apply through their annual prize application process	NGOs, Social Enterprises, Research Institutes

Jephcott Charitable Trust	Environmental conservation, community health, education	Grants for conservation and community health projects	https://www.jephcottcharitabletrust.org.uk/	€10,000 - €100,000	1-3 years	Apply through their online grant application process	NGOs, Community Organizations, Small Research Institutes
Partnership for Observation of the Global Ocean (POGO)	Ocean observation, marine science, capacity building	Funding and support for ocean observation and marine science projects	https://pogo-ocean.org/	€10,000 - €300,000	1-3 years	Apply through POGO's funding calls and partnerships	Research Institutes, Universities, Research Consortia
GIZ (Deutsche Gesellschaft für Internationale Zusammenarbeit)	Sustainable development, environmental protection, community development	Funding and technical assistance for sustainable development projects	https://www.giz.de/	€50,000 - €10 million	1-6 years	Apply through GIZ's country offices or specific program calls	Governments, Ministries, NGOs, Research Institutes, Universities
DANIDA (Danish International Development Agency)	Sustainable development, environmental protection, community livelihoods	Funding for international development projects, including marine conservation	https://um.dk/en/danida-en/	€100,000 - €5 million	1-5 years	Apply through DANIDA's project funding calls	Governments, Ministries, NGOs, Research Institutes, Universities
DFID (Department for International Development, UK)	Sustainable development, poverty reduction, environmental conservation	Grants and technical assistance for sustainable development and poverty reduction projects	https://www.gov.uk/government/organisations/department-for-international-development	€100,000 - €10 million	2-7 years	Apply through DFID's funding programs and calls for proposals	Governments, Ministries, NGOs, Research Institutes, Universities

UNHCR (United Nations High Commissioner for Refugees)	Humanitarian aid, community resilience, sustainable livelihoods	Supports projects improving livelihoods of displaced communities, including coastal livelihoods	https://www.unhcr.org/	€50,000 - €1 million	1-3 years	Submit a project proposal through UNHCR's funding calls and partnerships	Governments, NGOs, Research Institutes, Community Organizations
--	---	---	---	----------------------	-----------	--	---

Annex V: Programs to achieve objective 1: Protect Juvenile Fisheries in the Naf River Estuary and Adjacent Waters

Programs	Actions	Affected Resources	Threats Addressed	Phase	Costs (Millions Taka)	Responsible Parties
1.1 Identification of critical fishing grounds and their protection through regulatory measures	A. Conduct fish habitat surveys B. GIS mapping and spatial analysis C. Use local fishers' knowledge to validate findings	Fishery resources	Habitat destruction	1st	300 (Years 1-5)	MoFL/DoF, BCG, BN
1.2 Conservation of breeding and nursery habitats for juvenile fisheries	A. Establish protected areas for breeding grounds B. Restrict fishing in nursery areas C. Community-based habitat monitoring and activation CFG D. Conduct awareness campaigns	Juvenile fish, fisheries habitats	Overfishing and illegal fishing	1st-3rd	400 (Years 1-15)	MoFL/DoF, BCG, BP, UCC, UMCC

1.3 Implementation of seasonal fishing bans during breeding and nursery periods	A. Enforce fishing bans during key breeding seasons B. Train local stakeholders on compliance C. Monitor fishing activity during banned periods through FMC & CFG	Juvenile fish, breeding habitats	Overfishing	1st-2nd	200 (Years 1-10)	MoFL/DoF, BCG, BP, UCC, UMCC
1.4 Enforcement of sustainable fishing practices to reduce juvenile bycatch	A. Introduce and promote selective fishing gear B. Restrict the use of SBN, trawl net, and fine meshed gill net at dedicated area for protection of juvenile fisheries C. Train fishers on sustainable fishing techniques D. Monitor compliance with sustainable fishing regulations	Juvenile fish, fisheries habitats	Bycatch, harvest of under-sized fish and unsustainable practices	1st-3rd	250 (Years 1-15)	MoFL/DoF, BCG, BP, UCC, UMCC
1.5 Pollution control measures to prevent degradation of critical habitats	A. Monitor pollution levels in critical habitats B. Implement waste management systems in nearby communities C. Penalize polluters affecting estuarine habitats	Estuarine habitats	Habitat degradation	1st-3rd	150 (Years 1-10)	MoEFCC/DoE, MoFL/DoF, BCG, District Administration
1.6 Awareness campaigns among stakeholders, particularly fishers, to emphasize the importance of protecting juvenile fisheries	A. Conduct workshops for local fishers and stakeholders B. Develop communication materials (posters, radio messages) C. Educate fishers on the importance of juvenile fish protection	Fishery resources, local stakeholders	Lack of awareness	1st-3rd	100 (Years 1-5)	MoFL/DoF, UCC, UMCC

Annex VI: Programs to achieve objective 2: Enhance Fisheries Resources Through Sustainable Ecosystem-Based Management

Programs	Actions	Affected Resources	Threats Addressed	Phase	Costs (Millions Taka)	Responsible Parties
2.1 Stock assessment studies to monitor fish population health and inform management decisions	A. Conduct regular fish stock surveys B. Deploy community members/local fishers as citizen scientists C. Develop stock health reports D. Incorporate findings into adaptive management	Fishery resources	Overfishing	1st	100 (Years 1-5)	MoFL/DoF
2.2 Implementation of adaptive management techniques to respond to changes in fish stock dynamics and ecosystem conditions	A. Develop responsive total allowable catch (TAC) scheme or fishing quotas B. Monitor and adjust no-fishing zones C. Deploy CFG to monitor and enhance compliance C. Train DoF staff on adaptive management	Fishery resources	Unsustainable fishing practices	1st-2nd	120 (Years 1-10)	MoFL/DoF, BCG, CFG, UCC, UMCC
2.3 Capacity-building and awareness raising programs to train fishers in sustainable harvesting techniques and resource management	A. Conduct awareness campaign & workshops on sustainable fishing techniques B. Train fishers on gear modification to minimize ecosystem damage C. Provide resources for fisher education programs	Fishery resources, local economy	Overfishing and habitat damage	1st-3rd	200 (Years 1-15)	MoFL/DoF, CG
2.4 Development of fisheries co-management systems involving local	A. Form community-based management committees B. Provide small grants to support community	Fisheries resources, local stakeholders	Lack of community involvement	1st-3rd	150 (Years 1-10)	MoFL/DoF, UCC, UMCC, District Administration

communities and stakeholders	management projects C. Collaborate with fishers on resource-sharing agreements					
2.5 Alternative livelihood programs for fishers to reduce pressure on fisheries resources	A. Train fishers in aquaculture, handicrafts, tourism, and other alternative livelihood strategies aligning with UCC professional groups B. Provide vocational training to young fishers to foster livelihood transformation C. Provide financial incentives for alternative income generation D. Develop partnerships with NGOs for livelihood projects	Local fishing communities	Economic vulnerability, overfishing, fishing pressure and habitat destruction	1st-3rd	300 (Years 1-15)	MoFL/DoF, Dept. of Youth Development (DoYD)

Annex VII: Programs to achieve objective 3: Protect Megafauna Diversity Around the Naf River Estuary and Adjacent Areas

Programs	Actions	Affected Resources	Threats Addressed	Phase	Costs (Millions Taka)	Responsible Parties
3.1 Identification and restoration of priority habitats negatively impacted by human activities to support megafauna recovery	A. Assess and prioritize degraded habitats for restoration B. Conduct habitat restoration efforts (e.g., beach cleanup, artificial reef) C. Involve community members in restoration	Megafauna habitats, biodiversity	Habitat degradation	1st-3rd	250 (Years 1-15)	MoFL/DoF, MoEFCC, BCG
3.2 Implementation of protective measures for megafauna habitats such as nesting areas and migration routes	A. Restrict human activities in critical habitats B. Mark and monitor migration routes and nesting areas for megafauna	Megafauna (sharks, turtles, dolphins)	Habitat destruction and human disturbance	1st-3rd	300 (Years 1-15)	MoFL/DoF, BCG, Fishers' Association

	C. Enforce protective regulations for critical habitats					
3.3 Promotion of Bycatch Reduction Devices (BRDs) to minimize accidental capture of sharks, rays, and turtles	A. Develop, distribute and promote BRDs B. Train fishers on their proper use and handling of bycatch C. Monitor compliance with bycatch reduction policies	Megafauna (sharks, rays, turtles)	Bycatch and accidental species harm	1st	200 (Years 1-5)	MoFL/DoF, BFRI, Univ., BCG, BP, Fishers' Association
3.4 Education and awareness campaigns to reduce megafauna poaching and harassment by fishers and tourists	A. Develop school-based programs on marine biodiversity B. Organize events for tourists and locals C. Disseminate conservation-focused materials	Megafauna, local communities	Lack of awareness	1st-3rd	150 (Years 1-10)	MoFL/DoF, UA, District Administration, Fishers' Association
3.5 Monitoring programs to track megafauna population trends and threats	A. Deploy community members as citizen scientists B. Use technology like drones and acoustic monitoring for real-time data C. Share results with stakeholders to guide decision-making	Megafauna, biodiversity	Lack of data on population trends	1st-3rd	200 (Years 1-15)	MoFL/DoF, District Administration

Annex VIII: Programs to achieve objective 4: Conserve the Nesting Grounds of Sea Turtles and Shorebirds

Programs	Actions	Affected Resources	Threats Addressed	Phase	Costs (Millions Taka)	Responsible Parties
4.1 Protection of nesting beaches for sea turtles through access restrictions during nesting seasons	A. Restrict access to beaches during nesting seasons B. Employ community members as nest monitors C. Prevent artificial light disturbances	Sea turtles, shorebirds	Habitat destruction and human disturbance	1st-3rd	300 (Years 1-15)	MoFL/DoF, BCG, UCC, UMCC

4.2 Community involvement in monitoring and safeguarding turtle nesting areas	A. Train locals to monitor nesting and hatching B. Provide incentives for nest protection efforts C. Engage youth and local schools in conservation activities	Sea turtles, shorebirds	Poaching and nest predation	1st-3rd	200 (Years 1-15)	MoFL/DoF, District Administration, UCC, UMCC
4.3 Restoration and maintenance of nesting beaches to improve nesting success	A. Organize beach cleanup drives B. Remove obstacles affecting turtle nesting C. Monitor nesting site suitability	Sea turtles, shorebirds	Habitat degradation	1st-3rd	250 (Years 1-15)	MoFL/DoF, District Administration
4.4 Public awareness campaigns to reduce disturbances from tourists and local activities on nesting beaches	A. Conduct outreach programs for tourists and locals B. Develop communication materials like posters and videos C. Organize guided tours to showcase nesting sites	Local communities, tourism	Lack of awareness	1st-3rd	150 (Years 1-10)	MoFL/DoF, District Administration
4.5 Establishment of artificial lighting regulations to prevent disruption to turtle nesting and hatching	A. Install turtle-friendly lights in nesting areas B. Develop local regulations to minimize light pollution C. Educate stakeholders on lighting impacts	Sea turtles	Nesting site disruption	1st	100 (Years 1-5)	MoFL/DoF, CG

Annex IX: Programs to achieve objective 5: Improve the Livelihood Resilience of Fishers around the Naf River Estuary and Adjacent Marine Ecosystems

Programs	Actions	Affected Resources	Threats Addressed	Phase	Costs (Millions Taka)	Responsible Parties
5.1 Development of alternative livelihood programs such as	A. Train fishers in ecotourism, aquaculture, and handicrafts B. Provide microfinance	Local communities, fishers	Economic instability	1st-3rd	400 (Years 1-15)	MoFL/DoF, CG, BP, DoYD

ecotourism, aquaculture, and handicrafts to reduce dependency on fishing	support for transitioning livelihoods C. Establish community-led tourism initiatives					
5.2 Microfinance support for fishers transitioning to alternative livelihoods	A. Collaborate with microfinance institutions B. Provide small loans for alternative livelihood development C. Train fishers on financial literacy	Local communities	Lack of financial access	1st-3rd	200 (Years 1-10)	MoFL/DoF, Microfinance Institutions
5.3 Training and skill-building programs to prepare fishers for non-fishing economic activities	A. Organize vocational training in different trades based on local demand B. Train fishers on sustainable tourism practices C. Provide access to capacity-building workshops	Local economy, fishers	Economic vulnerability	1st-3rd	250 (Years 1-15)	MoFL/DoF, DoYD, NGOs
5.4 Establishment of community cooperatives to improve economic resilience and ensure equitable distribution of resources	A. Form cooperatives for resource sharing B. Develop cooperative-led projects like fish processing C. Facilitate partnerships between cooperatives and NGOs	Local communities, cooperatives	Lack of collaboration and resource sharing	1st-3rd	300 (Years 1-15)	MoFL/DoF, NGOs
5.5 Community-led ecotourism initiatives, such as guided tours or cultural tourism programs, to provide supplementary income	A. Develop infrastructure for guided tours and boat rides B. Train locals as ecotourism guides C. Market Naf MPA as a sustainable tourism destination	Local economy, tourism	Over-reliance on fisheries	2nd-3rd	500 (Years 6-15)	MoFL/DoF, Bangladesh Tourism Board, District Administration

Annex X: List of species available in Naf MPA

List of Elasmobranch species and Turtles

Common English Name	Local Name	Scientific Name	Family	IUCN Status
Spadenose shark	Churi Hangor	<i>Scoliodon laticaudus</i>	Carcharhinidae	Near Threatened
Tiger shark	Bangha hangor	<i>Galeocerdo cuvier</i>	Galeocerdonidae	Near Threatened
Pigeye shark	Boli hangor	<i>Carcharhinus amboinensis</i>	Carcharhinidae	Vulnerable
Scaly whipray	-	<i>Brevitrygon walga</i>	Dasyatidae	Near Threatened
Spotted numbfish	Bidyut machh	<i>Narcine timlei</i>	Narcinidae	Vulnerable
Granulated guitarfish	Dagi pitambori	<i>Glaucostegus granulatus</i>	Glaucostegidae	Critically endangered
Widenose guitarfish	Dagi pitambori	<i>Glaucostegus obtusus</i>	Glaucostegidae	Critically endangered
Spinetail devil ray	Ranga luimoni shing/ Deo mach	<i>Mobula mobular</i>	Mobulidae	Endangered
Shortfin devil ray	Pakura shing Chowain	<i>Mobula kuhlii</i>	Mobulidae	Endangered
Green sawfish	Karati hangor/ Aishya	<i>Pristis zijsron</i>	Pristidae	Critically Endangered
Large tooth sawfish	-	<i>Pristis pristis</i>	Pristidae	Critically Endangered
Narrow sawfish	-	<i>Anoxypristis cuspidata</i>	Pristidae	Critically Endangered
Green sea turtle	Sabuj Samudrik Kachim	<i>Chelonia mydas</i>	Cheloniidae	Endangered
Olive ridley turtle	Samudrik Kachim	<i>Lepidochelys olivacea</i>	Cheloniidae	Vulnerable
Hawksbill turtle	Bajthuti Samudrik Kachim	<i>Eretmochelys imbricata</i>	Cheloniidae	Critically Endangered
loggerhead turtle	Mugurmatha Kacchap	<i>Caretta caretta</i>	Cheloniidae	Vulnerable
leatherback turtle	Samudrik Kachim	<i>Dermochelys coriacea</i>	Dermochelyidae	Vulnerable

List of Fish and Crustaceans species

Common English Name	Local Name	Scientific Name	Family	IUCN Status
Grey Mullet	Khorul bata	<i>Mugil sp</i>	Mugilidae	Least Concern
Mullet	Bata/ Parse	<i>Liza sp</i>	Mugilidae	-
Barramundi/ Asian seabass	Bhetki or Koral	<i>Lates calcarifer</i>	Latidae	Least Concern
Sting ray	Raia	<i>Raja sp.</i>	Rajidae	Least Concern
Japanese King Prawn	Dora kata chingri/ Janani chingri/ Bagda	<i>Penaeus japonicas</i>	Penaeidae	Not Evaluated
Giant tiger prawn, Asian tiger shrimp, black tiger shrimp	Bagda	<i>P. monodon</i>	Penaeidae	Not Evaluated

Indian white prawn	Chapda chingri or Chamma chingri	<i>P. indicus</i>	Penaeidae	Not Evaluated
Banana prawn	-	<i>P. merguensis</i>	Penaeidae	Not Evaluated
Jawla paste shrimp	-	<i>Acetes sp</i>	Sergestidae	Not Evaluated
Giant Freshwater Prawn or Giant River Prawn	golda chingri	<i>Macrobrachium rosenbergii</i>	Palaemonidae	Not Evaluated
rowworm	-	<i>Sagitta sp</i>	Sagittidae	-
squid	Nuilla	<i>Loligo sp.</i>	Loliginidae	-
Olive Shell	Bukchira	<i>Oliva sp</i>	Olividae	-
Giant Mud Crab	Hubba Kakra	<i>Scylla serrata</i>	Portunidae	Not Evaluated
Flower Moon Crab	-	<i>Matuta lunaris</i>	Matutidae	Not Evaluated
Red Ghost Crab	Lal Kakra	<i>Ocypodema crocera</i>	Ocypodidae	Not Evaluated
blue crab	Santura kankra	<i>Portunus pelagicus</i>	Matutidae	Not Evaluated
Bombay-duck	Loitta	<i>Harpodon nehereus</i>	Synodontidae	Near Threatened
Silver Pomfret	Rupchanda	<i>Pampus argentus</i>	Stromateidae	Not Evaluated
Chinese pomfret	Rup Chanda	<i>P. chinensis</i>	Polygonaceae	Least Concern
devilfish	-	<i>Octopus spp</i>	Octopodidae	Least Concern
cuttlefish	Firki	<i>Sepia sp</i>	Sepiidae	Data Deficient
mantis shrimp	-	<i>Squilla spp</i>	Squillidae	Not Evaluated
Sea catfish or marine catfish	Kata mach	<i>Arius spp</i>	Ariidae	-
Long whiskers catfish or Long-whiskered catfish	Nuna Tengra	<i>Mystus gulio</i>	Bagridae	least concern
Red Sea whitespotted moray or whitespotted moray	Shap machh	<i>Gymnothorax punctatus</i>	Muraenidae	Least Concern
Pufferfish,	Futka mach	<i>Tetraodon sp.</i>	Tetraodontidae	Not threatened
Pangas catfish.	Pangas	<i>Pagasius pangasius</i>	Pangasiidae	least concern
Tonguefishes	Kukur jib	<i>Paraplagusia bilineata</i>	Cynoglossidae	Least Concern
Panna Croaker	Poa	<i>Panna microdon</i>	Sciaenidae	Least Concern
Flathead sillago	Tular dandi	<i>Sillago domina</i>	Sillaginidae	Not Evaluated
Goldspotted grenadier anchovy	Oluya	<i>Coilia spp</i>	Engraulidae	Not threatened
Scaly hairfin anchovy	Phansa	<i>Satipinna tatty</i>	Engraulidae	Least Concern

-	Chapila	<i>Sardenella sp</i>	Dorosomatidae	Data Deficient
Bigeye ilisha	Choukka	<i>Ilisha megalopa</i>	Pristigasteridae	Least Concern
Kelee shad	Gurta ilish	<i>Hilsha kelee</i>	Dorosomatidae	Least Concern
Bengal tongue sole	Pata bata	<i>Cynoglossus spp</i>	Cynoglossidae	Least Concern
Mud spiny lobster	Chhua Ichha	<i>Panulirus polyphagus</i>	Palinuridae	Least Concern
Painted spiny lobster	-	<i>Panulirus versicolor</i>	Palinuridae	Least Concern
Ornate spiny lobster	Chhua Ichha	<i>Panulirus ornatus</i>	Palinuridae	Least Concern
Spiny lobster	-	<i>P. homarus</i>	Palinuridae	Least Concern
Hilsa shad	ilish	<i>Tenualosa ilisha</i>	Clupeidae	Least Concern
Mysid shrimp	-	<i>Americamysis bahia</i>	Mysidae	Not Evaluated
Copepod	-	<i>Acartia tonsa</i>	Acartiidae	Not Evaluated
Juvenile Fish Species				
White grouper	badami bol	<i>Epinephelus spp</i>	Serranidae	-
Jarbua Terapon	Barguni	<i>Terapon spp</i>	Terapontidae	Not threatened
Silver sillago	Baila	<i>Sillago sp</i>	Sillaginidae	Data Deficient
threadfish	Pekhom mouri	<i>Alectis sp.</i>	Carangidae	-
Black Pomfret	Rup chada	<i>Parastrumateus sp</i>	Carangidae	Least Concern
Lookdown	Notomukh moori	<i>Selene sp</i>	Carangidae	Not Evaluated
Atlantic Tripletail	Sagor koi	<i>Lobotes sp</i>	Lobotidae	Not Threatened
Grunt	Guti datina	<i>Pomadasys sp</i>	Haemulidae	-
Yellowfin seabream	Bogni mach	<i>Acanthopagrus sp</i>	Sparidae	-
Croaker	Poa	<i>Johnius sp</i>	Sciaenidae	-
Threadfin	Taposhi	<i>Polynemus sp</i>	Polynemidae	-
sicklefish	Fota panmach	<i>Drepane sp</i>	Drepaneidae	Least Concerned
Spotted Scat	Payra	<i>Scatophagus sp</i>	Scatophagidae	Endangered
ribbon fish	Churi	<i>Eupleurogrammus sp</i>	Trichiuridae	-
Silver Pomfret	Fali Chanda	<i>Pampus sp</i>	Stromateidae	-

List of Cetaceans

Common English Name	Local Name	Scientific Name	Family	IUCN Status
Bryde's Whale	Bridis timi	<i>Balaenoptera edeni</i>	Balaenopteridae	Least Concern
Blue Whale	Timi	<i>Balaenoptera musculus</i>	Balaenopteridae	Endangered
False Killer whale	Chhadmaghatok Timi	<i>Pseudorca crassidens</i>	Delphinidae	Near Threatened
Sperm Whale	Sukranu Timi	<i>Physeter macrocephalus</i>	Physeteridae	Vulnerable
Pacific humpback dolphin	Golapi dolphin	<i>Sousa chinensis</i>	Delphinidae	Vulnerable
Finless porpoise	Pakhnahin porpoise	<i>Neophocaena phocaenoides</i>	Phocoenidae	Vulnerable
Irrawaddy dolphin	Iraboti dolphin	<i>Orcaella brevirostris</i>	Delphinidae	Endangered
Indo-pacific bottlenose dolphin	Botolnak dolphin	<i>Tursiops aduncus</i>	Delphinidae	Near Threatened
Pantropical spotted dolphin	Chitra dolphin	<i>Stenella attenuata</i>	Delphinidae	Least Concern
Spinner dolphin	Ghurni dolphin	<i>Stenella longirostris</i>	Delphinidae	Least Concern
Spotted Dolphin	Chitra dolphin	<i>Stenella attenuate</i>	Delphinidae	Least Concern

List of Seabirds

Common English Name	Local Name	Scientific name	Family	IUCN Status
Ruddy Shelduck	Chokachoki	<i>Tadorna ferruginea</i>	Anatidae	Least Concern
Whimbrel	Lal-chona	<i>Numenius phaeopus</i>	Scolopacidae	Least Concern
Ruddy Turnstone	Lal-Nuribatan	<i>Arenaria interpres</i>	Scolopacidae	Near Threatened
Brown-headed Gull	Khoiramatha Gangchil	<i>Larus brunnicephalus</i>	Laridae	Least Concern
Barn Swallow	Metho Ababil	<i>Hirundo rustica</i>	Hirundinidae	Least Concern
Pacific Golden Plover	Proshanto Sonajiriya	<i>Pluvialis fulva</i>	Charadriidae	Least Concern
Kentish Plover	Jiriya	<i>Charadrius alexandrinus</i>	Charadriidae	Least Concern
Little Egret	Chhoto Bok	<i>Egretta garzetta</i>	Ardeidae	Least Concern
Intermediate Egret	Maijhla Bok	<i>Egretta intermedia</i>	Ardeidae	Least Concern
Indian Pond Heron	Kani Bok	<i>Ardeola grayii</i>	Ardeidae	Least Concern
Black-bellied Tern	Nodia Panchil	<i>Sterna acuticauda.</i>	Laridae	Endangered