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BERMUDA'S
BLUE PROSPERITY PLAN

APRIL 2024, FINAL DRAFT

GOVERNMENT OF BERMUDA
Ministry of Home Affairs

BERMUDA OCEAN
PROSPERITY PROGRAMME

Table of Contents

Acronyms

AIS	automatic identification system
BDA	Bermuda Business Development Agency
BEC	Bermuda Environmental Consulting, Ltd.
BEDC	Bermuda Economic Development Corporation
BIOS	Bermuda Institute of Ocean Sciences
BOPP	Bermuda Ocean Prosperity Programme
BNT	Bermuda National Trust
BREAM	Bermuda Reef Ecosystem Assessment and Monitoring
BRUV	Baited Remote Underwater Video
BSMA	Bermuda Shipping and Maritime Authority
BTA	Bermuda Tourism Authority
BZS	Bermuda Zoological Society
CFC	Commercial Fisheries Council
DOE	Department of Energy
DENR	Department of Environment and Natural Resources
DOP	Department of Planning
DOPB	Department of Public Lands and Buildings
EA	Environmental Authority
ECO	Environmental Coalition
EDD	Economic Development Department
EEZ	exclusive economic zone
ES	Estates Section, Ministry of Public Works
ESG	environmental, social and governance
HWA	Historic Wrecks Authority
KBB	Keep Bermuda Beautiful
KPI	key performance indicator
M&P	Department of Marine and Ports Services
MDA	Marine Development Act
MOU	Memorandum of Understanding
MPA	marine protected area
MRB	Marine Resources Board
MSP	marine spatial plan
OECD	Organisation for Economic Co-operation and Development
PGOs	principles, goals, and objectives
RA	Regulatory Authority
SDG	sustainable development goal
SUPs	single use plastics
W&E	Department of Works and Engineering

1. Foreword

Walter H. Roban, JP, MP
Deputy Premier, Minister of Home Affairs

Bermudians have always recognised the role of the ocean in shaping their food sources, livelihoods, and recreation, as well as the island's economy and vital supply chains. Recently, it has also become apparent that humans play a role in shaping the ocean. Over the last few decades, we've seen this in the form of rising sea levels and warming ocean temperatures, shrinking polar ice caps, plastic pollution on our beaches, and increased pressure on fishing stocks worldwide. We can live in harmony with the ocean, but with a rapidly changing global climate, doing so requires a comprehensive plan that will allow us to sustainably grow jobs in ocean industries while responsibly managing the marine resources on which they depend.

Recognizing this, and highlighting a joint responsibility for protecting our marine resources, the Government of Bermuda articulated a 15-year management plan in its 2010 report *A Strategy for the Sustainable Use of Bermuda's Living Marine Resources*. This document includes a commitment to integrated planning for Bermuda's marine waters that involves all of Government and stakeholders in its development and implementation. We knew then that a Marine Spatial Plan would help us optimise and sustainably manage our best asset—the ocean.

In 2019, to operationalise the goal of integrated planning, we partnered with the Waitt Institute and the Bermuda Institute of Ocean Sciences to form the Bermuda Ocean Prosperity Programme. After four years of consultation and analyses, it is my pleasure to present to you the Blue Prosperity Plan, which includes:

- a **Marine Spatial Plan** that sets out a framework to sustainably manage marine resources, coordinate decision-making about marine development and protect 20 percent of Bermuda's waters as fully protected marine protected areas (MPAs); and

- a **Blue Economy Strategy** that guides the diversification of Bermuda's ocean industries and grows related employment opportunities alongside the responsible management of marine resources.

The Blue Economy Strategy and Marine Spatial Plan are complementary to one another and should be viewed in conjunction, as they are supporting documents that assist Bermuda in achieving its broader economic, social and environmental goals.

The Blue Prosperity Plan aims to maximise the benefit to Bermudians and minimise negative environmental impacts, resulting in enhanced ecosystem health. As a large ocean state, Bermuda's high GDP and thriving industries cannot be separated from ocean protection and enhancement of our blue assets. As a result, the Plan also builds on our trajectory of sustainable development and supports Blue economic growth as a cornerstone of our economy, accelerating Bermuda's pathway to Blue Economy leadership.

This is not a one-time plan; it will be revised to reflect changes in current scientific information, economic and social priorities and environmental conditions. Critically, this is also Bermuda's Blue Prosperity Plan. Together, we stood on the shoulders of giants to create a plan that is best for Bermuda, learning what has worked in other island nations, gathering the best available science about marine protected areas and incorporating local data, environmental constraints and community feedback.

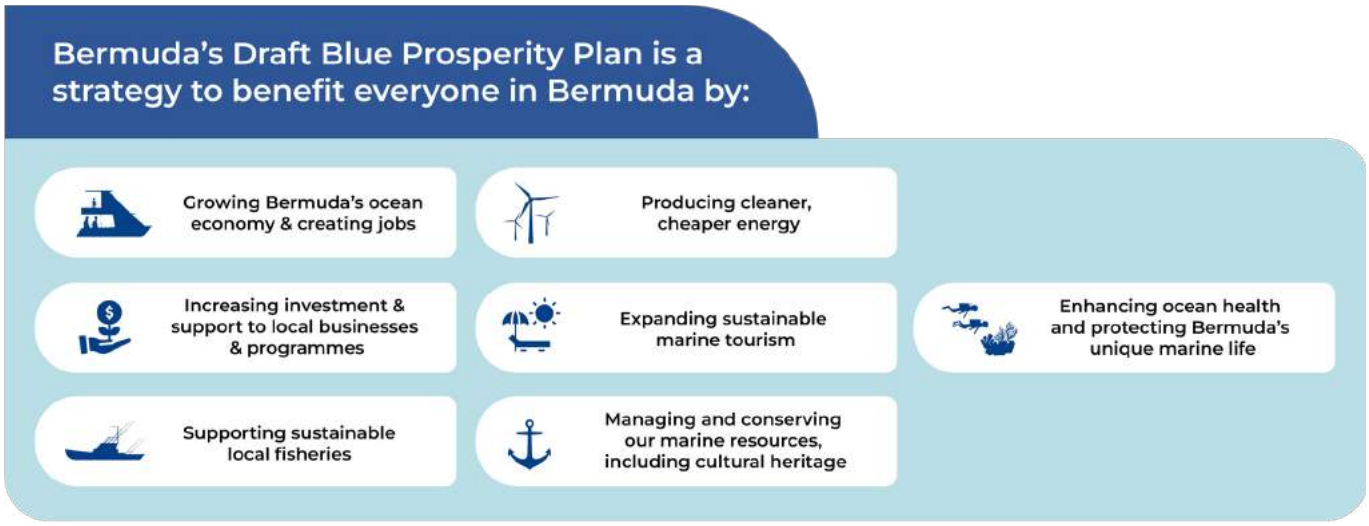
This plan would not have been possible without the dedicated efforts of our partners of the Bermuda Ocean Prosperity Programme, including members of the Steering Committee, who worked hard to make this an open and inclusive process. I would also like to thank individuals from the Department of Environment and Natural Resources, Bermuda Ocean Prosperity Programme's Science Committee and Bermuda Institute of Ocean Sciences for their valuable scientific and technical contributions to the plan. Finally, I extend my gratitude to all local residents who committed to creating this plan, including representatives of the Ocean Village stakeholder groups and the hundreds of individuals who responded to the Ocean Use Surveys, participated in the public consultation process and took part in the Focus Group Sessions. Your contributions helped to ensure this plan benefits Bermuda today and will help secure the island's prosperity well into the future.

I invite you to share in this lasting legacy of sustainability and economic growth for Bermudians for generations to come.

Walter H. Roban, JP, MP
Deputy Premier and Minister of Home Affairs

2. Executive Summary

This document, Bermuda's Blue Prosperity Plan, represents the culmination of a four-year planning and public review process led by the people of Bermuda. Bermuda seeks a future where its marine waters contain healthy ecosystems that can support a thriving and more resilient ocean-based economy while balancing the diverse priorities of ocean users. Bermuda's Blue Prosperity Plan delivers on this vision with a framework that supports the sustainable management of ocean resources, coordinates decision-making about marine-based development, ensures that 20% of Bermuda's marine waters are fully protected marine protected areas (MPAs), and provides a strategy for the sustainable growth of the Blue Economy.



In April 2019, the Cabinet authorised the Ministry of Home Affairs to enter into a collaborative agreement with the Waitt Institute (on behalf of the Blue Prosperity Coalition) and the Bermuda Institute of Ocean Sciences to develop and implement a Blue Prosperity Plan for Bermuda. This agreement was formalised in a Memorandum of Understanding that established the Bermuda Ocean Prosperity Programme (BOPP). The Blue Prosperity Plan marks the outcome of this agreement, outlining a Marine Spatial Plan and Blue Economy Strategy.

- Bermuda's **Marine Spatial Plan (MSP)** is a framework for implementing sustainable ocean development, protection and management in the island's marine waters. It was developed with a public process that used the best available information about the natural environment and human uses to make informed decisions about how to manage Bermuda's ocean spaces. Human activities are given spatial and temporal designations to achieve ecological, economic and social objectives. The MSP aims to find the right balance of industry and development, while protecting the environment and marine resources for future generations.

- Bermuda's **Blue Economy Strategy** is a guideline for growing Bermuda's ocean-related industries and attracting investment opportunities. It was created with stakeholder engagement and industry assessments. Existing laws, plans and other strategic documents served as the foundation, while ensuring not to constrict aspirational visioning.

The MSP and Blue Economy Strategy are interrelated; one cannot succeed without the other. A thriving ocean economy that supports economic growth is only possible with holistic ocean management that considers the interests of ocean stakeholders while balancing the conservation of Bermuda's blue assets. Bermuda's Blue Prosperity Plan is an important step towards bringing lasting economic and environmental security and resilience to our island's people, both today and in the future.

Bermuda's Marine Spatial Plan

The MSP is guided by Principles, Goals, and Objectives (PGOs) developed through a stakeholder consultation process that included the public, ocean stakeholders and the BOPP Steering and Science Committees. The success of the MSP will be measured against these objectives with a review process outlined in the Marine Development Act that governs MSP implementation and monitoring.

The MSP includes maps that define specific locations where human activities are permitted, restricted (i.e., allowed under certain conditions), or fully prohibited. It also contains action plans that support MSP implementation and management, and address future management needs that have been identified throughout the consultation process.

There are also descriptive maps that identify potentially suitable areas for priority activities listed in the PGOs, including aquaculture, habitat restoration, and renewable energy development. These maps are not legally binding but are intended to provide decision-makers and developers with initial guidance as they consider future proposals in Bermuda's marine environment.

In addition, the MSP identifies a legally binding Marine Protected Area (MPA) network to achieve the PGOs. MPAs are not intended to be a one-size-fits all management tool. Instead, to accommodate multiple ocean users and their diverse needs, the MPAs have varying levels of protection, including:

- **Fully protected:** allows for all non-extractive or non-destructive uses (e.g., diving, boating) and prohibits all activities that would damage habitats or cultural heritage (e.g., mining, development) or remove marine life (e.g., fishing).
- **Pelagic zones:** surface trolling and spearfishing for pelagic species allowed, prohibits bottom fishing and all other extractive or destructive activities.
- **Fisheries Areas:** prohibits development and other destructive activities to safeguard important fishing areas and valuable habitat.
- **Catch & Release Only:** allows catch & release fly fishing, prohibits all other extractive or destructive activities.
- **Special Protection Area:** allows all non-extractive or non-destructive uses (e.g., diving, boating), allows for maintenance of existing infrastructure and prohibits all other extractive or destructive activities.
- **2 m Mangrove Buffer:** allows all non-extractive or non-destructive uses (e.g., diving, boating), allows for maintenance of existing infrastructure and prohibits all other extractive or destructive activities.
- **Shoreline Buffer:** allows permitted shoreline activities (e.g., approved development, infrastructure maintenance and hook-and-line fishing).
- **Cable Zone:** allows cable maintenance work, prohibits all other extractive or destructive activities.
- **Seasonal No-Net Fishing:** prohibits net fishing (except dip netting) from May to October, inclusive.

- **No Net Fishing:** prohibits net fishing.
- **Seasonal Closure Areas:** seasonal fishing allowed as usual, prohibits development and shipping.
- **North Shore Habitat Protection Area:** prohibits large scale development and lobster trapping (other types of fishing will continue as usual).

MPAs confer a variety of socioeconomic and environmental benefits for local communities, including market benefits (relating to goods or services that are bought and sold, such as tourism and fisheries) and non-market benefits (such as the value people place on the habitat/organisms being protected). MPAs close to shore can help protect critical habitat types (e.g., nursery grounds or ecologically significant areas), retain or establish connectivity between habitats, and restore or preserve recreationally and commercially valuable species. MPAs far from shore can help protect whole ocean features (e.g., seamounts, submarine canyons) and support the conservation and management of highly mobile species (e.g., tuna). An outline of benefits for each of the MPAs, as well as justification for why each area was chosen for protection, is provided in the MSP.

The MSP is a result of four years of data collection, consultation with industry and marine science experts, numerous rounds of stakeholder consultation, and exhaustive ecological and economic analyses. There will be a final opportunity for public comments and objections with a review panel and then the MSP will go to the Cabinet for consideration and adoption.

Bermuda's Blue Economy Strategy

Bermuda has an abundance of ocean-related resources that contribute to its environmental, social and economic development. Its unique mid-ocean location, large Exclusive Economic Zone (EEZ) and rich marine biodiversity are just three examples. Paired with a strong history in Blue Economy industries, such as commercial fishing and tourism, as well as considerable prowess in the financial services sector, Bermuda is well-positioned for continued blue economic growth. These ocean resources and industries, combined with the island's physical and intellectual infrastructure, provide Bermuda with the potential to become a global hub for environmental, social, governance (ESG) and climate finance.

Bridging the gap from what exists today to a thriving, world-class Blue Economy requires a vision. The 2033 Blue Economy vision sees Bermuda as a global Blue Economy leader with prosperous and sustainable ocean industries. In this vision, Bermuda will become the Atlantic hub for equitable blue finance, where key investments and their economic benefits are shared proportionally among the local community. Built on a robust MSP for growing and maintaining natural resource capital, Bermuda's future Blue Economy supports blue entrepreneurs and enterprises and provides greater job opportunities for a wider cross-section of Bermuda's residents. It will also attract and develop innovative finance and build capacity to contribute to the growth of Blue Economy sectors while sustainably managing the island's ocean resources.

The Blue Economy Strategy follows a set of guiding principles adopted at the inception of its development:

- Provide social and economic benefits for current and future generations of Bermudians by contributing to food security, poverty eradication, livelihoods, income, employment, health, safety, equity and political stability.
- Restore, protect, and maintain the diversity, productivity, resilience, core functions and intrinsic value of marine ecosystems.

- Utilise evidence-based decision-making when evaluating new activities, policies, or trade-offs and, in circumstances where evidence is lacking, the burden of proof falls on those advocating for an action.
- Adopt a multidisciplinary approach to management and prioritise activities which benefit Bermuda and Bermudians as a whole, instead of a single sector.
- Employ participatory, inclusive and transparent governance.

The Blue Economy Strategy focuses on four of Bermuda's core Blue Economy industries and outlines a specific goal for each: commercial fishing, blue tourism, ocean renewable energy and aquaculture.

GOAL 1: Facilitate sustainable fisheries

The health of Bermuda's fisheries is vital to our culture and economy, supporting tourism, food security and nutrition while also providing a variety of ecosystem services, such as maintaining habitat and water quality. This goal aims to ensure the long-term health and viability of marine fisheries while meeting the needs of present and future generations of Bermuda's residents.

GOAL 2: Expand sustainable marine tourism

Tourism is an important economic sector, creating employment opportunities and having the potential to support sustainable environmental management. As Bermuda continues to rebound from the impacts of the pandemic, it is presented with opportunities to refine and strengthen its tourism sector with initiatives that enhance environmental and social sustainability. Expanding sustainable marine tourism can bring increased and lasting economic and social benefits while, at the same time, supporting the protection and sustainable management of the local marine environment.

GOAL 3: Accelerate the clean energy transition

Reducing dependency on imported fossil fuels will benefit the environment and the pocketbooks of Bermudians. Bermuda should continue to install renewable energy projects on land and begin a marine renewables programme. When coupled with supporting storage networks, these installations will produce cleaner energy with fewer emissions while increasing Bermuda's energy security. This goal will build on the 2019 Integrated Resource Plan, which provides a robust preliminary framework for action, and the Energy Regulatory Sandbox, a platform for innovation and experimentation in the sector.

GOAL 4: Increase blue investment and blue technologies in Bermuda

Bermuda can build on its strategic location, history and economic strengths to further attract and develop blue businesses, projects, technologies and entrepreneurs while providing greater job opportunities for a wider cross section of its residents. The island can also attract finance and build capacity to contribute to the growth and export potential of these sectors, in line with environmental and community values.

Additionally, it provides for the establishment of a targeted funding mechanism – the Bermuda Ocean Prosperity Fund (Ocean Fund). To capitalise the Ocean Fund, a range of sources for investment will be sought out, with a view to deploy finance into the target Blue Economy sectors (tourism, sustainable fisheries and renewable energy), as well as to support MSP implementation.

Fund activities will be divided into two “sister” mechanisms:

- An **Investment Programme**, providing repayable and blended finance for investment-ready projects and an associated Green Fund.

- An **Incubator Programme**, providing grant support, business planning and technical assistance to develop a pipeline of projects that could feed into the Investment Programme.

Governance will be structured to include relevant stakeholders across sectors and to ensure transparency in decision-making and fund allocation. Key performance indicators (KPIs) will be applied to ensure environmental performance targets are met.

It is important to note that the Ocean Fund, as a single sustainable finance mechanism, cannot fund the entire Blue Economy and MSP activities of Bermuda; rather, it is a supporting activity to the overall Strategy. Additional details of the proposed Ocean Fund design are found in the Strategy Implementation section of this document.

Next Steps

Following four years of data collection, consultation with industry and marine science experts, numerous rounds of stakeholder consultation, and in-depth ecological and economic analyses, the Blue Prosperity Plan will now go to the Cabinet for public release, consideration, and adoption. The public will have the opportunity to raise any final comments or objections in a review panel process. It will be the role of the Cabinet to formally adopt the Blue Prosperity Plan.

Concurrently, a new Marine Development Act (MDA) will provide an outline of the legislative framework for the Blue Prosperity Plan. The MDA is intended to legislate the governance, enforcement, and implementation of the MSP. It will also provide guidance on the Ocean Fund. This legal framework will allow the Blue Prosperity Plan to be iterative in design and adaptive to economic and ecological change.

3. Background and Overview

3.1 Bermuda Ocean Prosperity Programme: Context

In April 2019, the Cabinet authorised the Ministry of Home Affairs to enter into a collaborative agreement with the Waitt Institute (on behalf of the Blue Prosperity Coalition) and the Bermuda Institute of Ocean Sciences (BIOS) to develop and implement a Blue Prosperity Plan for Bermuda. This agreement was formalised in a Memorandum of Understanding (MOU) which established the Bermuda Ocean Prosperity Programme (BOPP) and provides for the development and adoption of the following:

- An enforceable **Marine Spatial Plan** that designates at least 20 percent of Bermuda's waters as fully protected marine protected areas (MPAs) and serves as a framework for managing multiple ocean activities—such as fishing, development and conservation—while reducing user conflict.

- A **Blue Economy Strategy** for the diversification of national revenue to strengthen the sustainable use of ocean resources for economic growth, improved livelihoods, increased employment opportunities and continued ecosystem health.

The MOU further commits to improving fisheries management, where appropriate, and partnering with stakeholders to support Bermuda's sustainable fisheries goals. This will include consultations, scientific research and economic analyses.

The goals set forth in the MOU align with those in Bermuda's 2010 report *A Strategy for the Sustainable Use of Bermuda's Living Marine Resources*[1] and in the 2022 report *The State of Bermuda's Waters: A Snapshot of Bermuda's Exclusive Economic Zone (EEZ) From the Coastline to 200 Nautical Miles (nm)*,[2] the latter of which states:

> "Marine spatial planning is an important tool to sustainably optimize Bermuda's marine environment…In order to ensure environmental health and continued economic growth, the management of Bermuda's waters needs to be conducted in a coordinated manner, hence an MSP [marine spatial plan]."

[1] Government of Bermuda. 2010. *A Strategy for the Sustainable Use of Bermuda's Living Marine Resources.* Hamilton: Ministry of the Environment and Sports, Government of Bermuda. https://cloudfront.bernews.com/wp-content/uploads/2010/04/Fisheries-Strategy.pdf

[2] Government of Bermuda. 2022. The State of Bermuda's Waters: A Snapshot of Bermuda's Exclusive Economic Zone (EEZ) From the Coastline to 200 Nautical Miles (nm). Hamilton: Mnistry of Home Affairs, Government of Bermuda. www.gov.bm/sites/default/files/The_State_of_Bermudas_Marine_Waters.pdf

Marine spatial planning is a process that can be applied within a single country, or among countries (i.e., within the European Union), and is widely accepted as an adaptive framework to manage a variety of human activities in large and busy maritime spaces or those under the purview of multiple governing bodies.

> "MSP promotes the reduction of conflicts and the creation of synergies and cooperation between sectors…and the creation of protected area networks to safeguard and maintain the environment by recognising the effects and opportunities for space utilization, [thereby also] raising stakeholder awareness."[3]

3.2 Bermuda's Marine Environment: Long-Term Vision

Bermuda seeks a future where its marine waters, the region that extends from Bermuda's coastline outward to 200 nautical miles (nm) - including the internal waters, territorial sea and Exclusive Economic Zone (EEZ) - contain healthy ecosystems that can support a thriving and more resilient ocean-based economy while reducing user conflict. Bermuda's Blue Prosperity Plan delivers on this vision with a framework that supports the sustainable management of ocean resources, coordinates decision-making about marine-based development, ensures that 20% of Bermuda's marine waters are designated as fully protected MPAs, and provides a strategy for the sustainable growth of the blue economy.

3.3 Plan Development

3.3.1 Planning Process

Since the creation of BOPP in 2019, the Blue Prosperity Plan has undergone multiple phases of extensive consultation with ocean stakeholders. Each phase has featured various engagement mechanisms designed to continuously refine and improve the MSP and Blue Economy Strategy. Prior to initiating plan development, Bermuda committed to involving stakeholders through an engagement goal and a public education campaign, with activities framed by a set of guiding principles for stakeholder engagement.

Engagement Goal

To constructively engage the general public and marine stakeholders in BOPP processes. The result should be a practical and effective Blue Economy Strategy and MSP, both of which will meet the objectives outlined in the MOU, consider and respond to stakeholder feedback, and create a sense of responsibility for the sustainable monitoring and management of Bermuda's marine waters for all its residents.

[3] Podda, C., and E.M.D. Porporato. 2023. Marine Spatial Planning for Connectivity and Conservation through Ecological Corridors between Marine Protected Areas and Other Effective Area-Based Conservation Measures. *Frontiers in Marine Science*. https://www.frontiersin.org/articles/10.3389/fmars.2023.1271397/full

Public Education Campaign

Interested persons were invited to participate in BOPP processes through workshops, town hall meetings, focus groups, targeted meetings, youth events, web updates, one-on-one meetings, stakeholder meetings, publications, media coverage, questionnaires and surveys, newsletters and social media.

Guiding Principles for Stakeholder Engagement

Acknowledging that stakeholder engagement and feedback in all aspects of the development and implementation of the MSP and Blue Economy Strategy are critical to the success of the Blue Prosperity Plan, BOPP committed to:

- Involving interested individuals early in the decision-making process and consulting stakeholders in draft creation.
- Engaging with stakeholders directly affected by BOPP objectives at the appropriate time with effective methods.
- Being adaptable and flexible regarding methods necessary for stakeholder consultation.
- Respecting the diversity of people, needs and lifestyles.
- Ensuring clarity regarding the purpose of any consultation and informing stakeholders how their provided information will be utilized.
- Making documents publicly available.
- Communicating clearly and avoiding jargon terms and phrases.

3.3.2 Governance

At the outset, BOPP established a governance structure to plan and execute activities supporting the MOU. BOPP governance supplements but does not replace those formal processes and procedures established by the Government of Bermuda for the approval of reports, plans and draft legislation resulting from BOPP activities, including the Blue Prosperity Plan. The BOPP governance structure includes a Steering Committee and Science Committee, as well as stakeholder groups that represent the diverse ocean user groups in Bermuda.

Steering Committee

The Steering Committee is composed of representatives of the Government of Bermuda and its associated boards, authorities, and member organisations, all of which are critical for the overall success of BOPP. The Steering Committee provides a layer of guidance and approval for BOPP activities. In general, the Steering Committee and its members:

- Act as ambassadors and liaisons for BOPP.
- Provide strategic input and guidance.
- Review draft policies and act as a peer review platform.
- Support the processes and procedures established within the Government of Bermuda for the formal approval of reports, plans and draft legislation that may result from BOPP activities.
- Attend Steering Committee meetings.

Steering Committee deliverables include, but are not limited to:

- Providing input during the MSP and Blue Economy Strategy drafting processes.
- Collecting recommendations from stakeholder working groups.
- Approving and supporting the Blue Prosperity Plan for/within the processes and procedures established by the Government of Bermuda for final Blue Prosperity Plan adoption.

The Steering Committee is composed of representatives from the following organisations: Bermuda Business Development Agency (BDA), Bermuda Department of Health (DOH), Bermuda Economic Development Corporation (BEDC), BIOS, Bermuda National Trust (BNT, observer), Bermuda Shipping and Maritime Authority (BSMA), Bermuda Tourism Authority (BTA), Commercial Fisheries Council (CFC), Department of Energy (DOE), Department of Environment and Natural Resources (DENR), Department of Marine and Ports (M&P), Department of Planning (DOP), Department of Workforce Development (DOWD), Environmental Authority (EA), Estates Section, Ministry of Public Works (ES); Historic Wrecks Authority (HWA), Marine Resources Board (MRB), and the Regulatory Authority (RA).

BOPP Science Committee

The Science Committee is composed of local and international scientific experts who provide technical advice and scientific data to support the Steering Committee in its decision-making process. The Science Committee includes the following representatives:

- Choy Aming, Bermuda Shark Project, Bermuda Zoological Society
- Dr. Annie Glasspool, Bermuda Environmental Consulting, Ltd.
- Dr. Gretchen Goodbody-Gringley, BIOS and Central Caribbean Marine Institute
- Dr. Mark Guishard, BIOS
- Dr. Eric Hochberg, BIOS
- Dr. Kevin Mayall, Locus, Ltd.
- Dr. Sarah Manuel, DENR, Government of Bermuda
- Dr. Thad Murdoch, Bermuda Reef Ecosystem Assessment and Mapping Programme
- Dr. Tim Noyes, BIOS
- Dr. Joanna Pitt, DENR, Government of Bermuda

- Dr. Philippe Rouja, DENR, Government of Bermuda
- Dr. Samia Sarkis, The Living Reefs Foundation
- Mandy Shailer, DOP, Government of Bermuda
- Dr. Geoff Smith, DENR, Government of Bermuda
- Dr. Robbie Smith, Bermuda Aquarium, Museum and Zoo, DENR, Government of Bermuda
- Dr. Tammy Warren, DENR, Government of Bermuda
- Andrew Stevenson, Independent Cetacean Scientist

Ocean Village

The Ocean Village is composed of local stakeholders with specific interests and perspectives regarding Bermuda's ocean environment. The role of Ocean Village participants is to act as representatives of these diverse interests to ensure that the needs and perspectives of Bermuda's communities, industries and ocean users are addressed in the Blue Prosperity Plan. Ocean Village groups included the following interests: commercial fishermen, recreational fishermen, passive recreation, conservation, swimming, aquaculture (mariculture), tourism, boating, sports, diving, snorkeling, wastewater/pollution management, utilities, infrastructure, and development. Perspectives and feedback from the Ocean Village contributed to the Steering Committee's decision-making throughout the Plan's development.

General Public

The Blue Prosperity Plan included multiple phases of public engagement through various mechanisms. From September 2020 to February 2021, BOPP conducted an Ocean Use Survey,[4] gathering information from 1,488 respondents to better understand how residents use the ocean and which areas are most valuable to them. The survey was updated in 2023[5] with additional data from the commercial fishing sector (Box 1).

Box 1: Updating the Ocean Use Survey

During public consultation, a major concern raised by the commercial fishing sector was that it appeared the complexities of the fishing industry (e.g., the various gear types used or species targeted) had not been adequately considered in the design of the proposed marine protected area network. As a result, BOPP decided to reopen Bermuda's Ocean Use Survey to commercial fishermen from November 2022 to March 2023.

During this period, input was gathered from 60% of Bermuda's full-time fishermen and 29% of Bermuda's part-time fishermen. The updated Ocean Use Survey provided a set of more detailed data that was used by the computer model to help design Bermuda's marine protected area network.

While soliciting response to the Ocean Use Survey, members of the public were invited to help shape the principles, goals, and objectives (PGOs) that ultimately defined the purpose and desired outcomes of the MSP. By completing an online questionnaire or participating in Ocean Village activities, members of the public were able to provide valuable input to the BOPP Steering Committee, which was subsequently reviewed

during a series of four two-hour meetings in spring 2021. In creating the final PGOs, the Steering Committee focused on considerations such as applicability, anticipated benefits, practicability and the ability to strengthen current marine priorities such as a thriving and sustainable Blue Economy. Further information on the PGOs is found in Section 3 of the MSP.

Additionally, the BOPP Steering Committee voted that BOPP's Blue Economy Strategy should prioritise the sustainable fishing, blue tourism and renewable energy sectors. An extensive stakeholder consultation process yielded a series of industry reports used to evaluate the historic and current performance of these core Blue Economy sectors in Bermuda. Later, these were supplemented with similar analyses of the local aquaculture industry. These reports were evaluated within the context of existing national planning documents and priorities and formed the basis of the draft Blue Economy Strategy. A survey was also conducted among commercial fishermen, with 52 respondents identifying activities that would potentially yield improvements for their industry and align with the Strategy's goal of promoting sustainable fisheries.

[4] Government of Bermuda. 2021. "Bermuda Ocean Use Survey Results." Government of Bermuda, Waitt Institute and Bermuda Institute of Ocean Sciences in conjunction with the McClintock Lab of the University of California, Santa Barbara. Hamilton: Government of Bermuda. https://www.bermudaoceanprosperity.org/_files/ugd/47d1fd_a9abc9b46947449697fa3094bbf215b3.pdf

[5] Government of Bermuda. 2023. "Bermuda Ocean Use Survey Results—Appendix 3: Additional Commercial Fishing Data." Government of Bermuda, Waitt Institute and Bermuda Institute of Ocean Sciences in conjunction with the McClintock Lab of the University of California, Santa Barbara. https://a5608098-1e68-4545-8d8f-3792e27f704a.filesusr.com/ugd/418ca0_e1ad7c3f12144f018a4190ff6464d233.pdf

Public consultation on the first draft of the Blue Prosperity Plan was held from September 12 to December 31, 2022, during which hundreds of comments were received through Ocean Village groups, as well as during three town halls, pop-up events, targeted outreach to specific stakeholders and through emails, surveys, and individual outreach. A complete record of the feedback received during this period is available online at https://www.bermudaoceanprosperity.org/.

Focus Groups

In April and May 2023, BOPP hosted a series of six focus groups to explore key topics that were raised during the 2022 public consultation. The aim was for stakeholders to explore and share what they considered as priorities and opportunities, and to identify the challenges, gaps or aspects of the draft Plan that needed clarification. Topics of the focus group sessions included:

- Maritime enforcement.
- Licensing and monitoring.
- The Blue Economy Strategy.
- Proposed maps for the nearshore MPA network.

Focus group participants included stakeholders closely involved in creating the draft Blue Prosperity Plan since public consultation began in 2020; members of the BOPP Steering Committee, BOPP Science Committee and Ocean Village; concerned citizens; and organisations involved in the BOPP process.

During this period, a BOPP Online Engagement webpage[6] was developed to share focus group presentations and key documents with Bermuda's residents and to provide updates about key issues in the draft Blue Prosperity Plan. Online surveys were also available for additional input.

Outcomes from the six focus group sessions, including strategic recommendations on key topics, helped the BOPP Steering Committee refine the draft Blue Prosperity Plan. Further information on the sessions and outcomes can be found online in the Bermuda Ocean Prosperity Programme 2023 Focus Group Series Report.[7]

A seventh and final focus group session was held in early November 2023 to share the updates to the Blue Prosperity Plan based on the feedback and recommendations from the previous six focus group sessions. This final session also provided an opportunity for participants to understand how their feedback was incorporated and to raise any concerns if outstanding user conflict needed to be addressed.

[6] See www.bermudaoceanprosperity.org/online-engagement.
[7] Government of Bermuda, Waitt Institute, and Bermuda Institute of Ocean Sciences. 2023. *Bermuda Ocean Prosperity Programme 2023 Focus Group Series Report*. Hamilton: Ministry of Home Affairs, Government of Bermuda.

4. Next Steps

Following four years of data collection, consultation with industry and marine science experts, numerous rounds of stakeholder consultation, and in-depth ecological and economic analyses, the Blue Prosperity Plan will now be released for a final feedback period before going to Cabinet. The public will have the opportunity to raise any final comments or objections in a review panel process. It will be the role of the Cabinet to formally adopt the Blue Prosperity Plan.

Concurrently, a new Marine Development Act (MDA) will provide an outline of the legislative framework for the Blue Prosperity Plan. The MDA is intended to legislate the governance, enforcement, and implementation of the MSP. It will also provide guidance on an independent fund to support long-term ocean management activities and the Blue Economy. This legal framework will allow the Blue Prosperity Plan to be iterative in design and adaptive to economic and ecological change.

Upon adoption, the implementation of the Blue Prosperity Plan will be guided by the MDA and the MSP itself; for example, the MSP calls for the development and implementation of a Monitoring Strategy. Private and public funding sources will initially resource MSP implementation, but act as a quasi-sinking fund—or reserve fund—until the Bermuda Ocean Prosperity Fund (Ocean Fund), as outlined and guided in the Blue Economy Strategy, is able to assume most of the implementation costs.

The Blue Prosperity Plan is a dynamic and complex document. It will be revised to reflect changes in current scientific information, economic and social priorities, and environmental conditions. The MDA will dictate such revisions and ensure that the Blue Prosperity Plan is consistent with current circumstances.

BERMUDA'S
BLUE PROSPERITY PLAN

Photo credit: Chris Burville

MARINE SPATIAL PLAN

APRIL 2024, FINAL DRAFT

GOVERNMENT OF BERMUDA
Ministry of Home Affairs

BERMUDA OCEAN
PROSPERITY PROGRAMME

Table of Contents

Table of Contents

Artwork by **Jill Raine** as part of the 2023 #BermudaIsWorthProtecting Art Contest.

Artwork by **Jodie Walters** as part of the 2023 #BermudaIsWorthProtecting Art Contest.

List of Tables, Figures and Charts

List of Tables, Figures and Charts

List of Maps

List of Maps

Bermuda's Marine Spatial Plan

RESOURCE GUIDE

This section provides a summary for each of the nearshore fully protected marine areas introduced in the Marine Spatial Plan and why that area should be protected.

What are Marine Protected Areas (MPAs) and why are they important?

MPAs are specially designated parts of the ocean set aside for long-term conservation. The idea is to choose representative areas of the ocean and keep them as healthy as possible so they can continue to provide essential benefits, called ecosystem services, for current and future generations, including protecting our coastlines, supporting well-functioning fisheries, mitigating the impacts of climate change, enhancing the tourism industry, and many more.

How can MPAs benefit Bermuda?

- Protecting and restoring our marine environment
- Replenishing commercially important fish stocks
- Protecting fish nursery habitats and spawning grounds
- Maintaining the full variety of marine life
- Protecting unique underwater geologic features, such as seamounts
- Ensuring long-term sustainable use of natural resources
- Safeguarding underwater cultural heritage, such as shipwrecks
- Increasing revenue for tourism and ocean-related businesses
- Increasing job opportunities in ocean industries

What can I do in fully protected MPAs?

Designation as an MPA protects an area from activities that could have a negative impact on the ecosystem. Examples include potentially damaging activities, such as dumping or infrastructure development, and so-called "extractive activities", such as fishing and mining. Activities such as swimming, SCUBA diving, and snorkeling, or "non-extractive activities" that do not cause damage or remove anything from the ocean, are a great way to enjoy the animals and plants that live within the MPAs. See Use Chart 3 in the Blue Prosperity Plan for an extended list of activities.

Permitted activities include:

- Non-extractive recreation
- Vessel transit and boating
- Non-extractive research
- Restoration/ enhancement for conservation

Prohibited activities include:

- All types of fishing
- Commercial Aquaculture
- Extractive research
- Dredging and dumping
- Renewable energy generation
- Infrastructure development
- Untreated water discharge
- Mining, oil and gas extraction

In this guide you will find **three different maps to represent the offshore, nearshore and coastal networks**. Together, these maps represent **Bermuda's MPA Network**, which was developed as part of the Marine Spatial Plan. *Please note that this MPA network aims to expand currently legislated marine areas in Bermuda. More information on currently legislated areas can be found on environment.bm.*

Bermuda's Marine Spatial Plan:

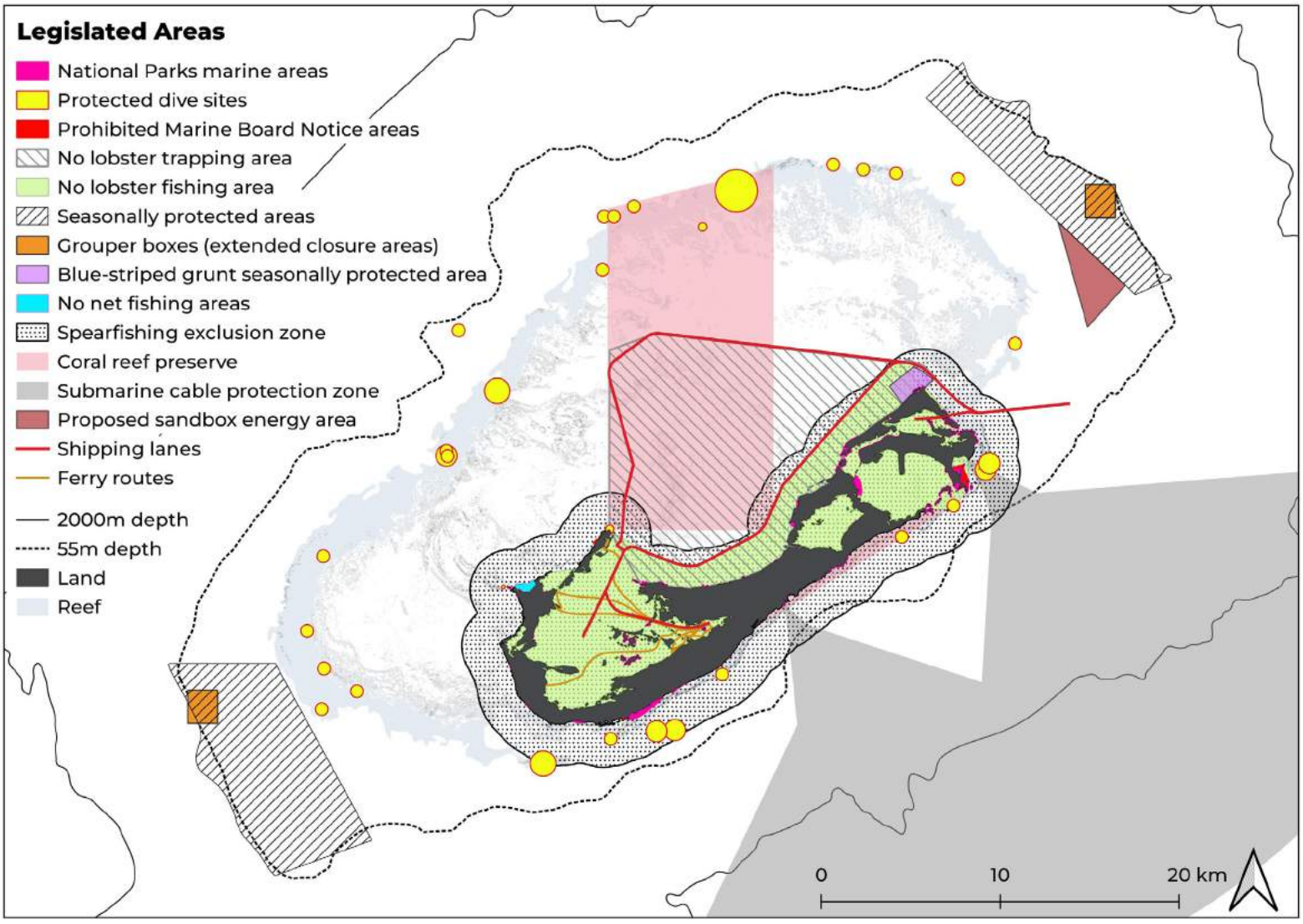
Currently Legislated Areas

The Fisheries Act of 1972 provides for the creation of the Fisheries (Protected Areas) Order 2000, which prohibits the take of fish or the use of any anchor other than a Danforth (sand) anchor at several historic wrecks and other dive locations around the island. These areas are known as Protected Dive Sites and can be seen on the Currently Legislated Areas Map as yellow circles with red borders. Additionally, shipwrecks that are over 50 years old are governed under the Historic Wrecks Act 2001 which provides for the protection and scientific management of Bermuda's underwater cultural heritage assets.

The map below shows currently legislated areas in Bermuda's waters. These areas and legislation will remain unchanged under the proposed legislation, and have been considered in the MSP's design. These areas will work alongside and be expanded by the proposed MPA network.

Dive site protections have been in place in Bermuda's waters for over 30 years.

To help maintain the beauty and diversity of Bermuda's marine environment, for everyone to enjoy, moorings are provided so that anchors do not damage corals, and fishing of all types is prohibited.



Bermuda's Marine Spatial Plan:
Offshore Network

The offshore MPA network covers Bermuda's waters from the 2,000 metre (m) depth contour around the Bermuda platform to the boundary of the island's EEZ, which extends 200 nautical miles (nm) from Bermuda's coastline.

MPAs far from shore can help protect whole ocean features, including seamounts, or submarine canyons, and support the conservation and management of highly mobile species, like tuna.

Offshore fully protected areas include the Muir Seamount Chain (A13), which protects unique seamounts, and the Southwestern EEZ (A14), which preserves rare deep-ocean ecosystems, including benthic habitats such as hills, plains and valleys, and their inhabitants.

Fully protected MPAs in Bermuda's outer EEZ help **support global efforts to protect open ocean environments**. This is particularly important due to Bermuda's location in the Sargasso Sea, where these protected areas play a critical role in maintaining the biodiversity of this unique ecosystem.

Bermuda's Offshore Marine Protected Areas

Fully Protected Areas:
Allows all non-extractive or non-destructive uses (e.g., diving, boating) and prohibits all activities that would damage habitats or cultural heritage (e.g., mining, development) or remove marine life (e.g., fishing)

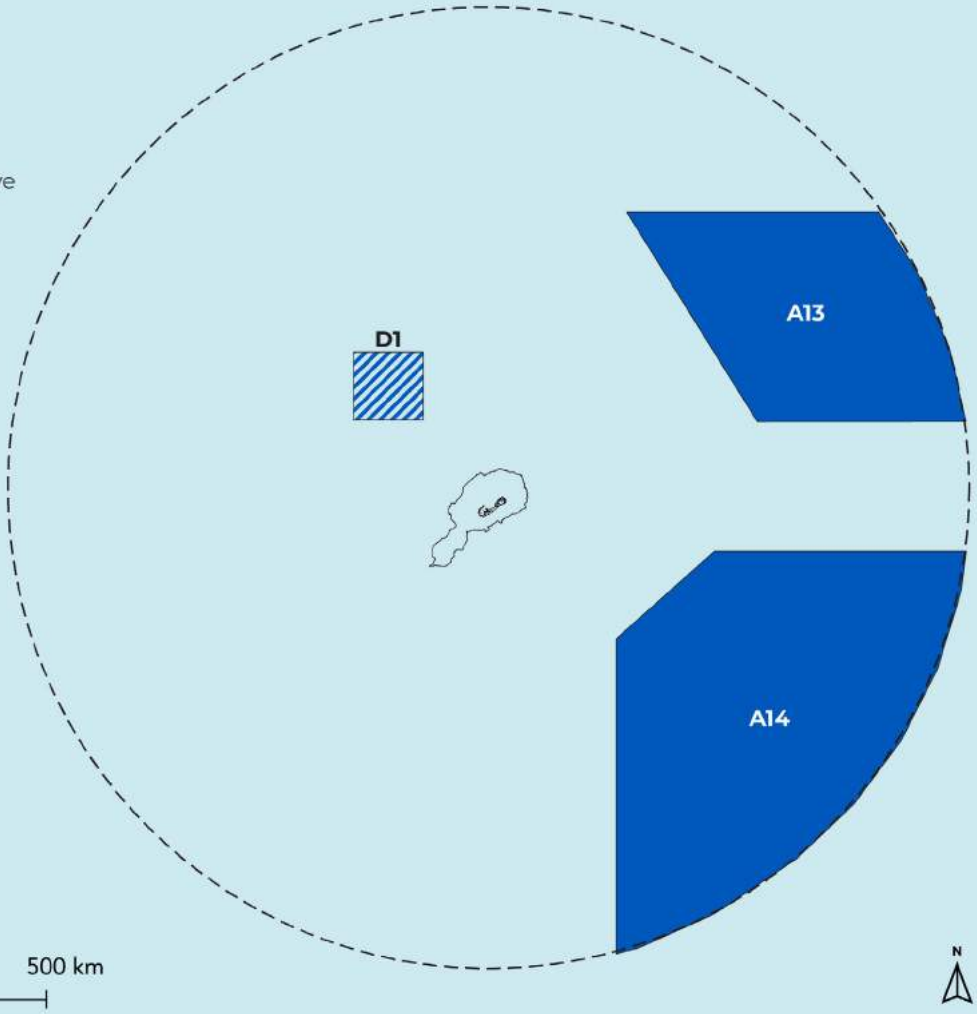
Lightly Protected Areas:
Surface fishing (including small-scale pelagic long lining) allowed, prohibits all other extractive or destructive activities

Other map features:

Land

2000m (1094 fathom) depth

Exclusive Economic Zone (EEZ)



Bermuda's Marine Spatial Plan:

Nearshore Network

What is protected in the nearshore MPAs?

- Historic Shipwrecks
- Coral Reefs & Fish Habitats
- Fish Spawning & Nurseries
- Tourism Hotspots
- Rare Species
- Seagrass
- Mangroves
- Seabirds
- Commercially Important Fish Species
- Lobster Nurseries
- Baitfish

MPAs enhance adjacent fisheries via the 'spillover effect.' When an area is fully protected, all activities that could potentially harm the ecosystem are removed in order to keep the habitats and the marine life that lives there as healthy as possible. Studies have shown that over time, populations of species protected within MPAs become so abundant they 'spill over' into nearby areas where fishing is permitted.

Bermuda's Nearshore Marine Protected Areas

Fully Protected Areas:
Allows all non-extractive or non-destructive uses (e.g., diving, boating) and prohibits all activities that would damage habitats or cultural heritage (e.g., mining, development) or remove marine life (e.g., fishing)

Pelagic Zones:
Surface trolling and spearfishing for pelagic species allowed, prohibits bottom fishing and all other extractive or destructive activities

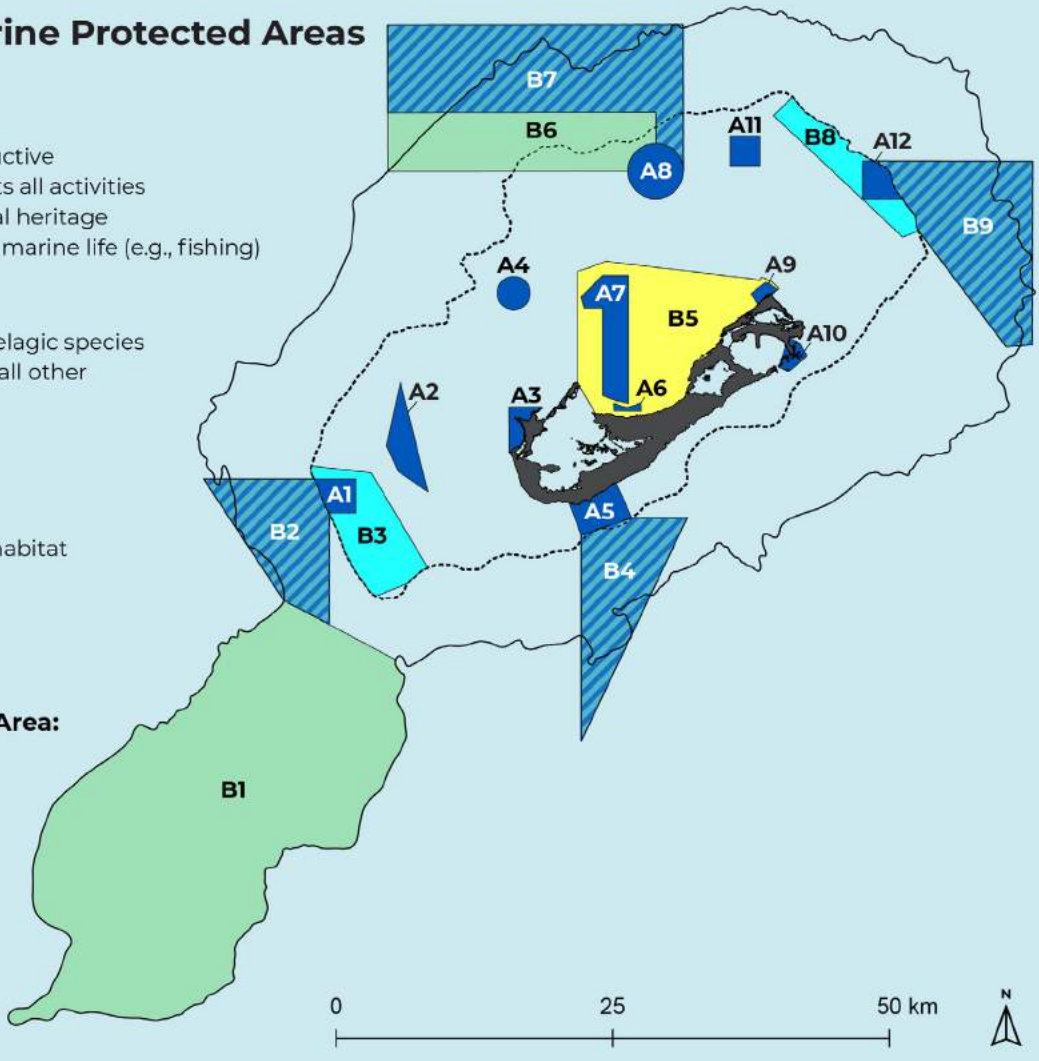
Fisheries Areas:
Prohibits development and other destructive activities to safeguard important fishing areas and valuable habitat

Seasonal Closure Areas:
Seasonal fishing is allowed as usual, prohibits development and shipping

North Shore Habitat Protection Area:
Prohibits large scale development and lobster trapping (other types of fishing will continue as usual)

Other map features:

- Land
- 55m (30 fathom) depth
- 2000m (1094 fathom) depth



Bermuda's Marine Spatial Plan:

Coastal Network

As with the offshore and nearshore networks, the coastal network builds upon currently legislated areas and existing management frameworks for fisheries and marine environmental protection, as well as regulatory procedures for development in Bermuda's marine waters.

The coastal network introduces additional protection designations to account for the wide variety of activities that take place in Bermuda's coastal waters.

Bermuda's Coastal Marine Protected Areas

Fully Protected Areas:
Allows all non-extractive or non-destructive uses (e.g., diving, boating) and prohibits all activities that would damage habitats or cultural heritage (e.g., mining, development) or remove marine life (e.g., fishing)

North Shore Habitat Protection Area:
Prohibits large-scale development and lobster trapping (other types of fishing will continue as usual)

Catch & Release Only:
Allows catch & release fly fishing, prohibits all other extractive or destructive activities

Special Protection Area:
Allows all non-extractive or non-destructive uses (e.g., diving, boating), allows for maintenance of existing infrastructure and prohibits all other extractive or destructive activities

2 m Mangrove Buffer:
Allows all non-extractive or non-destructive use (e.g., diving, boating), allows for maintenance of existing infrastructure and prohibits all other extractive or destructive activities

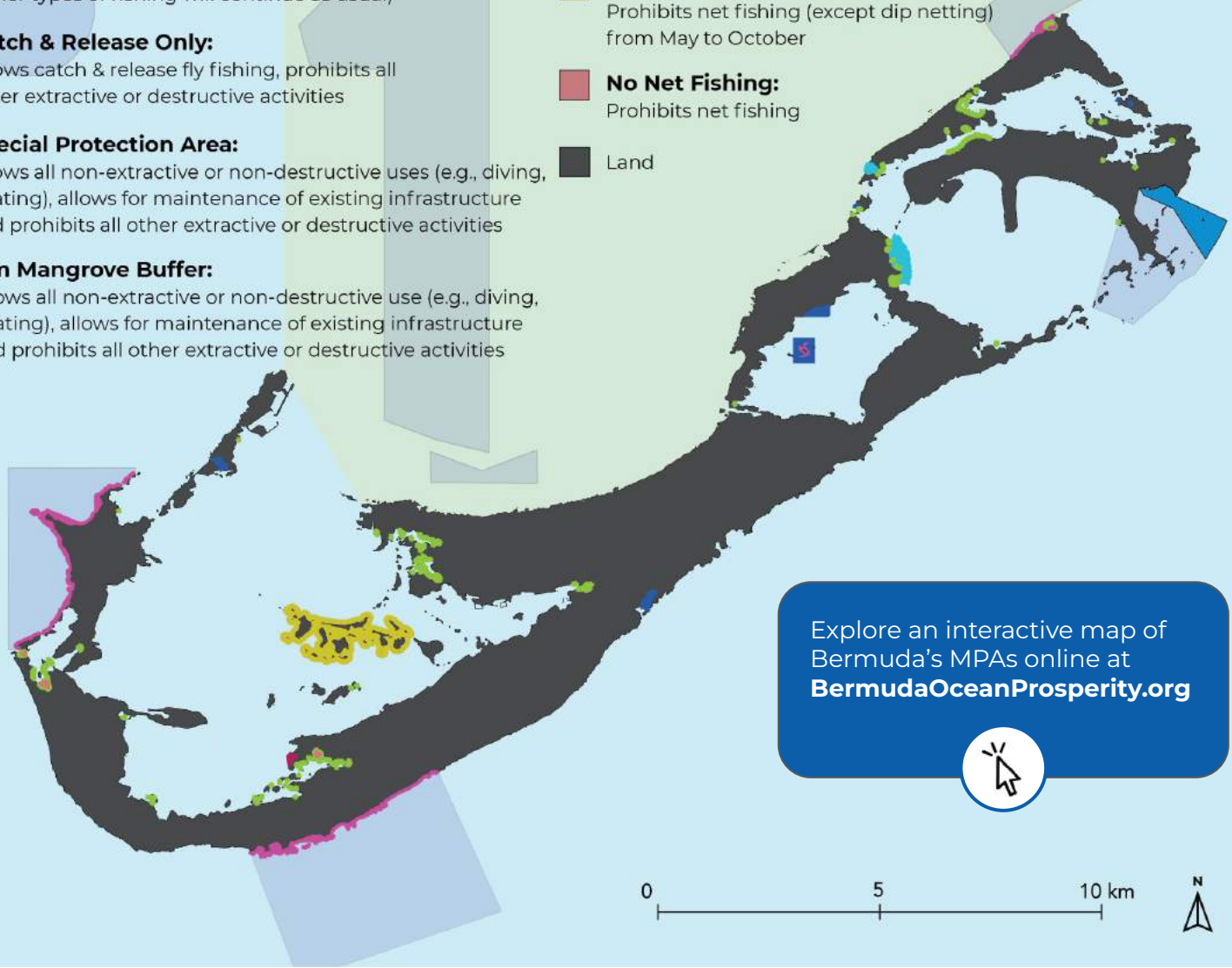
Shoreline Buffer:
Allows permitted shoreline activities (e.g., approved development, infrastructure maintenance and hook-and-line fishing)

Cable Zone:
Allows cable maintenance work, prohibits all other extractive/destructive activities

Seasonal No-Netting:
Prohibits net fishing (except dip netting) from May to October

No Net Fishing:
Prohibits net fishing

Land



Explore an interactive map of Bermuda's MPAs online at **BermudaOceanProsperity.org**

Bermuda's Marine Spatial Plan:

Fisheries Areas

A large area that includes the Challenger and Argus Banks (B1) and a region near North Rock (B6) have been designated as "fisheries areas." Under this designation, all legal fishing activities can continue as permitted under existing regulations; however, development and other destructive activities, such as seabed mining, are now prohibited to protect the valuable habitat and fishing grounds.

The offshore banks are important habitat for several species of pelagic fishes and marine mammals. The deep slopes of the banks and the Bermuda Platform support distinct coral, sponge, and fish communities. Strong ocean currents bring in nutrients and a variety of top predator fishes, such as tunas and wahoo, and extensive fishing occurs on the banks and along the perimeter of the Bermuda Platform.

Within the fisheries area, **the banks are undersea mountains that are hotspots of biodiversity.** These "seamounts" rise high off the seafloor and force deep ocean water, rich in nutrients, toward the surface. This fuels a food chain that attracts marine life from miles around—tunas, whales, sea birds, and sharks. This phenomenon makes these areas ideal fishing grounds for a variety of pelagic species.

What can I do in fisheries areas?

Permitted activities:
All legal fishing activities

Prohibited activities:
All other extractive or destructive activities, including development

Proposed fully protected area

Western Grouper Box (A1)
Eastern Grouper Box (A12)

Photo credit: Triangle Diving Ltd.

The two grouper boxes protect spawning grounds of the black grouper, an important fishery species, and the coral reefs they use for shelter.

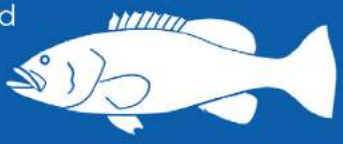
Why is this area protected?

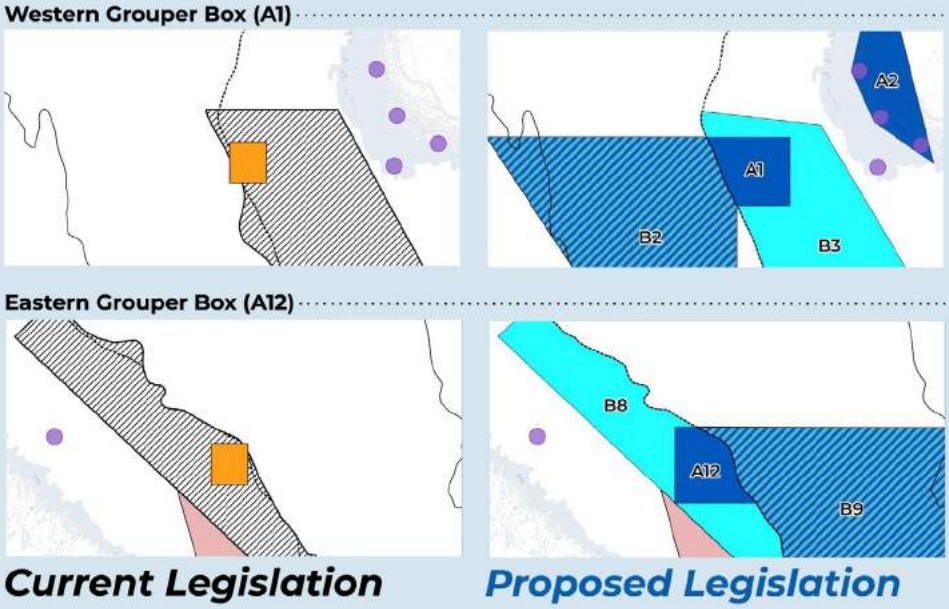
Coral Reefs & Fish Habitat

Fish Spawning & Nurseries

Commercially Important Fish Species

Black groupers are long-lived with a complex life cycle, making them particularly vulnerable to population decline. In Bermuda waters, Black groupers spawn monthly between April and November, forming large aggregations at these sites according to the lunar cycle. At present, these two key areas are closed to fishing during the critical spawning period. Protecting these important sites permanently, and prohibiting activities that might damage the habitat there, will help support the population of this valuable fishery species.





Map Legend

- Grouper Box
- Seasonally Protected Areas
- Protected Dive Sites
- Proposed Sandbox Energy Area
- **Fully Protected**
- **Pelagic Zone**
- **Seasonal Closure Areas**
- 55m (30 fathoms) depth
- 2000m (1094 fathoms) depth
- Land
- Reef

Proposed fully protected area

Chub Heads (A2)

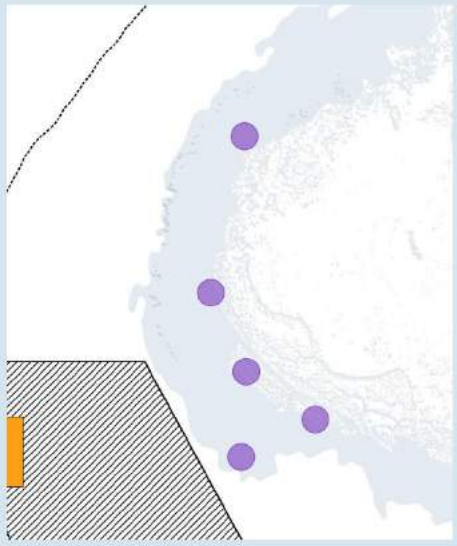
Recovering seagrass beds and good water quality support juvenile fishes and several rare and threatened species (e.g., queen conch and sea horses). This area also has more historic wrecks than anywhere else on the Platform.

Why is this area protected?

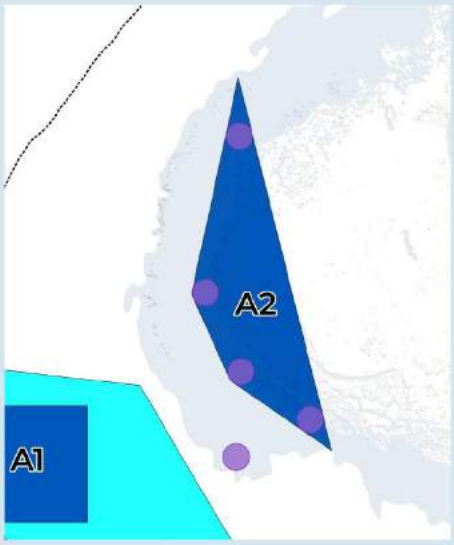
- **Rare Species**
- **Seagrass**
- **Fish Spawning & Nurseries**
- **Historic Shipwrecks**
- **Tourism Hotspots**

Queen Conch are a species of large marine sea snail, or mollusc, that is related to clams, octopi, and squid. These animals can live 25 to 30 years and weigh up to 2.2 kilograms (5 pounds). This species is native to Bermuda and is legally protected, which means it should never be harvested or collected.

Photo credit: Department of Environment and Natural Resources



Current Legislation



Proposed Legislation

Map Legend

- Protected Dive Sites
- Grouper Box
- Seasonally Protected Areas
- **Fully Protected**
- **Seasonal Closure Areas**
- 55m (30 fathoms) depth
- Land
- Reef

Proposed fully protected area

Daniel's Head (A3)

Daniel's Head is an important nursery and juvenile fish recruitment area that links mangrove, seagrass and patch reefs.

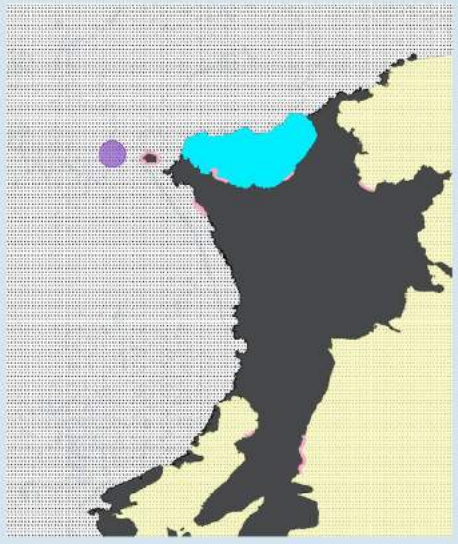
Why is this area protected?

Coral Reefs & Fish Habitat

Seagrass

Fish Spawning & Nurseries

The nearshore MPA network offers protection to many coastal nursery areas used by juvenile fishes and protected marine species. A **highly protected buffer zone** will permit shoreline activities that are compatible with the adjacent fully protected MPA to provide flexibility for tourism-related activities (subject to EIA and EIS requirements) while still protecting the ecological integrity of the MPA.



Current Legislation

Proposed Legislation

Map Legend

- Protected Dive Sites
- No Lobster Fishing Area
- Spearfishing Exclusion Zone
- No Net Fishing Area
- **Fully protected**
- **No Net Fishing**
- **Shoreline Buffer**
- **2 m Mangrove Buffer**
- 55m (30 fathoms) depth
- Land
- Reef

Proposed fully protected area

Eastern Blue Cut (A4)

Photo credit: Philippe Rouja

Eastern Blue Cut is one of the most popular dive and snorkelling spots in Bermuda. Incorporating a smaller area that is already protected from fishing, this proposed area would expand the protection to other nearby reefs and prohibit any extractive or destructive activities.

Why is this area protected?

Coral Reefs & Fish Habitat

Tourism Hotspots

Due to a natural break in the reef, clear, nutrient-rich water from the open ocean flows inside the reef system, attracting a variety of marine life, including large fishes and spotted eagle rays.

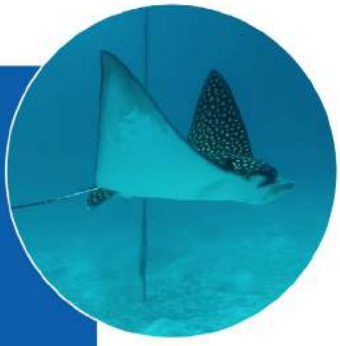
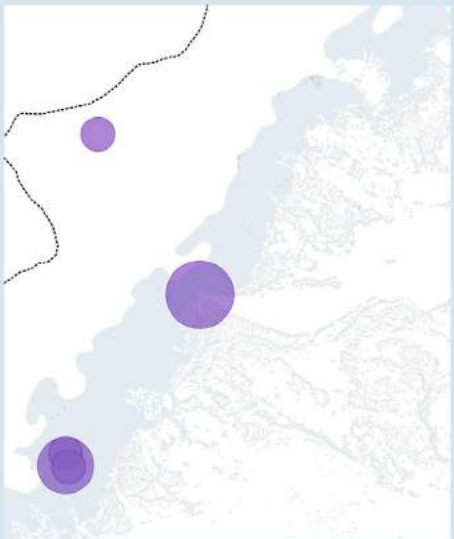
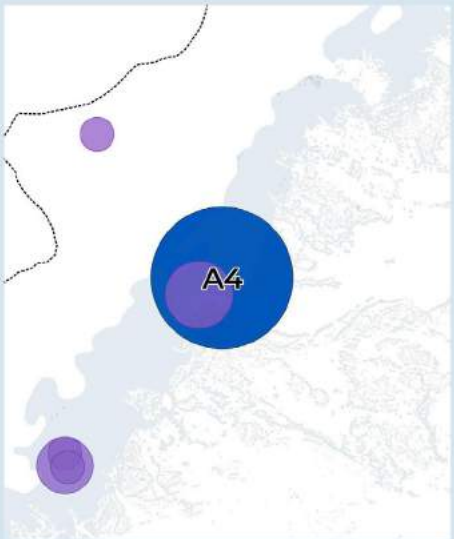


Photo credit: Philippe Rouja



Current Legislation



Proposed Legislation

Map Legend

- Protected Dive Sites
- **Fully Protected**
- 55m (30 fathoms) depth
- Land
- Reef

Proposed fully protected area

South Shore Reefs (A5)

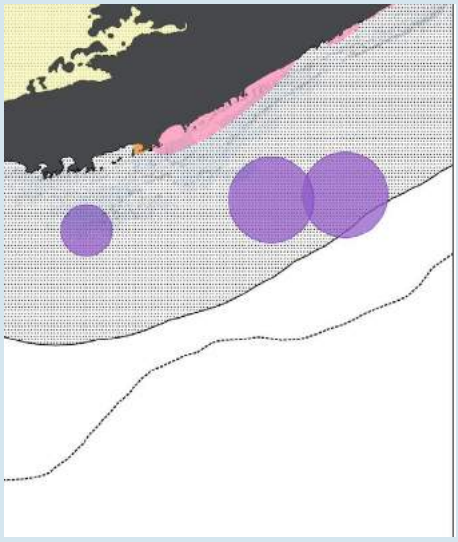
Photo credit: Andrew Stevenson

Lush coral reefs provide a home for many types of fish. Along with multiple historic wrecks, the reefs in this area help support the island's tourism industry and local businesses. This site builds upon an existing prohibited marine board notice area and national park marine areas between East Whale Bay and Warwick Long Bay to create ecological corridors for marine species.

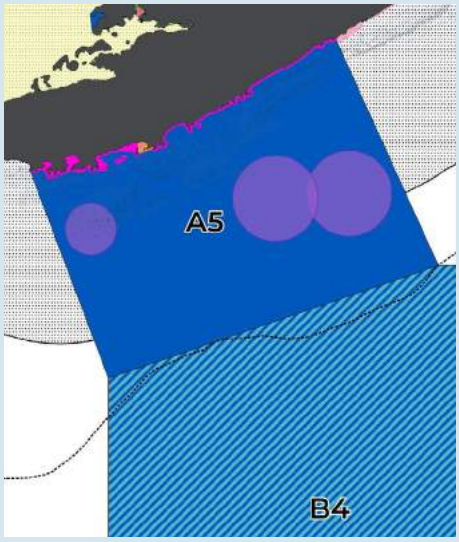
Why is this area protected?

- **Coral Reefs & Fish Habitat**
- **Fish Spawning & Nurseries**
- **Historic Shipwrecks**
- **Tourism Hotspots**

This area includes **historic wrecks and popular dive sites**, such as the Mary Celestia, Minnie Breslauer and others. These underwater heritage sites act as artificial reefs and habitats and, in this way, serve as "islands" of marine biological diversity.



Current Legislation



Proposed Legislation

Map Legend

- Protected dive sites
- Submarine cable protection area
- National Parks marine area
- No lobster fishing area
- **Fully Protected**
- **Pelagic Zone**
- **Shoreline Buffer**
- 55m (30 fathoms) depth
- Land
- Reef

Proposed fully protected area

North Shore Nursery (A6)

Photo credit: Department of Environment and Natural Resources

The North Shore Nursery is an important area of patch reef habitat in calm water close to shore. The many branching corals, which are less common on more exposed reefs, provide shelter for juvenile fish. It also links this nursery habitat and the protective corridor A7 in the North Lagoon, providing a protected pathway for juveniles to migrate to different habitats as they develop to maturity. The area is also located near the remaining seagrass beds at Spanish Point, providing a mosaic of habitats for good biodiversity.

Why is this area protected?

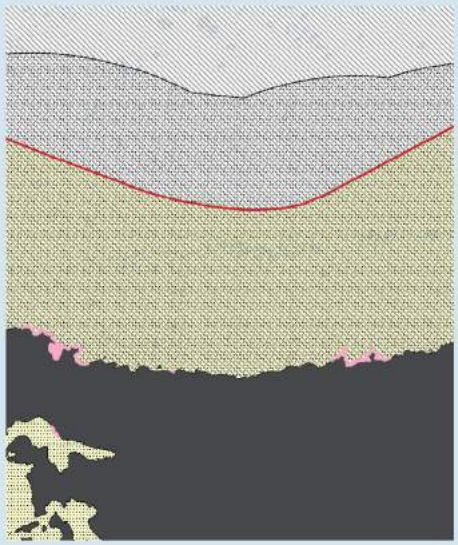
Rare Species

Coral Reefs & Fish Habitat

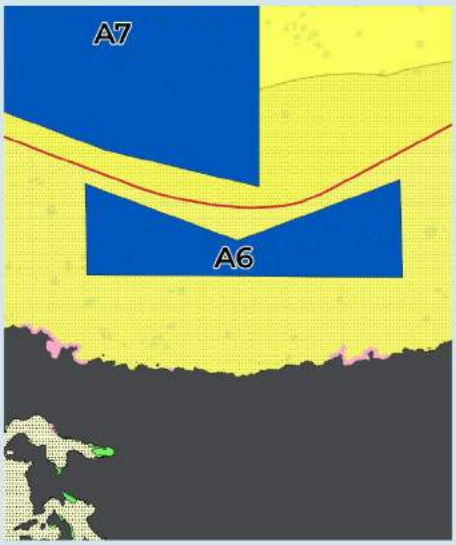
Fish Spawning & Nurseries

While rim reefs and terrace reefs grow around the edge of the Bermuda platform, **patch reefs** grow on top of it. These smaller, isolated reef structures form in shallow water where the currents are not as strong. Their shape allows more water to flow around the corals.

Photo credit: Department of Environment and Natural Resources



Current Legislation



Proposed Legislation

Map Legend

- Protected Dive Sites
- Shipping Lanes
- No Lobster Fishing Area
- Spiny Lobster Reservoir
- Spearfishing Exclusion Zone
- **Fully Protected**
- **North Shore Habitat Protection Area**
- **2 m Mangrove Buffer**
- 55m (30 fathoms) depth
- Land
- Reef

Proposed fully protected area

North Lagoon (A7)

Photo credit: NASA Earth Observatory images by Jesse Allen

The North Lagoon protected area links together a variety of ecologically valuable patch reefs. The area creates what is referred to as "ecological connectivity" or a "protective corridor," an important concept in the design of MPAs. Ecological connectivity considers the ability of organisms to move around within the MPA network throughout their life cycle in order to survive.

Why is this area protected?

- **Coral Reefs & Fish Habitat**
- **Fish Spawning & Nurseries**
- **Lobster Habitat**
- **Seagrass**

A7 links the nursery habitats in A6 to the outer rim reef. It falls within the **North Shore Habitat Protection Area**, which prohibits lobster trapping and large-scale development. In that area, other types of fishing will continue as usual.

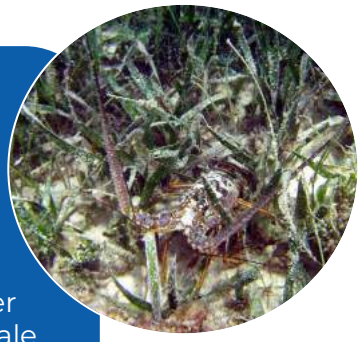
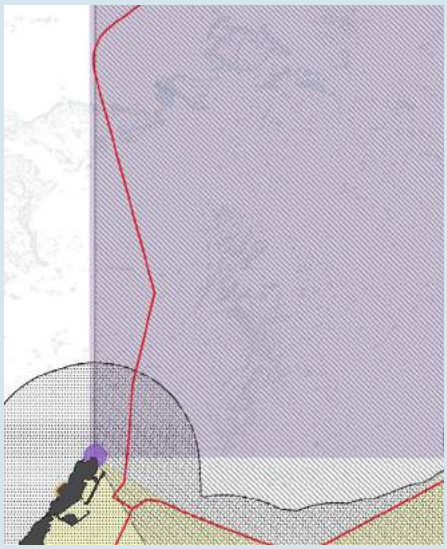
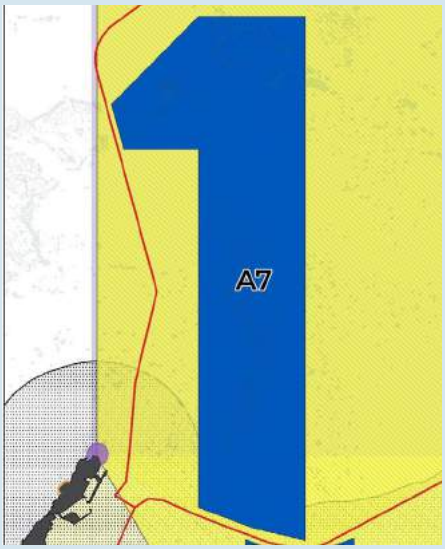


Photo credit: Department of Environment and Natural Resources



Current Legislation



Proposed Legislation

Map Legend

- Protected Dive Sites
- Shipping Lanes
- No Lobster Fishing Area
- Spiny Lobster Reservoir
- Spearfishing Exclusion Zone
- **Fully Protected**
- **North Shore Habitat Protection Area**
- **Seasonal No Net Fishing**
- 55m (30 fathoms) depth
- Land
- Reef

Proposed fully protected area

North Rock (A8)

Photo credit: JP Rouja, Nonsuch Expeditions

The North Rock fully protected area contains large healthy corals as well as an important and world-famous dive site. Expanding this existing protected dive site would help improve the ability of this ecosystem to withstand both human and natural disturbances.

Why is this area protected?

Coral Reefs & Fish Habitat

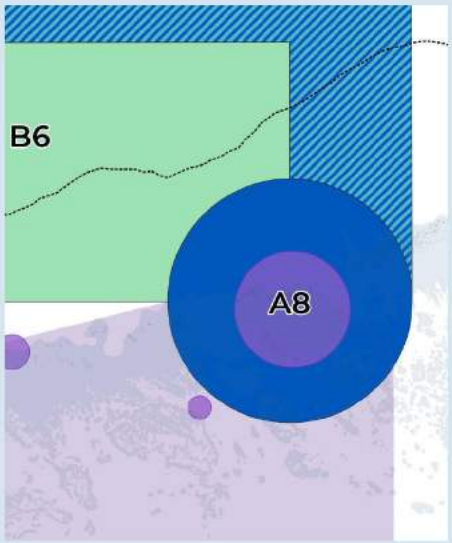
Fish Spawning & Nurseries

Tourism Hotspots

North Rock is a national treasure. It was declared as an MPA in 1990 to preserve marine life and cultural resources.

Photo credit: Shayna Brody

Current Legislation



Proposed Legislation

Map Legend

- Protected Dive Sites
- Coral Reef Preserve
- **Fully Protected**
- **Pelagic Zone**
- **Fisheries Area**
- 55m (30 fathoms) depth
- 2000m (1094 fathoms) depth
- Land
- Reef

Proposed fully protected area

Coot Pond Area (A9)

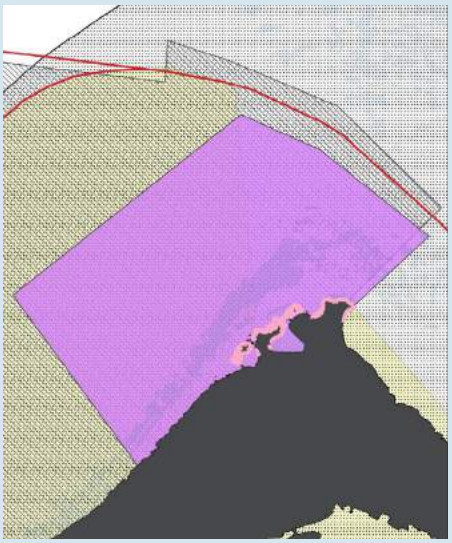
Photo credit: Andrew Stevenson

This area creates an ecological corridor so that fishes can travel between mangroves and patch reefs during their life cycle. It also contains a spawning site for the blue-striped grunt, a commercially and recreationally valuable fish species.

Why is this area protected?

- **Coral Reefs & Fish Habitat**
- **Mangroves**
- **Fish Spawning & Nurseries**
- **Commercially Important Fish Species**

Blue-striped grunts gather in this area during the new moon in May and/or June to spawn. Their larvae settle in seagrass beds and mangroves to develop. Giving the grunts a safe place to spawn ensures they can continue to act as prey species for larger fish and support a healthy fishery.



Current Legislation

Proposed Legislation

Map Legend

- Shipping Lanes
- No Lobster Fishing Area
- Spiny Lobster Reservoir
- Spearfishing Exclusion Zone
- National Parks Marine Areas
- Blue-striped Grunt Seasonally Protected Area
- **Fully Protected**
- **Shoreline Buffer**
- **North Shore Habitat Protection Area**
- **2 m Mangrove Buffer**
- Land
- Reef

Proposed fully protected area

Castle Harbour Islands and Reefs (A10)

Photo credit: Shayna Brody

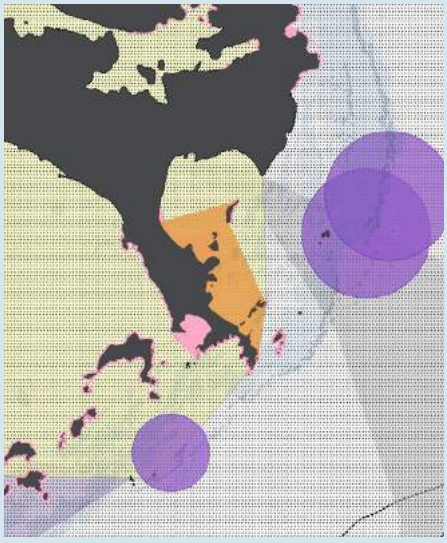
The Castle Harbour Islands and Reefs fully protected area connects nursery habitat for juvenile reef fishes and small baitfish in Castle Harbour with South Shore coral reefs. Baitfish support commercial fisheries and are a food source for many native seabirds.

Why is this area protected?

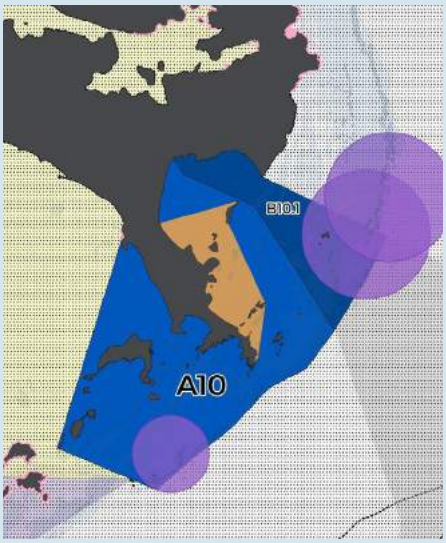
- **Coral Reefs & Fish Habitat**
- **Fish Spawning & Nurseries**
- **Seabirds**
- **Baitfish**
- **Historic Shipwrecks**
- **Seagrass**

Bermuda's national bird, the **Cahow**, is an endemic, critically endangered species believed to be extinct for 330 years before a few pairs were rediscovered nesting on isolated rocks in Castle Harbour. A rigorous conservation programme, which includes restoring the entirety of Nonsuch Island to pre-colonial forest, is allowing their population to be restored.

Photo credit: JP Rouja, Nonsuch Expeditions



Current Legislation



Proposed Legislation

Map Legend

- No Lobster Fishing Area
- National Parks Marine Areas
- Spearfishing Exclusion Zone
- Protected Dive Sites
- Prohibited Marine Board Notice Areas
- **Fully Protected**
- **Cable Zone**
- **2 m Mangrove Buffer**
- Land
- Reef

Proposed fully protected area

North East Breaker (A11)

North East Breaker is an area of high coral cover with an existing protected dive site that contains the wreckage of multiple ships, including the 17th century *Eagle* and the 18th century *Manilla*. This area helps the MPA network maintain representative coverage of critical habitats and protect areas that are important nursery grounds or migratory routes.

Why is this area protected?

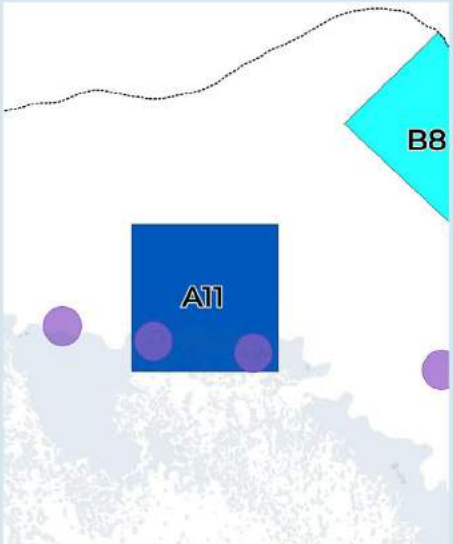
Coral Reefs & Fish Habitat

Seabirds

Historic Shipwrecks

Why protect coral?
Corals are among the first marine organisms to be impacted by climate change due to their sensitivity to changes in water temperature, light, and pH (a measure of water acidity).

Current Legislation



Proposed Legislation

Map Legend

- Protected Dive Sites
- Seasonally Protected Areas
- **Fully Protected**
- **Seasonal Closure Areas**
- 55m (30 fathoms) depth
- Land
- Reef

1. Vision

Bermuda seeks a future where its marine waters contain healthy ecosystems that support a thriving and more resilient ocean-based economy while reducing user conflicts. Bermuda's MSP delivers on this vision with a framework that supports the sustainable management of ocean resources, coordinates decision-making about marine-based development, and ensures that 20 percent of Bermuda's waters are designated as fully protected MPAs.

Photo Credit: ***Shayna Brody***

2. Scope and Authority

Bermuda's marine waters cover a vast area, encompassing an estimated 465,000 square kilometers, or 180,000 square miles.

Within Bermuda's marine waters, Bermuda has the right of exploration and exploitation and has responsibility for the conservation and management of its living natural resources. Responsibility also extends to the conduct of marine scientific research and other activities for the economic exploitation and exploration of Bermuda's marine resources. This MSP is the first integrated plan in Bermuda to guide those decisions concerning marine activities and developments that are not attached to the coastline. It applies to the entirety of Bermuda's EEZ.

A new Marine Development Act (MDA) will outline the legal framework for the MSP. It will designate DENR as the coordinating authority for marine planning and development and designate this MSP as Bermuda's development plan for the marine environment. The MDA will further provide a process for the MSP's review and revision so that it is iterative in design and adaptive to economic and ecological change, including new scientific information when it becomes available. The MDA will not replace or override sectoral legislation that already applies in Bermuda's marine waters. Other existing sectoral entities and statutes remain operative.

The MDA, to the extent possible, is modeled on and adapted from the Development and Planning Act 1974[8] as it relates to development plans and the policies governing development of the terrestrial environment. The planning authority contained within the DOP and the MDA, respectively, are intended to be complementary, but not to overlap. Planning responsibility for

Photo Credit: ***Philippe Rouja***

facilities connected to land—such as marinas, floating docks, and the like—would remain subject to the DOP and be excluded from the coverage of the MDA. Similarly, the MDA will not alter how Bermuda presently regulates usage of the foreshore or the seabed and subsoil beneath the territorial sea—lands over which the Crown is sovereign. Furthermore, because ocean governance in Bermuda is multi-sectoral and involves many different ministries and other entities across government, the governance structure of the MSP must ensure that the ministry responsible for the environment—which has lead oversight authority for the MSP—consults with stakeholder ministries and other entities.

The MDA will include provisions to:

- Identify the core principles to guide marine spatial planning in Bermuda, as set forth and elaborated in the MSP.
- Develop, adopt, modify or revoke Bermuda's MSP.
- Establish, recognise, manage and enforce area types, including MPAs, for inclusion in the MSP.
- Adopt a procedure for considering marine-based development (including through the use of an Environmental Impact Assessment).
- Establish an interdepartmental National Marine Working Group.

The MDA will bind all persons, including the Crown, and give legal effect to an MSP to the maximum extent possible under Bermuda law. Other Bermudian legislation should be interpreted consistently with the MSP—for example, such that permits and licences issued pursuant to other Acts should conform to, and not contradict, the MSP. Likewise, new regulatory requirements should not be applied inconsistently. The MDA will give legal effect to Bermuda's first MSP for an initial period of 10 years.

The International Union for the Conservation of Nature (IUCN) defines a marine protected area (MPA) as: "A clearly defined geographical space, recognised, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values."[9]

MPAs can vary in size, level of protection, purpose, and management approach; however, they are widely seen as one mechanism to protect sensitive habitats, biodiversity, depleted fish stocks and threatened populations of marine organisms. They are also useful management tools in situations where there is a need to sustain the health of marine environments while allowing for a variety of human uses, such as fishing, industry, boating and other forms of recreation.

[8] Government of Bermuda. 1974. "Development and Planning Act" Hamilton: Department of Planning, Government of Bermuda. https://planning.gov.bm/wp-content/uploads/2024/01/Development-and-Planning-Act-1974.pdf.pdf

[9] IUCN. 2012. "When is a Marine Protected Area Really a Marine Protected Area?" https://www.iucn.org/content/when-a-marine-protected-area-really-a-marine-protected-area

3. Principles, Goals, and Objectives

The PGOs outlined in the following sections define the purpose and desired results of Bermuda's MSP. BOPP's Steering Committee and Ocean Village groups helped develop the goals and objectives beginning in fall 2020, then refining and ranking them in spring 2021. A complete overview of the process is found online in the Principles, Goals, and Objectives for Bermuda's Marine Spatial Plan.[10] The inclusion of local ocean users and stakeholders in the creation of foundational elements of the MSP helped to ensure the Marine Spatial Plan reflects the values and priorities of Bermuda.

Principle

The MSP is guided by a set of principles (Table 1) that determine the nature and characteristics of the MSP. The principles do not stand by themselves; rather, they are reflected throughout the MSP process and the final plan, as well as in the goals and objectives identified later.

Table 1

Bermuda's Marine Spatial Plan Principles

COMMON RESOURCES	Bermuda's marine environment belongs to all and its integrity is held in trust for the people of Bermuda by the Government and managed collaboratively among stakeholders for the benefit of current and future generations.
CONFLICT MANAGEMENT	Integrated management of the marine environment will minimize conflict among stakeholders while recognizing each other's interest and the interest of nature.
ECOSYSTEM INTEGRITY	Management of the dynamic marine environment aims to converse biodiversity and ecosystem function. Ecosystem Function The services provided for humans and other organisms through the interaction of living and non-living elements in an ecosystem.
SUSTAINABLE 'BLUE ECONOMY'	Management of the marine environment aims to support a sustainable 'blue economy' that promotes social justice, equity, inclusion, innovation, and economic opportunities for Bermuda's people.
COMMUNITY VALUES	Management of the marine environment will fully consider cultural heritage, local traditions, and community amenity value.
TRANSPARENCY AND INTEGRATION	The decision-making process will be clear, transparent, and shared publicly, including contributions from all stakeholders.

[10] Government of Bermuda. 2021. "Principles, Goals, & Objectives for Bermuda's Marine Spatial Plan." Bermuda Ocean Prosperity Programme, Government of Bermuda. https://www.bermudaoceanprosperity.org/_files/ugd/47d1fd_265059d33fc64e80a1b4b11ad31a0bce.pdf

ANTICIPATORY AND ADAPTIVE	Management of the marine environment will be forward-looking and adaptive to account for new information, opportunities, and changing circumstances.
EVIDENCE-BASED	To address the potential for risk to the human and natural environment, decisions regrading proposed activities and developments in the marine environment will be based on the best available scientific and socio-economic evidence.

Note: Adapted from
https://www.bermudaoceanprosperity.org/_files/ugd/47d1fd_265059d33fc64e80a1b4b11ad31a0bce.pdf

Goal

A goal is a statement of general direction or intent that is of a high level and relates to a desired outcome the MSP hopes to achieve. Goals are intended to be broad and abstract and are differentiated from objectives in that they cannot be measured. Instead, each goal has associated objectives and actions with measurable outcomes that define its success.

Objective

An objective is a statement of a well-defined outcome or observable behavioural change that represents the achievement of a goal. An objective is concrete, detailed, and focused. It is achieved with a reasonable amount of effort and resources, and will contribute to the desired goal. Importantly, an objective is measurable and time bound.

- ***A spatial objective*** relates to, occupies, or otherwise has the character of physical space. It aims to define a specific location(s) where human activities are permitted, restricted or enhanced.
- ***A nonspatial objective*** is an activity, process, or policy to be achieved during the development or implementation of the MSP to support the stated goal. It can also address future management needs identified during the MSP process.

Table 2 lists the goals and objectives that were approved for Bermuda's MSP. Not every goal has both spatial and non-spatial objectives. To guide the implementation of non-spatial objectives, the BOPP Steering Committee identified a lead organisation to develop and implement an Action Plan for its achievement, a list of Steering Committee members to be consulted and a provisional timeline for completion. The lead organisation may also consult with any organisations that fall outside Steering Committee membership, as needed.

Each of the MSP's 15 goals has been given a unique three-letter designation. A goal's spatial objectives—where applicable—are identified by its three-letter designation followed by a number, while associated non-spatial objectives are identified by the goal's three-letter designation followed by a letter. These designations will be used to refer to the goals, spatial and non-spatial objectives, and action plans throughout the MSP.

Table 2

Bermuda's Marine Spatial Plan Goals and Objectives

Note: timeline dates are provisional and subject to modification.

GOAL	OBJECTIVE					
Facilitate sustainable commercial and recreational fisheries (FSH)	Spatial Objectives	Ensure continued access to the most highly-valued fishing grounds on and around the nearshore area, including the Bermuda Platform and outlying banks, as identified by the Ocean Use Survey and other relevant data sources by March 2022. (FSH.1)				
		To the extent possible, allow for spatial continuity of fishing for pelagic species in depths > 55 m around the edge of the nearshore area, including the Bermuda Platform and the outlying banks, by March 2022. (FSH.2)				
	Non-Spatial Objectives	What	Lead	Consult	Timeline	Action Plan
		Develop a licensing structure which will allow for better monitoring of reported catches. This will lead to better reporting as it relates to quotas and better management of fish stocks to ensure sustainable commercial and recreational fisheries. (FSH.A)	DENR	CFC, MRB	2026	Action Plan for FSH.A
Preserve areas of historical and cultural importance (HIS)	Spatial Objectives	Marine protected areas designations should prioritise those areas that have both conservation and historical significance. (HIS.1)				
	Non-Spatial Objectives	What	Lead	Consult	Timeline	Action Plan
		N/A				N/A
Identify and evaluate the environmental, economic, cultural, and social impacts of all proposed marine activities and developments, and require Environmental Impact Assessments as outlined in the MSP Legal Framework (DEV)	Spatial Objectives	N/A				
	Non-Spatial Objectives	What	Lead	Consult	Timeline	Action Plan
		Develop and adopt the legal framework for regulating and managing activities and development within the marine environment, including statutory provisions for evaluating impacts of all proposals and requiring Environmental Impact Assessments for certain proposals. (DEV.A)	DENR, DOP	BEDC, BNT, DOE, DOPB, EDD, HWA, M&P, MRB	2024	Action Plan for FSH.A
		Develop a Strategic Environmental Assessment to establish the decision- making criteria and process for certain types of development proposals. (DEV.B)	DENR, DOP	BDA, BNT, DOPB, DOE, HWA, M&P, MRB	2025	

Support environmentally sustainable marine and maritime tourism that promotes social justice, equity, inclusion, innovation, and economic opportunities for Bermuda's people (TSM)	Spatial Objectives	N/A				
	Non-Spatial Objectives	What	Lead	Consult	Timeline	Action Plan
		Design a streamlined, integrated, one-stop permitting system for maritime tourism businesses. (TSM.A)	DOED	BDA, BEDC, BTA, CFC, M&P, MRB	2025	In progress
		Integrate sustainable, equitable blue tourism policies and actions into the implementation of the Bermuda National Tourism Plan. (TSM.B)	BTA	BDA, HWA, MRB	2026	
		Promote educational materials that enhance awareness about environmentally friendly coast-al maritime tourism practices (e.g., watercraft handling around sensitive areas, best practices for SCUBA diving, etc.). (TSM.C)	BTA	BIOS, DENR, HWA, M&P, MRB	Phase 2 2025	
Support Maritime infrastructure needs (INF)	Spatial Objectives	N/A				
	Non-Spatial Objectives	What	Lead	Consult	Timeline	Action Plan
		Lead a feasibility study that evaluates the benefits and challenges (including insurance considerations and cost) for the gradual removal of abandoned and unregistered moorings, and the changeover or installation of eco-friendly swing moorings, including public use moorings in environmentally sensitive areas commonly used for recreation. (INF.A)	DENR	BNT, M&P, DOPB, MRB	2025	Action Plan for INF.A
		Lead the creation of a study that assesses potential sea level rise and other climate change impacts (rising temperatures, storm frequency and precipitation), including possible adaptation plans, on the airport, bridges, causeways, commercial wharves, ferry docks, fuel docks, marinas, boatyards, BELCO power station, and beaches, updating and expanding on the Smith Warner (2004) and National Trust (2008) reports. (INF.B)	Ministry of Home Affairs with support of Climate Change Task Force	BIOS, DENR, DOE, DOP, DOPB, DOWD, EA, M&P, MRB, Ministry of Public Works	2025	In progress and will be publicly available after Cabinet approval
		Conduct a survey of current marina operators, yacht clubs and the Bermuda Tourism Authoriy to inquire on Current capacity , anticipated demand and any plans for expansion. (INF.C)	M&P	BEDC, BTA, DENR, DOP, MRB,	2025	In progress

Evaluate the feasibility of Integrated Resource Plan (IRP)- proposed marine renewable energy solutions taking into account economic, environmental, and cultural impacts (IRP)	Spatial Objectives	Identify potential energy production zones that recognise the physical characteristics and criteria that should be considered when placing ocean renewable technologies for the purpose of delineating the broadest areas where these technologies could be implemented in Bermuda's EEZ with the lowest potential impact to ecosystem function. (IRP.1)				
	Non-Spatial Objectives	What	Lead	Consult	Timeline	Action Plan
		Contribute to a Strategic Environmental Impact Assessment as part of this MSP to establish the decision-making criteria and process for marine renewable energy development proposals by December 2022. (IRP.A)	RA	DENR, DOE, DOP, DOPB, EA	2025	Please refer to the Action Plan under DEV.A and B
Facilitate the development of responsible, environmentally and economically sustainable mariculture* * Mariculture is the culture of marine organisms in their natural environment for restoration, food and other products. (MAR)	Spatial Objectives	Define suitable aquaculture zones for each cultivation technology applicable to Bermuda (floating, submerged, suspended and bottom cultivation technologies) as determined by relevant literature. (MAR.1)				
	Non-Spatial Objectives	What	Lead	Consult	Timeline	Action Plan
		Lead a research project on the economic feasibility/viability of mariculture in Bermuda by 2023 and produce a guidance document regarding environmental, social and economic considerations for mariculture in Bermuda. (MAR.A)	DENR	BIOS, CFC, DOPB, EA, EH, MRB	2025	In progress; an initial feasibility/ viability report has been completed and will be used to produce the guidance document.
		Develop legislation and policy to create a framework to enable mariculture in Bermuda. (MAR.B)	DENR	DOP, DOPB, EH, M&P, MRB	2026	In progress
Facilitate effective enforcement within the marine environment (ENF)	Spatial Objectives	N/A				
	Non-Spatial Objectives	What	Lead	Consult	Timeline	Action Plan
		Develop a marine resources e nforcement strategy that clearly outlines consequences for infractions and is implemented through strengthened legislation. (ENF.A)	DENR	BSMA, CFC, M&P, MRB	2026	Action Plan for ENF.A, ENF.B, and ENF.C
		Conduct a study to measure the efficacy of enforcement measures. (ENF.B)	DENR	BSMA, CFC, M&P, MRB	2026	
		Conduct a public education campaign to raise awareness about existing and new marine regulations. (ENF.C)	DENR	BSMA, CFC, EA, M&P, MRB, RA	2026	

Protect biological diversity, productivity, and ecological function across all habitat types (BIO)	Spatial Objectives	Designate a minimum of 20% of the Bermuda EEZ as fully protected no-take Marine Protected Areas. These designations should consider and optimise existing designations. Efforts should be made to ensure the representative coverage of each key habitat type (20%) and higher coverage of habitats as specified in other objectives. (BIO.1)				
	Non-Spatial Objectives	What	Lead	Consult	Timeline	Action Plan
		Conduct a study to assess the need and cost/benefit for regulations on transitory commercial maritime traffic speed in Bermuda's EEZ. (BIO.A)	M&P, DENR	BSMA, MRB	2027	In progess
		Increase ties with relevant international programs to consider Bermuda's EEZ in the context of the wider oceanic environment. (BIO.B)	DENR	BIOS, MRB	2027	Action Plan for BIO.B, Part I Action Plan for BIO.B, Part II
Facilitate reproductive success of marine species through protection and restoration of important nursery grounds, spawning sites, and migratory routes (REP)	Spatial Objectives	Maintain seasonal no-take restrictions at all known 'fish' breeding and/or aggregation sites under the Fisheries (Protected Areas) Order 2000, and evaluate changes as new scientific information becomes available. (REP.1)				
		Identify and protect 50% of coastal habitats that appear to be juvenile fish nursery habitats and/or used by protected marine species. (REP.2)				
	Non-Spatial Objectives	What	Lead	Consult	Timeline	Action Plan
		N/A				
Restore degraded and vulnerable habitats (HAB)	Spatial Objectives	Establish active restoration of areas that were formerly seagrass habitats (100m^2) through turtle exclusion. (HAB.1)				
	Non-Spatial Objectives	What	Lead	Consult	Timeline	Action Plan
		Inventory and assess past, present and potential salt marsh and mangrove habitat areas and develop a strategic plan for conservation and restoration. (HAB.A)	DENR	BIOS, BNT, CFC, MRB	2025	Action Plan for HAB.A, HAB.B, and HAB.C

		Initiate active restoration of threatened mangrove habitats. (HAB.B)	DENR	BIOS, CFC, MRB	2025	
		Initiate active restoration of damaged and/or degraded coral habitats in protected areas. (HAB.C)	DENR	BIOS, CFC, MRB	2025	
Preserve unique, rare, and/or threatened species and habitats (UNQ)	Spatial Objectives	When designating marine protected areas, prioritise those areas that seek to protect habitat used by unique, rare, and/or threatened species named in the Protected Species Act. (UNQ.1)				
		When designating marine protected areas, prioritise those areas that seek to protect at least 40% of seamount area in Bermuda's outer EEZ. This objective specifically excludes Argus and Challenger Banks. (UNQ.2)				
	Non-Spatial Objectives	What	Lead	Consult	Timeline	Action Plan
		Support and promote a strategic management plan that recommends levels of protection for remaining natural living rocky intertidal shorelines and beaches from inappropriate development. (UNQ.A)	DENR	BNT, DOP, MRB	2027	In progress; will be considered for inclusion in MPA management plans
		Support recommendations as identified by DENR for protections of shark species. (UNQ.B)	DENR	BIOS, MRB	2022	This is complete per updated shark fishing legislation passed in 2022. Additional steps will be considered for inclusion as part of MPA management
Improve water quality and reduce ocean pollution (WQA)	Spatial Objectives	N/A				
	Non-Spatial Objectives	What	Lead	Consult	Timeline	Action Plan
		Map point-source pollution and reduce the concentration of pollutants (sewage related, industrial waste, antifouling paints) by 30-40% at impacted nearshore areas. (WQA.A)	DENR	W&E, EA, MRB	2027	Action Plan for WQA.A, WQA.B, and WQA.C
		Improve wastewater treatment of municipal sewage outfalls to reduce the concentration of sewage-related pollutants (suspended solids, fats, oils, and greases) in surrounding waters 40-60% below current concentrations. (WQA.B)	DENR	W&E, EA, MRB	2029	
		Establish a strategic plan for the management of abandoned/ sunken boats. (WQA.C)	DENR	M&P, MRB	2025	

Promote scientific and technological research (SCI)	Spatial Objectives	N/A				
	Non-Spatial Objectives	What	Lead	Consult	Timeline	Action Plan
		Develop legislation that establishes a clear and straight-forward licence process for research activities by local and visiting scientists. (SCI.A)	DENR	BIOS, MRB	2025	In progress; legislation will be drafted that includes review process with relevant expertise.
		Create an intersectoral working group to identify key areas of research and develop strategies to increase activity in the marine environment. (SCI.B)	DENR	BIOS, EA, HWA, MRB	2025	Action Plan for SCI.B, Part I Action Plan for SCI.B, Part II
Educate the public about the importance of the marine environment (EDU)	Spatial Objectives	N/A				
	Non-Spatial Objectives	What	Lead	Consult	Timeline	Action Plan
		Deliver a series of public outreach MSP campaigns in collaboration with key partners. (EDU.A)	DENR	BEDC, BIOS, DOWD, HWA, MRB	2025	EDU.A, EDU.B, EDU.C, and EDU.D will all be completed as part of the MSP's implementation.
		Deliver a series of educational curriculum products relative to the marine environment and MSP to be distributed to local schools. (EDU.B)	DENR	BIOS, DOWD, HWA, MRB	2025	
		Incorporate Bermuda's MSP in local adult education programs (18+) to give Bermudians experience relevant to local marine environment jobs. (EDU.C)	DENR	BIOS, DOWD, HWA, MRB	2025	
		Develop an intersectoral working group to promote collaboration among marine stakeholders for MSP implementation. (EDU.D)	DENR	BEDC, DOWD, WHA, MRB	2025	

Note: timeline dates are provisional and subject to modification.

Source: (i) Adapted from Government of Bermuda. 2021. *Principles, Goals, & Objectives for Bermuda's Marine Spatial Plan*. Bermuda Hamilton: Ocean Prosperity Programme, Government of Bermuda. www.bermudaoceanprosperity.org/_files/ugd/47d1fd_265059d33fc64e80a1b4b11ad31a0bce.pdf

4. Management Plan

The management plan for Bermuda's MSP consists of a framework that uses a combination of spatial and non-spatial objectives to achieve the MSP's goals.

- **A spatial objective** relates to, occupies, or otherwise has the character of physical space. It aims to define a specific location(s) where human activities are permitted, restricted or enhanced.
- **A non-spatial objective** is an activity, process, or policy to be achieved during the development or implementation of the MSP to support the stated goal. It can also address future management needs identified during the MSP process.

4.1 Non-Spatial Objectives

To guide the implementation of non-spatial objectives, the BOPP Steering Committee identified a lead organisation to develop and implement an Action Plan for its achievement, a list of Steering Committee members to be consulted and a provisional timeline for completion. The lead organisation may also consult with any organisations that fall outside Steering Committee membership, as needed.

To create Action Plans, lead organisations liaised with BOPP's Marine Spatial Planning Specialist and various relevant consulting partners. Action Plans outline ongoing and planned priority activities to achieve each of the MSP's non-spatial objectives. The Action Plans incorporate stakeholder feedback and include details relevant to required resources and anticipated output(s).

Below is a list of each non-spatial objective, a link to the Action Plan (when applicable), and a summary of the Action Plan. The Action Plans will also be housed on this webpage that will be updated regularly as Plans progress. **Please note, dates listed for the non-spatial objectives and included in the Action Plans are provisional and will be updated after MSP adoption.**

GOAL (FSH): Facilitate sustainable commercial and recreational fisheries

Non-Spatial Objective

FSH (A): **Develop a licensing structure which will allow for better monitoring of reported catches. This will lead to better reporting as it relates to quotas and better management of fish stocks to ensure sustainable commercial and recreational fisheries.**

Review of licensing structure

FSH.A DENR has developed an Action Plan on Licensing and Monitoring[11] to update fisheries licensing and improve monitoring of marine resources. A priority objective in this Plan that supports Goal (FSH) is the development and implementation of a licensing structure for the recreational fishery. Actions include proposed legislation that supports licensing of recreational fishing activities - details to be determined - and the reporting of catch and effort. Bag limits for the recreational fishery are also considered. DENR included a review of recreational fishery gear restrictions as a priority action item specifically to address concerns raised during public consultation about cast net restrictions and suggestions to improve compliance.

The Action Plan reinforces and expands on key licensing and monitoring priorities in DENR's 2018 Fishery Data Improvement and Assessment Action Plan.[12] This includes activities already underway, such as expanding the use of electronic technologies to fill critical data gaps and to support more responsive fisheries management; improving training on electronic reporting for commercial and recreational fishers; and enhancing public and industry-specific education about licensing requirements and fisheries legislation.

GOAL (DEV): Identify and evaluate the environmental, economic, cultural and social impacts of all proposed marine activities and developments, and require Environmental Impact Assessments as outlined in the MSP Legal Framework

Non-Spatial Objective

DEV (A): **Develop and adopt the legal framework for regulating and managing activities and development within the marine environment, including statutory provisions for evaluating impacts of all proposals and requiring Environmental Impact Assessments for certain proposals.**

DEV (B): **Develop a strategic environmental assessment to establish decision-making criteria and process for certain types of development proposals.**

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[11] Government of Bermuda. 2023. "Action Plan on Licensing and Monitoring" Hamilton: Department of the Environment and Natural Resources, Government of Bermuda. https://www.bermudaoceanprosperity.org/_files/ugd/418ca0_99ec8529daa440789a2cb5d0fd43d48f.pdf

[12] Government of Bermuda. 2018. "Fishery Data Improvement and Assessment Action Plan." Hamilton: Department of the Environment and Natural Resources, Government of Bermuda.

Environmental Impact Assessments and evaluating proposals

DEV.A The Action Plan for DEV.A outlines foundational elements of a legal framework for regulating and managing activities and development in the marine environment. The details will be articulated in the Marine Development Act (MDA) and supporting statutory documents. This includes the designation of the MSP as the development plan for Bermuda's marine environment to be implemented by the Ministry of Home Affairs through the Department of Environment and Natural Resources.

Decision-making criteria and process for development proposals

DEV.B The legal framework for regulating and managing activities and development in the marine environment will be outlined in the MDA and its supporting statutory documents. The Action Plan for DEV.B provides that the legal framework include means for decision-makers to evaluate the effects of proposals, policies, plans and programmes in the marine environment with regard to their environmental, economic and social impacts. The Action Plan further provides steps for the creation of the development decision process, a list of entities for consultation in the creation of this process and additional elements for consideration as suggested during the MSP stakeholder engagement process.

GOAL (TSM): Support environmentally sustainable marine and maritime tourism that promotes social justice, equity, inclusion, innovation and economic opportunities for Bermuda's people

Non-Spatial Objective

TSM (A): **Design a streamlined, integrated, one-stop permit system for maritime tourism businesses.**

TSM (B): **Integrate sustainable, equitable blue tourism policies and actions into the implementation of the Bermuda National Tourism Plan.**

TSM (C): **Promote educational materials that enhance awareness about environmentally friendly coastal maritime tourism practices (e.g., watercraft handling around sensitive areas, best practices for SCUBA diving, etc.).**

One-stop permitting system for maritime tourism businesses

TSM.A The EDD's Action Plan for TSM.A allows for coordination with relevant consulting agencies and ministries to ensure sufficient administrative support, efficient cross-departmental review and compliance with relevant regulations. In consideration of the variety of stakeholders and regulatory bodies involved, the Action Plan proposes to begin with activities designed to identify gaps, inefficiencies and areas for improvement in the current permitting system, as well as taking into consideration best practices that are currently being used in other jurisdictions. To begin the design of a one-stop permitting system for Bermuda's maritime tourism businesses, the Action Plan for TSM.A includes a complete process mapping and redesign that would incorporate, when available, automation and technology solutions, such as a centralised online platform or the potential for integration with third-party platforms. During this process, a collaborative framework would be developed involving the

relevant government departments that allows for streamlined communication, efficient decision-making and clear designation of roles and responsibilities within the new permitting system. The EDD's Action Plan also recommends a pilot testing phase in which stakeholder feedback can be gathered and used to optimize the system prior to full-scale implementation, as well as training programmes and materials to ensure that stakeholders and business owners are familiar with the new system.

National blue tourism policies

TSM.B At the time of printing, this Action Plan is in progress.

Tourism best practices and educational materials

TSM.C At the time of printing, this Action Plan is in progress.

GOAL (INF): Support maritime infrastructure needs

Non-Spatial Objective

INF (A): **Lead a feasibility study that evaluates the benefits and challenges (including insurance considerations and cost) for the gradual removal of abandoned and unregistered moorings, and the changeover or installation of eco-friendly swing moorings, including public use moorings in environmentally sensitive areas commonly used for recreation.**

INF (B): **Lead the creation of a study that assesses potential sea level rise and other climate change impacts (e.g., rising temperatures, storm frequency and precipitation), including possible adaptation plans, on the airport, bridges, causeways, commercial wharves, ferry docks, fuel docks, marinas, boatyards, BELCO power station, and beaches, updating and expanding on the Smith Warner (2004) and National Trust (2008) reports.**

INF (C): **Conduct a survey of current marina operators, yacht clubs and the BTA to inquire on current capacity, anticipated demand and plans for expansion.**

Eco-friendly swing moorings

INF.A DENR's Action Plan for INF.A incorporates feedback received during public consultation and relies on a collaborative working relationship with M&P. A number of priority actions have already been completed that support this non-spatial objective, including investigations into how other jurisdictions use, fund and manage public eco-friendly moorings. DENR and M&P will consult with relevant stakeholders to determine the concerns and possible solutions regarding changeover to eco-friendly moorings as well installation of public use moorings prior to developing plans for their adoption.

Assess impacts of climate change

INF.B In 2021 the Government of Bermuda's Ministry of Home Affairs established a Climate Task Force, comprising representatives from the DOE, DENR, and DOP, as well as from the BWS and the Ministries of Home Affairs, Public Works, Finance, and Transport. With guidance from this Task Force and support from a U.K. Government grant, a contract was established between the Ministry of Home Affairs and Smith Warner International Ltd. to expand upon their 2004 study.[13] The updated study, which will be made available to the public upon completion and Cabinet approval, will include specific recommendations intended to assist government officials in climate change adaptation and mitigation assessments, as well as in land use planning and zoning decisions. These recommendations are intended to build upon the adaptation and mitigation measures proposed in the 2008 climate change report commissioned by the BNT. [14]

Survey of marinas and yacht industry

INF.C M&P will repeat a survey of marina operators and yacht clubs that was previously conducted in 2011 by the Marine Conservation Section. At the time of printing, this Action Plan was in process.

GOAL (IRP): Evaluate the feasibility of Integrated Resource Plan (IRP)-proposed marine renewable energy solutions taking into account economic, environmental and cultural impacts

Non-Spatial Objective

IRP (A): Contribute to a Strategic Environmental Impact Assessment as part of this MSP to establish the decision-making criteria and process for marine renewable energy development proposals by December 2022.*

**December 2022 was identified in the PGO process as signifying the date of MSP adoption. To honor the PGO process, this date has not been edited. However, MSP adoption should mark the starting point.*

Criteria and process for marine renewable energy proposals

IRP.A Planning decisions for marine renewable energy will require specific technical expertise. The Action Plan for IRP.A provides for consultation with the RA, guided by the Bulk Generation Procurement Rules,[15] to be integrated in the creation of the decision-making criteria and process for marine renewable energy development proposals. Further elements to be considered for inclusion in the process are based on feedback received during MSP stakeholder engagement.

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[13] Smith Warner International Ltd. 2004. *Coastal Protection and Development Planning Guidelines for Bermuda*. Prepared for the Ministry of the Environment, Government of Bermuda. Kingston, Jamaica: SWI https://planning.gov.bm/wp-content/uploads/2018/11/DC-Coastal-Development-Protection.pdf.

[14] Glasspool, A. F., 2008. The Impact of Climate Change on Bermuda. Report Prepared for the Bermuda National Trust. www.widecast.org/Resources/Docs/Glasspool_2008_Impact_of_Climate_Change_on_Bermuda.pdf.

[15] Government of Bermuda. 2020. "Bulk Generation Procurement Rules – Order/Schedule." Hamilton: Government of Bermuda, Regulatory Authority. https://www.raarchive.com/documents/2020-10-27-bulk-generation-procurement-rules-order_schedule/

GOAL (MAR): Facilitate the development of responsible, environmentally and economically sustainable mariculture [Mariculture is the culture of marine organisms in their natural environment for restoration, food and other products.]

Non-Spatial Objective	
MAR (A):	**Lead a research project on the economic feasibility/viability of mariculture in Bermuda by 2023 and produce a guidance document regarding environmental, social and economic considerations for mariculture in Bermuda.**
MAR (B):	**Develop legislation and policy to create a framework to enable mariculture in Bermuda.**

To honor the PGO process, this date has not been edited. However, MSP adoption should mark the starting point.

Guidance document on mariculture in Bermuda

MAR.A In 2021, the Waitt Institute funded an independent suitability analysis of the aquaculture industry in Bermuda conducted by local expert Dr. Samia Sarkis. The resulting report[16] is intended as a guide for policy and decision-makers in the development of Bermuda-based aquaculture, as well as preliminary identification of inshore and offshore marine aquaculture areas. The report identifies five native species with the best technological readiness (Level 1): Two species of snapper, almaco jack, calico scallop, and pearl oyster. These species were selected based on economic and technological factors, environmental sustainability and best management practices. The next two levels of prioritised species (Levels 2 and 3) require a Research and Development phase to achieve commercial-scale technological readiness; some of these are worth further investigation based on their export potential.

Also in 2021, during Phase 1 of the Blue Economy Strategy, the Waitt Institute engaged KPMG Advisory Ltd. (KPMG) to assess the financial feasibility of commercial-scale aquaculture operations to produce sustainable mariculture species in Bermuda. The KPMG report focusses on the species with technological readiness identified by Sarkis, and considers factors such as market demand, capital costs and economies of scale in the investigation of multiple business models over a 10-year period. Due primarily to high capital and production costs, as well as limited demand among the local market, all model runs result in a net negative cash flow for Level 1 species. Level 2 and Level 3 species were not included in the KPMG report. Nevertheless, the report notes that aquaculture activities can benefit the environment, create jobs in the blue economy and enhance food security and, therefore, are likely to remain a topic of interest in the near future.

The Action Plan for MAR.A calls for the hiring of a contractor to produce a guidance document using the KPMG report, the Sarkis suitability analysis and any other information, scientific reports and data deemed necessary to take into account the environmental, social, and economic considerations of commercial-scale mariculture in Bermuda, including costs for Research and Development phases, where required.

[16] Sarkis, S., 2021. "Bermuda Aquaculture Suitability Analysis." Technical Report, Bermuda Ocean Prosperity Programme, Bermuda

Conditions to enable mariculture in Bermuda

MAR.B At the time of printing, this Action Plan is in progress.

GOAL (ENF): Facilitate effective enforcement within the marine environment

Non-Spatial Objective

ENF (A): **Develop a marine resource enforcement strategy that clearly outlines consequences for infractions and is implemented through strengthened legislation.**

ENF (B): **Conduct a study to measure the efficacy of enforcement measures.**

ENF (C): **Conduct a public education campaign to raise awareness about existing and new marine regulations.**

Marine resource enforcement strategy

ENF.A The Blue Prosperity Plan's Maritime Enforcement Action Plan[17] complements and builds upon DENR's draft Marine Resources Enforcement Strategy by coordinating and focusing resources for enforcement to help protect against pollution; illegal, unreported and unregulated fishing; and other environmental damage. To meet this objective, the Action Plan for ENF.A—as part of the Maritime Enforcement Action Plan—sets out a number of legislative proposals as priority actions, many of which reflect feedback received during public consultation for the draft Blue Prosperity Plan, such as increasing fines for illegal fishing and imposing a "presumption of guilt" for individuals handling illegally caught fish. The Action Plan also highlights legislative reform activities already underway, including requiring AIS on commercial fishing vessels and developing a mechanism to report incidents of vessel groundings.

The Maritime Enforcement Action Plan details strategic partnerships to assist in the implementation of the Blue Prosperity Plan's enforcement objectives. In the first year of the Blue Belt Ocean Shield programme, which Bermuda joined in 2021, the U.K. Government increased funding, training and equipment for marine resources enforcement and maritime domain awareness activities within Bermuda's waters. Enforcement and surveillance collaborations also involve various agencies within the Bermuda Government, including DENR's Fisheries Enforcement Section, the Royal Bermuda Regiment Coast Guard and the Bermuda Maritime Operations Centre/ Bermuda Radio. Enforcement activities will be further enhanced through involvement in global enforcement consortiums, including the International Monitoring, Control, and Surveillance Network and Global Fishing Watch's Joint Analytical Cell.

Measure the efficacy of enforcement measures

ENF.B The draft Marine Resources Enforcement Strategy includes key performance indicators (KPIs) for monitoring enforcement system efficiency and efficacy, and to assist in the

[17] Government of Bermuda. 2023. "Maritime Enforcement Action Plan" Hamilton: Department of the Environment and Natural Resources, Government of Bermuda. https://www.bermudaoceanprosperity.org/action-plans

evaluation of whether the Strategy is having the desired effect. The KPIs have the added benefit of revealing trends over time, allowing managers to identify problems and adjust the Strategy as needed. In addition, the MSP's Monitoring Strategy will include a component that looks at the efficacy of select enforcement measures identified by DENR as priority indicators and measures of success.

Public education about marine regulations

ENF.C The draft Marine Resources Enforcement Strategy and the Blue Prosperity Plan's Maritime Enforcement Action Plan[18] both call for education campaigns to encourage and improve compliance with fisheries rules and regulations. The campaigns include public education activities intended to raise awareness among the broader population, as well as initiatives that target specific ocean stakeholders, such as commercial and recreational fishermen, developers and boaters. A variety of education modalities are proposed, including web-based information portals, interpretative signage and in-person stakeholder meetings and presentations.

Photo Credit: ***Bermuda Department of Environment and Natural Resources - fisheries wardens at the Marine Expo conducting outreach and education activities***

[18] Ibid. p 1-6.

GOAL (BIO): Protect biological diversity, productivity and ecological function across all habitat types

Non-Spatial Objective	
BIO (A):	**Conduct a study to assess the need and cost/benefit for regulations on transitory commercial maritime traffic speed in Bermuda's EEZ.**
BIO (B):	**Increase ties with relevant international programmes to consider Bermuda's EEZ in the context of the wider oceanic environment.**

Regulations on commercial maritime traffic speed

BIO.A At the time of printing, this Action Plan is in progress.

Increase ties with international programmes

BIO.B Recognising that Bermuda is not well-integrated into regional and international networks, in part due to its location, the Action Plan for BIO.B identifies programmes and collaborations in which DENR currently participates or would like to participate across four thematic areas: marine resource management, marine conservation, enforcement and pollution control. Groundwork for the Action Plan identified rationales and potential barriers to collaborations.

The Action Plan for BIO.B includes a variety of activities designed to leverage on-island expertise in the facilitation of successful collaborations, such as developing a matrix of what local scientists, environmental non-profits and resource managers can offer new partners, and what these new partnerships might look like in terms of potential constraints and outcomes. The Plan also calls for the creation of a protocol related to intellectual property rights to be implemented during international scientific collaborations. To further foster opportunities for new relationships and to strengthen existing ones, the Action Plan for BIO.B calls for the identification of international conferences that DENR staff should attend and the prioritisation of support for their attendance, as well as an annual conference for local scientists, environmental non-profits, and marine resource managers to review the status of this Action Plan, identify potential project collaborations related to need and engage in information-sharing sessions.

GOAL (HAB): Restore degraded and vulnerable habitats

Non-Spatial Objective	
HAB (A):	**Inventory and assess past, present and potential salt marsh and mangrove habitat areas and develop a strategic plan for conservation and restoration.**
HAB (B):	**Initiate active restoration of threatened mangrove habitats.**
HAB (C):	**Initiate active restoration of damaged and/or degraded coral habitats in protected areas.**

Conservation and restoration of salt marsh and mangrove habitats

HAB.A The first step to achieving objective HAB.A is the identification of mangrove and salt marsh habitats that are potentially suited to restoration activities. This was accomplished through the development of Potential Use Area Maps; specifically Potential Conservation Area Maps for Habitat Restoration. Further information on these maps and how they should be used to guide the strategic conservation and restoration of salt marsh and mangrove habitats can be found in Section 4.3.2. Subsequent priority actions proposed in the Action Plan for HAB.A include the completion of a damage assessment report for each location. Damage assessments provide resource managers with valuable information on the status of the habitat in a specific area, possible causes of habitat degradation—including the presence, types and quantities of invasive species—and insight into future threats, as well as opportunities for improvement. The damage assessment report will also highlight knowledge gaps in our understanding of Bermuda's mangrove and salt marsh habitats, including information required for successful management and restoration activities. In reporting on these gaps, HAB.A will identify the types and scope of scientific research required to provide necessary future data sets. Along with the damage assessment report, the input of local scientists and resource managers will be used to create a prioritised list of mangrove and salt marsh areas for restoration.

The Action Plan for HAB.A recognises the important role that community-based habitat restoration activities play in Bermuda's social and environmental landscape. The damage assessment report will help resource managers identify areas suited to community restoration initiatives, and the Hungry Bay mangrove restoration initiative will be used as a model to follow and engage local community leaders. A recently updated GIS database of mangrove habitat will aid in restoration activities, serve as a public education tool and provide critical data for future monitoring and assessments.

Recognising the increasing threats to these habitats from climate change, additional priority activities focus on increasing the ocean's capacity for resilience and adaptation, as well as the ability of Bermuda's residents to mobilise an appropriate response when damage occurs. Specific activities include establishing protocols for assessing storm-related damage to mangrove and salt marsh habitats; training rapid response teams to quickly mobilise resources to mitigate such damage; developing community capacity to identify and remove invasive species; and creating a response protocol against threatening invasive marine species.

Mangrove habitat restoration

HAB.B Mangrove restoration activities may take place at any point within the preliminary timeline of activities set out in the Action Plan for HAB.B under the current guidelines set forth in The Bermuda Plan 2018[19] and the Protected Species Act 2003.[20]

One of the first actions in the Action Plan for HAB.B is conducting a thorough literature review, including interviews with experts, to report on lessons learned from previous mangrove restoration efforts, such as best planting methods. The review will also look at lessons learned from previous mangrove nursery projects, such as whether pre-rooting propagules in a nursery helps seedlings become established when planted outdoors.

[19] Government of Bermuda. 2018. "The Bermuda Plan." Hamilton: Department of Planning, Government of Bermuda. https://planning.gov.bm/wp-content/uploads/2021/06/Final-Bermuda-Plan-2018.pdf
[20] Government of Bermuda. 2003. "Protected Species Act." Hamilton: Ministry of the Environment, Government of Bermuda. https://faolex.fao.org/docs/pdf/ber64069.pdf

Areas that are suitable for mangrove restoration have already been identified in the Potential Use Area Maps for Habitat Restoration (Maps 37-39, Section 4.3.2). The development of a prioritised list for mangrove restoration will be developed through a damage assessment report and consultation with local experts, two activities that are called for in the Action Plan for HAB.A. While these activities are ongoing, HAB.B can progress by holding a workshop to train volunteers in methods used to cull invasive plant species and plant mangrove propagules. The Action Plan for HAB.B also calls for a social media forum to be established so that members of the public can share information or pictures and report on observations or signs of unauthorised development impacting mangroves.

Coral habitat restoration

HAB.C The Action Plan for HAB.C begins by collating data on the current status of coral habitat in each protected area, as well as in areas identified as suitable for restoration activities using the Potential Use Area Maps for Habitat Restoration (Maps 32-34, Section 4.3.2). Similar to HAB.A, the Action Plan for HAB.C calls for a damage assessment to be conducted in each protected area or proposed restoration area, followed by a gap analysis and the creation of a prioritised list of research needed to close the information gap.

Coral is among the first marine organisms to be impacted by climate change, due to its sensitivity to changes in water temperature, light, and pH (a measure of water acidity). Coral can also be broken during the intense wave action of hurricanes, which Bermuda is experiencing in both increased frequency and intensity.[21] Many countries are addressing this, in part, through coral nursery programmes that "grow" juvenile corals which are then "planted" on a reef following disturbances, such as marine heat waves or vessel groundings.

The Action Plan for HAB.C calls for an assessment to be conducted that evaluates the cost and successes of techniques adapted to Bermuda's corals for enhancing and/or restoring a reef damaged by storms or grounding events. Simultaneous planned activities that support HAB.C include a training workshop for volunteer divers on coral identification, coral diseases, and methods for recovering detached corals and either re-attaching them to the reef or recovering them for a coral nursery. This may involve legislative reform under the Protected Species Act 2003[22] to create a licensing and reporting system that allows volunteers to recover detached coral for restoration or remediation purposes. Training programmes will also be held to create response teams for coral-related storm damage and ship groundings on reefs, as well as in the event of a coral disease or invasive species outbreak. These training programmes will help develop protocols to assess the impact and implementation of remediation activities, including follow-up surveys.

GOAL (UNQ): Preserve unique, rare and/or threatened species and habitats

Non-Spatial Objective	
UNQ (A):	**Support and promote a strategic management plan that recommends levels of protection for remaining natural/living rocky intertidal shorelines and beaches from inappropriate development.**
UNQ (B):	**Support recommendations as identified by DENR for protection of shark species.**

Protection of natural/living rocky intertidal shorelines and beaches

UNQ.A The Action Plan for UNQ.A consists of a strategic management plan recommending varying levels of protection for the island's natural or living rocky intertidal shorelines and beaches that are not protected under the MDA, the Bermuda Plan of 2018[23] or any other current legislation. Development of this plan will occur during the implementation of the MSP's management plan and will take into account stakeholder feedback received regarding shoreline development for future economic purposes (i.e., sustainable marine tourism development) and shoreline degradation resulting from inappropriate or unapproved coastal development. Consequences for infractions will be made clear and enforceable under current marine and terrestrial resources enforcement plans.

Protection of shark species

UNQ.B In 2022, new legislation was implemented to protect all sharks from commercial and recreational fishing, with the exception of the Galapagos, gummy and six-gill sharks.[24] These sharks were given exemptions for cultural reasons, such as the production and consumption of shark harsh, and to allow commercial fishermen to continue their currently limited, small-scale fishing practices. Under this new legislation, recreational fishermen are prohibited from catching any shark species and commercial fishermen must obtain a special licence to catch permitted shark species.[25]

The MSP supports this legislation and will enforce it within the nearshore and offshore MPA networks. The MSP's monitoring plan may include a system to monitor shark populations. This would provide resource managers with critical data about Bermuda's shark populations and the effectiveness of recent changes in shark protection legislation.

GOAL (WQA): Improve water quality and reduce ocean pollution

Non-Spatial Objective

WQA (A): **Map point-source pollution and reduce the concentration of pollutants (sewage-related, industrial waste, antifouling paints) by 30–40% at impacted nearshore areas.**

WQA (B): **Improve wastewater treatment of municipal sewage outfalls to reduce the concentration of sewage-related pollutants (suspended solids, fats, oils and greases) in surrounding waters 30–60% below current concentrations.**

WQA (C): **Establish a strategic plan for the management of abandoned/sunken boats.**

[21] Guishard, M. 2023. "Climate Change and Bermuda Part II: Impacts and Societal Risk." St. George's: Bermuda Institute of Ocean Sciences. https://bios.asu.edu/currents/bios-releases-part-ii-of-climate-change-report/
[22] Government of Bermuda. 2003. "Protected Species Act." Hamilton: Ministry of the Environment, Government of Bermuda. https://faolex.fao.org/docs/pdf/ber64069.pdf
[23] Government of Bermuda. 2018. "The Bermuda Plan." Hamilton: Department of Planning, Government of Bermuda. https://planning.gov.bm/wp-content/uploads/2021/06/Final-Bermuda-Plan-2018.pdf
[24] Government of Bermuda. 2022. "Protection of Sharks and the Giant Manta Ray." Hamilton: Ministry of Home Affairs. https://www.gov.bm/articles/protection-sharks-and-giant-manta-ray
[25] Ibid.

Point-source pollution in nearshore areas

WQA.A DENR's Action Plan for WQA.A includes the ongoing activities, such as the creation of a GIS map showing the locations of all "controlled plants" as defined in the First Schedule of the Clean Air Act[26] and work to pass regulatory bans on specific active ingredients in marine grade antifouling paint as referenced in the Fisheries (Anti-Fouling Paints Prohibition) Regulations Act 1989.[27] Ongoing work in this area also includes public education aimed at encouraging ship yards, marinas and other marine-based developments to promote alternative technologies that would lead to a reduction in the use of anti-fouling paint. These may include new mechanical scrubbing technologies that use robotic systems to perform regular hull maintenance, effectively removing microfouling organisms while avoiding damage to anti-fouling paint coatings and preventing the need for regular vessel haul-outs and complete hull re-coatings.

Incorporating feedback received during public consultation for the draft Blue Prosperity Plan, DENR's Maritime Enforcement Action Plan[28] highlights an action completed in 2018 in which a new regulation was created under the Water Resources Act,[29] the Water Resources (Prevention of Pollution by Sewage from Boats) Regulations 2018.[30] Inspection of vessels is permitted under these regulations for appropriate signage of the requirements of the "No Discharge Zones" and to ensure that overboard discharge valves (i.e., stop cocks) from sewage holding tanks or heads to the sea are positioned in the 'closed' configuration when the boat is located within a "No Discharge Zone." Building on this, the Action Plan for WQA.A calls for continued work to enforce the Water Resources (Pollution by Sewage from Boats) Regulations[31] through public education campaigns that promote awareness among the boating community that discharging sewage in "No Discharge Zones" is a punishable offence and to introduce the option of adding biodegradable dye tables to the heads and sewage holding tanks of suspected habitual offenders of the regulation.

A significant amount of feedback received during public consultation touched on the need for a plan to addresses the issue of marine plastics pollution, specifically with respect to single use plastics (SUPs). The Action Plan for WQA.A highlights two completed actions and one action in progress that support a reduction of plastic waste in the environment. In August 2021, the Ministry of Home Affairs produced the document "Regulating Single Use Plastics in Bermuda: Policy Paper for Public Consultation"[32] that was later updated with the results of a public consultation that took place from September 1 through October 31, 2021. Currently, Cabinet is considering the Cabinet Memorandum to authorise drafting of legislation to regulate the use of SUPs.

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[26] Government of Bermuda. 1991. "Clean Air Act." Hamilton: Ministry of the Environment, Government of Bermuda. https://faolex.fao.org/docs/pdf/ber49029.pdf

[27] Government of Bermuda. 1989. "Fisheries (Anti-Fouling Paints Prohibition) Regulations. Hamilton: Ministry of the Environment, Government of Bermuda. https://faolex.fao.org/docs/pdf/ber49389.pdf

[28] Government of Bermuda. 2023. "Maritime Enforcement Action Plan" Hamilton: Department of the Environment and Natural Resources, Government of Bermuda.

[29] Government of Bermuda. 1975. "Water Resources Act." Hamilton: Ministry of the Environment, Government of Bermuda. https://faolex.fao.org/docs/pdf/ber19371.pdf

[30] Government of Bermuda. 2018. "Water Resources (Prevention of Pollution by Sewage from Boats) Regulations 2018." Hamilton: Ministry of Home Affairs, Government of Bermuda. https://faolex.fao.org/docs/pdf/ber186471.pdf

[31] Ibid

[32] Government of Bermuda. 2022. "Regulating Single Use Plastics in Bermuda: Policy Paper for Public Consultation." Hamilton: Ministry of Home Affairs, Government of Bermuda.

Wastewater treatment and sewage-related pollutants

WQA.B The Action Plan for WQA.B lists the DENR Pollution Control Section as the lead organisation and includes ongoing activities, such as improving the discharge quality from 'controlled plants' that are licensed under the Clean Air Act 1991,[33] such as wastewater treatment plants. Improvements to reduce the percentage of fats, oils and greases discharged into nearshore waters (initial data suggested improvements remove over 60% and greater percentages of suspended solids and 95% removal of fecal coliforms) will be assessed as part of the requirements set under the operating licence conditions. The Plan also highlights the near-term closure of the penultimate marine outfall located near Tobacco Bay, St. George's, which will reduce the effluent of sewage-related pollutants to those nearshore waters.

Management of abandoned/sunken vessels

WQA.C DENR's draft Marine Resources Enforcement Strategy calls for the creation of a legislative framework to remove abandoned and derelict vessels (ADVs) from the marine environment. The strategy also proposes working agreements between government agencies and non-governmental organisations to develop a process for effective implementation of the plan. DENR's Maritime Enforcement Action Plan[34] calls for the creation of a legislated mechanism to report vessel grounding incidents, which may help reduce the number of ADVs in Bermuda's marine waters.

DENR's Action Plan for WQA.C includes two priority legislative reform action items that further address the issue of ADVs in the marine environment. The first aims to develop a strategic plan that builds upon the current MOU between the Bermuda Government and Keep Bermuda Beautiful (KBB). The programme with KBB has already removed 85 ADVs over the past two years and is now working with insurance companies to develop a more sustainable future that does not require funds from Government or donors. The second reform item would further address the issue of ADVs by developing a legal mechanism to recover the costs associated with removal of ADVs from the environment, such as a Boat Insurance Fund.

GOAL (SCI): Promote scientific and technological research

Non-Spatial Objective	
SCI (A):	**Develop legislation that establishes a clear and straightforward licence process for research activities by local and visiting scientists.**
SCI (B):	**Create an intersectoral working group to identify key areas of research and develop strategies to increase activity in the marine environment.**

[33] Government of Bermuda. 1991. "Clean Air Act." Hamilton: The Environmental Authority. https://faolex.fao.org/docs/pdf/ber49029.pdf

[34] Government of Bermuda. 2023. "Maritime Enforcement Action Plan" Hamilton: Department of the Environment and Natural Resources, Government of Bermuda. https://www.bermudaoceanprosperity.org/action-plans

Licensing process for scientific research activities

SCI.A To address SCI.A, DENR will draft legislation that leverages licensing requirements already included in the fisheries and environmental frameworks, together with any land-based research requirements as necessary for consultations. DENR will work with the Ministry of Home Affairs and any other departments/ministries to develop a vetting process for research applications that require a specific expertise for approval.

Working group to increase marine research activities

SCI.B DENR is the lead organisation responsible for the implementation of the Action Plan for SCI.B, which includes a number of activities designed to foster new relationships and maintain or strengthen existing ones, such as the development of a registry of scientists, engineers and resource managers that lists their respective areas of expertise; the creation of a database of local resource users and practitioners in various sectors (e.g., aquaculture, renewable energy, shipping, marine biotechnology, etc.) and their respective areas of expertise; a comprehensive review of overseas scientists who have conducted research in Bermuda over the past two decades —and their research outputs; and the creation of a working group to carry out these various activities.

GOAL (EDU): Educate the public about the importance of the marine environment

Non-Spatial Objective

EDU (A)*: **Deliver a series of public outreach MSP campaigns in collaboration with key partners.**

EDU (B)*: **Deliver a series of educational curriculum products relative to the marine environment and MSP to be distributed to local schools.**

EDU (C)*: **Incorporate Bermuda's MSP in local adult education programmes (18+) for Bermudians' experience relevant to local marine environment jobs.**

EDU (D)*: **Develop an intersectoral working group to promote collaboration among marine stakeholders for MSP implementation.**

***None of the objectives listed in support of Goal (EDU) have associated Action Plans as they are all considered part of the MSP's early-stage implementation activities.**

Public outreach MSP campaigns

EDU.A Already underway as part of the Blue Prosperity Plan public engagement process, a series of public outreach campaigns that highlight the benefits of and science behind marine spatial planning and MPA networks will continue to be delivered in collaboration with key partners as part of the MSP's implementation plan.

Curriculum products to local schools.

EDU.A Early in the process of the MSP's implementation, a series of classroom and informal education curriculum products (the latter of which supplement classroom learning) will be developed in partnership with representatives from the Ministry of Education, DENR and community partners. The curriculum products will be aligned with the

Cambridge Curriculum Framework to facilitate integration into existing lesson plans and thematic units. Potential topics include science (biology, biodiversity, climate change), geography (map comprehension and GIS skills), history (as it relates to Bermuda's maritime heritage) and politics (the creation of new legislation, the role of civil society in politics, etc.).

MSP in adult (18+) education programmes.

EDU.C With the implementation of the MSP's enforcement, management and monitoring plans will come a variety of new career opportunities. To prepare for these and build capacity among the local workforce in the Blue Economy, the MSP's early implementation plan includes as a priority action the incorporation of MSP-related information into local adult post-secondary education programmes. Additional activities in support of EDU.C may involve working with local university-level education institutions or technical certification providers to develop formalised education and training programmes.

Develop an intersectoral working group for MSP implementation.

EDU.D DENR will lead activities in support of EDU.D, leveraging partnerships, collaborations and working relationships fostered among various marine stakeholders during the development of the Blue Prosperity Plan. The intersectoral working group will represent a diverse cross-section of industries and ocean users to ensure that MSP implementation proceeds as described (Section 5.1), as well as to ensure the PGOs are being achieved through the MSP's various Action Plans.

4.2 Spatial Objectives

Marine Protected Areas (MPAs)

The International Union for the Conservation of Nature (IUCN) defines an MPA as: "A clearly defined geographical space, recognised, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values."[35] This MSP describes a network of MPAs with varying levels of protection. This framework helps balance conservation of the marine environment with the multiple human uses that rely on the island's marine and coastal waters for commerce, recreation and income. The designations listed below are new protection designations resulting from this MSP and do not include designations already in place as a result of existing legislation (Map 1).

- **Fully Protected:** Allows all non-extractive or non-destructive uses (e.g., diving, boating) and prohibits all activities that would damage habitats or cultural heritage (e.g., mining, development) or remove marine life (e.g., fishing).
- **Pelagic Zones:** Surface trolling and spearfishing for pelagic species allowed, prohibits bottom fishing and all other extractive or destructive activities.
- **Fisheries Areas:** Prohibits development and other destructive activities to safeguard important fishing areas and valuable habitat.
- **Catch & Release Only:** Allows catch & release fly fishing, prohibits all other extractive or destructive activities.
- **Special Protection Area:** Allows all non-extractive or non-destructive uses (e.g., diving, boating), allows for maintenance of existing infrastructure and prohibits all other extractive or destructive activities.
- **2 m Mangrove buffer:** Allows all non-extractive or non-destructive uses (e.g., diving, boating), allows for maintenance of existing infrastructure and prohibits all other extractive or destructive activities.
- **Shoreline Buffer:** Allows permitted shoreline activities (e.g., approved development, infrastructure maintenance and hook-and-line fishing).
- **Cable Zone:** Allows cable maintenance work, prohibits all other extractive or destructive activities.
- **Seasonal No-Netting:** Prohibits net fishing (except dip netting) from May to October, inclusive.
- **No Net Fishing:** Prohibits net fishing.
- **Lightly Protected Areas:** Surface fishing (including small scale pelagic long-lining) allowed, prohibits all other extractive or destructive activities.

This section describes how the currently legislated areas work alongside the MPA network to achieve the spatial objectives of the MSP. For each spatial objective, qualitative and quantitative summaries are provided that describe how well the MPA network meets the criteria set forth in the objective. The intent is to provide a holistic understanding of how the MPA network might impact critical marine habitats, fishing and areas of cultural and historic importance. Each spatial objective supports a specific goal, or desired outcome, of the MSP.

Some extractive activities may be allowed in fully protected MPAs if they contribute towards the MSP objectives (e.g., removal of waste, removal of invasive species, extractive research for conservation, historic wreck rescue and repair and restorative aquaculture).

GOAL (FSH): Facilitate sustainable commercial and recreational fisheries

Spatial Objective FSH (1)

Ensure continued access by March 2022* to the most highly valued fishing grounds on and around the nearshore areas, including the Bermuda Platform and outlying banks, as identified by the Ocean Use Surveys and other relevant data sources.

**March 2022 was identified in the PGO process as signifying the date of MSP adoption. It will be modified to reflect the true adoption date.*

Significant effort was undertaken during the design of the MPA network to ensure continued access to the most highly valued fishing grounds for both the commercial and recreational fisheries. From the outset, Argus and Challenger Banks were removed from consideration as areas for full protection due to their importance to Bermuda's commercial fishery. Special consideration was given to Crescent Seamount in order to provide some protection for vulnerable deepwater habitats on the seamount, while continuing to allow access to the high value longline fishing opportunities in the waters above.

Throughout the Plan's development, all recreational and commercial fishermen had opportunities to communicate the location of their "most highly valued" fishing grounds by participating in Ocean Village Groups, focus groups, and individual meetings or by providing feedback through the Ocean Use Surveys.[36] [37] As more refined data were provided, they were used to better understand ocean use by the fishing community to avoid conflicts and prioritise areas for protection.

The MPA network avoids 67% of the most highly valued commercial fishing area and 70% of the most highly valued recreational fishing area (Figure 1). MPAs that prohibit all types of fishing avoid 87.6% of the most highly valued commercial fishing area and 91.9% of the most highly valued recreational fishing area. The current network actually decreases the proportion of highly valued commercial fishing grounds that fall within areas that fully prohibit fishing, from 22.3% in the original MPA proposals that were released for public comment in August 2022 down to 12.4% in the current MPA network.

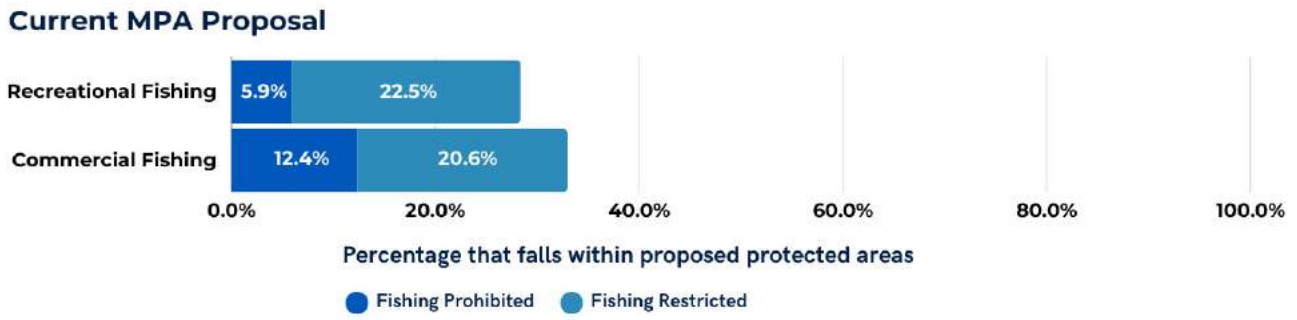
[35] IUCN. 2012. "When is a Marine Protected Area Really a Marine Protected Area?" https://www.iucn.org/content/when-a-marine-protected-area-really-a-marine-protected-area

[36] Government of Bermuda. 2021. "Bermuda Ocean Use Survey Results." Government of Bermuda, Waitt Institute and Bermuda Institute of Ocean Sciences in conjunction with the McClintock Lab of the University of California, Santa Barbara. Hamilton: Government of Bermuda. https://www.bermudaoceanprosperity.org/_files/ugd/47d1fd_a9abc9b46947449697fa3094bbf215b3.pdf.

[37] Government of Bermuda. 2023. "Bermuda Ocean Use Survey Results—Appendix 3: Additional Commercial Fishing Data" Government of Bermuda, Waitt Institute and Bermuda Institute of Ocean Sciences in conjunction with the McClintock Lab of the University of California, Santa Barbara. https://a5608098-1e68-4545-8d8f-3792e27f704a.filesusr.com/ugd/418ca0_e1ad7c3f12144f018a4190ff6464d233.pdf

Figure 1:

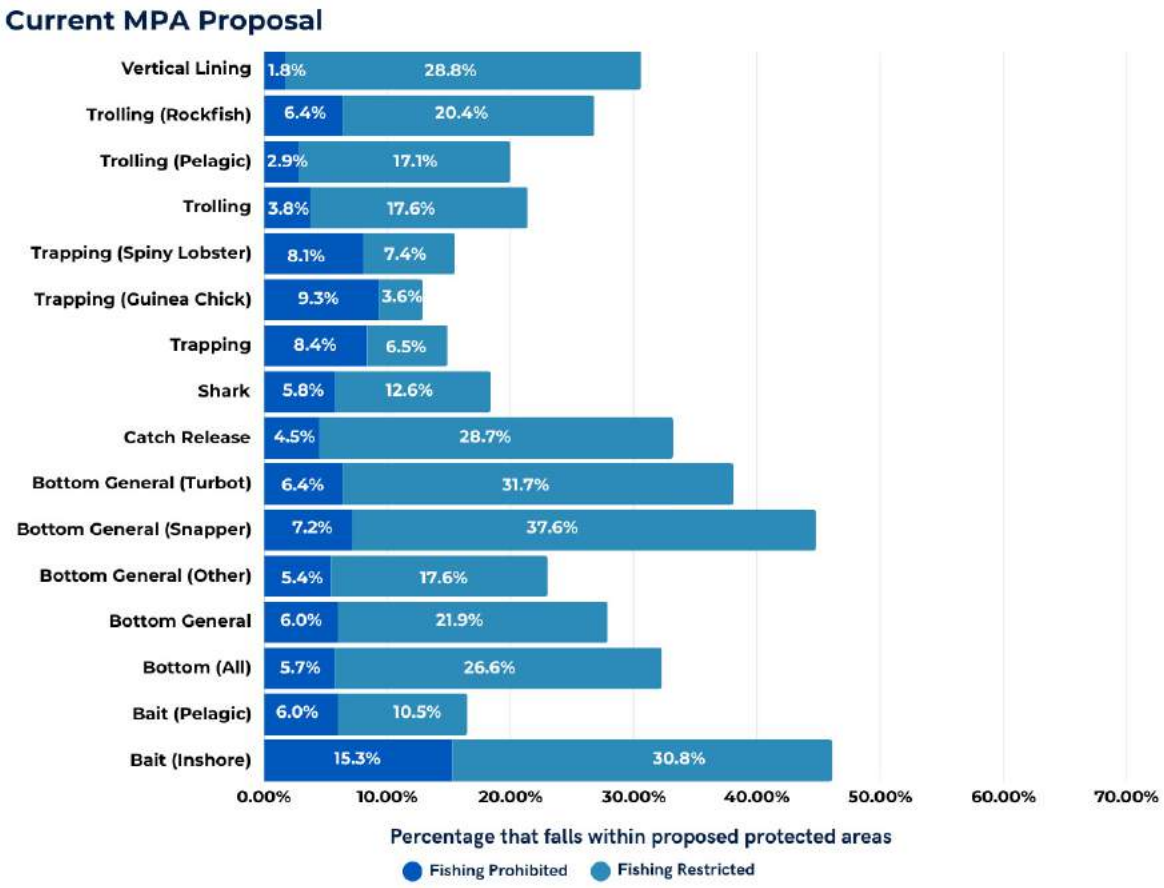
Percentage of Highly Valued Recreational and Commercial Fishing Grounds that Fall Within MPAs that Fully Prohibit Fishing (blue) and Restrict Fishing (teal).



To ensure that no single commercial fishery would be overly impacted by the MPA network, data from the updated Ocean Use Survey were broken down by fishery, gear type, location (where the fishing vessel departed from) and season. The subsequent revisions to the MPA network reduced potential user conflict with every aspect of the commercial fishery, with the largest reduction in potential user conflict measured in the inshore bait fishery (Figure 2).

Figure 2:

Percentage of Highly Valued Recreational and Commercial Fishing Grounds that Fall Fall Within MPAs that Fully Prohibit Fishing (blue) and Restrict Fishing (teal) Compared Across Individual Commercial Fisheries.



Spatial Objective FSH (2)

To the extent possible by March 2022*, allow for spatial continuity of fishing for pelagic species in depths >55 metres (m) around the edge of the nearshore area, including the Bermuda Platform and outlying banks.

**March 2022 was identified in the PGO process as signifying the date of MSP adoption. It will be modified to reflect the true adoption date.*

The Current MPA network permits uninterrupted surface trolling and allows for spearfishing for pelagic fishes in identified pelagic zones; however, bottom fishing in pelagic zones is prohibited. Prohibitions outlined in current legislation and regulations still apply and can be viewed in the Currently Legislated Areas Map and include the following:

- The spearfishing exclusion zone, as stated in Regulation 22(5)(c) of the Fisheries Regulations 2010.[38]
- The submarine cable protection zone, as stated in the Submarine Communications Cables Act 2020.[39]

These MPAs focus on protecting seabed habitats in order to preserve biological diversity, productivity and ecological function. Permitting fishing for pelagic species to continue will not inhibit the protection of seabed habitats and the marine organisms that live there. Consequently, these MPAs contribute to the success of spatial objective BIO.1 while not preventing continued pelagic fishing access. This seabed protection is especially valuable in the two pelagic zones adjacent to the important spawning areas for Black grouper and Red hind.

The rationale for this MSP approach is supported by a meta-analysis of 33 modelling exercises with 57 case studies that reviewed the impacts of MPA size on fisheries yields and profits. The highest benefits for fisheries were identified when fully protected MPAs covered at least 30% (and up to 50%) of the habitat area.[40] However, "MPAs cannot function as islands, but must interact with areas open to fishing."[41] Therefore, the design of the nearshore MPA network (Section 4.2.4) takes a "stepping stone" approach to protection, where fully protected MPAs are often adjacent to highly protected MPAs, with areas in between managed by existing regulations. This design allows for pelagic fishing to continue, particularly in areas identified as having a high commercial fishing value.

Refer to FSH.A for the non-spatial objective associated with this goal.

[38] Government of Bermuda. 2010. "Fisheries Regulations 2010." Hamilton: Government of Bermuda. https://faolex.fao.org/docs/pdf/ber100293.pdf.

[39] Government of Bermuda. 2020. "Submarine Communications Cable Act 2020." Hamilton: Government of Bermuda. www.marops.bm/Documents/Legals/Submarine%20Communications%20Cables%20Act%202020.pdf.

[40] Gaines, S. D., C. White, M. H. Carr and S. R. Palumbi. 2010. "Designing Marine Reserve Networks for both Conservation and Fisheries Management." *Proceedings of the National Academy of Sciences* 107.43: 18286-18293. www.pnas.org/doi/abs/10.1073/pnas.0906473107

[41] Goni, R. R. Hilborn, D. Díaz, S. Mallol and S. Alderstein. 2010. "Net Contribution of Spillover from a Marine Reserve to Fishery Catches." *Marine Ecology Progress Series*, 400: 233–43.

GOAL (HIS): Preserve areas of historical and cultural importance

Spatial Objective HIS (1)

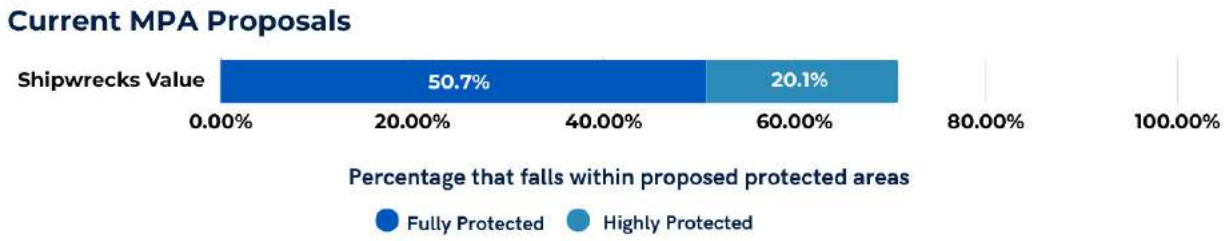
Marine protected area designations should prioritise those areas that have both conservation and historical significance.

The Fisheries Act 1972[42] provides for the creation of the Fisheries (Protected Areas) Order 2000,[43] which prohibits the take of fish or the use of any anchor other than a Danforth (sand) anchor at several historic wrecks and other dive locations around the island. These areas are known as Protected Dive Sites and can be seen on the Currently Legislated Areas Map as yellow circles with red borders. Moreover, shipwrecks that are over 50 years old are governed under the Historic Wrecks Act 2001[44] which provides for the protection and scientific management of Bermuda's underwater cultural heritage assets.

The MSP addresses this objective and incorporates areas of historical significance, including protected dive sites and open wrecks, into the MPA network. It includes 70.8% of shipwrecks value, based on the heat map showing historic shipwreck abundance per sq km. Shipwrecks value is a metric of how many of Bermuda's historic shipwrecks are given some level of protection. Between the release of the original MPA proposal in August 2022 and this current proposal, 9.5% more of shipwrecks value is protected (Figure 3).

Figure 3:

Percentages of Shipwrecks Value that Fall Within Fully Protected (blue) and Highly Protected (teal) Areas.



In addition to their intrinsic value as areas of cultural and historic importance, underwater heritage sites and resources are able to serve as islands of biological diversity, acting as artificial reefs and offering hard substrate for a variety of macro-organisms and marine benthic microbiomes to colonise.[45] Although historic wrecks are not defined as a critical habitat type in the MSP, protecting these resources within the MPA network supports Goal (BIO) by preserving biodiversity across a variety of marine ecosystems.

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[42] Government of Bermuda. 1972. "The Fisheries Act." Hamilton: Government of Bermuda. https://faolex.fao.org/docs/pdf/ber1053.pdf

[43] Government of Bermuda. 2000. "Fisheries Act 1972: Fisheries (Protected Areas) Order 2000." Hamilton: Department of the Environment, Government of Bermuda. https://faolex.fao.org/docs/pdf/ber64030.pdf

[44] Government of Bermuda. 2001. "Historic Wreck Act 2001." Hamilton: Government of Bermuda. https://static.squarespace.com/static/501134e9c4aa430673203999/501295cfe4b0ebc53ba7b245/501295cfe-4b0ebc53ba7b248/1252512082683.

[45] Hamdan, Leila J., et al. 2021. "Deep-sea shipwrecks represent island-like ecosystems for marine microbiomes." *Multidisciplinary Journal of Microbial Ecology*, 15.10: 2883–91. www.nature.com/articles/s41396-021-00978-y.

Goal (IRP): Evaluate the feasibility of Integrated Resources Plan (IRP)-proposed marine renewable energy solutions taking into account economic, environmental, and cultural impacts.

Spatial Objective IRP (1)

Identify potential energy production zones that recognise the physical characteristics and criteria that should be considered when placing ocean renewable technologies for the purpose of delineating the broadest areas where these technologies could be implemented in Bermuda's EEZ with the lowest potential impact to ecosystem function.

Bermuda's Economic Recovery Plan[46] encourages new renewable energy technology developers to test their products in Bermuda by creating an energy regulatory sandbox. Subsequently, the Electricity Act 2016[47] was amended under the Electricity Amendment Act 2022[48] to promote and encourage innovation in the electricity sector. One area that has been set aside under this Act for renewable energy testing and is currently undergoing an environmental impact assessment is demarcated on the Currently Legislated Areas Map as a dark red triangle.

The Potential Use Area Maps (Section 4.3) are non-legislated (not legally binding) maps that are intended to provide initial guidance on the most suitable areas for priority uses identified in the MSP. The Potential Use Area Maps for Renewable Energy (Maps 26-31, Section 4.3.1) identify the most suitable locations for renewable energy development in the nearshore area. The maps use siting criteria that exclude the most valuable coral and seagrass habitats, while prioritising remaining areas using an index based on coral cover, coral diversity and seagrass value, as well as other metrics that address environmental, social and economic constraints.

These maps are not legally binding and are not intended to be used independently for site selection. A comprehensive Environmental Impact Assessment is required to be conducted prior to final site selection in an effort to reduce potential long-term environmental and economic impacts. The Potential Use Area Maps do, however, provide preliminary data for renewable energy projects. These data allow potential investors to consider opportunities and options for dedicating resources and technology toward Bermuda's target of reducing its annual carbon emissions as set out in the Bermuda Integrated Resource Plan[49] and towards meeting the Blue Economy Strategy's goal of accelerating the clean energy transition.[50]

Refer to IRP.A for the non-spatial objective associated with this goal.

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[46] Government of Bermuda. 2021. "Bermuda's Economic Recovery Plan: Summary Report." Ministry of Finance, Government of Bermuda. www.gov.bm/sites/default/files/20210319-ERP-public-DOC-KS_Final_2_Print_Version.pdf.

[47] Government of Bermuda. 2016. "Electricity Act 2016." Hamilton: Government of Bermuda. http://www.bermudalaws.bm/laws/Consolidated%20Laws/Electricity%20Act%202016.pdf.

[48] Government of Bermuda. 2022. "Electricity Amendment Act 2022." Hamilton: Government of Bermuda. http://www.bermudalaws.bm/laws/Annual%20Laws/2022/Acts/Electricity%20Amendment%20Act%202022.pdf.

[49] Government of Bermuda. 2019. "Bermuda Integrated Resource Plan." Hamilton: Regulatory Authority of Bermuda, Government of Bermuda. https://cloudfront.bernews.com/wp-content/uploads/2019/07/2019-06-30-Bermuda-IRP.pdf

[50] Government of Bermuda. 2023. "Blue Prosperity Plan" Hamilton: Ministry of Home Affairs, Government of Bermuda, p XX. https://www.bermudaoceanprosperity.org/

Goal (MAR): Facilitate the development of responsible, environmentally and economically sustainable mariculture

Spatial Objective MAR (1)

Define suitable aquaculture zones for each cultivation technology applicable to Bermuda (floating, submerged, suspended and bottom cultivation technologies) as determined by relevant literature.

Establishing sustainable aquaculture/mariculture activity within Bermuda's waters requires identification of suitable areas that consider applied technologies, the biological and cultivation requirements of various species and potential impacts to the surrounding marine environment. Based on research[51] conducted by local scientist, Dr. Samia Sarkis, the MSP includes a series of Potential Use Area Maps for Aquaculture that take into account the preceding factors, as well as other potentially limiting factors, such as depth characteristics of nearshore and offshore locations, physical and chemical properties of seawater, and current environmental and regulatory considerations. The Potential Use Area Maps for Aquaculture (Maps 40-43, Section 4.3.3) are not legally binding. They are meant to serve as a point of information for development-decisions regarding aquaculture activities. A comprehensive Environmental Impact Assessment is required to be conducted prior to final site selection in an effort to reduce potential long-term environmental and economic impacts. The Potential Use Area Maps for Aquaculture support the Blue Economy Strategy's goal of supporting sustainable fishing.

Refer to MAR.A and MAR.B for the non-spatial objectives associated with this goal.

Goal (BIO): Protect biological diversity, productivity, and ecological function across all habitat types

Spatial Objective BIO (1)

Designate a minimum of 20 percent of the Bermuda EEZ as fully protected no-take Marine Protected Areas. These designations should consider and optimise existing designations. Efforts should be made to ensure the representative coverage of each key habitat type (20 percent) and higher coverage of habitats as specified in other objectives.

The Marine Development Act will provide the legal framework for the MSP, including the power to designate the MPAs identified in the MSP. These MPAs (Section 4.2) achieve the target of designating a minimum of 20% of Bermuda's marine waters as fully protected no-take MPAs (Figure 4).

Research shows that full protection confers the greatest ecological benefits, including higher fish biomass and more rapid restoration of ecosystem function and resilience following disturbances.[52]

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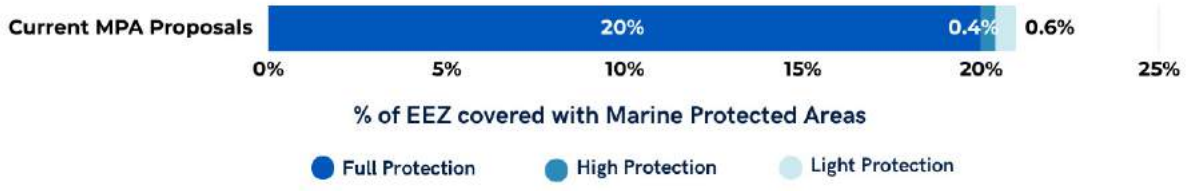
[51] Sarkis, S., 2021. "Bermuda Aquaculture Suitability Analysis." Technical Report, Bermuda Ocean Prosperity Programme, Bermuda.

[52] Lester, Sarah E. et al. 2009 "Biological Effects within No-Take Marine Reserves: A Global Synthesis." *Marine Ecology Progress Series* 384: 33–46. www.int-res.com/articles/meps2009/384/m384p033.pdf

This latter point is particularly important as it means that fully protected MPAs can more effectively increase the capacity of Bermuda's marine environments to adapt and respond to climate-related events, such as marine heat waves or stronger and more frequent hurricanes.

Figure 4:

Comparison of Percentage of Fully Protected Waters in the MPA Network



The MPAs identified complement and build upon the existing legislative framework shown in the Currently Legislated Areas Map. This increases coordination among government departments and agencies, leveraging existing protections and management requirements to achieve the MSP objectives.

Additionally, the MSP increases protection for important areas for mangroves, seagrass and coral. Research demonstrates that increasing protection can enhance natural ecosystem processes and reduce the impact of external stressors, such as pollution and physical damage.[53]

Many of the MPAs overlap with habitats that act as nursery grounds for commercially valuable fish species. Safeguarding these habitats with full or increased protection promotes efforts to enhance and replenish fish stocks, thereby benefitting the local fishing industry. In other locations on the globe where similar MPAs have been well implemented, increases in the average size and number of fish caught outside the fully protected MPA boundary have been documented, indicating that spillover from within the MPA is occurring.[54] Spillover has also been well-documented among spiny lobster species, including in temperate MPAs, where significant increases were observed in both the overall number of female lobsters and their individual egg production.[55]

The MPAs identified take a "stepping-stone" approach to connectivity and dispersal, with key habitats given either full or high protection, and individual species maintaining protection with existing management measures. Networks with similar continuity between critical habitats "can reduce and reverse disturbances through the replenishment of the impacted populations from external connected sources," which not only enhances ecosystem resilience but also helps prevent

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[53] Bohnsack, James A., D. B. McClellan, D. E. Harper, G. S. Davenport, G. J. Konovalet al. 1999. "Baseline Data for Evaluating Reef Fish Populations in the Florida Keys, 1979–1998." NOAA Technical Memorandum NMFS-SEFSC-427. Florida: National Oceanic and Atmospheric Administration, Government of the United States. https://repository.library.noaa.gov/view/noaa/30889

[54] Goñi, Raquel, Fabio Badalamenti, and Mark H. Tupper. "Fisheries—Effects of Marine Protected Areas on Local Fisheries: Evidence from Empirical Studies." In "Marine Protected Areas: A Multidisciplinary Approach," (2011): 72-98.

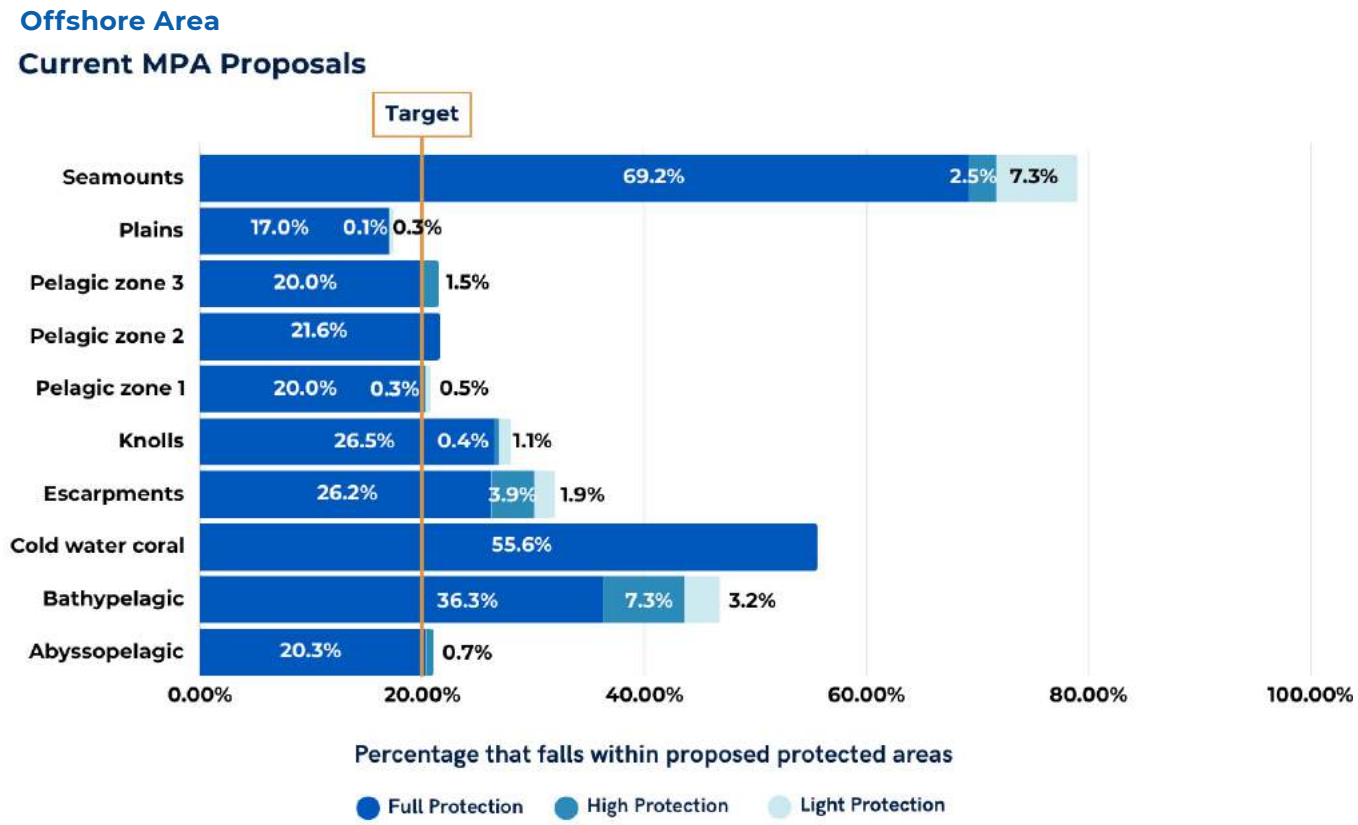
[55] Díaz, D., S. Mallol Martinez, A. M. Parma, and R. Goñi. 2011. "Decadal Trend in Lobster Reproductive Output from a Temperate Marine Protected Area." *Marine Ecology Progress Series*, 433: 149–157. www.int-res.com/abstracts/meps/v433/p149-157.

local species extinctions.[56] This approach to MPA network design has been shown to yield fisheries benefits while providing ecosystem resilience to climate-related disturbances.[57]

Refer to BIO.A and BIO.B for the non-spatial objectives associated with this goal.

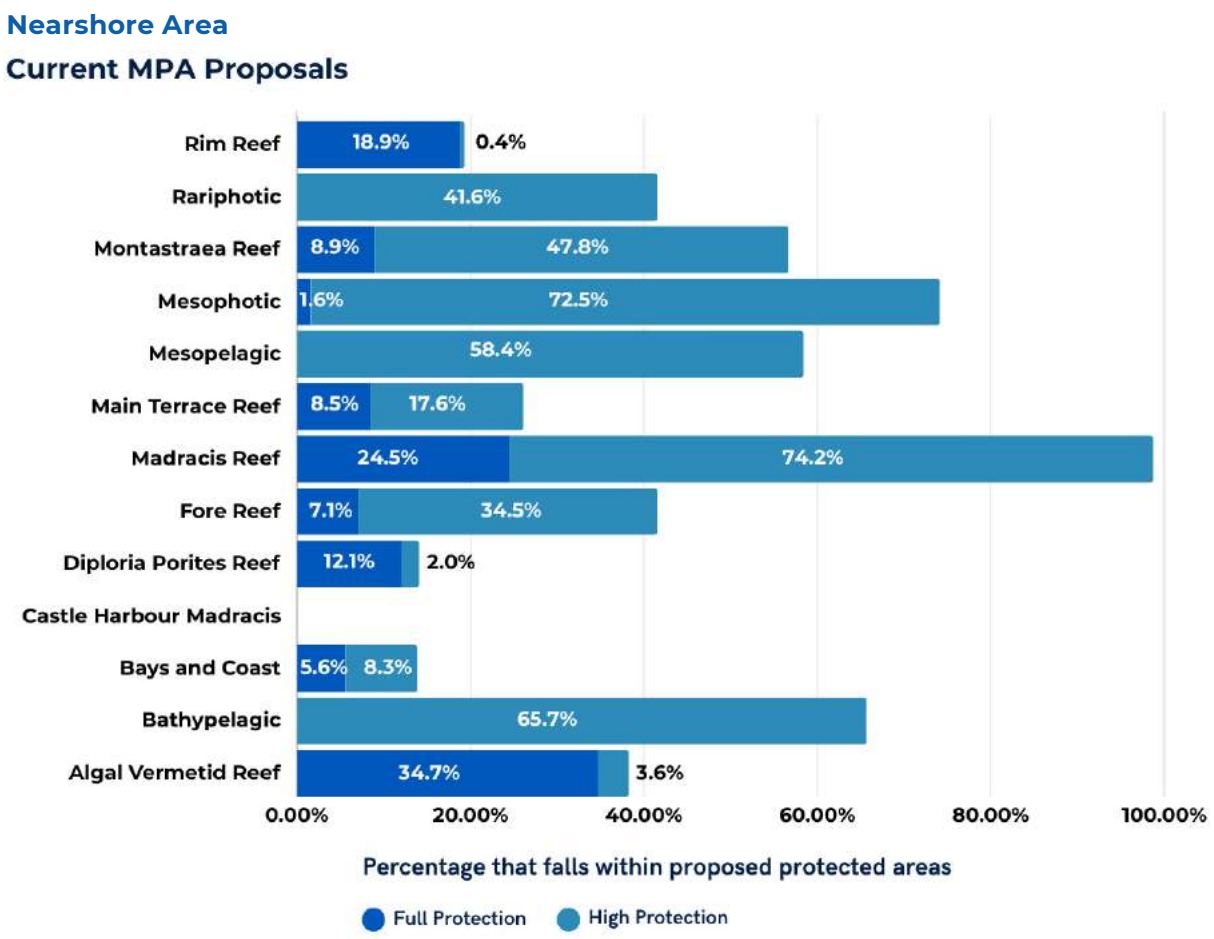
By including a variety of habitat types in offshore and nearshore protected areas, the MSP aims to protect marine biodiversity and promote ecological connectivity, which adds to ecosystem resilience.[58] Figure 5 and Figure 6 demonstrate the dispersal of protection across habitats in the MSP.

Figure 5:
Critical Habitat Types Protected in the Offshore MPA Network.



[56] Assis, J. et al. 2021. "Potential Biodiversity Connectivity in the Network of Marine Protected Areas in Western Africa." *Frontiers in Marine Science*, 8. www.frontiersin.org/articles/10.3389/fmars.2021.765053/full
[57] McLeod, E., R. Salm, A. Green, and J. Almany. 2008. "Designing Marine Protected Area Networks to Address the Impacts of Climate Change." *Frontiers in Ecology and the Environment* 7.7: 362–370. https://esajournals.onlinelibrary.wiley.com/doi/10.1890/070211
[58] McLeod, E., R. Salm, A. Green, and J. Almany. 2008. "Designing Marine Protected Area Networks to Address the Impacts of Climate Change." *Frontiers in Ecology and the Environment* 7.7: 362–370. https://esajournals.onlinelibrary.wiley.com/doi/10.1890/070211

Figure 6:
Critical Habitat Types Protected in the Nearshore MPA Network.



Goal (REP): Facilitate reproductive success of marine species through protection and restoration of important nursery grounds, spawning sites and migratory routes

Spatial Objective REP (1)

Maintain seasonal no-take restrictions at all known "fish" breeding and/or aggregation sites under "Fisheries (Protection Areas) Order 2000," and evaluate changes as new scientific information becomes available.

Current no-take seasonally restricted areas can be viewed in the Currently Legislated Areas Map. The Fisheries (Protected Areas) Order 2000,[59] which governs these restrictions, and will remain largely unchanged, with the exception of adjustments to the borders of the seasonally restricted areas to align with the easier-to-follow and more up-to-date contour lines of the protected areas in the MSP (these modifications were made based on stakeholder feedback; more information on this can be found in Section 4.2.4). The Fisheries Act 1972[60] allows for the declaration of protected fish aggregation sites via a publicly gazetted notice for a period of up to 90 days if there is an immediate risk to these valued areas.

[59] Government of Bermuda. 2000. "Fisheries Act 1972: Fisheries (Protected Areas) Regulations Order 2000." Hamilton: Government of Bermuda. https://faolex.fao.org/docs/pdf/ber64030.pdf
[60] Government of Bermuda. 1972. "The Fisheries Act." Hamilton: Government of Bermuda. www.bermudalaws.bm/laws/Consolidated%20Laws/Fisheries%20Act%201972.pdf.

The proposed MPA network in Section 4.2.1 includes highly protected MPAs overlapping these areas to afford additional protections that prohibit development, dredging or dumping of any kind, so as to protect the structural integrity of spawning aggregation sites for these important fisheries species. New fully protected MPAs that incorporate the current "Grouper Boxes" are included in the network to better protect the Black groupers that aggregate at these sites during seven months of the year, along with the habitat on which they depend. Similarly designed MPAs in other locations that afford protection to spawning aggregation sites have been shown to help restore and sustain stocks of commercially important fishes.[61]

A Blue-striped grunt aggregation site located near Coot Pond, which has been protected annually during May and June since 2007 using Section 4A of the Fisheries Act 1972,[62] will now also be included in a fully protected MPA (A9).

Spatial Objective REP (2)

Identify and protect 50 percent of coastal habitats that appear to be juvenile fish nursery habitats and/or used by protected marine species.

The Protected Species Order 2012[63] (which falls under the Protected Species Act 2003[64]) lists the plants and animals that are protected within Bermuda's marine waters, including coral, seagrass, and mangrove species that often form the basis of fish nursery habitats. Consistent with current regulations, 100% of established mangrove sites, which are coastal habitats known to be nursery grounds used by a variety of marine species, will receive high protection that will still allow for maintenance of existing infrastructure.

The nearshore MPA network (Section 4.2.4) offers additional protection to nursery habitats, helping to protect areas that are critical for the early life stages of many sub-adult fishes.[65] As shown in Figure 7, the nearshore MPA network protects a total of 38.1% of nursery habitat. Critically, the network also protects 36.2% of seagrass habitat. The network also includes a 3 m partially protected shoreline buffer that safeguards many coastal nursery areas used by juvenile fishes and protected marine species.

Of particular importance is the protected area near Coot Pond (A9) in the nearshore network, which includes nursery patch reef habitats. This area provides protective ecological connectivity with the protected mangroves within Coot Pond, which can have significant beneficial effects on fish assemblages and diversity.[66]

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[61] Waterhouse, L., S. A Heppell, C. V. Pattengill-Semmens, C. McCoy, P. Bush et al. 2020. "Recovery of Critically Endangered Nassau Grouper (*Epinephelus Striatus*) in the Cayman Islands following Targeted Conservation Actions. *Proceedings of the National Academy of Sciences*, 117(3): 1587–1595. https://www.pnas.org/doi/10.1073/pnas.1917132117

[62] Government of Bermuda. 2000. "Fisheries Act 1972: Fisheries (Protected Areas) Regulations Order 2000." Hamilton: Government of Bermuda. https://faolex.fao.org/docs/pdf/ber64030.pdf

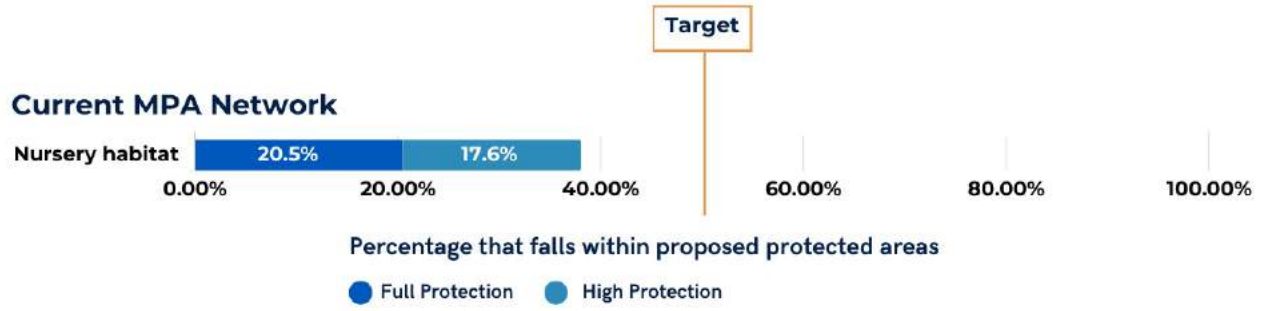
[63] Government of Bermuda. 2012. "Protected Species Order 2012." Hamilton: Government of Bermuda. https://faolex.fao.org/docs/pdf/ber118395.pdf

[64] Government of Bermuda. 2003. "Protected Species Act." Hamilton: Government of Bermuda. https://faolex.fao.org/docs/pdf/ber64069.pdf

[65] Nagelkerken, Ivan, Monique G. G. Grol and Peter J. Mumby. 2012. "Effects of Marine Reserves Versus Nursery Habitat Availability on Structure of Reef Fish Communities." *PloS one* 7.6: e36906.

Figure 7:

Nursery Habitat that Falls Within Fully and Highly Protected Areas.



Goal (HAB): Restore degraded and vulnerable habitats

Spatial Objective HAB (1)

Establish active restoration of areas that were formerly seagrass habitats (100 m2) through turtle exclusion.

All seagrasses are protected by the Protected Species Act 2003, however, there has been a marked decline of Bermuda's seagrass meadows over the last 25 years. The decline in seagrass is a result of direct (e.g. development, boat moorings and groundings) and indirect (e.g. overfishing of sharks and conservation of turtles) human impacts. Unlike most places around the world the decline has not been driven by declining water quality.[67] Up until 2018 the density of green turtles around Bermuda increased substantially.[68] The seagrass meadows could not grow quickly enough to meet the food demand of the turtles and many of the seagrass meadows collapsed as a result.[69] [70] The Government of Bermuda funded the first installation of turtle exclusion cages in 2020 for the purpose of seagrass restoration. The wire cages are designed to allow seagrass to have proper water flow and light exposure, while preventing turtles from grazing on the seagrass shoots, allowing them to grow. As a result of private donations, the original goal of covering 225 sq metres with cages was increased to a total of 2180 sq metres.

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[66] Kopp, D., Y. Bouchon-Navaro, M. Louis, D. Mouillot and C. Bouchon. 2010. "Juvenile Fish Assemblages in Caribbean Seagrass Beds: Does Nearby Habitat Matter?" *Journal of Coastal Research*, 26(6): 1133–1141. https://doi.org/10.2112/JCOASTRES-D-09-00063.1

[67] Fourqurean, J. W., S. A. Manuel, K. A. Coates, S. C. Massey and W. J. Kenworthy. 2019. "Decadal Monitoring in Bermuda Shows a Widespread Loss of Seagrasses Attributable to Overgrazing by the Green Sea Turtle *Chelonia Mydas*." *Estuaries and Coasts* 42.6: 1524–1540. https://link.springer.com/article/10.1007/s12237-019-00587-1

[68] Meylan, P. A., R. F. Hardy, J. A. Gray and A. B. Meylan. 2022. "A Half-Century of Demographic Changes in a Green Turtle (Chelonia Mydas) Foraging Aggregation during an Era of Seagrass Decline." *Marine Biology* 169(74): 1–20. https://link.springer.com/article/10.1007/s00227-022-04056-5

[69] Fourqurean, J. W., Manuel, S., Coates, K. A., Kenworthy, W. J., & Smith, S. R. 2010. "Effects of excluding sea turtle herbivores from a seagrass bed: overgrazing may have led to loss of seagrass meadows in Bermuda." *Marine Ecology Progress Series*, 419, 223-232. https://www.int-res.com/articles/meps2010/419/m419p223.pdf

[70] Fourqurean, J. W., Manuel, S. A., Coates, K. A., Massey, S. C., & Kenworthy, W. J. (2019). Decadal monitoring in Bermuda shows a widespread loss of seagrasses attributable to overgrazing by the green sea turtle Chelonia mydas. *Estuaries and Coasts*, 42, 1524-1540. http://serc.fiu.edu/seagrass/pubs/2019_FourqureanEtAl.pdf

DENR is currently in the process of drafting a conservation management plan for seagrass that includes information on restoration implementation and management. The Potential Use Area Maps for Habitat Restoration, specifically the maps that outline the most suitable areas for seagrass restoration (Maps 35 and 36, Section 4.3.2), support this effort. These maps include locations of current turtle exclusion cage installations and applies a suitability index to suggest potential restoration locations based on their inclusion in ongoing restoration projects and recent observations of seagrass growth.

In recognition of the complexities of Bermuda's declining seagrass meadows, and to account for feedback received during the public comment period, non-spatial objective INF.A includes a proposal to modify standard swing moorings into eco-friendly swing moorings, which will reduce the negative impacts to seagrass from anchors and chains that drag across the seabed.

Refer to HAB.A, HAB.B, and HAB.C for the non-spatial objectives associated with this goal.

Goal (UNQ): Preserve unique, rare, and/or threatened species and habitats

Spatial Objective UNQ (1)

When designating marine protected areas, prioritise those areas that seek to protect habitat used by unique, rare and/or threatened species named in Protected Species Act.

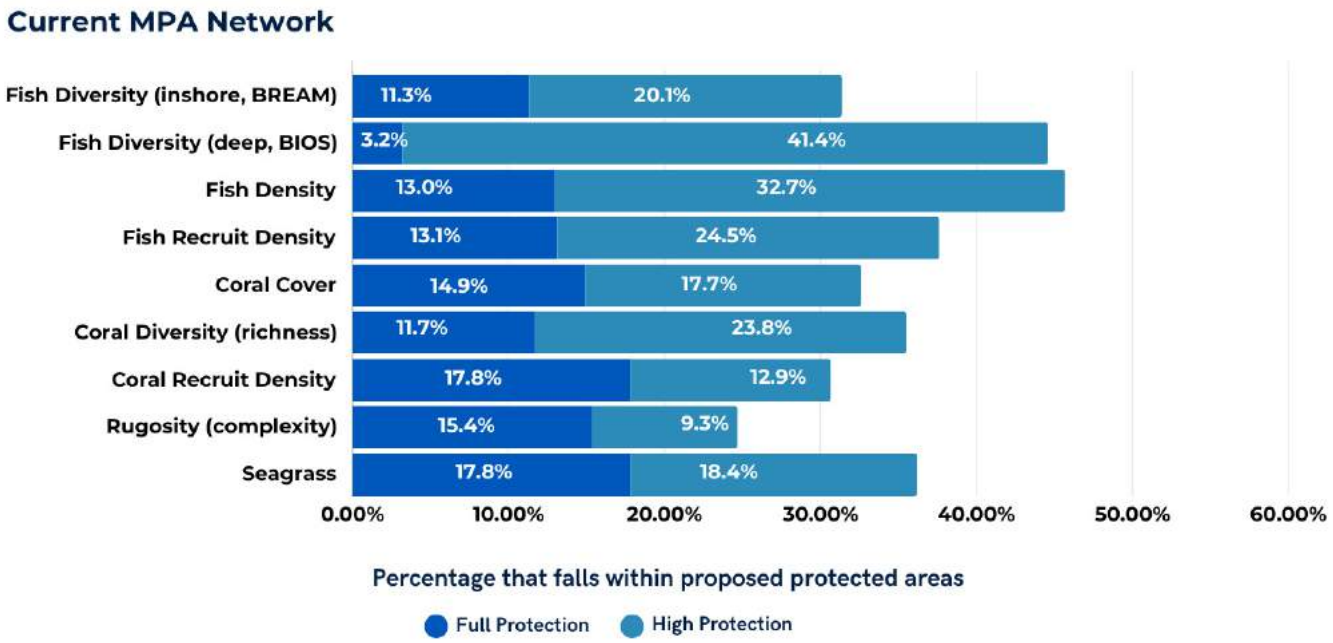
The Protected Species Order 2012[71] (which falls under the Protected Species Act 2003[72]) and Fisheries (Protected Species) Order 1978[73] (which falls under the Fisheries Act 1972[74]) list species that are protected within Bermuda's territorial sea and EEZ, respectively, lists the species that are protected anywhere within Bermuda's marine waters. The MSP (Section 4.2) offers additional protection where MPAs overlap with areas of high-quality habitat. Understanding where and how high-quality habitats—such as breeding, feeding, and migratory grounds—are used by unique, rare and/or threatened species are important considerations for effective protection.[75] In Bermuda, these areas for the nearshore MPA network have been determined using nine measures of reef health (Figure 8).

[71] Government of Bermuda. 2012. "Protected Species Order 2012." Hamilton: Government of Bermuda. https://faolex.fao.org/docs/pdf/ber118395.pdf
[72] Government of Bermuda. 2003. "Protected Species Act." Hamilton: Government of Bermuda. https://faolex.fao.org/docs/pdf/ber64069.pdf
[73] Government of Bermuda. 1978. "Fisheries (Protected Species) Order 1978." Hamilton: Government of Bermuda. https://faolex.fao.org/docs/pdf/ber7100.pdf
[74] Government of Bermuda. 2000. "Fisheries Act 1972: Fisheries (Protected Areas) Order 2000." Hamilton: Department of the Environment, Government of Bermuda. https://faolex.fao.org/docs/pdf/ber64030.pdf
[75] Roberts, K. E., B. J. Smith, D. Burkholder and K. M. Hart. 2021. "Evaluating the Use of Marine Protected Areas by Endangered Species: A Habitat Selection Approach." Ecological Solutions and Evidence 2.1: e12035. https://besjournals.onlinelibrary.wiley.com/doi/10.1002/2688-8319.12035

It was recognised in the development of the MSP that these habitats play a role in sustaining Bermuda's unique marine biodiversity which, in turn, is essential to preserving ecosystem health and well-being. Protecting critical habitats, particularly for keystone species or organisms that serve as the foundation of marine food chains, can provide an extra level of protection against the impacts of climate change, while sustaining important ecosystem services such as water filtration, healthy fisheries and carbon sequestration.[76]

Figure 8:

Proportion of "High Quality" Habitat in Fully and Highly Protected Areas of the Current MPA Network



Spatial Objective UNQ (2)

When designating marine protected areas, prioritise those areas that seek to protect at least 40 percent of seamount area in Bermuda's outer EEZ. This objective specifically excludes Challenger and Argus Banks.

Seamounts are distinctive features of the global ocean, with many supporting dense communities of commercially important fishes and unique benthic organisms, such as deep-water corals. Seamounts are also vulnerable to damaging extractive activities and should be afforded additional protection to safeguard these habitats.[77] These underwater mountains are also known as "hotspots of biodiversity," rising high off the seafloor and forcing cold, deep ocean currents, rich in nutrients, toward the surface.[78] These ocean upwelling zones attract marine life from miles around—tunas,

[76] Rogers-Bennett, L. and C. A. Catton. 2022. "Cascading Impacts of a Climate-Driven Ecosystem Transition Intensifies Population Vulnerabilities and Fishery Collapse." *Frontiers in Climate*, 4: 908708. www.frontiersin.org/articles/10.3389/fclim.2022.908708/full

[77] Probert, P. K., S. Christiansen, K. Gjerde and S. Gubbay. 2007. "Management and Conservation of Seamounts." *Seamounts: Ecology, Fisheries, and Conservation*. Blackwell Fisheries and Aquatic Resources Series 12: 442–475.

[78] Silva, M., M. Araujo, F. Geber, C. Medeiros, C., Araujo, et al. 2021. "Ocean Dynamics and Topographic Upwelling around the Aracati Seamount-North Brazilian Chain from in situ Observations and Modeling Results." *Frontiers in Marine Science*, 8: 609113. https://www.frontiersin.org/articles/10.3389/fmars.2021.609113/full

whales, sea birds, and sharks—and this phenomenon is also what makes them ideal fishing grounds for a variety of pelagic species.

The MSP (Section 4.2) achieves the target of protecting at least 40% of seamounts in Bermuda's offshore area. In the offshore network, 69.2% of seamounts are safeguarded by fully protected areas, while an additional 2.5% are designated as highly protected areas (Figure 5). As noted in the spatial objective, Challenger and Argus Banks, which are also seamounts, were specifically excluded from consideration for protection due to their importance as fishing grounds.

Referring to Map 2 (Section 4.2.3), the Muir Chain of seamounts is fully protected in Shape A13, while the Crescent Seamount in Shape D1 has been given a lightly protected designation. For the Muir Chain this means that fishing activities are not permitted so as to preserve the ecological connectivity and resilience between the surface waters and the seabed. The benefits from this are supported by a growing body of scientific literature linking the health of deep-sea ecosystems with activities that take place at the surface and in the upper layers of the ocean.[79] For the Crescent Seamount, due its value to Bermuda's longlining fishery, only bottom fishing is prohibited.

Similarly, referring to Map 3 (Section 4.2.4), both the Challenger and Argus Banks have been designated as "fisheries areas." With this designation, all legal fishing activities can continue as permitted under existing regulations, but development and other destructive activities are now prohibited to protect valuable habitat and fishing grounds.

Refer to UNQ.A and UNQ.B for the non-spatial objectives associated with this goal.

4.2.1 MPA Network

This section describes and defines the MPA network for Bermuda's nearshore area (coastline to 2000 m depth) and offshore area (2000 m depth to the outer EEZ boundary), as well as a coastal network that covers Bermuda's shoreline, bays and harbours. The network was designed to meet the maximum number of approved objectives, while also considering feedback from the BOPP Science Committee and BOPP Steering Committee, as well as stakeholder input. The effectiveness of the network at meeting the approved spatial objectives is outlined in Section 4.2.

User Impact Assessments detail the impacts of the MPA network—when combined with current legislation—on ocean user groups. This collection of maps covers a variety of ocean uses, including fishing (multiple gear types), infrastructure and development, and other marine activities such as aquaculture, research, non-extractive recreation and shipping. The maps show the impact of the revised nearshore proposal on each activity (by calculating how much area each activity is permitted, prohibited, or restricted within) and compares these figures to the status quo—under existing legislation.

In the following sections, you will find explanations for the spatial designations for Bermuda's waters, including:

- Currently Legislated Areas.
- The proposal of a newly legislated MPA network (offshore, nearshore and coastal).
- Non-legislated suitability maps for Potential Use Areas for priority activities.

[79] O'Leary, B. C., and C. M. Roberts. 2018. "Ecological Connectivity across Ocean Depths: Implications for Protected Area Design." *Global Ecology and Conservation*, 15: e00431. https://www.sciencedirect.com/science/article/pii/S2351989418301021.

Photo Credit: ***Shayna Brody***

MPAs are assigned a level of protection based on guidance in *The MPA Guide*.[80] Each level of protection outlines the types of human activities that are permitted and prohibited within the various MPAs to ensure Bermuda has the highest level of success in achieving the MSP's management and conservation goals. For reference purposes, these activities are listed as "Use Charts" associated with MPAs in each of the offshore, nearshore and coastal proposals throughout the following sections. Examples and descriptions of specific activities in each category are summarised in Table 3 at the end of Section 4.2.2 (please note these examples and descriptions are not intended to be comprehensive and legally binding lists).

In addition to the maps included in the MSP, additional resources are available to help you understand the new MPA network and changes in levels of protection associated with each area. Please visit https://www.bermudaoceanprosperity.org/ to learn more. These resources include:

- An online, interactive map viewer
- A resource guide with detailed information about each of the fully protected areas
- A grid-based map book with "before" and "after" maps showing where and how protected areas have changed, along with navigational coordinates for ease of reference

4.2.2 Currently Legislated Areas

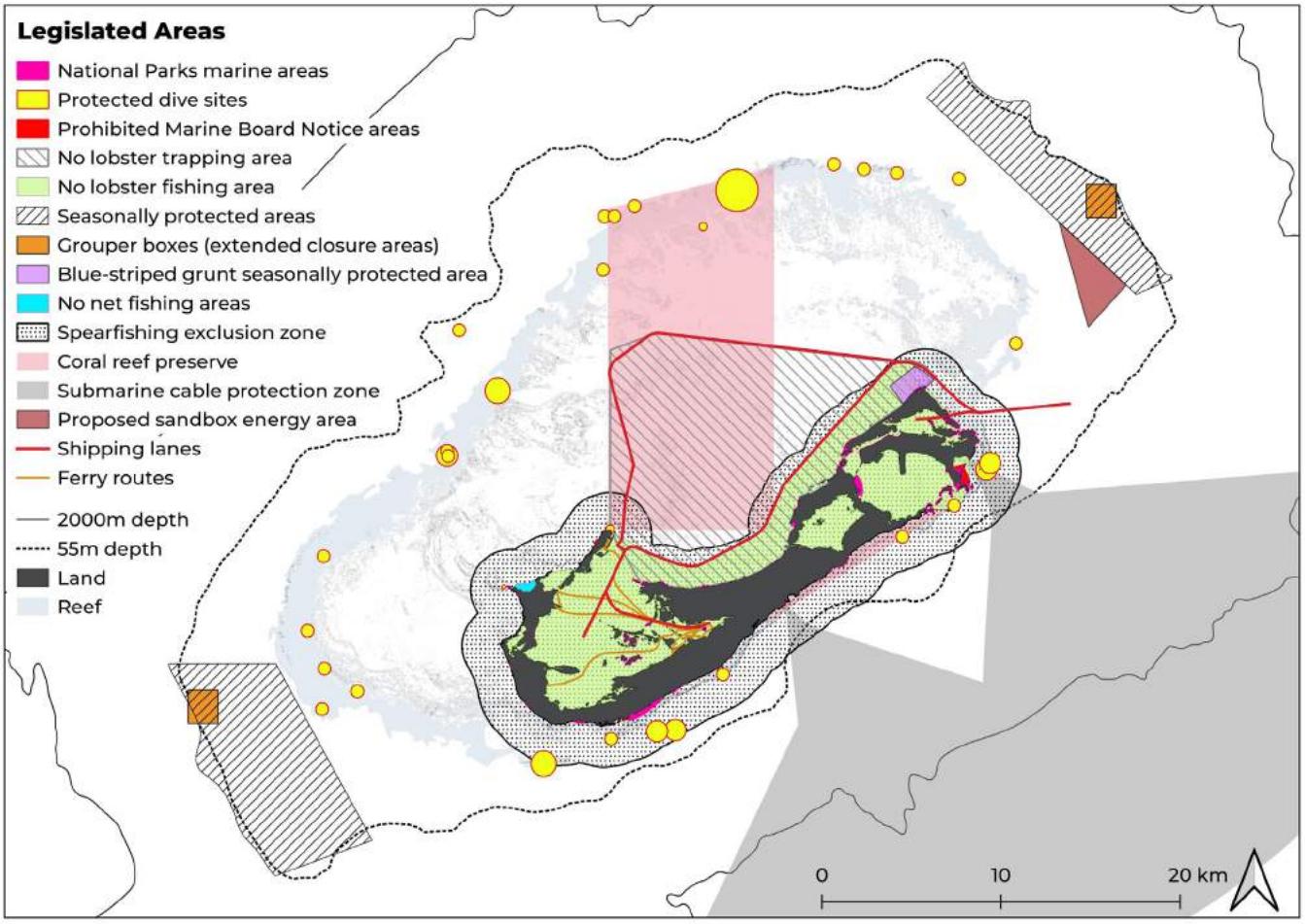
Currently legislated areas are those areas managed for a specific purpose under Bermuda law. Most of these areas and legislation will remain unchanged under the MDA and have been considered in the MSP's design. They include the following areas and are outlined in Map 1, below. The allowed activity types in each area are outlined in Use Chart 1. Table 3 provides specific examples of activities within each broad category of the use chart.

[80] Grorud-Colvert, K., J. Sullivan-Stack, C. Roberts, V. Constant, B. Horta e Costa et al. 2021. "The MPA Guide: A Framework to Achieve Global Goals for the Ocean." *Science*, 373(6560). www.science.org/doi/10.1126/science.abf0861

- Coral reef preserves
- Ferry routes
- Grouper boxes (extended closure areas)
- National Parks marine areas
- No lobster fishing area
- No lobster trapping area
- No net fishing areas
- Prohibited Marine Board Notice areas
- Protected dive sites
- Proposed sandbox energy area
- Seasonally protected areas
- Shipping lanes
- Spearfishing exclusion zone
- Submarine cable protection zone

Map 1

Currently Legislated Areas



Use Chart 1 Currently Legislated Areas

*None of the areas listed in the Currently Legislated Areas Map have requirements for 1) an Environmental Impact Assessment for development, change of use or intensity of use, or 2) a management plan for special areas of interest, legislated, or declared protected areas.

What Activities are Allowed or Not Allowed in Currently Legislated Areas?

● Permitted ● Restricted ● Prohibited

	Non extractive research	Restoration/ enhancement for conservation	Non extractive recreation	Low impact tourism	High impact tourism	Extractive research	Lobster trapping	Lobster diving	Bottom fishing	Netting (all types)	Commercial trolling/ surface fishing	Recreational trolling/ surface fishing
Ferry Routes	●	●	●	●	●	●	●	●	●	●	●	●
Shipping Lanes	●	●	●	●	●	●	●	●	●	●	●	●
Protected Dive Sites	●	●	●	●	●	●	●	●	●	●	●	●
National Parks Marine Areas	●	●	●	●	●	●	●	●	●	●	●	●
Prohibited Marine Board Notice Areas	●	●	●	●	●	●	●	●	●	●	●	●
Seasonally Protected Areas	●	●	●	●	●	●	●	●	●	●	●	●
Grouper boxes (extended closure areas)	●	●	●	●	●	●	●	●	●	●	●	●
No net fishing areas	●	●	●	●	●	●	●	●	●	●	●	●
Spearfishing exclusion zone	●	●	●	●	●	●	●	●	●	●	●	●
No lobster fishing areas	●	●	●	●	●	●	●	●	●	●	●	●
Lobster reservoir (no lobster trapping)	●	●	●	●	●	●	●	●	●	●	●	●
Coral reef preserve	●	●	●	●	●	●	●	●	●	●	●	●
Submarine cable protection zone	●	●	●	●	●	●	●	●	●	●	●	●
Proposed Sandbox energy area	●	●	●	●	●	●	●	●	●	●	●	●

Use Chart 1 Currently Legislated Areas

*None of the areas listed in the Currently Legislated Areas Map have requirements for 1) an Environmental Impact Assessment for development, change of use or intensity of use, or 2) a management plan for special areas of interest, legislated, or declared protected areas.

What Activities are Allowed or Not Allowed in Currently Legislated Areas?

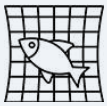
● Permitted ● Restricted ● Prohibited

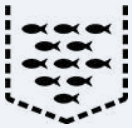
	Catch & release fly fishing	Recreational spearfishing	Navigation /transiting vessels/ boating	Shipping	Restoration /enhancement other reasons	Industrial scale fishing & aquaculture	Aquaculture (small scale)	Dredging and dumping	Renewable energy generation	Infrastructure works & development	Cabling	Untreated water discharge	Mining, oil and gas extraction
Ferry Routes	●	●	●	●	●	●	●	●	●	●	●	●	●
Shipping Lanes	●	●	●	●	●	●	●	●	●	●	●	●	●
Protected Dive Sites	●	●	●	●	●	●	●	●	●	●	●	●	●
National Parks Marine Areas	●	●	●	●	●	●	●	●	●	●	●	●	●
Prohibited Marine Board Notice Areas	●	●	●	●	●	●	●	●	●	●	●	●	●
Seasonally Protected Areas	●	●	●	●	●	●	●	●	●	●	●	●	●
Grouper boxes (extended closure areas)	●	●	●	●	●	●	●	●	●	●	●	●	●
No net fishing areas	●	●	●	●	●	●	●	●	●	●	●	●	●
Spearfishing exclusion zone	●	●	●	●	●	●	●	●	●	●	●	●	●
No lobster fishing areas	●	●	●	●	●	●	●	●	●	●	●	●	●
Lobster reservoir (no lobster trapping)	●	●	●	●	●	●	●	●	●	●	●	●	●
Coral reef preserve	●	●	●	●	●	●	●	●	●	●	●	●	●
Submarine cable protection zone	●	●	●	●	●	●	●	●	●	●	●	●	●
Proposed Sandbox energy area	●	●	●	●	●	●	●	●	●	●	●	●	●

Table 3

Examples of Activities in Each Category

Activity Type		Examples of Activities in Each Category
	**Non-extractive research**	Video and photographs of marine habitats for surveying and monitoring, visual fish counts, etc.
	**Restoration/enhancement for conservation**	Replanting of native and endemic species, including mangroves and seagrasses, to support the restoration of degraded environments for species conservation purposes.
	**Non-extractive recreation**	Passive recreation with minimal disruption to the ocean that does not involve removing organisms or geological materials (e.g., shells, sand) from the marine environment (i.e., kayaking, swimming, snorkeling, etc).
	**Low-impact tourism**	Passive recreation that involves some disruption to the ocean, as tourists are more immersed in the ocean environment (i.e., SCUBA, snorkeling, sports photography), yet is still not extractive in nature.
	**High-impact tourism**	Tourism activities that result in damage to the marine environment, usually in the form of noise pollution and trash left in the water and adjacent coastal areas. Examples include water-based concerts and raft-ups, as well as marine excursions led by inexperienced operators.
	**Extractive research**	Research that involves removing organisms or non-living samples from the area. This may include sediment cores, catching fish for investigation in the lab, or performing catch and release studies. Recognizing the MSP's monitoring plan will require a broad data set that will likely involve some of these methods, there are plans to develop a permitting system for legitimate scientific research that falls within this category. Extractive research requires a permit.
	**Lobster trapping**	This refers to trapping activities conducted by commercial fishermen with a valid lobster trapping license that take place between September 1 and March 31 in designated locations, in accordance with any fisheries control measures that have been enacted.
	**Lobster diving**	This refers to activities conducted by recreational fishermen with a valid license for lobster diving that take place between September 1 and March 31, in designated locations, and in accordance with any fisheries control measures that have been enacted.

Activity Type		Examples of Activities in Each Category
	**Bottom fishing**	Bottom fishing in Bermuda generally occurs in the nearshore waters and targets a wide range of species including red hind, snapper, coneys and porgies.
	**Netting (all types)**	Net fishing is used in Bermuda in the bait fishing industry. This activity covers all types of net fishing unless specified otherwise. All fixed nets are prohibited.
	**Commercial trolling/ surface fishing**	Trolling is a type of fishing where rods and reels are used to pull baited hooks (or lures) behind a commercially-licensed boat (this is different than bottom trawling).
	**Recreational trolling/ surface fishing**	Same definition as above, only on a recreational boat, therefore the fishermen are not legally permitted to sell their catch.
	**Catch and release fly fishing**	Most of the catch and release fly fishing is done for bonefish, but there is a growing number of sports fishermen who are using catch and release (with custom lures) to catch spearfish and marlin.
	**Recreational spearfishing**	Recreational fishermen must apply for a spearfishing licence and / or a lionfish culling permit if they wish to engage in these activities. Lionfish culling permits allow lionfish culling in all areas, including fully and highly protected MPAs, as removal of invasive species supports the conservation goals of these areas. ⚠
	**Navigation/transiting vessels/boating**	Legal and legitimate maritime activities conducted in accordance with the Marine Board Act 1962 and any current legislation that places time/geographic constraints on vessel transit and navigation within Bermuda's waters.
	**Shipping**	Generally commercial activities conducted on large sea-going steamers, motor or sailing ships, whose transit occurs within set shipping channels, and where loading and offloading activities take place at municipal docks (e.g., Hamilton docks, St. George's docks)
	**Restoration/enhancement for other reasons**	Activities in this category include habitat restoration and enhancement activities that are conducted for reasons other than conservation. Examples include the installation of underwater sculpture gardens and the creation of underwater viewing areas.

Activity Type		Examples of Activities in Each Category
	**Industrial-scale fishing and aquaculture**	Industrial-scale fishing and aquaculture refers to commercial operations that utilise high levels of technology that require high levels of investment. Examples of industrial-scale fishing operations include purse seiners and trawlers.
	**Small-scale aquaculture**	Small-scale aquaculture typically refers to mariculture conducted by households or communities often for a variety of reasons that involve food security, economic diversification and income generation for improved living conditions.
	**Dredging and dumping**	Using industrial-scale equipment to remove material from the seabed for excavation purposes, or to reclaim the seabed material as fill for another location.
	**Renewable energy generation**	Approved development and installation of marine-based renewable energy technologies, including but not limited to wave energy platforms, wind energy turbines, floating solar photovoltaic (PV) panels, and others.
	**Infrastructure works and development**	Routine maintenance of existing coastal and marine infrastructure, such as docks and moorings, upgrading existing infrastructure to be less damaging to the marine environment (e.g., installing “swing” moorings), or the development of new infrastructure, as permitted under existing legislation (such as the Development and Planning Act 1974 and lease agreements with the Minster of Public Works for use of the ‘King’s Bottom’).
	**Cabling**	Cable repair or installation activities as described in the Submarine Cable Communications Act 2020.
	**Untreated water discharge**	Discharge of water into nearshore waters that is not in accordance with The Water Resources (Prevention of Pollution by Sewage from Boats) Regulations 2018 (e.g., emptying a holding tank in a “No Discharge Zone”).
	**Mining, oil and gas extraction**	Industrial-scale activities intended to identify and extract metals and minerals from the ocean’s seabed, or to tap into oil and gas deposits to be pumped or barged back to the shoreline.
	**Shoreline Fishing**	Shoreline fishing relates to hook-and-line fishing only. Other types of fishing, including cast netting, are not considered ‘shoreline fishing’ in the MSP.

4.2.3 Offshore Network

As before, this network covers Bermuda's waters from the 2,000 m depth contour around the Bermuda platform to the boundary of the island's EEZ, 200 nm from Bermuda's shores.

A formal management plan for the offshore area will define conservation objectives, build on current Species Action Plans and detail activities (e.g., spatial management measures) that should be undertaken in specific circumstances. The management plan will also include a review and potential modification of the currently legislated areas in accordance with the MSP's objectives.

In addition, the MDA will set forth legal procedures for development activities taking place in Bermuda's offshore waters, including the requirement for EIAs. This particular requirement is being implemented to further safeguard Bermuda's marine habitats for future generations (goal DEV and non-spatial objectives DEV.A and DEV.B).

Shape A13 in the northeastern portion of the EEZ is designated with full protection and covers the Muir Seamount, which helps preserve unique habitats (goal UNQ) and prioritises areas that seek to cover at least 40% of seamount area in Bermuda's EEZ (spatial objective UNQ.1). Shape A14 in the southeastern portion of the EEZ covers diverse and unique deep-sea benthic habitats, including knolls, plains, and valleys, helping achieve representative protection of a range of critical habitats (goal BIO and spatial objective BIO.1), as well as preserving unique and rare deep-ocean ecosystems and their inhabitants (goal UNQ). Full protection of these larger open-ocean areas also provides the framework for spillover to occur for pelagic fish species, such as tuna, should Bermuda decide to pursue the expansion of a sustainable commercial pelagic fishery in the future.[81]

In this offshore MPA network, an area of approximately 220 sq km (85 sq mi) was removed from full protection in the northwest corner of Shape A14 to open up important fishing grounds closer to the Platform that are of higher value for pelagic fishing. The designation of Shape D1, around Crescent Seamount, was reduced from highly protected to lightly protected. This change allows for small-scale longlining to take place in this region, which was identified as the "highest value" area for Bermuda's longliner, while still safeguarding the seamount against destructive activities such as development and seabed mining. Both of these changes help facilitate sustainable fisheries (goal FSH) and ensure continued access to the most highly valued fishing grounds on and around the nearshore area (spatial objective FSH.1)

Use Chart 2 outlines the activities that are allowed and prohibited within the offshore MPA network. In addition, each of the protected areas in the offshore MPA network (A13, A14, and D1) have an EIA requirement for all development, change of use, or intensity of use, and require a management plan for special areas of interest, legislated, or declared protected areas.

[81] Medoff, S., J. Lynham and J. Raynor. 2022. "Spillover Benefits from the World's Largest Fully Protected MPA." *Science*, 378(6617): 313–316. www.science.org/doi/10.1126/science.abn0098

Map 2

Offshore MPA Network (2000 m to EEZ boundary)

Use Chart 2

What Activities are Allowed or Not Allowed in the Revised MPA Network - Offshore Network Proposal

	Zone Type	Non extractive research	Restoration/ enhance-ment for conser-vation	Non extractive recreation	Extractive research	Lobster trapping	Lobster diving	Bottom fishing; Deep trolling & Vertical lining	Netting (all types)	Surface trolling	Pelagic long lining	Shoreline Fishing	Catch & release fly fishing	Recre-ational spear-fishing
A13- Muir Seamount Chain	Fully Protected	●	●	●	●	●	●	●	●	●	●	○	●	●
A14 - Southeast EEZ	Fully Protected	●	●	●	●	●	●	●	●	●	●	○	●	●
D1 - Crescent Seamount	Lightly Protected	●	●	●	●	●	●	●	●	●	R1	○	●	●

	Zone Type	Navigation; Transiting vessels; Boating; Anchoring	Shipping	Restoration /enhance-ment other reasons	Industrial-scale fishing & aquaculture	Restorative Aqua-culture	Aqua-culture (small-scale)	Dredging and dumpin	Renewable energy generation	Infra-structure works & develop-ment	Cabling	Untreated water discharge	Mining, oil and gas extraction	Mooring Works
A13- Muir Seamount Chain	Fully Protected	●	*	●	●	●	●	●	●	●	●	●	●	R3
A14 - Southeast EEZ	Fully Protected	●	*	●	●	●	●	●	●	●	●	●	●	R3
D1 - Crescent Seamount	Lightly Protected	●	*	●	●	●	●	●	●	●	●	●	●	R1

Legend :

- ● Prohibited
- ● Restricted
- ● Permitted
- ○ Not Applicable
- R1 : May be deployed 10NM from the 2000 m contour under the terms and conditions of the required special licence from DENR.
- R3 : Minimal impact fixed moorings at low density are compatible with fully protected MPAs.

** Shipping has special consideration when placing MPAs. The United Nations Convention on the Law of the Sea (UNCLOS) applies and there are different shipping rights of passage through the various ocean zones.*

Note: There is an EIA requirement for all development, change of use or intensity of use in each of these areas. Management plan is required for special areas of interest, legislated or declared protected areas.

4.2.4 Nearshore Network

The nearshore MPA network (Map 3) covers Bermuda's waters from the mean high-water mark at the coastline to the 2000 m depth contour. As with the offshore network, the nearshore network comprises a series of MPAs with varying levels of protection designations—and, therefore, allowable human use activities—based on initial guidance from *The MPA Guide*. The Guide does not set concrete definitions for protection designations, instead allowing them to be determined "based on the impact of allowed activities...[where] impact is determined by activity type, intensity, scale, duration, and frequency relative to biodiversity conservation goals."[82] In this way, *The MPA Guide* provides flexibility for planners and resource managers to consider features of MPA design, such as size and location, when determining the appropriate protection designation.

Areas proposed for full protection in the nearshore MPA network are spread across the Bermuda Platform to account for different prevailing environmental conditions that may affect both marine organisms and human uses, and also to reduce the impact on resource users operating from any one part of the island. Designing the network in this way helps the MSP meet a variety of its ecological objectives while simultaneously taking into consideration economic, cultural and social impacts of the Plan's implementation.

As with the offshore network, a formal management plan for the nearshore network will define conservation objectives, build on current Species Action Plans and detail activities (e.g., spatial management measures) that should be undertaken in specific circumstances. The management plan will also include a review and potential modification of the currently legislated areas in accordance with the MSP's objectives.

In addition, the MDA will set forth legal procedures for development activities taking place in Bermuda's marine waters, including the requirement for EIAs. This particular requirement is being implemented to further safeguard Bermuda's marine habitats—including important fishing grounds, spawning grounds and nursery habitat—for future generations (goal DEV and non-spatial objectives DEV.A and DEV.B).

Based on feedback received during the public comment period; focus group sessions; one-on-one interviews with stakeholders, including commercial fishermen; as well as input from the BOPP Steering Committee and Science Committee, the original nearshore MPA network was modified to address four main areas of concern:

1. Proposed protection should not impact the ability to maintain critical infrastructure.
2. MPA placement should enhance the tourism industry and not limit potential development opportunities that are in line with the MSP.
3. The complexities of the fishing industry should be adequately considered.
4. Proposed protection should better meet the MSP's ecological objectives.

Finally, based on the advice of enforcement experts, the shapes of individual MPAs were changed, where possible, to simple shapes—such as circles and squares—with straight line (north-south and east-west) boundaries and/or borders that stop at the edge of known depth contours—such as the 55 m (30 fathom) depth contour. These small modifications make the rules and regulations of the MPA network easier to both enforce and follow, facilitating effective enforcement within the marine environment (Goal ENF).

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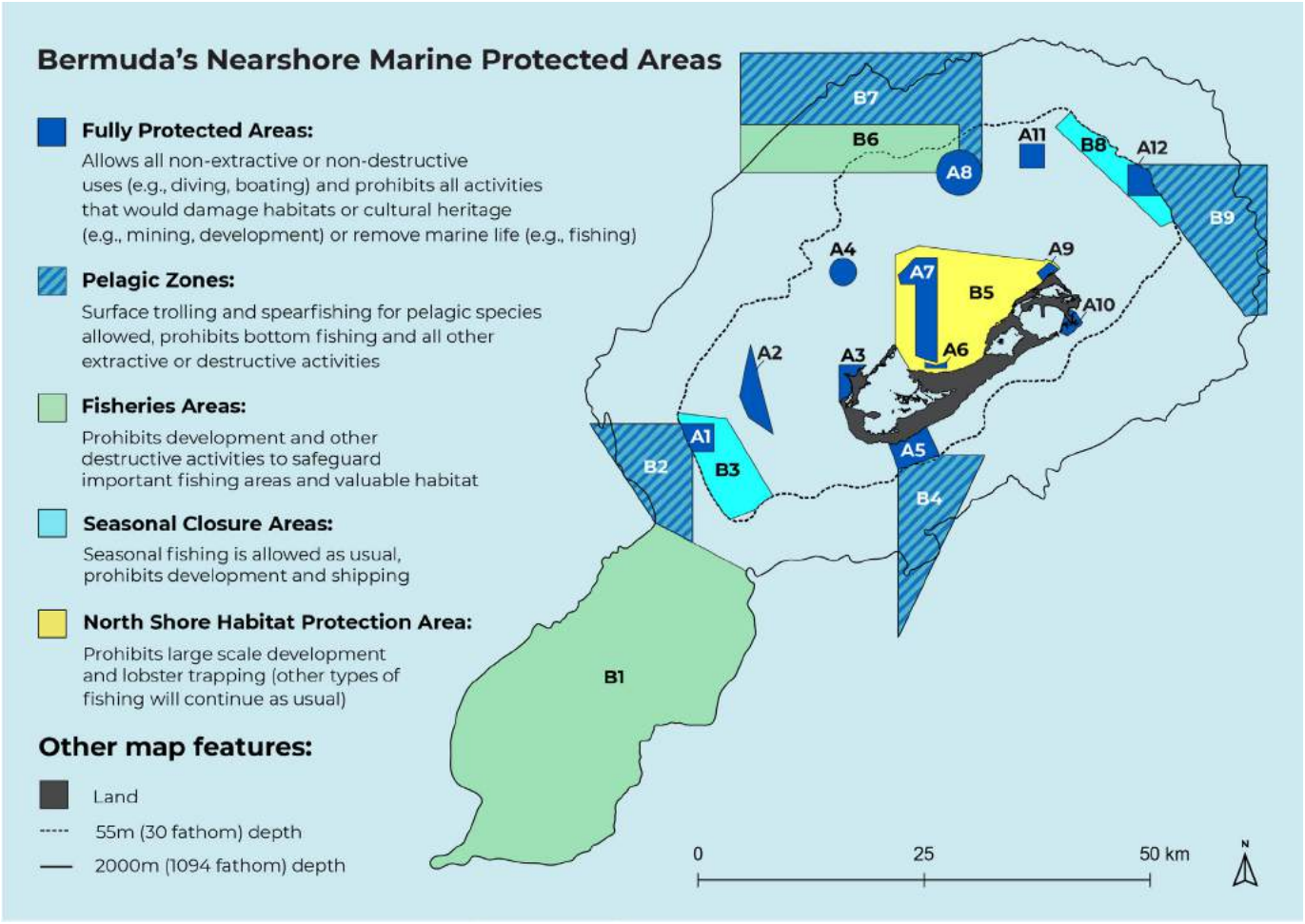
[82] Grorud-Colvert, K., J. Sullivan-Stack, C. Roberts, V. Constant, B. Horta e Costa et al. 2021. "The MPA Guide: A Framework to Achieve Global Goals for the Ocean." *Science*, 373(6560). www.science.org/doi/10.1126/science.abf0861

Map 3

Revised MPA Network – Nearshore Proposal



Use Chart 3 What Activities are Allowed or Not Allowed in the Revised MPA Network - Nearshore Network Proposal

● Permitted ● Restricted ● Prohibited

	Zone Type	Non extractive research	Restoration/ enhance-ment for conservation	Non extractive recreation	Extractive research	Lobster trapping	Lobster diving	Bottom fish-ing; Deep trolling & Vertical lining	Netting (all types)	Surface trolling	Pelagic long lining	Shoreline Fishing	Catch & release fly fishing	Recreational spear-fishing
A1 - Western Grouper Box	Fully Protected	●	●	●	●	●	●	●	●	●	●	●	●	●
A2 - Chub Heads	Fully Protected	●	●	●	●	●	●	●	●	●	●	●	●	●
A3 - Daniel's Head	Fully Protected	●	●	●	●	●	●	●	●	●	●	●	●	●
A4- Eastern Blue Cut	Fully Protected	●	●	●	●	●	●	●	●	●	●	●	●	●
A5 - South Shore	Fully Protected	●	●	●	●	●	●	●	●	●	●	●	●	●
A6 - North Shore Nursery	Fully Protected	●	●	●	●	●	●	●	●	●	●	●	●	●
A7 - North Lagoon	Fully Protected	●	●	●	●	●	●	●	●	●	●	●	●	●
A8 - North Rock	Fully Protected	●	●	●	●	●	●	●	●	●	●	●	●	●
A9 - Coot Pond Area	Fully Protected	●	●	●	●	●	●	●	●	●	●	●	●	●
A10 - Castle Harbour Islands and Reef	Fully Protected	●	●	●	●	●	●	●	●	●	●	●	●	●
A11 - Northeast Breaker	Fully Protected	●	●	●	●	●	●	●	●	●	●	●	●	●
A12 - Eastern Grouper Box	Fully Protected	●	●	●	●	●	●	●	●	●	●	●	●	●

Note: There is an EIA requirement for all development, change of use or intensity of use in each of these areas. Management plan is required for special areas of interest, legislated or declared protected areas.

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Permitted Restricted Prohibited

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A1 - Western Grouper Box	Fully Protected	●	●	●	●	●	●	●	●	●	●	●	●	●
A2 - Chub Heads	Fully Protected	●	●	●	●	●	●	●	●	●	●	●	●	●
A3 - Daniel's Head	Fully Protected	●	●	●	●	●	●	●	●	●	●	●	●	●
A4- Eastern Blue Cut	Fully Protected	●	●	●	●	●	●	●	●	●	●	●	●	●
A5 - South Shore	Fully Protected	●	●	●	●	●	●	●	●	●	●	●	●	●
A6 - North Shore Nursery	Fully Protected	●	●	●	●	●	●	●	●	●	●	●	●	●
A7 - North Lagoon	Fully Protected	●	●	●	●	●	●	●	●	●	●	●	●	●
A8 - North Rock	Fully Protected	●	●	●	●	●	●	●	●	●	●	●	●	●
A9 - Coot Pond Area	Fully Protected	●	●	●	●	●	●	●	●	●	●	●	●	●
A10 - Castle Harbour Islands and Reef	Fully Protected	●	●	●	●	●	●	●	●	●	●	●	●	●
A11 - Northeast Breaker	Fully Protected	●	●	●	●	●	●	●	●	●	●	●	●	●
A12 - Eastern Grouper Box	Fully Protected	●	●	●	●	●	●	●	●	●	●	●	●	●

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B1 - Banks	Fisheries Area	●	●	●	●	●	●	●	●	●	●	●	●	●
B2 -Western Grouper Box	Pelagic Zone	●	●	●	●	●	●	●	●	●	●	●	●	●
B3 - Seasonally Protected Area - west	Seasonal Closure Areas	●	●	●	●	●	●	●	●	●	●	●	●	●
B3.1 - Daniel's Head	Shoreline Buffer	●	●	●	●	●	●	●	●	●	●	●	●	●
B4 - South Shore	Pelagic Zone	●	●	●	●	●	●	●	●	●	●	●	●	●
B5 - North Shore Habitat Protection Area	North Shore Habitat Protection Area	●	●	●	●	●	●	●	●	●	●	●	●	●
B5.1 - South Shore	Shoreline Buffer	●	●	●	●	●	●	●	●	●	●	●	●	●

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B5.2 - Trunk Island	Shoreline Buffer	●	●	●	●	●	●	●	●	●	●	●	●	●
B6 - North Rock	Fisheries Area	●	●	●	●	●	●	●	●	●	●	●	●	●
B7 - North Rock	Pelagic Zone	●	●	●	●	●	●	●	●	●	●	●	●	●
B8 - Seasonally Protected Area - east	Seasonal Closure Area	●	●	●	●	●	●	●	●	●	●	●	●	●
B9 - Eastern Grouper Box	Pelagic Zone	●	●	●	●	●	●	●	●	●	●	●	●	●
B9.1 - Coot Pond Area	Shoreline Buffer	●	●	●	●	●	●	●	●	●	●	●	●	●
B10.1 - Castle Harbour Islands and Reef	Cable Zone	●	●	●	●	●	●	●	●	●	●	●	●	●

Note: There is an EIA requirement for all development, change of use or intensity of use in each of these areas.Management plan is required for special areas of interest, legislated or declared protected areas.

Use Chart 3 What Activities are Allowed or Not Allowed in the Revised MPA Network - Nearshore Network Proposal

Permitted Restricted Prohibited

	Zone Type	Navigation; Transiting vessels; Boating; Anchoring	Shipping	Restoration /enhance-ment other reasons	Industrial-scale fishing & aqua-culture	Restorative Aquaculture	Aquaculture (small-scale)	Dredging and dumpin	Renewable energy generation	Infrastruc-ture works & develop-ment	Cabling	Untreated water discharge	Mining, oil and gas extraction	Mooring Works
B1 - Banks	Fisheries Area	●	●	●	●	●	●	●	●	●	●	●	●	●
B2 -Western Grouper Box	Pelagic Zone	●	●	●	●	●	●	●	●	●	●	●	●	●
B3 - Seasonally Protected Area - west	Seasonal Closure Areas	●	●	●	●	●	●	●	●	●	●	●	●	●
B3.1 - Daniel's Head	Shoreline Buffer	●	●	●	●	●	●	●	●	●	●	●	●	●
B4 - South Shore	Pelagic Zone	●	●	●	●	●	●	●	●	●	●	●	●	●
B5 - North Shore Habitat Protection Area	North Shore Habitat Protection Area	●	●	●	●	●	●	●	●	●	●	●	●	●
B5.1 - South Shore	Shoreline Buffer	●	●	●	●	●	●	●	●	●	●	●	●	●

Note: There is an EIA requirement for all development, change of use or intensity of use in each of these areas.Management plan is required for special areas of interest, legislated or declared protected areas.

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● Permitted ● Restricted ● Prohibited

	Zone Type	Navigation; Transiting vessels; Boating; Anchoring	Shipping	Restoration /enhance-ment other reasons	Industrial-scale fishing & aqua-culture	Restorative Aquaculture	Aquaculture (small-scale)	Dredging and dumpin	Renewable energy generation	Infrastruc-ture works & develop-ment	Cabling	Untreated water discharge	Mining, oil and gas extraction	Mooring Works
B5.2 - Trunk Island	Shoreline Buffer	●	●	●	●	●	●	●	●	●	●	●	●	●
B6 - North Rock	Fisheries Area	●	●	●	●	●	●	●	●	●	●	●	●	●
B7 - North Rock	Pelagic Zone	●	●	●	●	●	●	●	●	●	●	●	●	●
B8 - Seasonally Protected Area - east	Seasonal Closure Area	●	●	●	●	●	●	●	●	●	●	●	●	●
B9 - Eastern Grouper Box	Pelagic Zone	●	●	●	●	●	●	●	●	●	●	●	●	●
B9.1 - Coot Pond Area	Shoreline Buffer	●	●	●	●	●	●	●	●	●	●	●	●	●
B10.1 - Castle Harbour Islands and Reef	Cable Zone	●	●	●	●	●	●	●	●	●	●	●	●	●

Note: There is an EIA requirement for all development, change of use or intensity of use in each of these areas.Management plan is required for special areas of interest, legislated or declared protected areas.

The following sections describe how the original nearshore proposal was modified to address the above four main areas of concern raised by stakeholders, and how the current nearshore network better meets the MSP's goals and objectives as a result of these modifications. For additional information on how the current nearshore network impacts specific ocean activities, please refer to the User Impact Assessments.

Proposed protection should not impact the ability to maintain critical infrastructure

Bermuda is a large ocean state and development can be found along the entire 317 km (197 mi) of the island's coastline.[83] As a result, a variety of critical infrastructure is attached to or located in close proximity to the shoreline, including docks, boat moorings and shipping channels. Many of these, particularly the latter, require regular maintenance (dredging) to consistently supply the island with necessary goods and services. To facilitate this ongoing maintenance, all areas that were proposed for protection were cross-referenced for overlap with existing infrastructure. If overlap existed, either the MPA boundary was modified or the level of protection designation was changed to ensure that current infrastructure won't be negatively impacted. As one example, the North Shore Habitat Protection Area (Shape B5, Map 3) now lists dredging as a permitted activity to allow for the maintenance of shipping lanes and ship anchorages. Making these modifications supports future maritime infrastructure needs (goal INF).

MPA placement should enhance the tourism industry and not limit potential development opportunities that are in line with the MSP

Bermuda's tourism industry is among the top five industries on the island, with pre-COVID numbers showing the sector employs over 10% of the island's workforce.[84] In addition, both the National Tourism Plan[85] and the Blue Economy Strategy call for increased support of sustainable marine tourism activities (or "ecotourism") as part of a long-term strategy for growth in that sector. However, this growth must be balanced by the recognition that sustainable marine tourism depends upon the careful management of the living marine resources (e.g., coral and fishes) that bring tourists to the island.

For those MPAs that had a potentially high conflict with tourism, a highly-protected shoreline buffer has been added between the shoreline and the border of the fully protected zone. The standard shoreline buffer extends 10 m seaward of the mean high-water mark, except where bays are adjacent to hotel properties. In these cases, the shoreline buffer extends across the bay to cover the marine areas that are bounded by hotel-owned land parcels. This buffer will permit shoreline activities that are compatible with the adjacent fully protected MPA, including permitted developments, infrastructure works and shoreline fishing. This will provide flexibility for tourism-related activities (subject to EIA and EIS requirements) while still protecting the ecological integrity of the MPA.

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[83] Government of Bermuda. 2022. *The State of Bermuda's Waters: A Snapshot of Bermuda's Exclusive Economic Zone (EEZ) From the Coastline to 200 Nautical Miles (nm).* Hamilton: Ministry of Home Affairs, Government of Bermuda. https://www.gov.bm/sites/default/files/The_State_of_Bermudas_Marine_Waters.pdf

[84] Ibid.

[85] Bermuda Tourism Authority. 2019. National Tourism Plan 2019-2026. https://www.gotobermuda.com/sites/default/files/2023-05/updated-bermuda-national-tourism-master-plan-update-may2023.pdf

Tourism operators and hoteliers can strategically optimise their operations and products, both in line with the National Tourism Plan and the Blue Economy Strategy. For example, to obtain internationally recognised "green/blue" or "sustainable" tourism certifications and promote Bermuda as a place where one can walk from your hotel room directly into the pristine waters of a subtropical MPA.

Two examples of this buffer can be seen on Map 4 where the bright pink partially protected shoreline on the southern and southwestern portions of the island coincide with fully protected areas (A5 and A3, respectively). Working with stakeholders in the tourism industry to arrive at an outcome that benefits people and the environment in an equitable manner supports a sustainable marine tourism industry (goal TSM). Many of the specific activities relating to certifications and public education about Bermuda's sustainable/ecotourism best practices also offer job growth and professional development opportunities in our Blue Economy (nonspatial objectives TSM.2 and TSM.3).

The complexities of the fishing industry should be adequately considered

The original MPA proposal contained protected areas that overlapped with "high value" fishing areas, causing conflict with recreational and commercial fishermen, and placing undue burden on some fisheries more than others. To address this, the detailed data gained from the second Ocean Use Survey[86] along with stakeholder feedback from the focus group series served as inputs for the modeling software that assisted in the development of the MPA network. The nearshore MPA network meets the MSP's goal of 20% full protection (spatial objective BIO.1) while also ensuring access to "high value" fishing grounds and continuity of pelagic fishing grounds (spatial objectives FSH.1 and FSH.2), as well as achieving a number of the MSP's ecological objectives.

Specific examples of modifications made to the original MPA proposals to accommodate the complexities of the fishing industry can be seen in Map 3 including: 1. Changing the borders of Shapes A1 and A12 so they stop at the 55 m depth contour. This allows trolling for pelagic species to occur outside these areas; 2. Removing the fisheries restrictions from Shape B6 and designating it with additional protection as a "Fisheries Area" to prohibit development; 3. Removing protection completely from the eastern side of Shape A2 (Chub Heads) and the western side of Shape A10 (Castle Harbour) in recognition of "highly valued" lobster and guinea chick trapping areas.

Additionally, one of the major concerns raised by fishermen was that impacts to the bait fishery were too high. To address these concerns, modifications were made to the coastal MPA surrounding Paradise Lakes (Map 15), which was highlighted as an area critical for bait fishing in the winter months due to its sheltered location. In the original MPA proposals, this area prohibited net fishing year-round. In this nearshore MPA network, net fishing is prohibited from May through October. This safeguards critical habitat when fish are spawning but allows for fishing during the winter months.

Other modifications to reduce impacts on the bait fishery include reducing the amount of proposed protection around shoreline mangroves. The original MPA proposals called for protection of all established mangrove habitat with a 10 metre fully protected buffer,

[86] Government of Bermuda. 2023. *Bermuda Ocean Use Survey Results—Appendix 3: Additional Commercial Fishing Data*. Government of Bermuda, Waitt Institute and Bermuda Institute of Ocean Sciences in conjunction with the McClintock Lab of the University of California, Santa Barbara. https://a5608098-1e68-4545-8d8f-3792e27f704a.filesusr.com/ugd/418ca0_e1ad7c3f12144f018a4190ff6464d233.pdf

and an additional 50 metre no-fishing buffer. This nearshore MPA network reduces the full protection buffer to 2 metres and removes the additional 50 metre no-fishing buffer. It also recommends additional locations that should have greater protection from net fishing activities in cases where the mangrove habitat is highly developed and in excellent condition, thus providing outstanding ecosystem goods and services to a wide range of resident species. These areas will be suggested for addition to the existing list of four bays where net fishing is prohibited under Section 3(2) of the Fisheries (Use of Fishing Nets) Order 1990[87].

Protection should better meet the MSP's ecological objectives

While changes in protection designations and locations were made to better address stakeholder concerns, the design of the MPA network must meet a variety of ecological objectives.

By re-running the computer models with the new Ocean Use Survey data and having additional meetings with the BOPP Science Committee to discuss the model outcomes, a variety of changes were made to the nearshore and coastal networks that provide more protection to ecologically valuable areas.

Looking at Map 3, Shapes A3, A7 and A11 were added to compensate for areas where protection was removed. Each of these areas help the MPA network maintain representative coverage of critical habitat types (spatial objective BIO.1) and protect coastal habitats that are important nursery grounds or migratory routes (goal REP and spatial objective REP.2). Shape A3 is an important nursery and juvenile fish recruitment area and helps to link mangrove, seagrass and nursery patch reefs. Shape A11 is an area of high coral cover and helps protect five key habitat types. Full protection was also added to the coastal network to compensate for the protected areas lost by removing the 10 metre no-fishing mangrove buffer. This can be seen on Map 4 in Section 4.2.5.

Shape A7 links together a variety of patch reefs of ecological value. This MPA promotes "ecological connectivity" or a "protective corridor" which is an important concept in the design of both terrestrial and marine protected areas. Ecological connectivity "regards the spatial structure of a network of MPAs" and the potential and ability for organisms to move within a MPA and migrate to another MPA to survive.[88] Ecological connectivity considers larval dispersal patterns, how a species moves around an ecosystem throughout its various life stages, and if interaction with other populations is important for genetic exchange.

Making these changes to the MPA nearshore network led to better representative coverage of critical habitats (spatial objective BIO.1) and protection for a higher percentage of nursery habitat (spatial objective REP.2), while still ensuring continued access to the most highly valued fishing grounds (spatial objective FSH.1).

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[87] Government of Bermuda. 1990. "Fisheries (Use of Fishing Nets) Order 1990." Hamilton: Department of Environment. https://faolex.fao.org/docs/pdf/ber7099.pdf

[88] Podda, C., and E. M. Porporato. 2023. "Marine Spatial Planning for Connectivity and Conservation through Ecological Corridors between Marine Protected Areas and Other Effective Area-Based Conservation Measures." *Frontiers in Marine Science*, 10. www.frontiersin.org/articles/10.3389/fmars.2023.1271397/full

4.2.5 Coastal Network

The nearshore MPA network includes a series of smaller-scale coastal MPAs (the coastal network), shown in an overview in Map 4 and then in detail in Maps 5-25. The coastal network introduces additional protection designations to account for the wide variety of activities that take place in Bermuda's coastal waters and to help address the four main areas of concern raised by stakeholders. These additional designations include:

Catch & Release Only: Allows catch and release fly fishing; prohibits all other extractive or destructive activities.

Special Protection Area: Allows all non-extractive or non-destructive uses (e.g., diving, boating); allows for maintenance of existing infrastructure and prohibits all other extractive or destructive activities.

2 m Mangrove Buffer: Allows all non-extractive or non-destructive uses (e.g., diving, boating); allows for maintenance of existing infrastructure and prohibits all other extractive or destructive activities.

Shoreline Buffer: Allows permitted shoreline activities (e.g., approved development, infrastructure maintenance and hook-and-line fishing).

Cable Zone: Allows cable maintenance work; prohibits all other extractive and destructive activities.

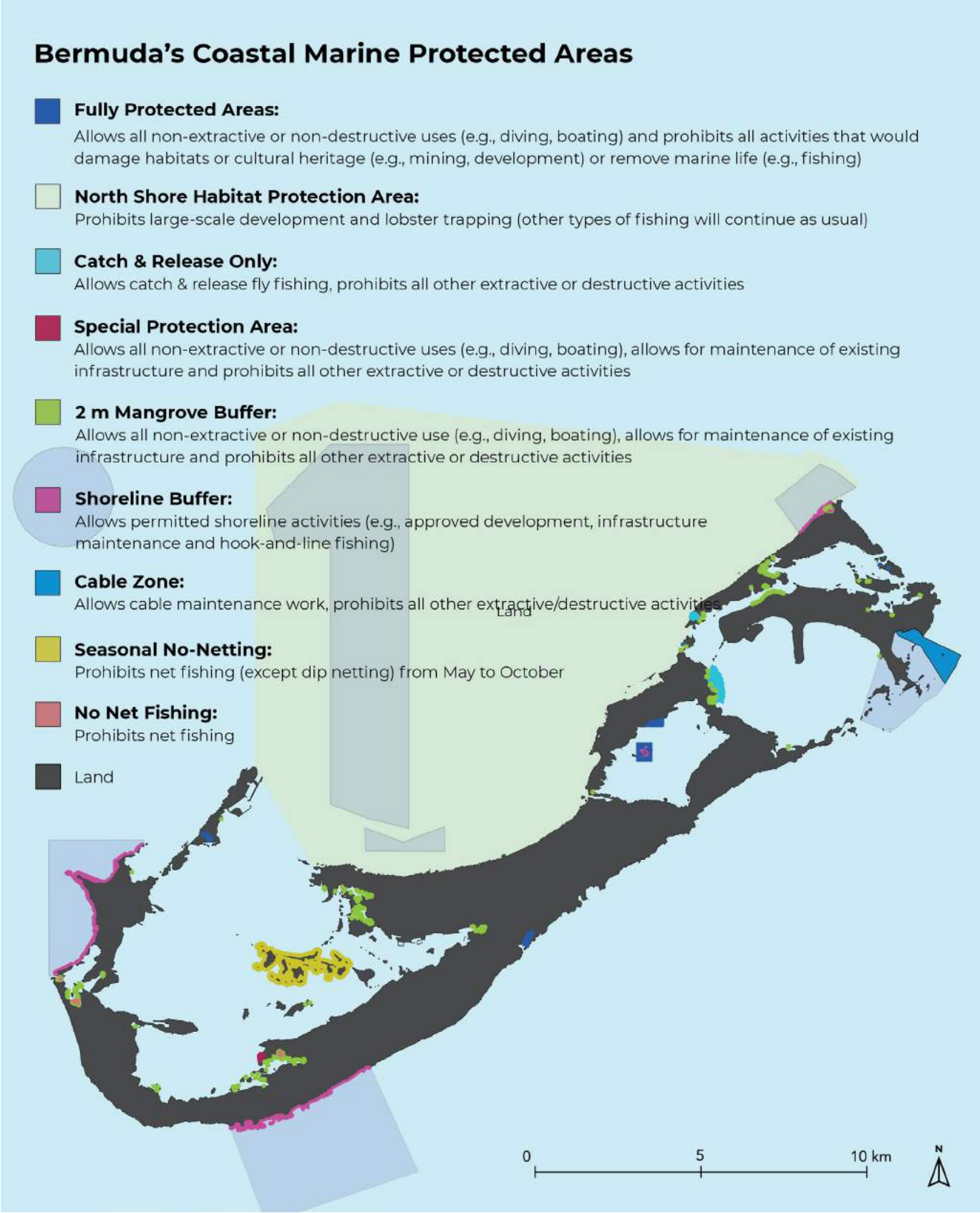
Seasonal No-Netting: Prohibits net fishing (except dip netting) from May to October, inclusive.

No Net Fishing: Prohibits net fishing.

As with the offshore and nearshore networks, the coastal network builds upon currently legislated areas (Map 1) and existing management frameworks for fisheries and marine environmental protection, as well as regulatory procedures for development in Bermuda's marine waters.

Map 4

Coastal MPA Network



Use Chart 4 What Activities are Allowed or Not Allowed in the Revised MPA Network - Coastal Network Proposal

Permitted Restricted Prohibited

	Zone Type	Non extractive research	Restoration/ enhance-ment for conservation	Non extractive recreation	Extractive research	Lobster trapping	Lobster diving	Bottom fish-ing; Deep trolling & Vertical lining	Netting (all types)	Surface trolling	Pelagic long lining	Shoreline Fishing	Catch & release fly fishing	Recreational spear-fishing
C1 - The Lagoon	Fully Protected	●	●	●	●	●	●	●	●	●	●	●	●	●
C2 - Ely's Harbour	No Netting	●	●	●	●	●	●	●	●	●	●	●	●	●
C3 - Pilchard Bay	No Netting	●	●	●	●	●	●	●	●	●	●	●	●	●
C4 - North of Riddell's Bay	Special Protection Area	●	●	●	●	●	●	●	●	●	●	●	●	●
C5 - Riddell's Bay	No Netting	●	●	●	●	●	●	●	●	●	●	●	●	●
C6 - Paradise Lakes	Seasonal No Netting	●	●	●	●	●	●	●	R2	●	●	●	●	●
C7 - Hungry Bay	Fully Protected	●	●	●	●	●	●	●	●	●	●	●	●	●

R2 : Seasonal restrictions from May to October inclusive. Dip netting allowed year-round.

R3 : Minimal impact fixed moorings at low density are compatible witfully protected MPAs.

R4 : Maintenance of existing infrastructure permitted.

Note : There is an EIA requirement for all development, change of use or intensity of use in each of these areas. Management plan is required for special areas of interest, legislated or declared protected areas.

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C8 - Trunk Island	Fully Protected	●	●	●	●	●	●	●	●	●	●	●	●	●
C9 - Cockroach Island	Fully Protected	●	●	●	●	●	●	●	●	●	●	●	●	●
C10 - Walsingham	Catch and Release	●	●	●	●	●	●	●	●	●	●	●	●	●
C11 - Coney Cove	Fully Protected	●	●	●	●	●	●	●	●	●	●	●	●	●
C12 - Whalebone Bay	Catch and Release	●	●	●	●	●	●	●	●	●	●	●	●	●
C13 - Paget Island NW	Fully Protected	●	●	●	●	●	●	●	●	●	●	●	●	●
C14 - Paget Island SW	Fully Protected	●	●	●	●	●	●	●	●	●	●	●	●	●
M1-M44 - Mangroves	2 m Mangrove Buffer	●	●	●	●	●	●	●	●	●	●	●	●	●

R2 : Seasonal restrictions from May to October inclusive. Dip netting allowed year-round.

R3 : Minimal impact fixed moorings at low density are compatible witfully protected MPAs.

R4 : Maintenance of existing infrastructure permitted.

Note : There is an EIA requirement for all development, change of use or intensity of use in each of these areas. Management plan is required for special areas of interest, legislated or declared protected areas.

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	Zone Type	Navigation; Transiting vessels; Boating; Anchoring	Shipping	Restoration /enhance-ment other reasons	Industrial-scale fishing & aqua-culture	Restorative Aquaculture	Aquaculture (small-scale)	Dredging and dumpin	Renewable energy generation	Infrastruc-ture works & develop-ment	Cabling	Untreated water discharge	Mining, oil and gas extraction	Mooring Works
C1 - The Lagoon	Fully Protected	●	●	●	●	●	●	●	●	●	●	●	●	R3
C2 - Ely's Harbour	No Netting	●	●	●	●	●	●	●	●	●	●	●	●	●
C3 - Pilchard Bay	No Netting	●	●	●	●	●	●	●	●	●	●	●	●	●
C4 - North of Riddell's Bay	Special Protection Area	●	●	●	●	●	●	●	●	●	●	●	●	R3
C5 - Riddell's Bay	No Netting	●	●	●	●	●	●	●	●	●	●	●	●	●
C6 - Paradise Lakes	Seasonal No Netting	●	●	●	●	●	●	●	●	●	●	●	●	●
C7 - Hungry Bay	Fully Protected	●	●	●	●	●	●	●	●	●	●	●	●	R3

R2 : Seasonal restrictions from May to October inclusive. Dip netting allowed year-round.

R3 : Minimal impact fixed moorings at low density are compatible witfully protected MPAs.

R4 : Maintenance of existing infrastructure permitted.

Note : There is an EIA requirement for all development, change of use or intensity of use in each of these areas. Management plan is required for special areas of interest, legislated or declared protected areas.

Use Chart 4 What Activities are Allowed or Not Allowed in the Revised MPA Network - Coastal Network Proposal

Permitted Restricted Prohibited

	Zone Type	Navigation; Transiting vessels; Boating; Anchoring	Shipping	Restoration /enhance-ment other reasons	Industrial-scale fishing & aqua-culture	Restorative Aquaculture	Aquaculture (small-scale)	Dredging and dumpin	Renewable energy generation	Infrastruc-ture works & develop-ment	Cabling	Untreated water discharge	Mining, oil and gas extraction	Mooring Works
C8 - Trunk Island	Fully Protected	●	●	●	●	●	●	●	●	●	●	●	●	R3
C9 - Cockroach Island	Fully Protected	●	●	●	●	●	●	●	●	●	●	●	●	R3
C10 - Walsingham	Catch and Release	●	●	●	●	●	●	●	●	●	●	●	●	R3
C11 - Coney Cove	Fully Protected	●	●	●	●	●	●	●	●	●	●	●	●	R3
C12 - Whalebone Bay	Catch and Release	●	●	●	●	●	●	●	●	●	●	●	●	R3
C13 - Paget Island NW	Fully Protected	●	●	●	●	●	●	●	●	●	●	●	●	R3
C14 - Paget Island SW	Fully Protected	●	●	●	●	●	●	●	●	●	●	●	●	R3
M1-M44 - Mangroves	2 m Mangrove Buffer	●	●	●	●	●	●	●	●	R4	●	●	●	R3

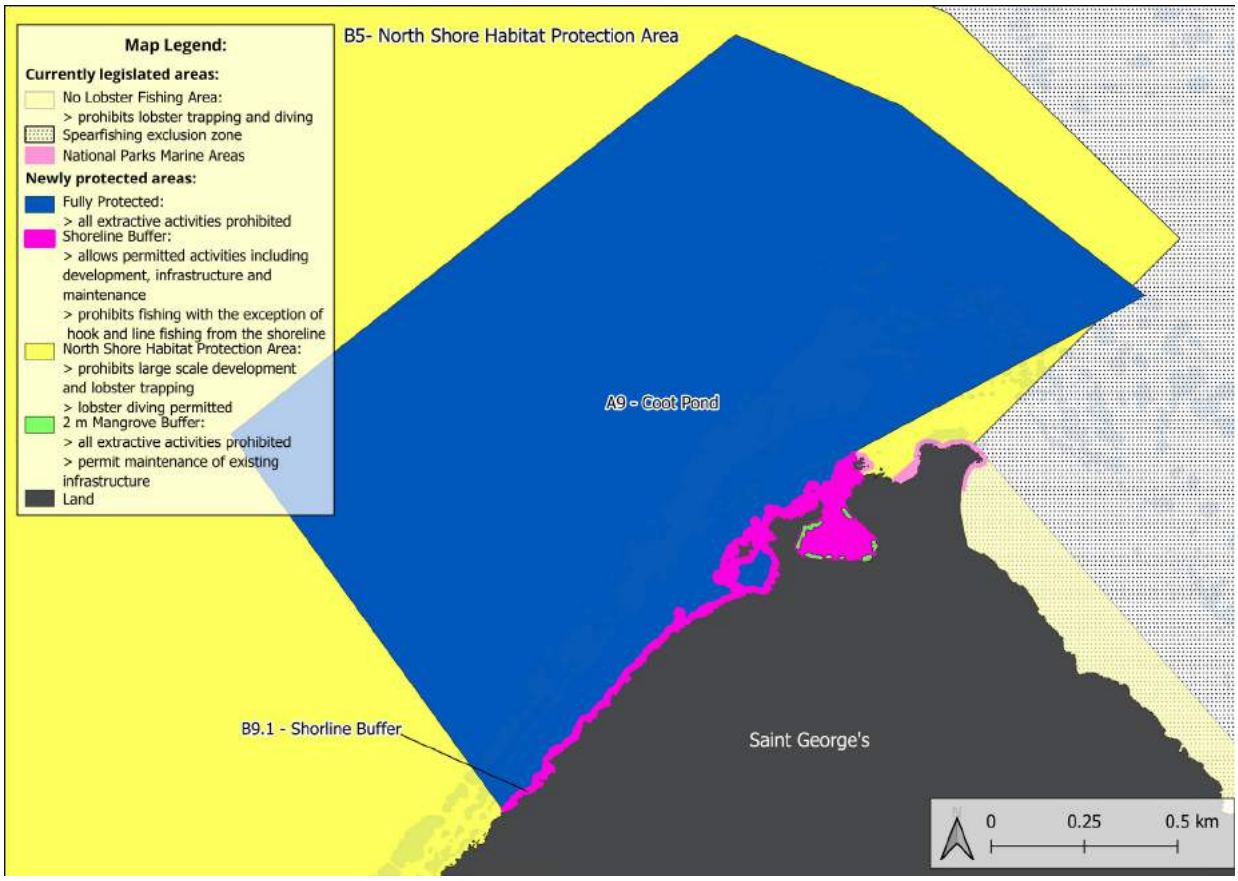
R2 : Seasonal restrictions from May to October inclusive. Dip netting allowed year-round.

R3 : Minimal impact fixed moorings at low density are compatible witfully protected MPAs.

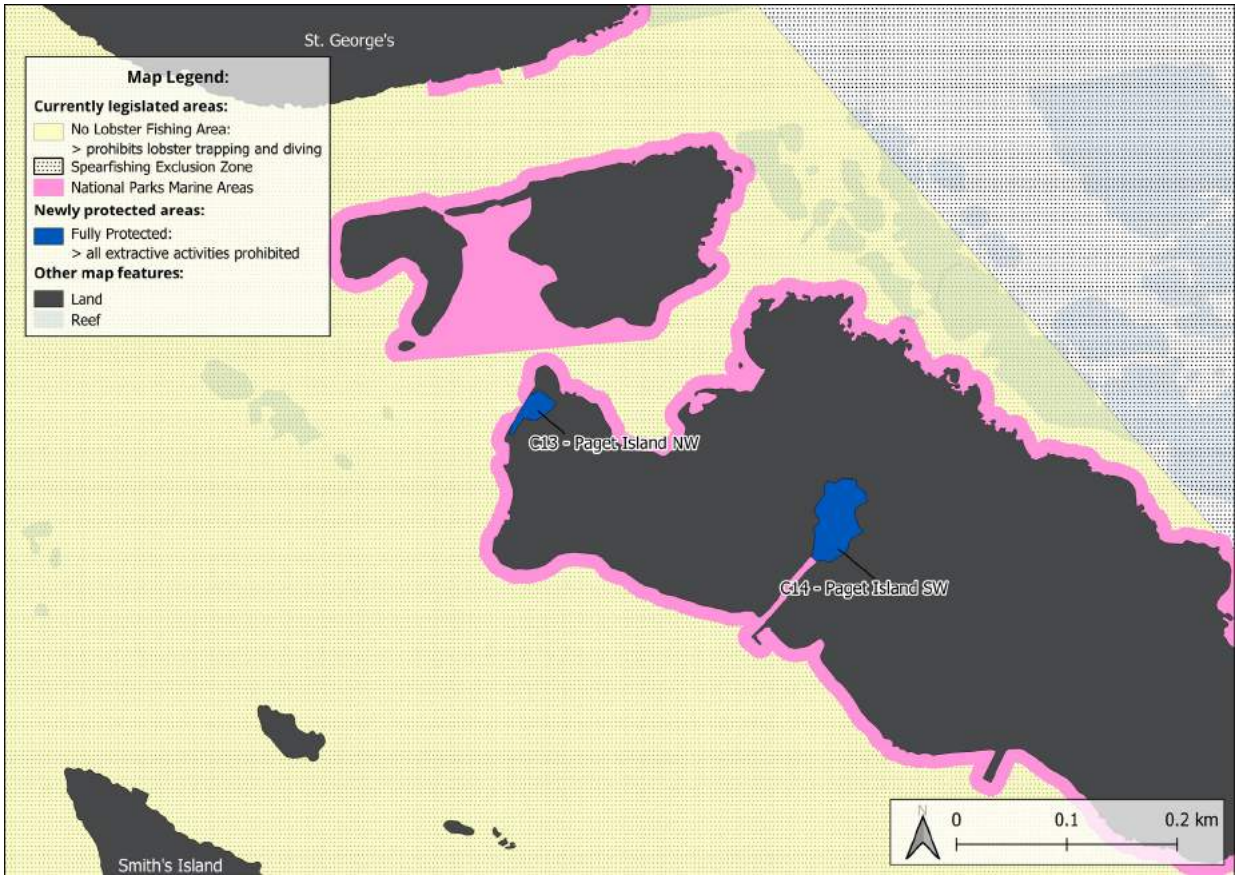
R4 : Maintenance of existing infrastructure permitted.

Note : There is an EIA requirement for all development, change of use or intensity of use in each of these areas. Management plan is required for special areas of interest, legislated or declared protected areas.

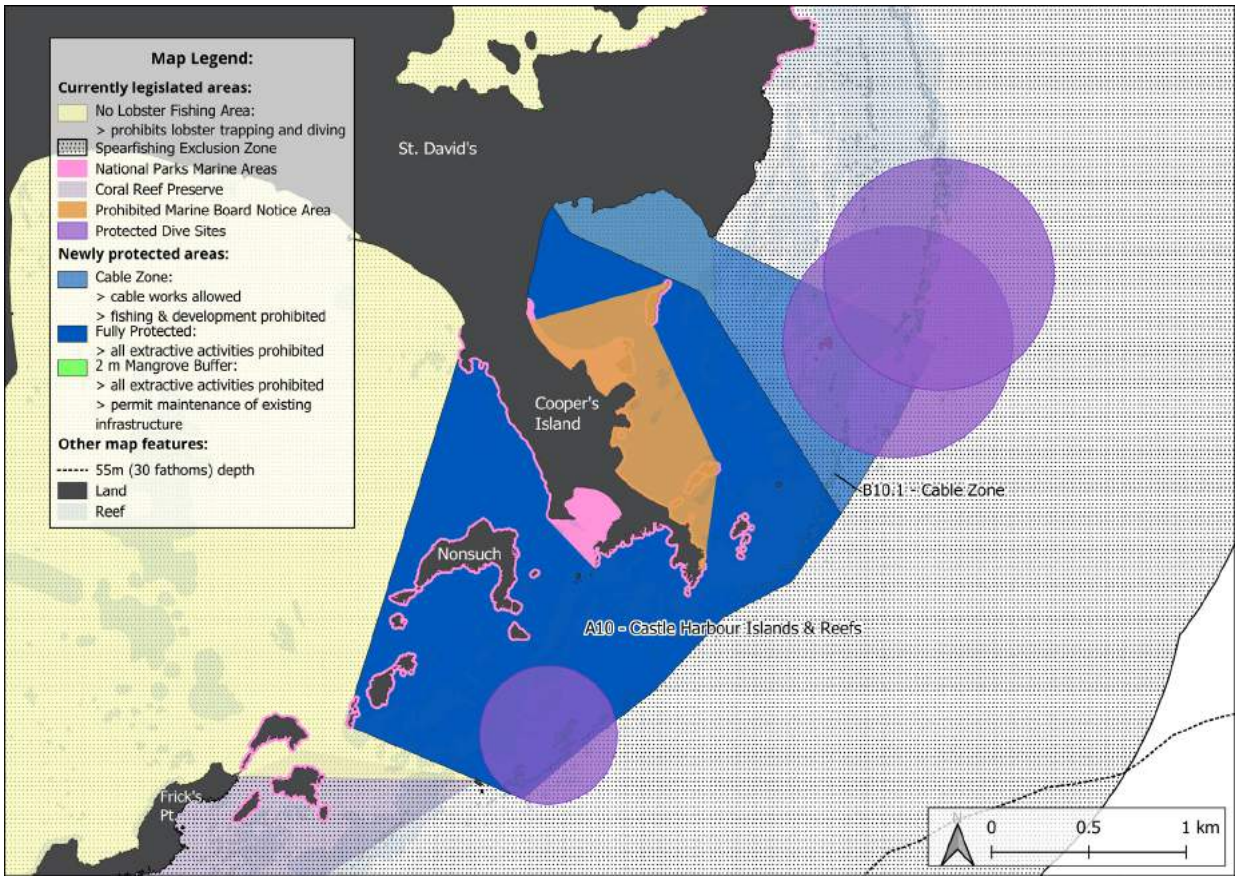
Map 5


Map Legend:
Currently legislated areas:
No Lobster Fishing Area:
> prohibits lobster trapping and diving
Spearfishing exclusion zone
National Parks Marine Areas
Newly protected areas:
Fully Protected:
> all extractive activities prohibited
Shoreline Buffer:
> allows permitted activities including development, infrastructure and maintenance
> prohibits fishing with the exception of hook and line fishing from the shoreline
North Shore Habitat Protection Area:
> prohibits large scale development and lobster trapping
> lobster diving permitted
2 m Mangrove Buffer:
> all extractive activities prohibited
> permit maintenance of existing infrastructure
Land
B5- North Shore Habitat Protection Area
A9 - Coot Pond
B9.1 - Shorline Buffer
Saint George's
0
0.25
0.5 km

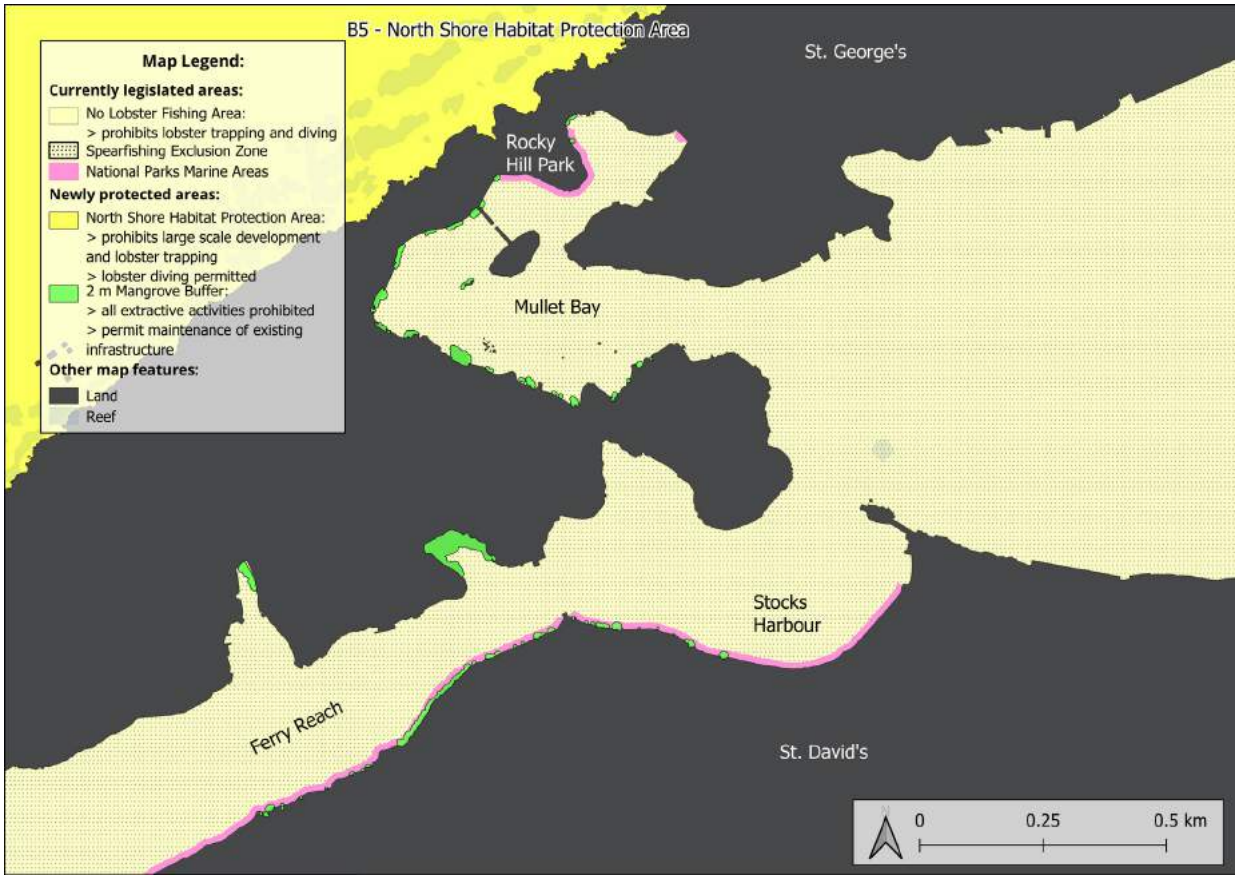
Map 6


St. George's
Map Legend:
Currently legislated areas:
No Lobster Fishing Area:
> prohibits lobster trapping and diving
Spearfishing Exclusion Zone
National Parks Marine Areas
Newly protected areas:
Fully Protected:
> all extractive activities prohibited
Other map features:
Land
Reef
C13 - Paget Island NW
C14 - Paget Island SW
Smith's Island
0
0.1
0.2 km

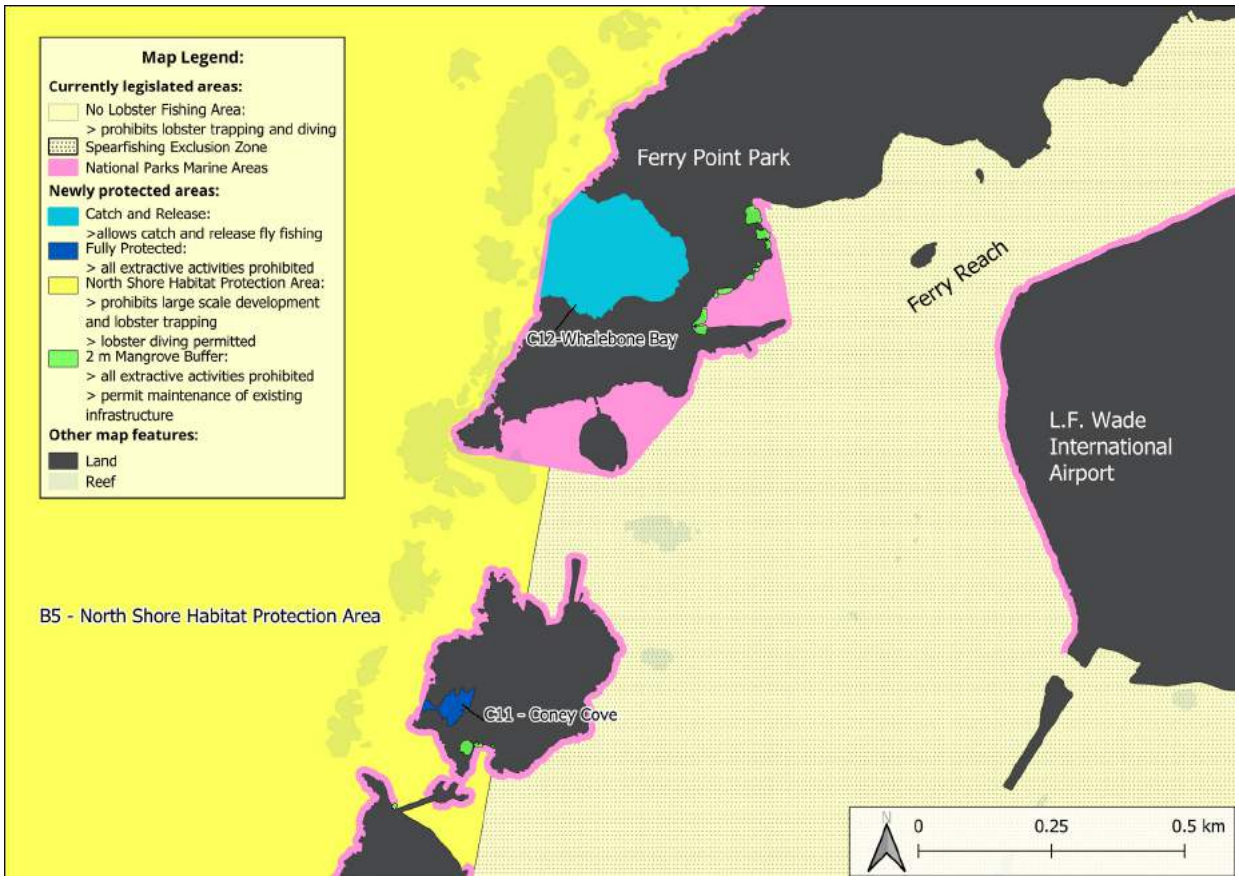
Map 7


Map Legend:
Currently legislated areas:
No Lobster Fishing Area:
> prohibits lobster trapping and diving
Spearfishing Exclusion Zone
National Parks Marine Areas
Coral Reef Preserve
Prohibited Marine Board Notice Area
Protected Dive Sites
Newly protected areas:
Cable Zone:
> cable works allowed
> fishing & development prohibited
Fully Protected:
> all extractive activities prohibited
2 m Mangrove Buffer:
> all extractive activities prohibited
> permit maintenance of existing infrastructure
Other map features:
55m (30 fathoms) depth
Land
Reef
St. David's
Cooper's Island
B10.1 - Cable Zone
Nonsuch
A10 - Castle Harbour Islands & Reefs
Frick's Pt
0
0.5
1 km

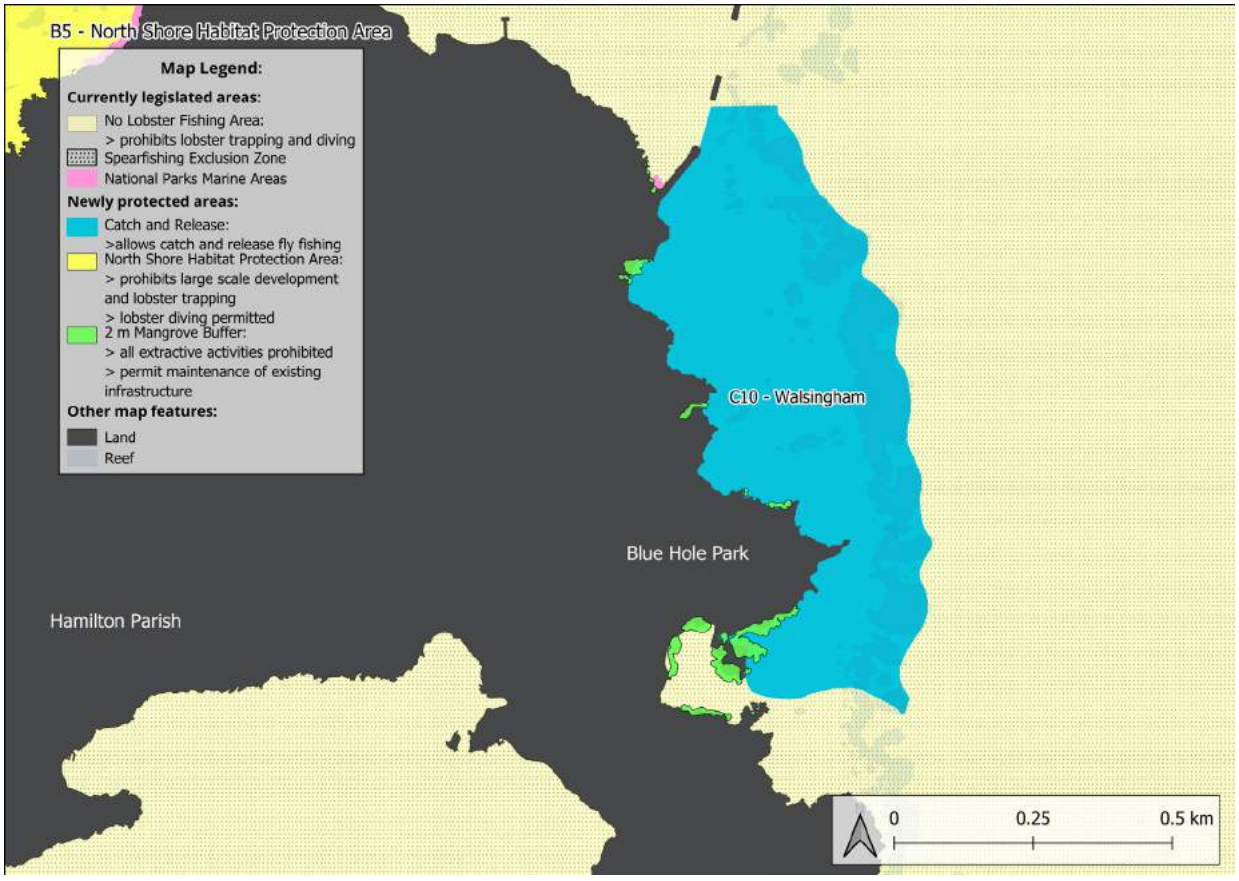
Map 8


Map Legend:
Currently legislated areas:
No Lobster Fishing Area:
> prohibits lobster trapping and diving
Spearfishing Exclusion Zone
National Parks Marine Areas
Newly protected areas:
North Shore Habitat Protection Area:
> prohibits large scale development and lobster trapping
> lobster diving permitted
2 m Mangrove Buffer:
> all extractive activities prohibited
> permit maintenance of existing infrastructure
Other map features:
Land
Reef
B5 - North Shore Habitat Protection Area
St. George's
Rocky Hill Park
Mullet Bay
Stocks Harbour
Ferry Reach
St. David's
0
0.25
0.5 km

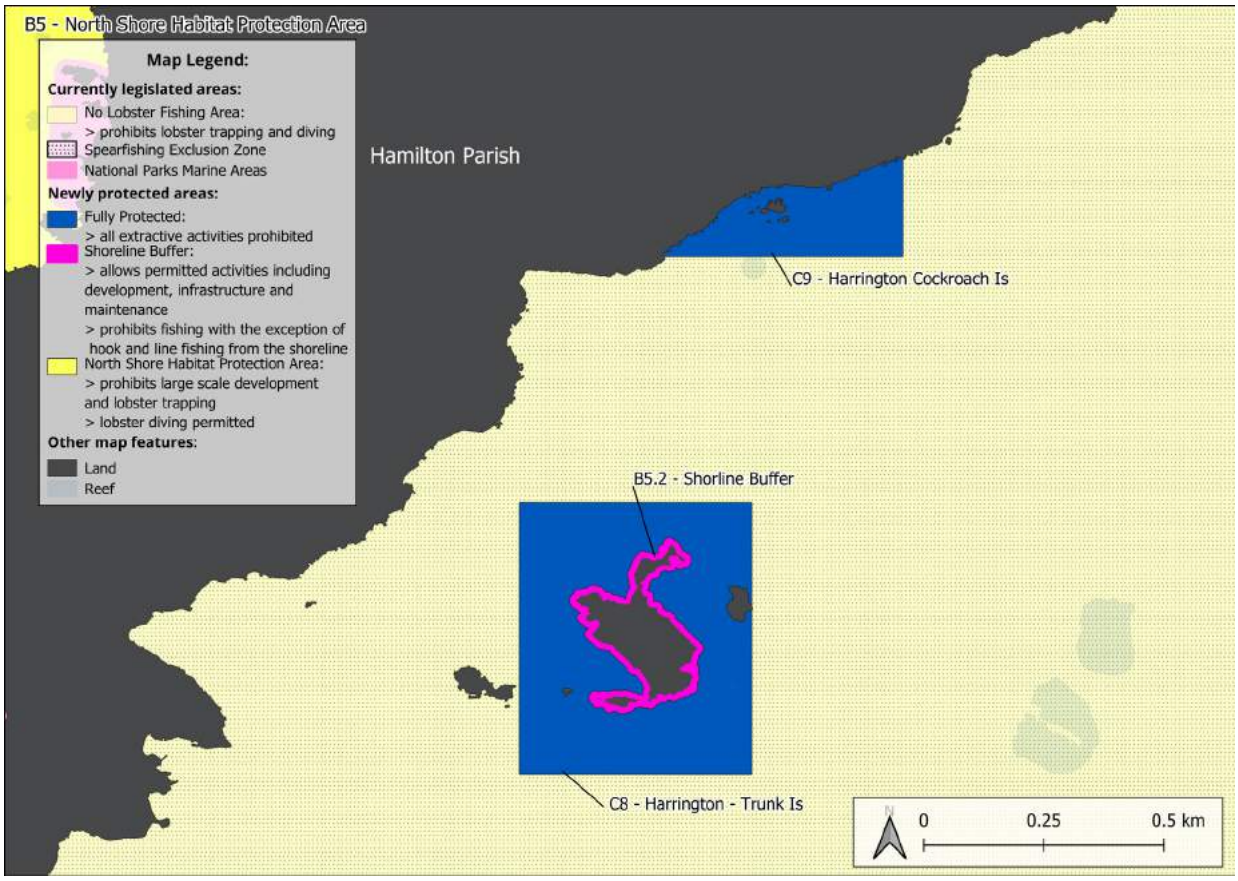
Map 9


Map Legend:
Currently legislated areas:
No Lobster Fishing Area:
> prohibits lobster trapping and diving
Spearfishing Exclusion Zone
National Parks Marine Areas
Newly protected areas:
Catch and Release:
>allows catch and release fly fishing
Fully Protected:
> all extractive activities prohibited
North Shore Habitat Protection Area:
> prohibits large scale development and lobster trapping
> lobster diving permitted
2 m Mangrove Buffer:
> all extractive activities prohibited
> permit maintenance of existing infrastructure
Other map features:
Land
Reef
Ferry Point Park
Ferry Reach
C12-Whalebone Bay
L.F. Wade International Airport
B5 - North Shore Habitat Protection Area
C11 - Coney Cove
N
0
0.25
0.5 km

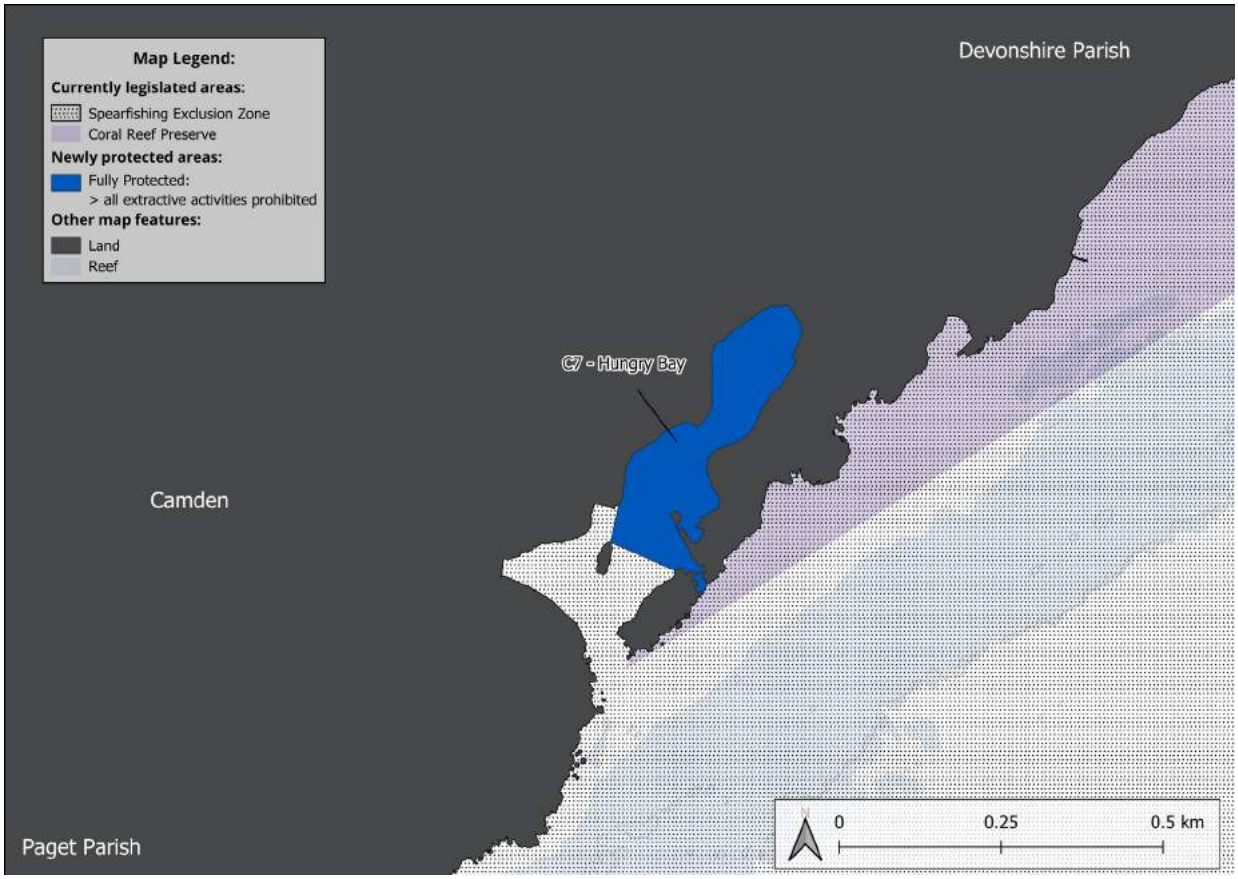
Map 10


B5 - North Shore Habitat Protection Area
Map Legend:
Currently legislated areas:
No Lobster Fishing Area:
> prohibits lobster trapping and diving
Spearfishing Exclusion Zone
National Parks Marine Areas
Newly protected areas:
Catch and Release:
>allows catch and release fly fishing
North Shore Habitat Protection Area:
> prohibits large scale development and lobster trapping
> lobster diving permitted
2 m Mangrove Buffer:
> all extractive activities prohibited
> permit maintenance of existing infrastructure
Other map features:
Land
Reef
C10 - Walsingham
Blue Hole Park
Hamilton Parish
0
0.25
0.5 km

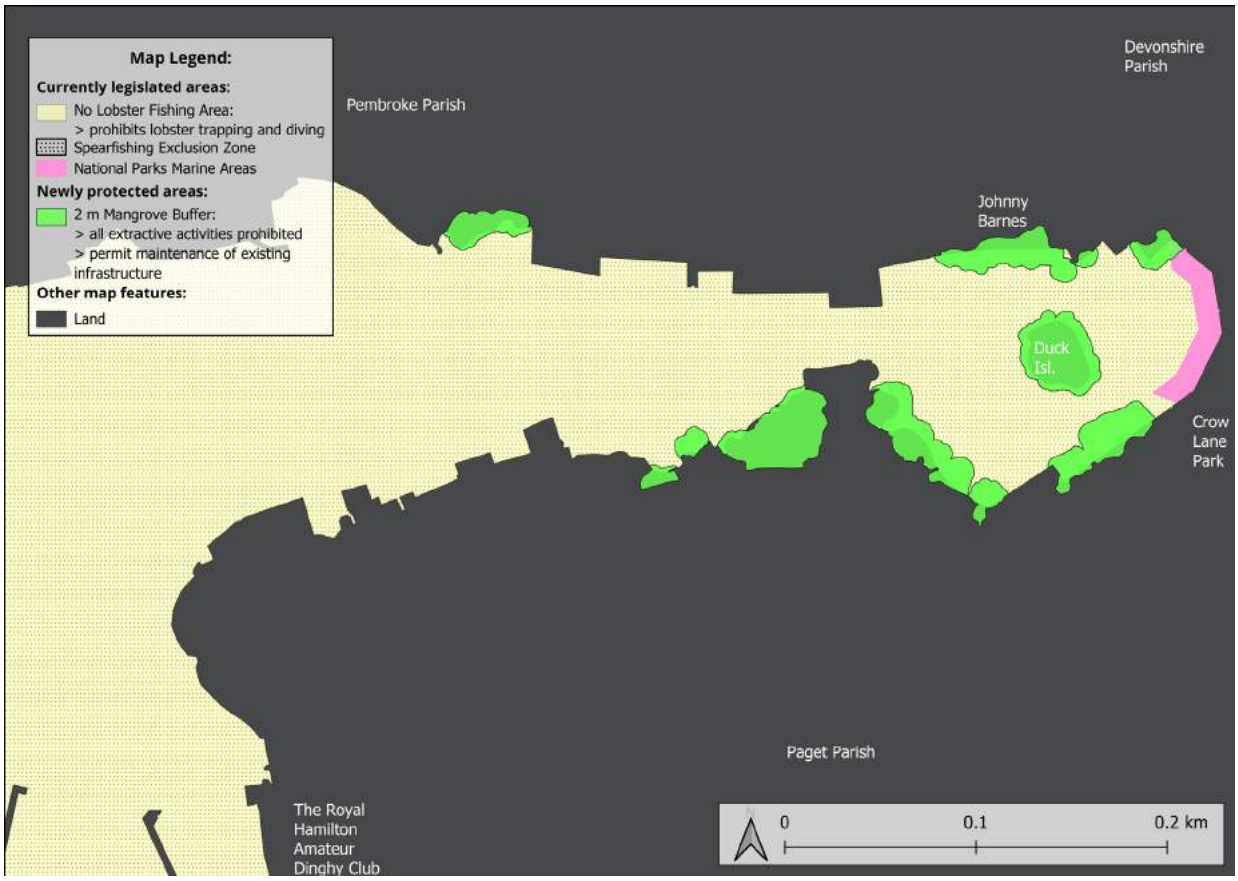
Map 11


B5 - North Shore Habitat Protection Area
Map Legend:
Currently legislated areas:
No Lobster Fishing Area:
> prohibits lobster trapping and diving
Spearfishing Exclusion Zone
National Parks Marine Areas
Newly protected areas:
Fully Protected:
> all extractive activities prohibited
Shoreline Buffer:
> allows permitted activities including development, infrastructure and maintenance
> prohibits fishing with the exception of hook and line fishing from the shoreline
North Shore Habitat Protection Area:
> prohibits large scale development and lobster trapping
> lobster diving permitted
Other map features:
Land
Reef
Hamilton Parish
C9 - Harrington Cockroach Is
B5.2 - Shorline Buffer
C8 - Harrington - Trunk Is
0
0.25
0.5 km

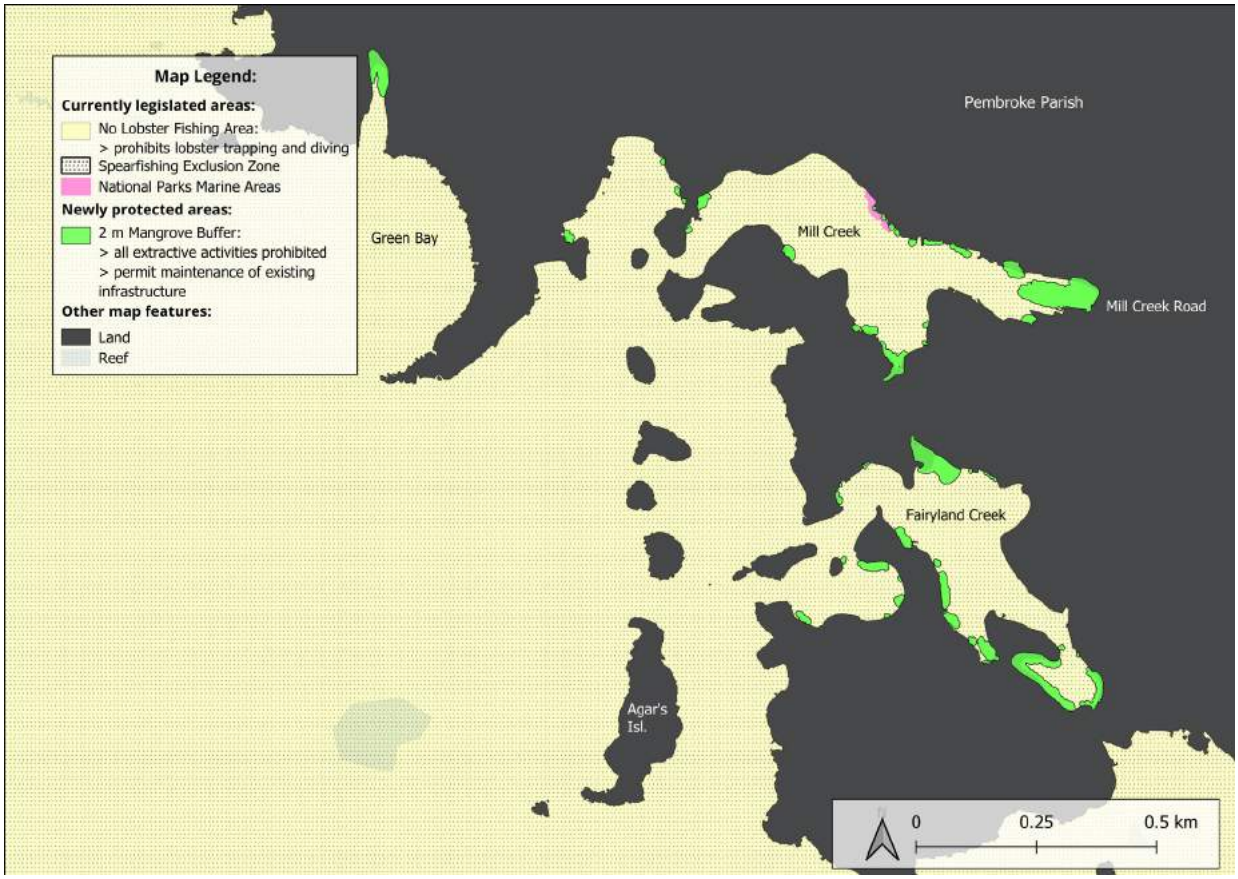
Map 12


Map Legend:
Currently legislated areas:
Spearfishing Exclusion Zone
Coral Reef Preserve
Newly protected areas:
Fully Protected:
> all extractive activities prohibited
Other map features:
Land
Reef
Devonshire Parish
C7 - Hungry Bay
Camden
Paget Parish
0
0.25
0.5 km

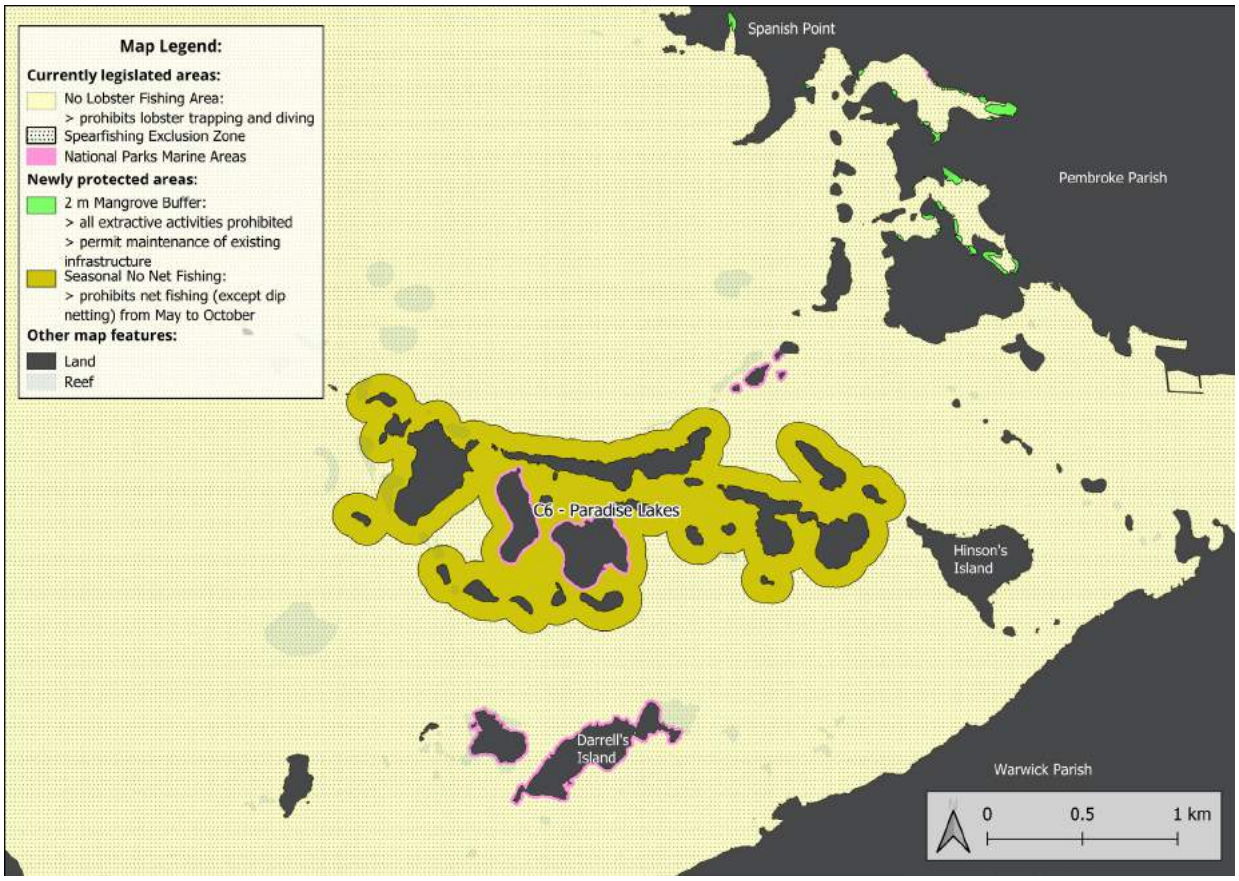
Map 13


Map Legend:
Currently legislated areas:
No Lobster Fishing Area:
> prohibits lobster trapping and diving
Spearfishing Exclusion Zone
National Parks Marine Areas
Newly protected areas:
2 m Mangrove Buffer:
> all extractive activities prohibited
> permit maintenance of existing infrastructure
Other map features:
Land
Pembroke Parish
Devonshire Parish
Johnny Barnes
Duck Isl.
Crow Lane Park
Paget Parish
The Royal Hamilton Amateur Dinghy Club
0
0.1
0.2 km

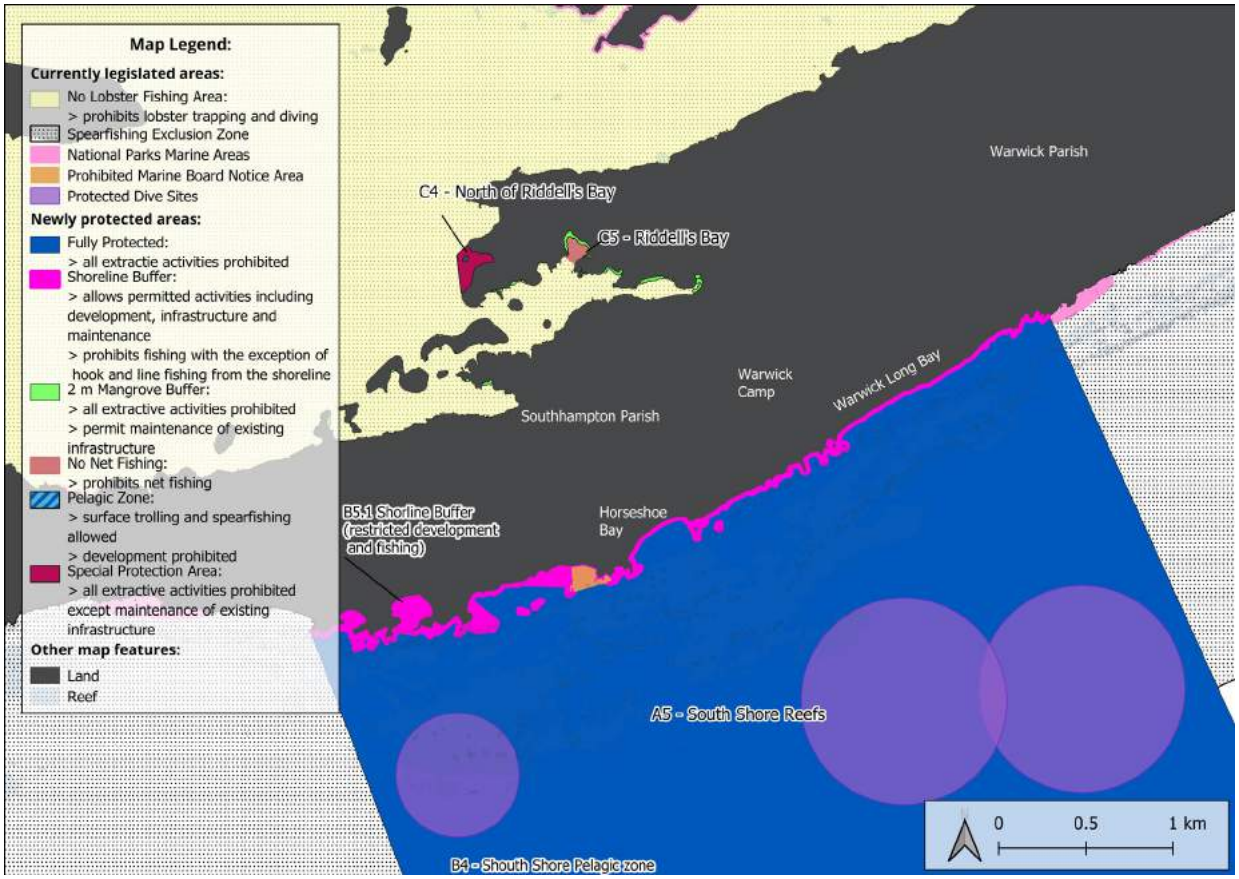
Map 14


Map Legend:
Currently legislated areas:
No Lobster Fishing Area:
> prohibits lobster trapping and diving
Spearfishing Exclusion Zone
National Parks Marine Areas
Newly protected areas:
2 m Mangrove Buffer:
> all extractive activities prohibited
> permit maintenance of existing infrastructure
Other map features:
Land
Reef
Pembroke Parish
Green Bay
Mill Creek
Mill Creek Road
Fairyland Creek
Agar's Isl.
0
0.25
0.5 km

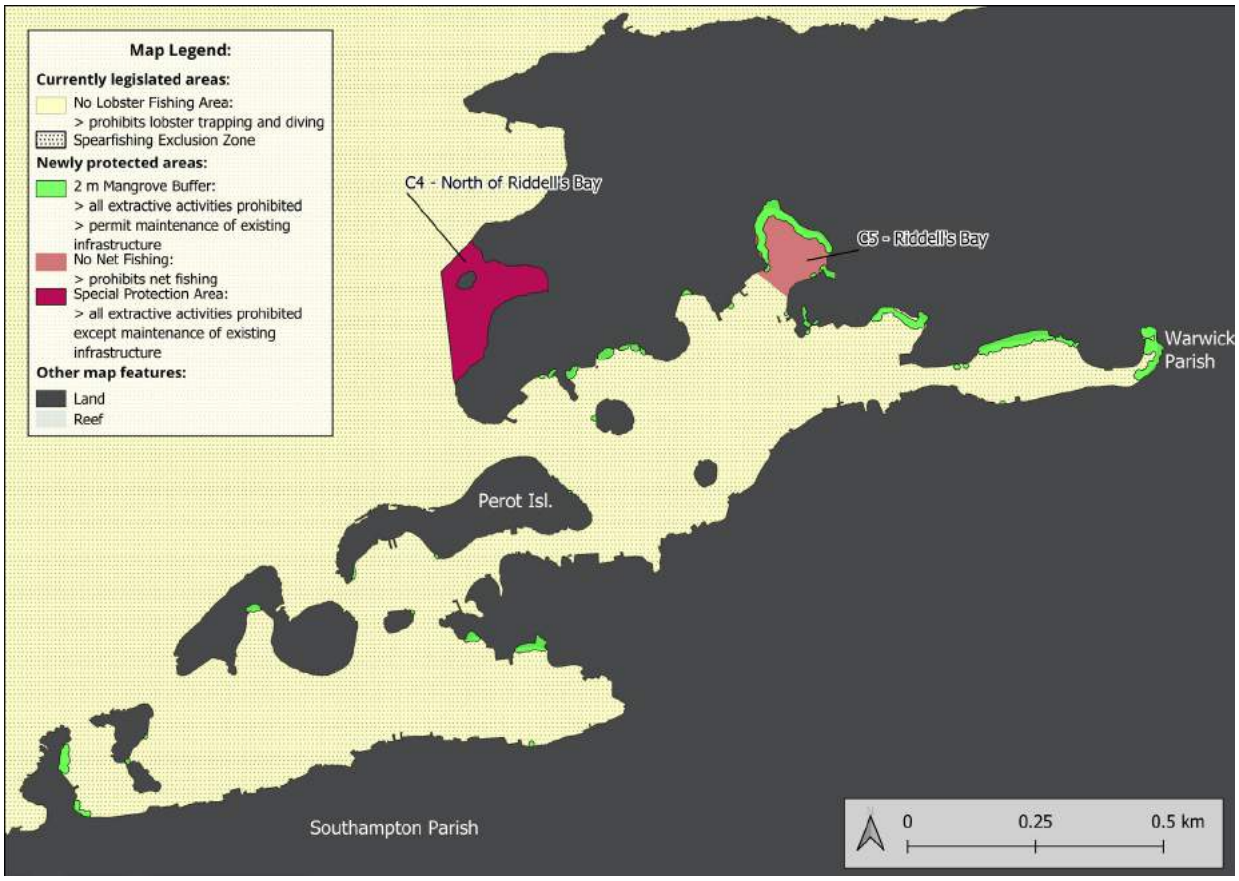
Map 15


Map Legend:
Currently legislated areas:
No Lobster Fishing Area:
> prohibits lobster trapping and diving
Spearfishing Exclusion Zone
National Parks Marine Areas
Newly protected areas:
2 m Mangrove Buffer:
> all extractive activities prohibited
> permit maintenance of existing infrastructure
Seasonal No Net Fishing:
> prohibits net fishing (except dip netting) from May to October
Other map features:
Land
Reef
Spanish Point
Pembroke Parish
C6 - Paradise Lakes
Hinson's Island
Darrell's Island
Warwick Parish
0
0.5
1 km

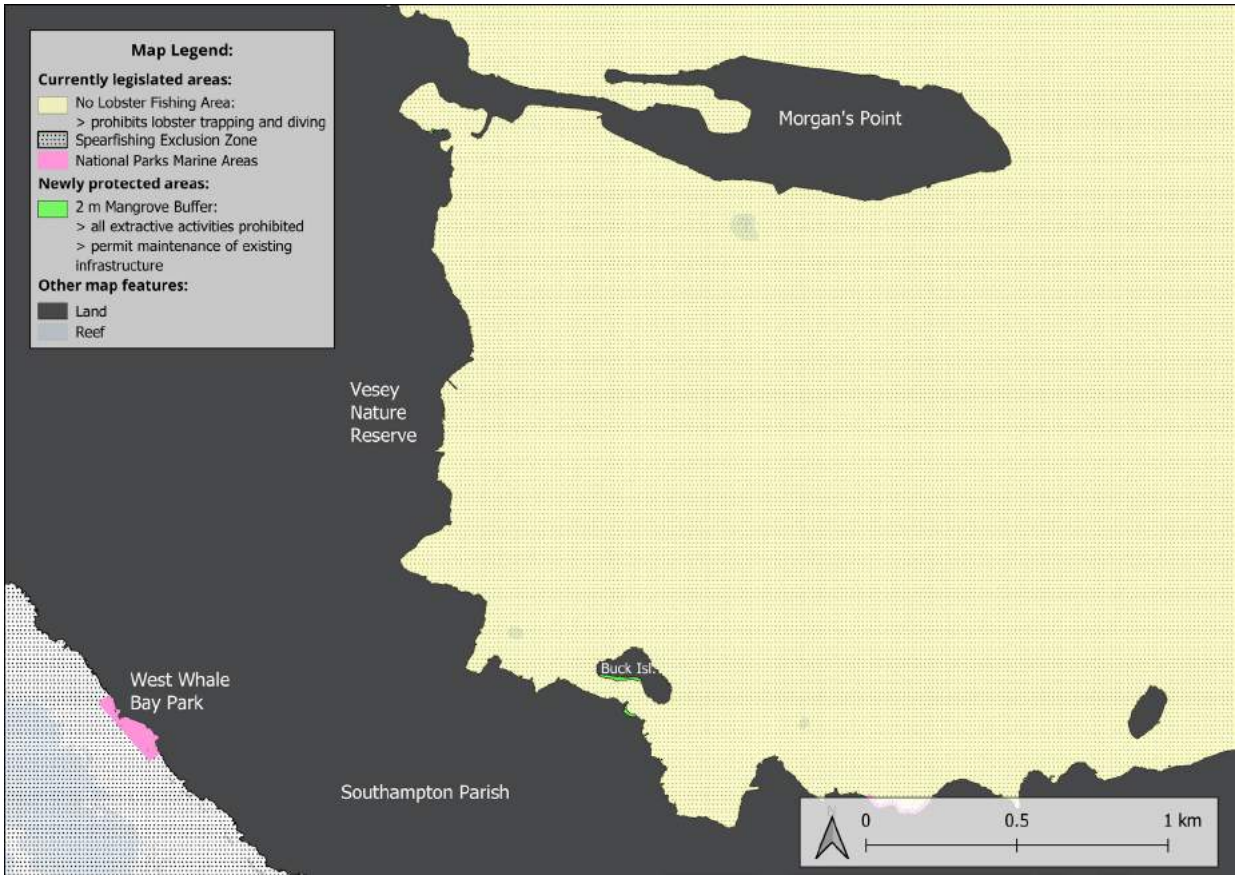
Map 16


Map Legend:
Currently legislated areas:
No Lobster Fishing Area:
> prohibits lobster trapping and diving
Spearfishing Exclusion Zone
National Parks Marine Areas
Prohibited Marine Board Notice Area
Protected Dive Sites
Newly protected areas:
Fully Protected:
> all extractie activities prohibited
Shoreline Buffer:
> allows permitted activities including development, infrastructure and maintenance
> prohibits fishing with the exception of hook and line fishing from the shoreline
2 m Mangrove Buffer:
> all extractive activities prohibited
> permit maintenance of existing infrastructure
No Net Fishing:
> prohibits net fishing
Pelagic Zone:
> surface trolling and spearfishing allowed
> development prohibited
Special Protection Area:
> all extractive activities prohibited except maintenance of existing infrastructure
Other map features:
Land
Reef
Warwick Parish
C4 - North of Riddell's Bay
C5 - Riddell's Bay
Warwick Camp
Warwick Long Bay
Southhampton Parish
B5.1 Shorline Buffer (restricted development and fishing)
Horseshoe Bay
A5 - South Shore Reefs
B4 - Shouth Shore Pelagic zone
0
0.5
1 km

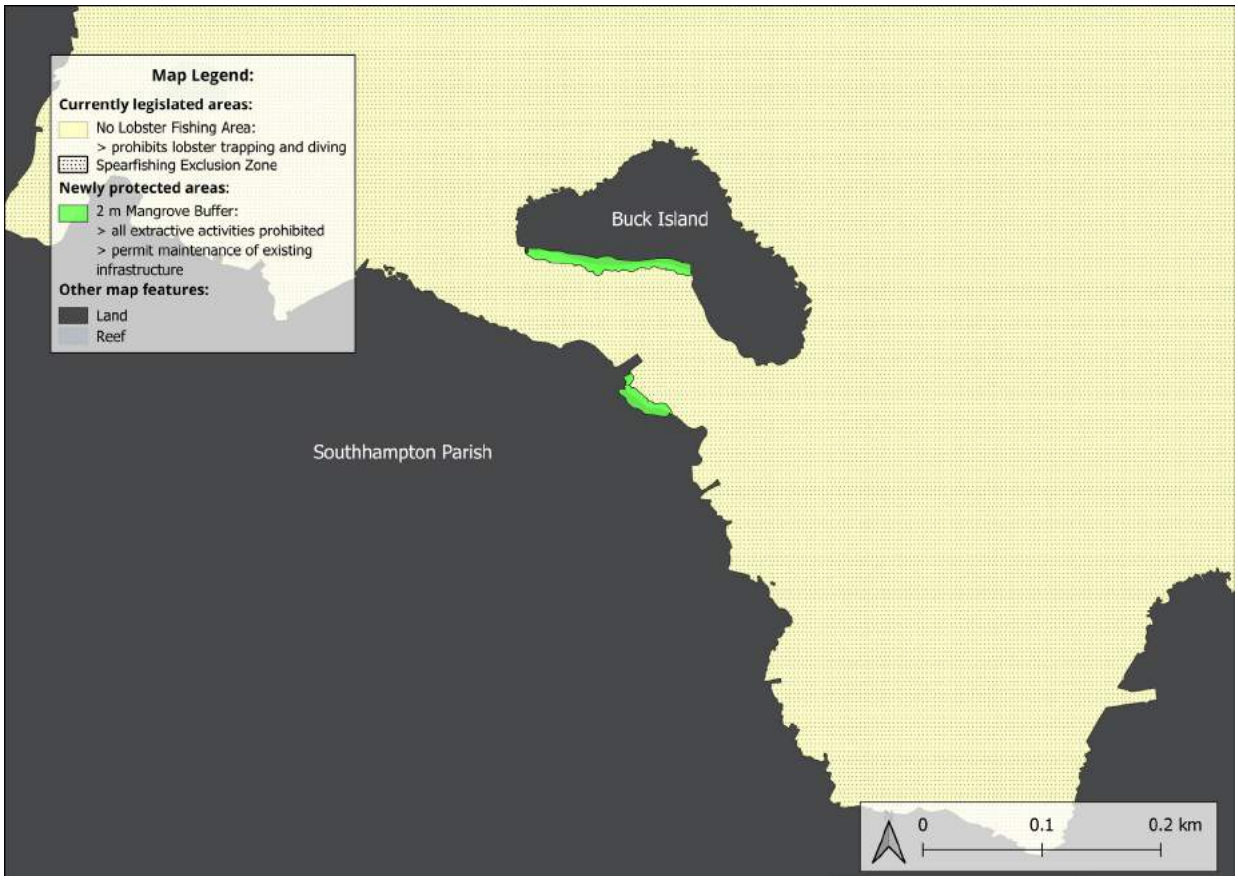
Map 17


Map Legend:
Currently legislated areas:
No Lobster Fishing Area:
> prohibits lobster trapping and diving
Spearfishing Exclusion Zone
Newly protected areas:
2 m Mangrove Buffer:
> all extractive activities prohibited
> permit maintenance of existing infrastructure
No Net Fishing:
> prohibits net fishing
Special Protection Area:
> all extractive activities prohibited except maintenance of existing infrastructure
Other map features:
Land
Reef
C4 - North of Riddell's Bay
C5 - Riddell's Bay
Warwick Parish
Perot Isl.
Southampton Parish
0
0.25
0.5 km

Map 18


Map Legend:
Currently legislated areas:
No Lobster Fishing Area:
> prohibits lobster trapping and diving
Spearfishing Exclusion Zone
National Parks Marine Areas
Newly protected areas:
2 m Mangrove Buffer:
> all extractive activities prohibited
> permit maintenance of existing infrastructure
Other map features:
Land
Reef
Morgan's Point
Vesey Nature Reserve
West Whale Bay Park
Buck Isl.
Southampton Parish
0
0.5
1 km

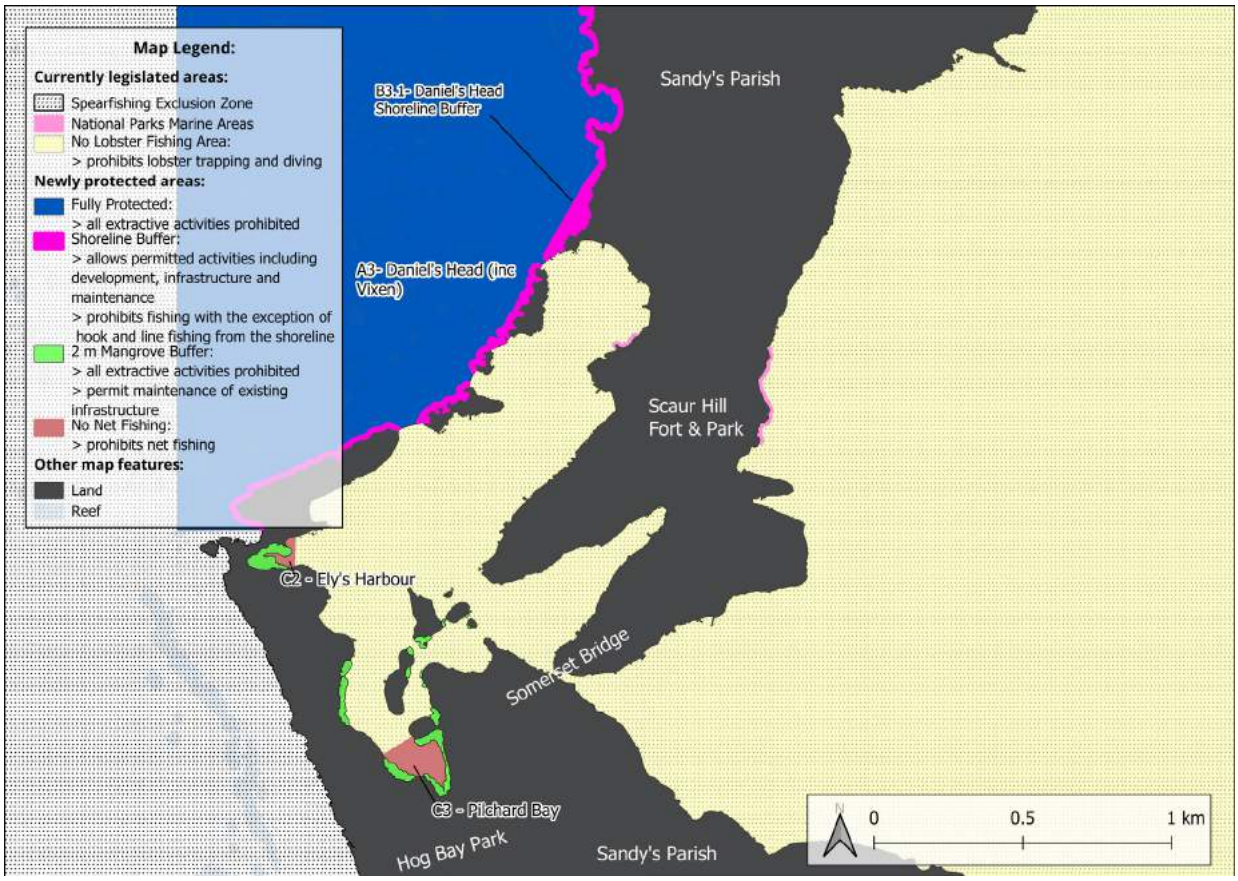
Map 19


Map Legend:
Currently legislated areas:
No Lobster Fishing Area:
> prohibits lobster trapping and diving
Spearfishing Exclusion Zone
Newly protected areas:
2 m Mangrove Buffer:
> all extractive activities prohibited
> permit maintenance of existing infrastructure
Other map features:
Land
Reef
Buck Island
Southhampton Parish
0
0.1
0.2 km

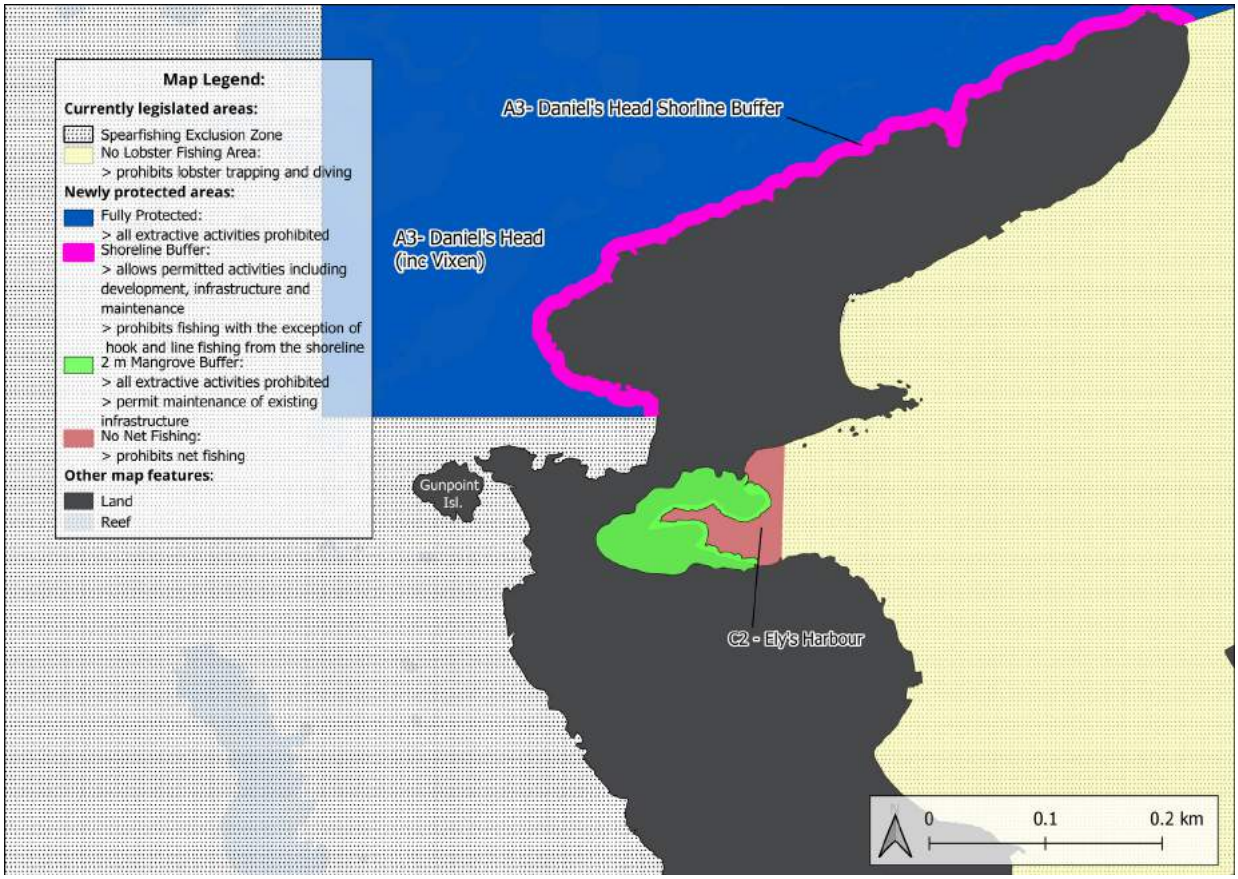
Map 20


Map Legend:
Currently legislated areas:
No Lobster Fishing Area:
> prohibits lobster trapping and diving
Spearfishing Exclusion Zone
Newly protected areas:
2 m Mangrove Buffer:
> all extractive activities prohibited
> permit maintenance of existing infrastructure
Other map features:
Land
Morgan's Point
Ferry Terminal
0
0.1
0.2 km

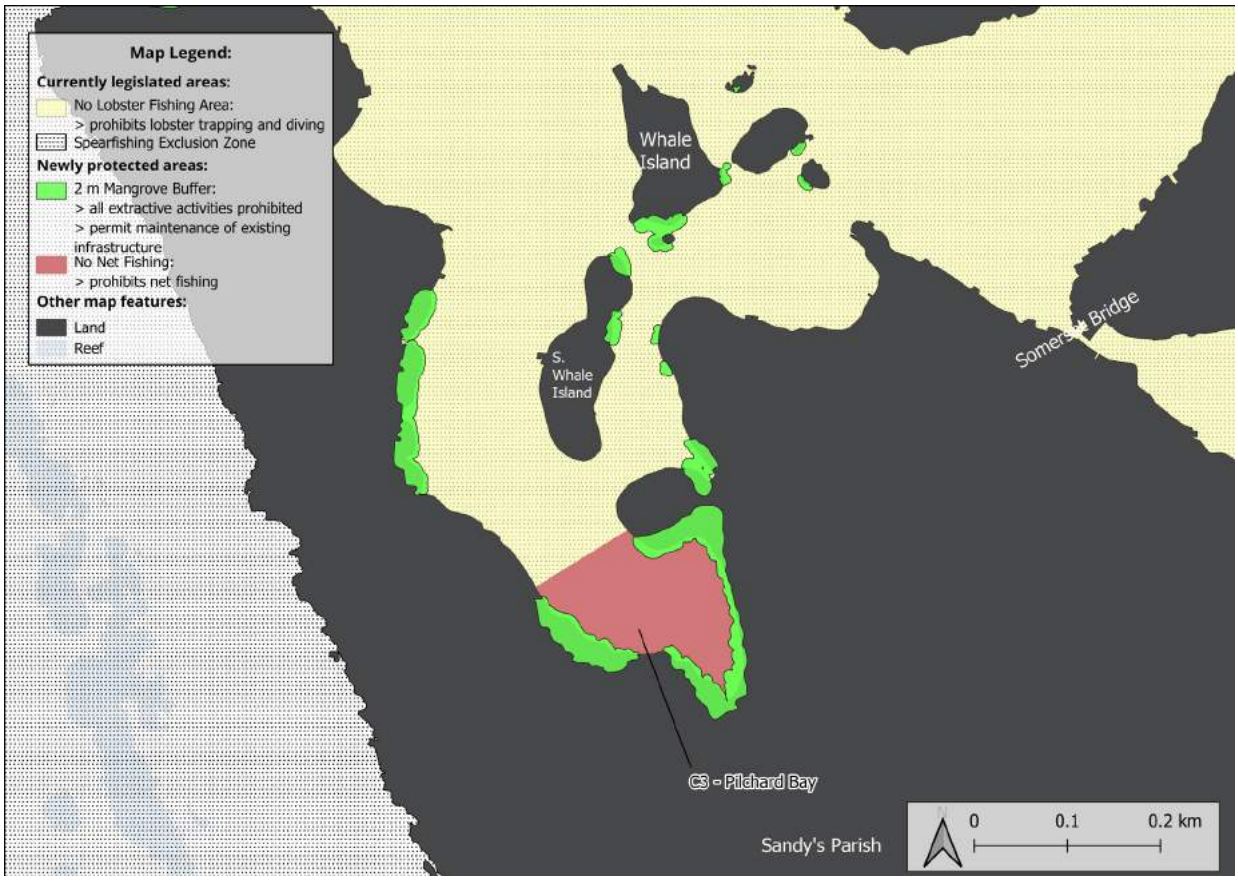
Map 21


Map Legend:
Currently legislated areas:
Spearfishing Exclusion Zone
National Parks Marine Areas
No Lobster Fishing Area:
> prohibits lobster trapping and diving
Newly protected areas:
Fully Protected:
> all extractive activities prohibited
Shoreline Buffer:
> allows permitted activities including development, infrastructure and maintenance
> prohibits fishing with the exception of hook and line fishing from the shoreline
2 m Mangrove Buffer:
> all extractive activities prohibited
> permit maintenance of existing infrastructure
No Net Fishing:
> prohibits net fishing
Other map features:
Land
Reef
B3.1- Daniel's Head Shoreline Buffer
Sandy's Parish
A3- Daniel's Head (inc Vixen)
Scaur Hill Fort & Park
C2 - Ely's Harbour
Somerset Bridge
C3 - Pilchard Bay
Hog Bay Park
Sandy's Parish
0
0.5
1 km

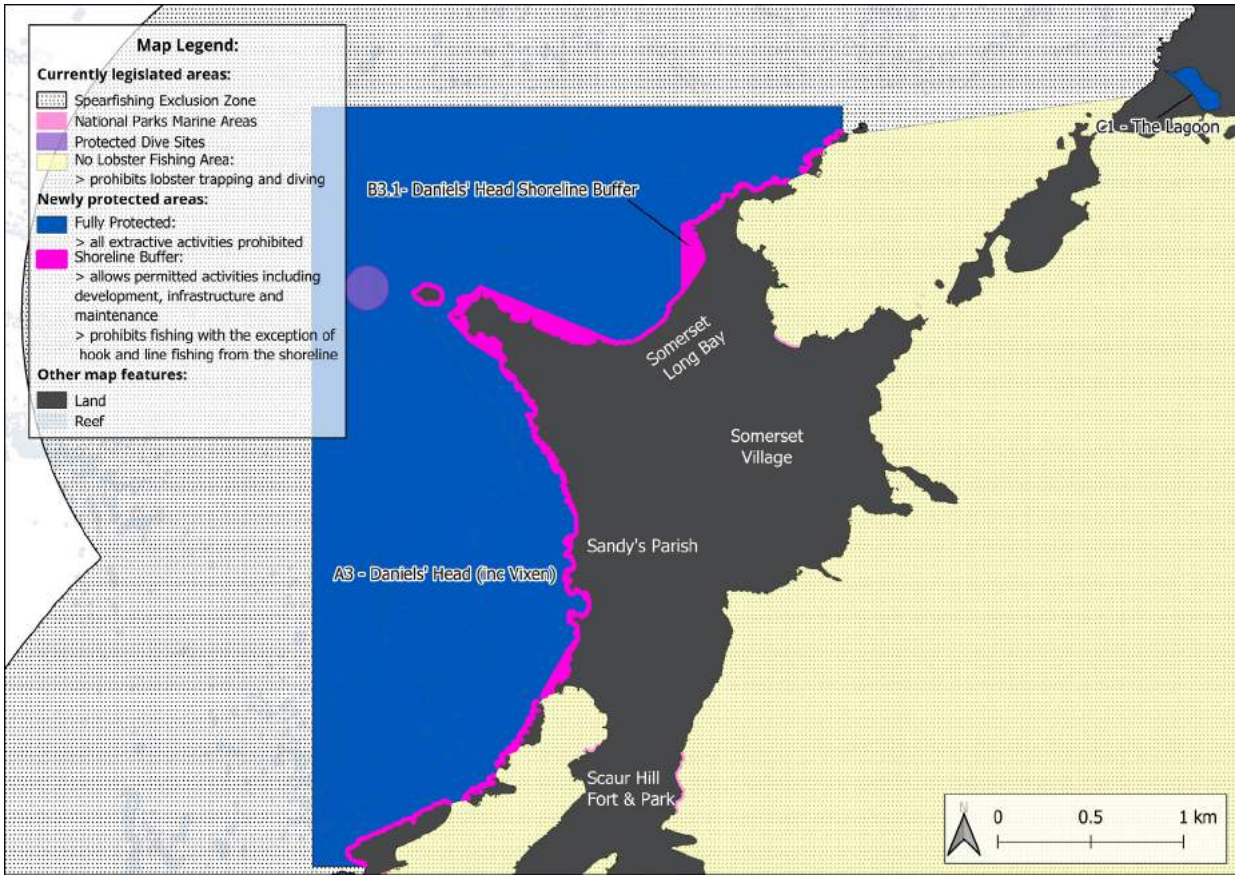
Map 22


Map Legend:
Currently legislated areas:
Spearfishing Exclusion Zone
No Lobster Fishing Area:
> prohibits lobster trapping and diving
Newly protected areas:
Fully Protected:
> all extractive activities prohibited
Shoreline Buffer:
> allows permitted activities including development, infrastructure and maintenance
> prohibits fishing with the exception of hook and line fishing from the shoreline
2 m Mangrove Buffer:
> all extractive activities prohibited
> permit maintenance of existing infrastructure
No Net Fishing:
> prohibits net fishing
Other map features:
Land
Reef
A3- Daniel's Head Shorline Buffer
A3- Daniel's Head (inc Vixen)
Gunpoint Isl.
C2 - Ely's Harbour
0
0.1
0.2 km

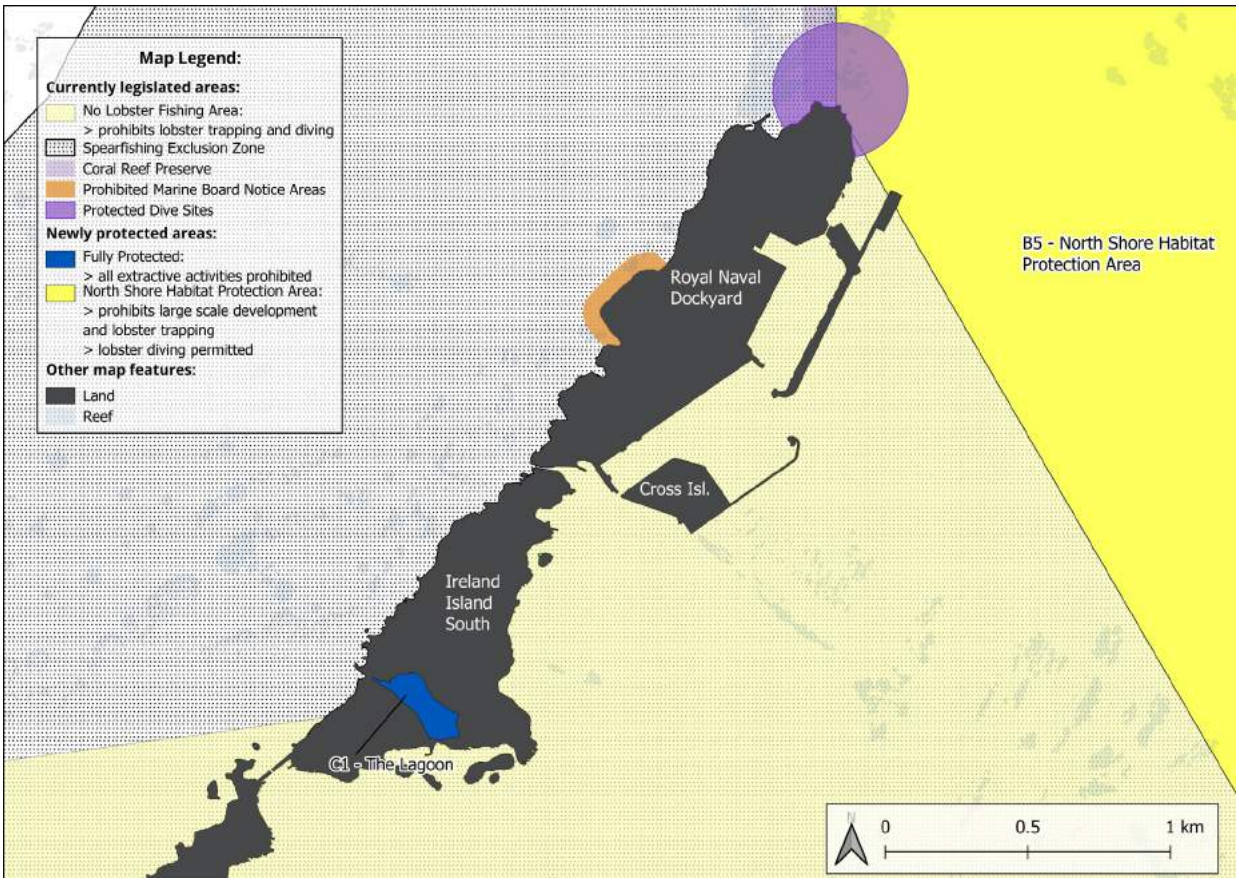
Map 23


Map Legend:
Currently legislated areas:
No Lobster Fishing Area:
> prohibits lobster trapping and diving
Spearfishing Exclusion Zone
Newly protected areas:
2 m Mangrove Buffer:
> all extractive activities prohibited
> permit maintenance of existing infrastructure
No Net Fishing:
> prohibits net fishing
Other map features:
Land
Reef
Whale Island
S. Whale Island
Somerset Bridge
C3 - Pilchard Bay
Sandy's Parish
0
0.1
0.2 km

Map 24


Map Legend:
Currently legislated areas:
Spearfishing Exclusion Zone
National Parks Marine Areas
Protected Dive Sites
No Lobster Fishing Area:
> prohibits lobster trapping and diving
Newly protected areas:
Fully Protected:
> all extractive activities prohibited
Shoreline Buffer:
> allows permitted activities including development, infrastructure and maintenance
> prohibits fishing with the exception of hook and line fishing from the shoreline
Other map features:
Land
Reef
C1 - The Lagoon
B3.1 - Daniels' Head Shoreline Buffer
Somerset Long Bay
Somerset Village
Sandy's Parish
A3 - Daniels' Head (inc Vixen)
Scaur Hill Fort & Park
0
0.5
1 km

Map 25



4.3 Potential Use Areas

Included in the MSP are descriptive maps for Potential Use Areas that identify areas of suitability for priority activities as listed in the PGOs: renewable energy development, habitat restoration, and aquaculture. The maps are **not legally binding** and are intended to guide stakeholders and decision-makers as they consider proposals for future uses of Bermuda's marine environment.

4.3.1 Potential Use Areas – Renewable Energy

Potential Use Areas for renewable energy development provide developers and resource managers a preliminary tool to assess constraints on the placement of renewable energy technologies, including offshore wind (fixed), offshore wind (floating), floating solar photovoltaic (PV) and wave energy. The maps show which areas in Bermuda's waters might be suitable for further investigation for each of these purposes. It should be noted that such activities will require a comprehensive environmental impact assessment (EIA) and additional feasibility studies. These maps will assist in meeting the goal of the Blue Economy Strategy of accelerating the clean energy transition by facilitating opportunities for investable projects.

Local technical experts and scientists were consulted by BOPP to provide guidance in the creation of the Potential Use Area maps for renewable energy development. The maps were created by excluding areas considered important or valuable for economic (e.g., fishing, the location of shipping or ferry lanes, or the cost of installing cabling), ecological/environmental (e.g., protected

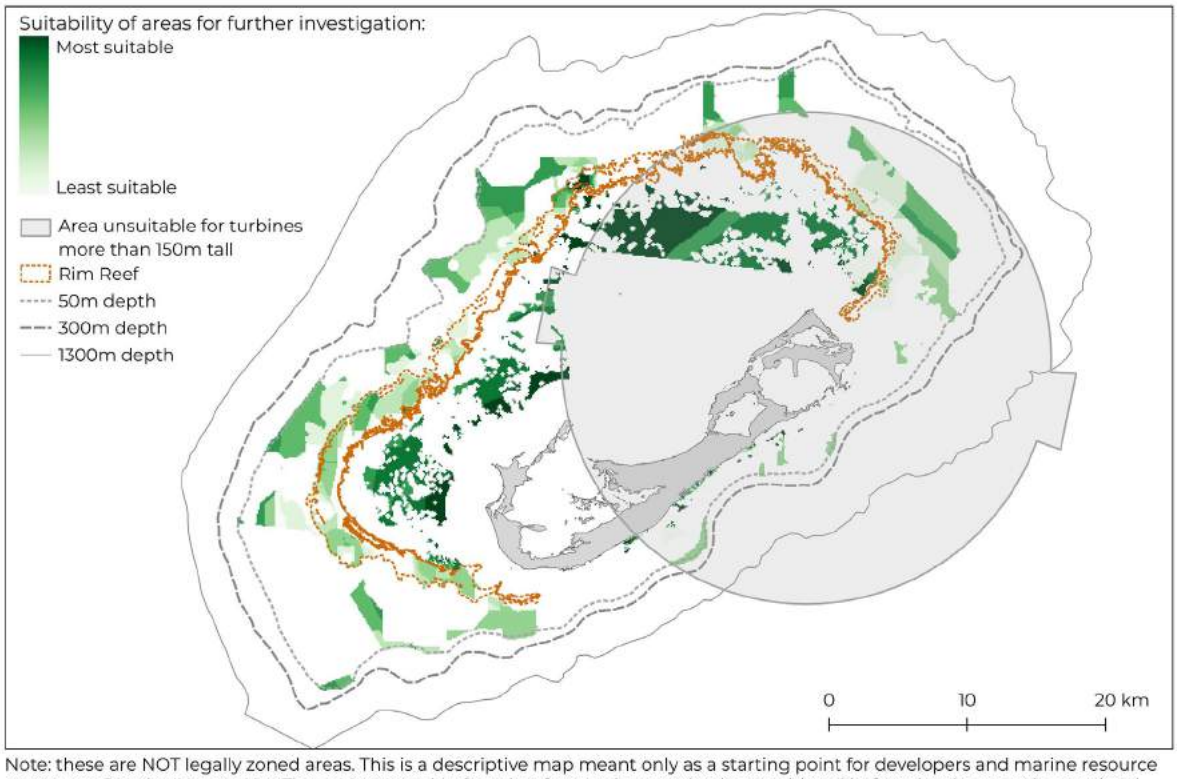
areas, sensitive habitats, or fish spawning sites), cultural/historic (e.g., the location of historic wrecks), or practical reasons (e.g., depth limitations or wave energy requirements).

The maps for offshore fixed wind technologies (wind farms) also consider a metric known as the "levelised cost of energy" (LCOE) which is a measure of the cost of energy production commonly employed in the development and placement of wind farms. LCOE is defined as "the revenue required (from whatever source) to earn a rate of return on investment equal to the weighted average cost of capital [average rate of return that investors can expect over the lifetime of the wind farm]" not including tax and inflation.[89] Many factors influence LCOE including site conditions, transportation costs, supply chain evolution, technology development and even competition among suppliers. These criteria were combined to produce a final site suitability index that measures which areas are more or less suitable for renewable energy development.

The Potential Use Areas maps are not legally binding and additional factors, such as those listed under "How to Use These Maps," should be taken into consideration. For more information on the methodology used to develop the Potential Use Area maps for Renewable Energy, please refer to the "Renewable Energy Siting" document.

Map 26

Potential development areas for offshore fixed wind



Note: these are NOT legally zoned areas. This is a descriptive map meant only as a starting point for developers and marine resource managers. See the 'How to Use These Maps' section for other factors that need to be considered before development is permitted.

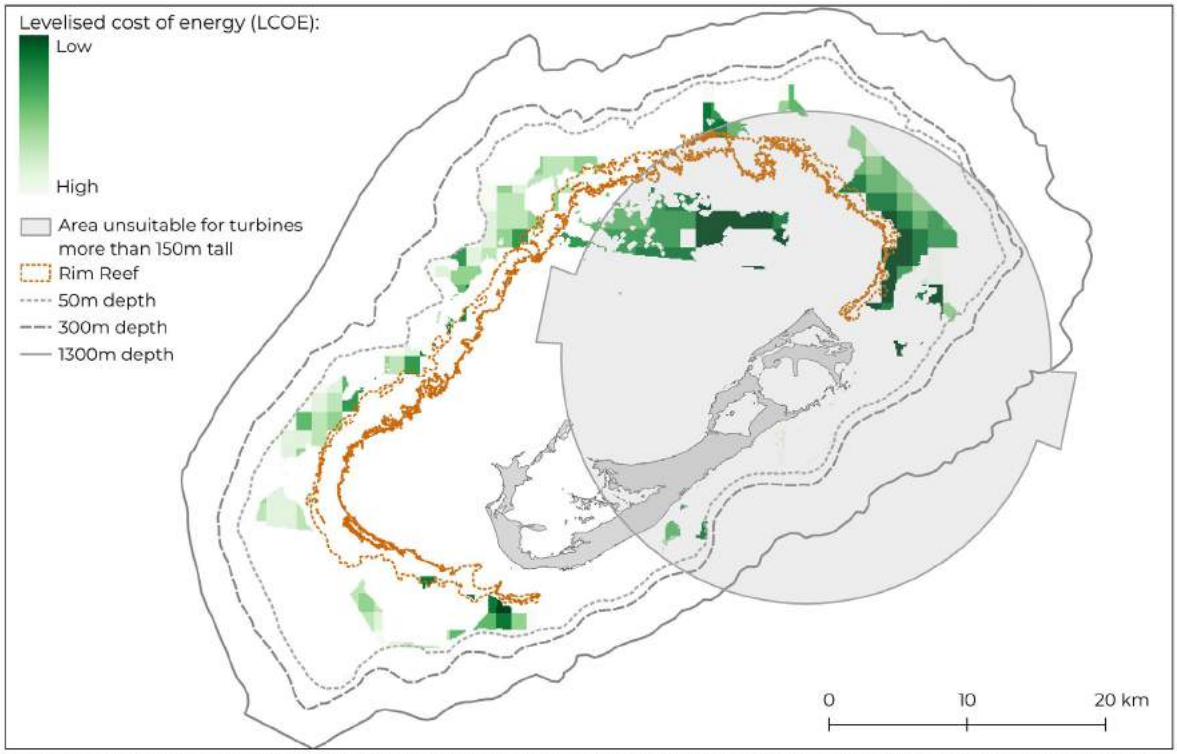
Map 26 shows areas suitable for further investigation for the installation of offshore fixed wind technologies. Suitability is shown as a scale, with darker green indicating areas of greater suitability and lighter green indicating areas of least suitability. The grey circular area denotes a region that is unsuitable for installation of any turbines greater than 150 metres tall given the clearance necessary

[89] BVG Associates. 2024. https://guidetoanoffshorewindfarm.com/glossary

for planes on takeoff and approach to L.F. Wade International Airport. Additional factors used in the creation of this map can be found in the "Renewable Energy Siting" document.

Map 27

Potential development areas for fixed wind with levelised cost of energy (LCOE) shown

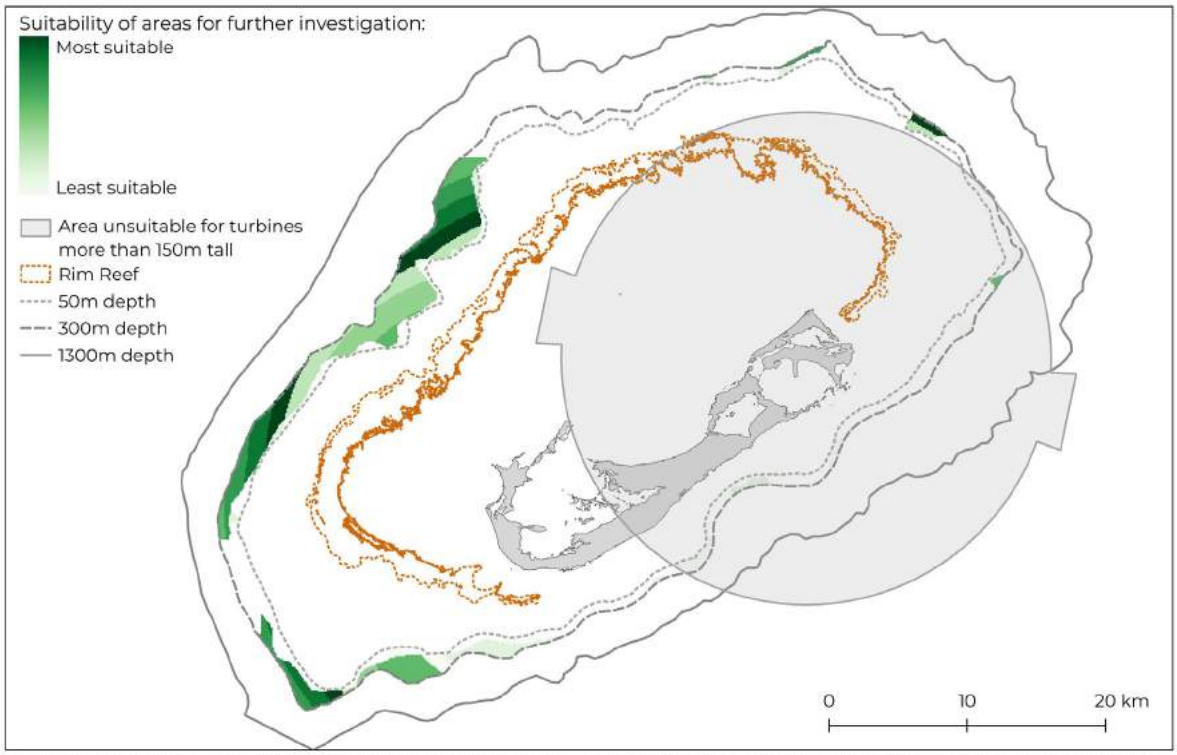


Note: these are NOT legally zoned areas. This is a descriptive map meant only as a starting point for developers and marine resource managers. See the 'How to Use These Maps' section for other factors that need to be considered before development is permitted.

Map 27 shows areas suitable for further investigation for fixed wind installations shown against an economic factor called levelized cost of energy (LCOE). LCOE helps evaluate and compare the cost of electricity production from different locations and can help developers (and consumers) compare the cost of a single unit of energy produced from various locations. In the map above, darker green areas have lower LCOE, which benefits the electricity consumer. Additional factors used in the creation of this map can be found in the "Renewable Energy Siting" document.

Map 28

Potential development areas for offshore floating wind

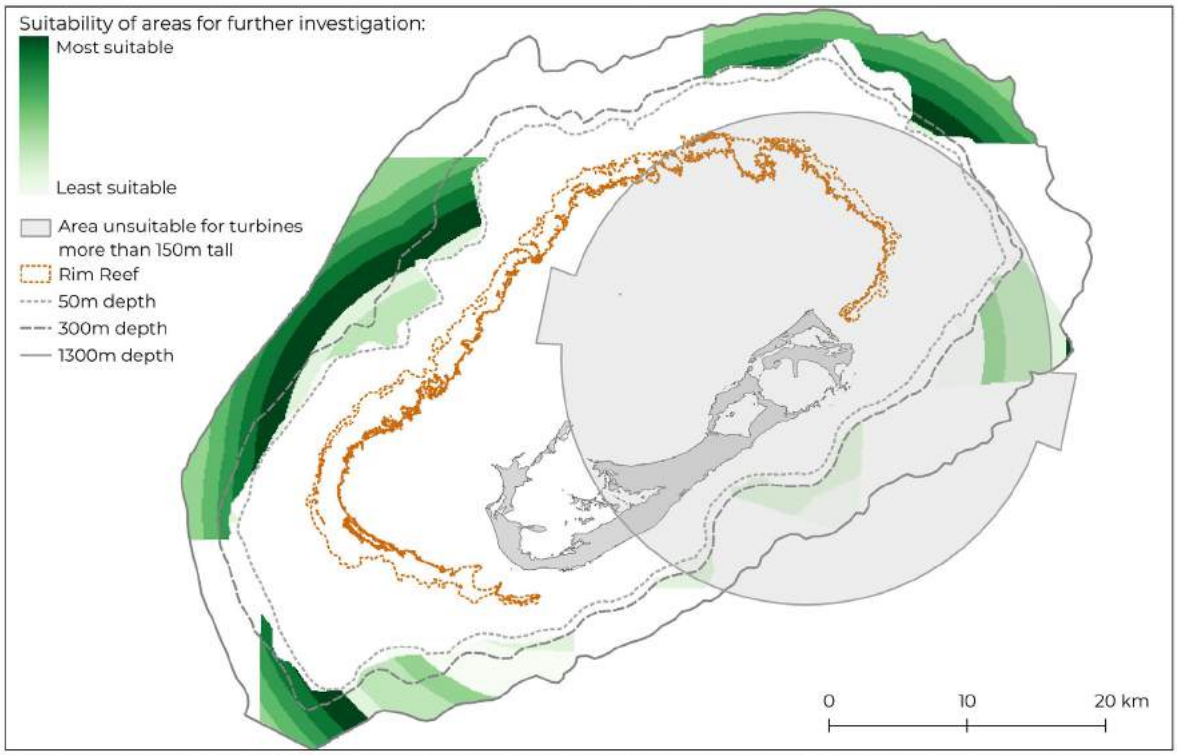


Note: these are NOT legally zoned areas. This is a descriptive map meant only as a starting point for developers and marine resource managers. See the 'How to Use These Maps' section for other factors that need to be considered before development is permitted.

Map 28 shows areas that are suitable for further investigation for the installation of offshore floating wind technologies. As with Map 26, suitability is shown as a scale, with darker green indicating areas of greater suitability and lighter green indicating areas of least suitability. The grey circular area denotes a region that is unsuitable for installation of any turbines greater than 150 metres tall given the clearance necessary for planes on takeoff and approach to L.F. Wade International Airport. Additional factors used in the creation of this map can be found in the "Renewable Energy Siting" document.

Map 29

Potential development areas for offshore floating wind (technologically feasible)

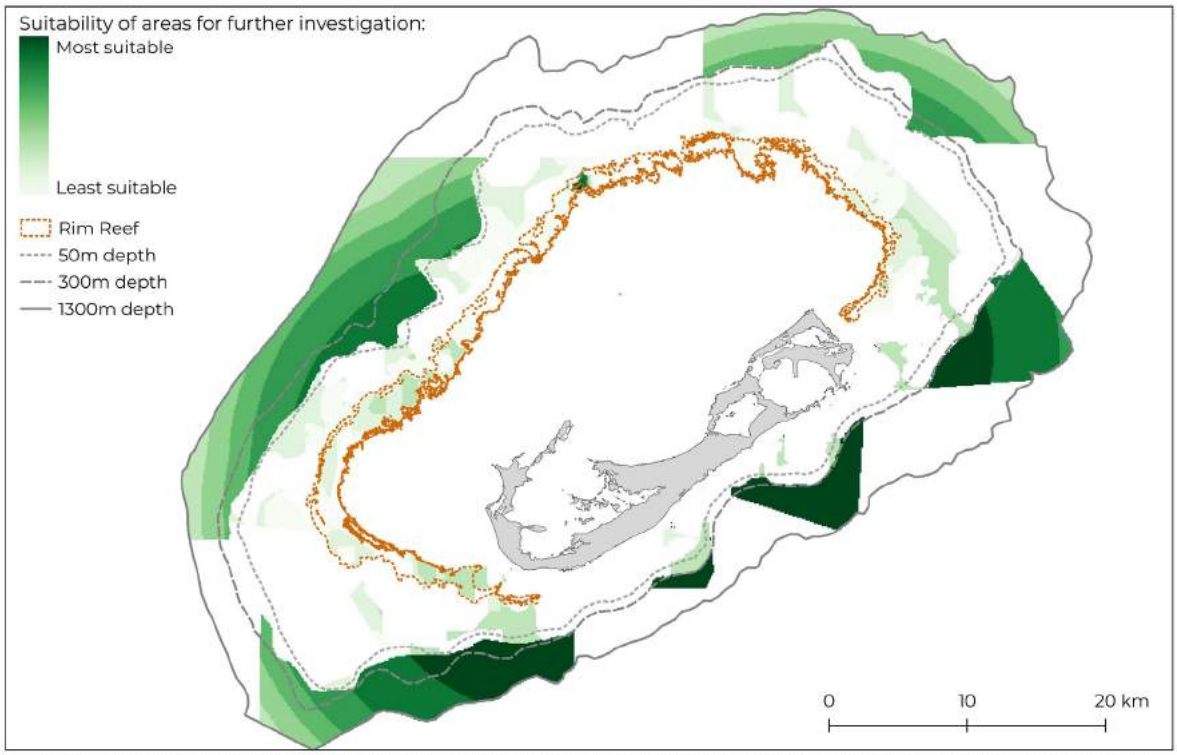


Note: these are NOT legally zoned areas. This is a descriptive map meant only as a starting point for developers and marine resource managers. See the 'How to Use These Maps' section for other factors that need to be considered before development is permitted.

Map 29 shows areas that are suitable for further investigation for the installation of offshore floating wind technologies against what is considered technologically feasible. The definition of "technologically feasible" includes water depths that are currently considered technically, but not economically, feasible for platform installation. In addition, areas outside the rim reef are only partially suitable for floating wind technologies based on the literature finding that maximum wave height before catastrophic failure is 17 metres; the Bermuda Weather Service forecast data for outside the reef reports an absolute highest wave height of 10.7 metres. In the above map, darker green areas indicate a higher level of technological feasibility/suitability, while lighter green areas indicate a lower level of technological feasibility/suitability. Additional factors used in the creation of this map can be found in the "Renewable Energy Siting" document.

Map 30

Potential development areas for offshore wave energy

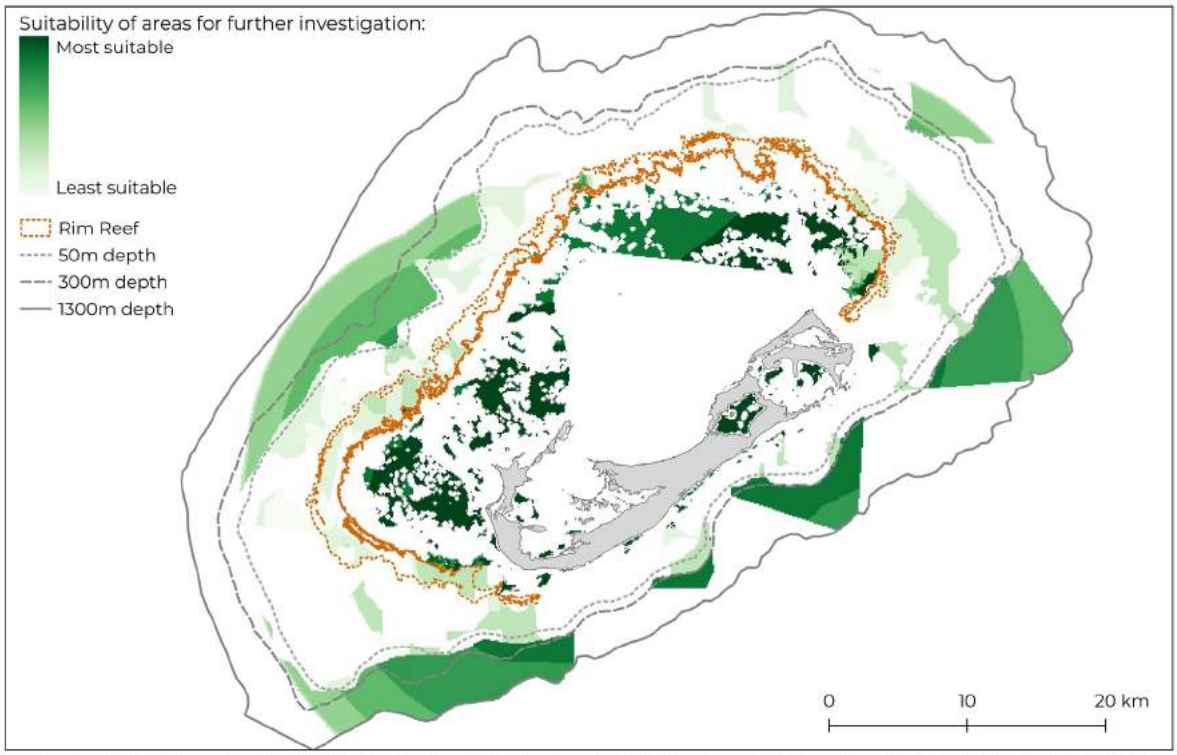


Note: these are NOT legally zoned areas. This is a descriptive map meant only as a starting point for developers and marine resource managers. See the 'How to Use These Maps' section for other factors that need to be considered before development is permitted.

Map 30 shows areas that are suitable for further investigation for the installation of offshore wave energy technologies. Darker green indicates areas that are more suitable while lighter green indicates areas that are least suitable. Additional factors used in the creation of this map can be found in the "Renewable Energy Siting" document.

Map 31

Potential development areas for floating solar energy



Note: these are NOT legally zoned areas. This is a descriptive map meant only as a starting point for developers and marine resource managers. See the 'How to Use These Maps' section for other factors that need to be considered before development is permitted.

Map 31 shows areas that are potentially suitable for further investigation for the installation of floating solar energy technologies. Similar to floating wind technologies, areas inside the rim reef are more suitable, while areas outside the reef are only partially suitable. For floating solar technologies, the maximum wave height before catastrophic failure is currently 13 metres; the Bermuda Weather Service has reported an absolute maximum height wave outside Bermuda's reef of 10.7 metres. In the above map, darker green indicates areas of greater suitability, while lighter green indicates areas of least suitability. Additional factors used in the creation of this map can be found in the "Renewable Energy Siting" document.

How to Use These Maps

These maps SHOULD NOT be used independently for site selection for renewable energy development. The following considerations should be addressed prior to granting development approval:

1. Additional feasibility studies should be conducted, including a cost-benefit analysis to determine the financial feasibility of installing the equipment, and a technical feasibility study to investigate specific logistics related to project implementation and potential energy generation (e.g., coral reef structures impeding construction).
2. A comprehensive EIA must be conducted prior to development approval being granted and should include:
    1. A user impact assessment that assesses potential positive and negative impacts on ocean stakeholders.

2. A requirement to assess the impact of cabling to shore, as well as the impacts of fixed renewable energy structures.
3. A requirement to enhance fixed structures where possible to improve ecological value.
4. A requirement to assess the viability of several other potential locations.

3. A license or lease must be obtained from the Minister of Public Works for any works impacting the seabed.
4. Consider enacting additional legislation on an as-needed basis to support potential use areas that will require some level of protection/exclusion and are not in currently legislated zones.

4.3.2 Potential Use Areas - Habitat Restoration

Potential Habitat Restoration Areas provide opportunities for habitat restoration in regions with special environmental significance, including coral reefs, seagrasses, and mangroves/salt marshes. The maps provide a starting point for investable projects that can assist in meeting the goal of expanding sustainable or regenerative marine tourism as outlined in the Blue Economy Strategy. The maps also outline areas in which ecosystem enhancement activities could be funded through developer mitigation payments, as proposed in the Blue Economy Strategy.

Technical experts and scientists were consulted by BOPP to provide guidance on creating these habitat restoration maps. Their guidance was used to apply a combination of criteria to identify areas suitable for restoration in coral, seagrass and mangrove/salt marsh habitats. These criteria included environmental and ecological indicators, such as proximity to nature reserves, recreation/amenity sites, and water resources protection areas (for mangroves/salt marsh habitats); proximity to existing mangrove stands (for mangroves/salt marsh habitats); presence of seagrass (for seagrass beds); and vulnerability of existing patch reefs to coastal erosion due to storm events (for coral). Other criteria included the presence of ongoing restoration efforts, as well as (in the case of mangroves and salt marshes) supplemental data from a 2020 survey[90] by Dr. S. R. Smith (BZS), and additional site suggestions based upon local expert knowledge.

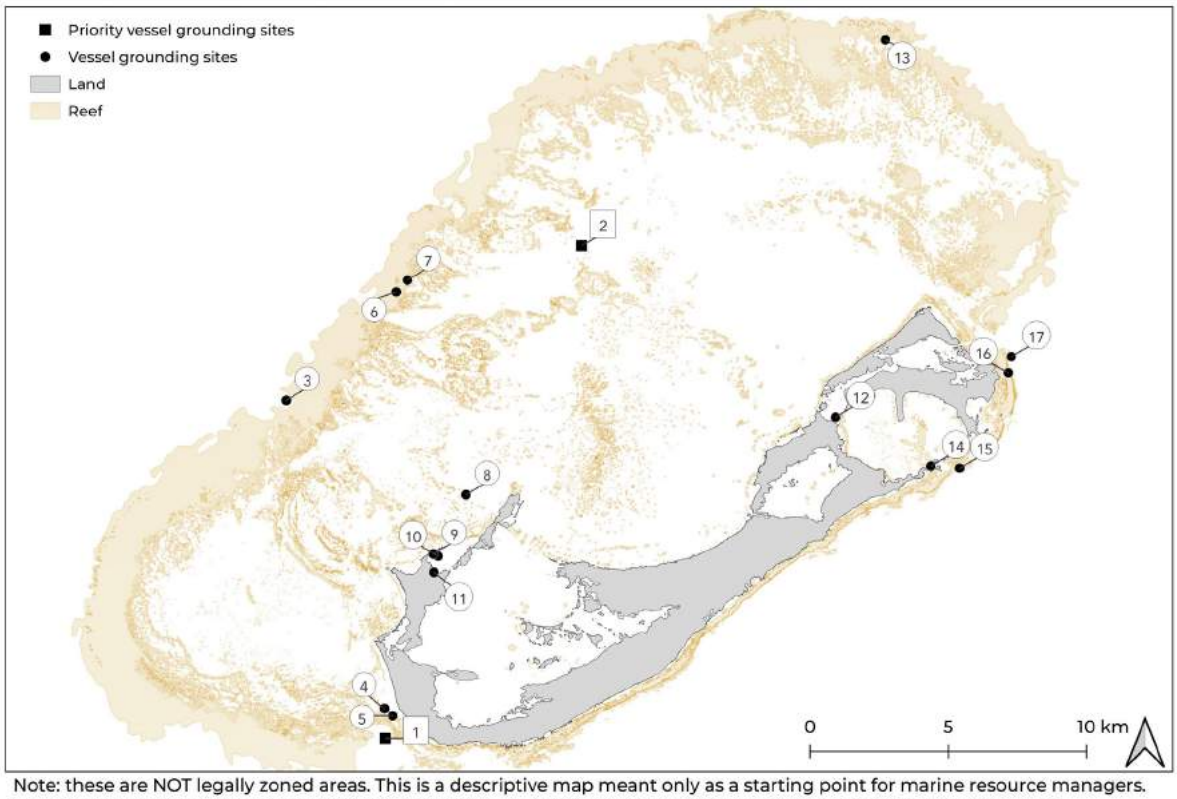
The resulting set of maps identifies areas for each habitat type that are suitable for further investigation for restoration activities. The areas identified in these maps represent recommendations based on the best available science, as well as feedback from the BOPP Steering Committee, BOPP Science Committee and stakeholders. While not legally binding, the locations in the maps represent areas that have the potential for habitat restoration and, as such, developers should take measures to avoid them. For more information on the methodology used to develop the Potential Use Area maps for Habitat Restoration, please refer to the technical reports for each habitat type: coral, seagrass, and mangroves.

[90] Unpublished data

Coral

Map 32

Vessel grounding sites potentially suitable for coral restoration



Note: these are NOT legally zoned areas. This is a descriptive map meant only as a starting point for marine resource managers. See the "How to Use These Maps' section for other factors that need to be considered before this activity is permitted.

Given feedback from coral reef experts, this map shows the priorities for coral restoration areas (black squares) with secondary priorities shown in black circles. These areas are vessel grounding sites, some dating back as far as 2012. Visual surveys show that some corals are still loose and restoration could begin with re-cementing activities. NB - the coordinates used to plot these points are estimates based on descriptions of grounding locations and need ground truthing. Names of vessel grounding sites that correspond with numbers are found in Table 4.

Table 4

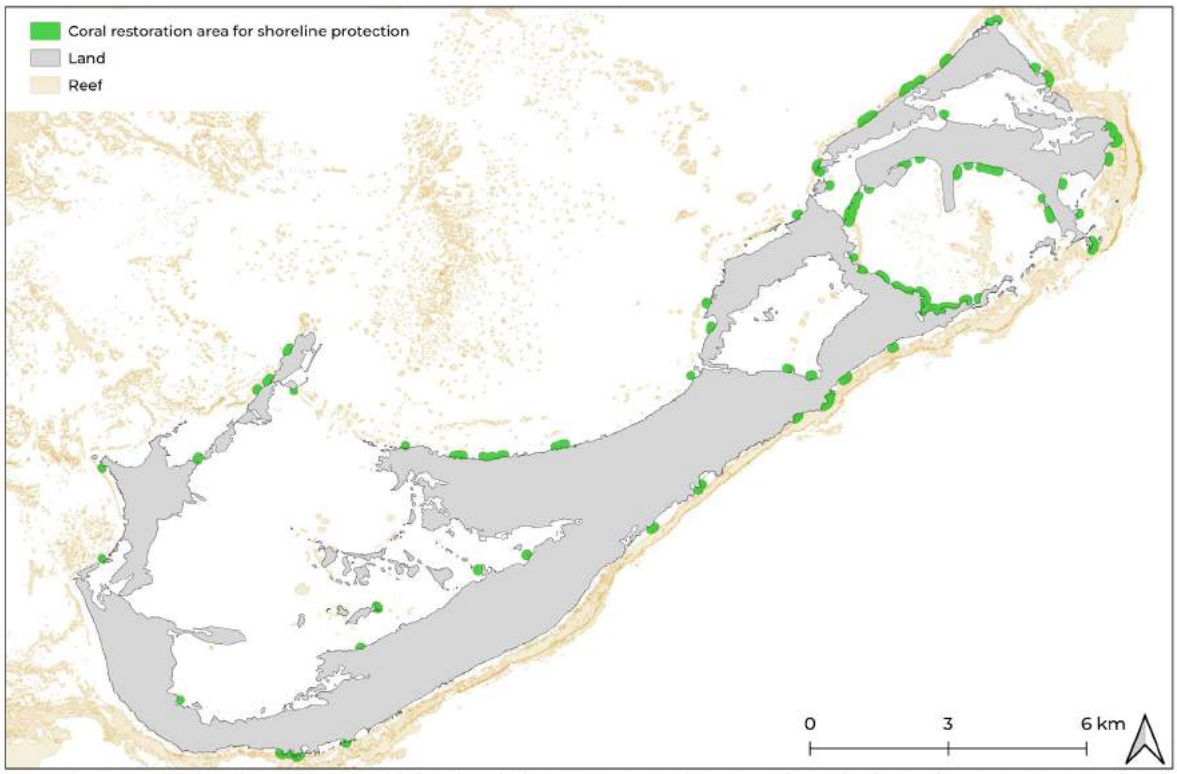
List of Vessel Grounding Sites Potentially Suitable for Coral Restoration (Shown in Map 32)

Number on Map	Name of Vessel Grounding Site
1	Pompano patch reefs
2	Cruise ship grounding
3	S/V Star of Liberty (aground on the reef)

4	Local F/V N093 aground near Pompano, Somerset
5	S/V Private Island (aground)
6	S/V Bank Von Bremen (grounding)
7	D'Natalin IV (aground Eastern Blue Cut)
8	S/V Loumilis (grounded)
9	Sailboat grounded off Teddy Tuckers
10	Abandoned boat on rocks
11	S/V aground Mangrove Bay
12	P/C M&P 7188 (disabled grounded west side of Causeway)
13	Ubiquitous aground Northeast Breaker
14	P/C Justified aground Castle Rocks
15	C218 aground Gurnet Rock
16	P/C Kayla on rocks
17	P/C Bunny Lu (aground South Spit Buoy)

Map 33

Potential coral restoration areas for shoreline protection to vulnerable infrastructure

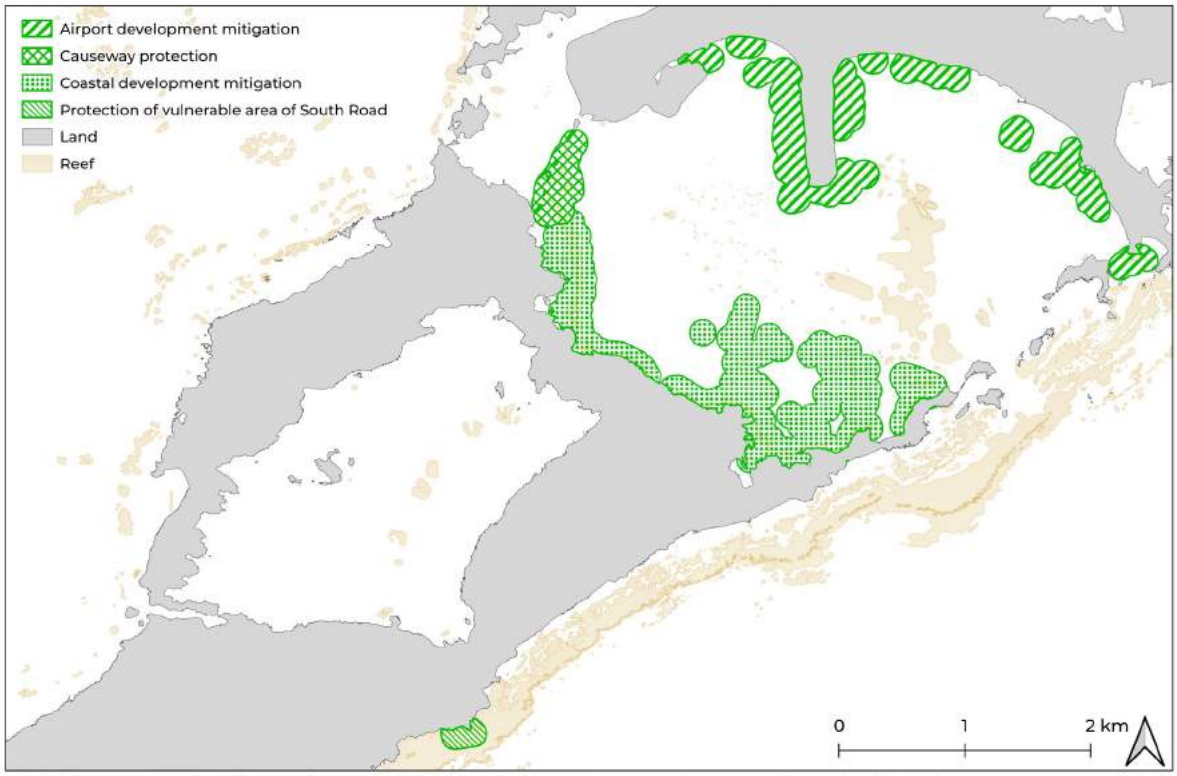


Note: these are NOT legally zoned areas. This is a descriptive map meant only as a starting point for marine resource managers. See the "How to Use These Maps' section for other factors that need to be considered before this activity is permitted.

Map 33 shows potential coral restoration areas (in green) identified for the purposes of creating additional nature-based protection for vulnerable infrastructure, such as the Causeway and around the L.F. Wade International Airport.

Map 34

Potential coral restoration areas as suggested by local expert



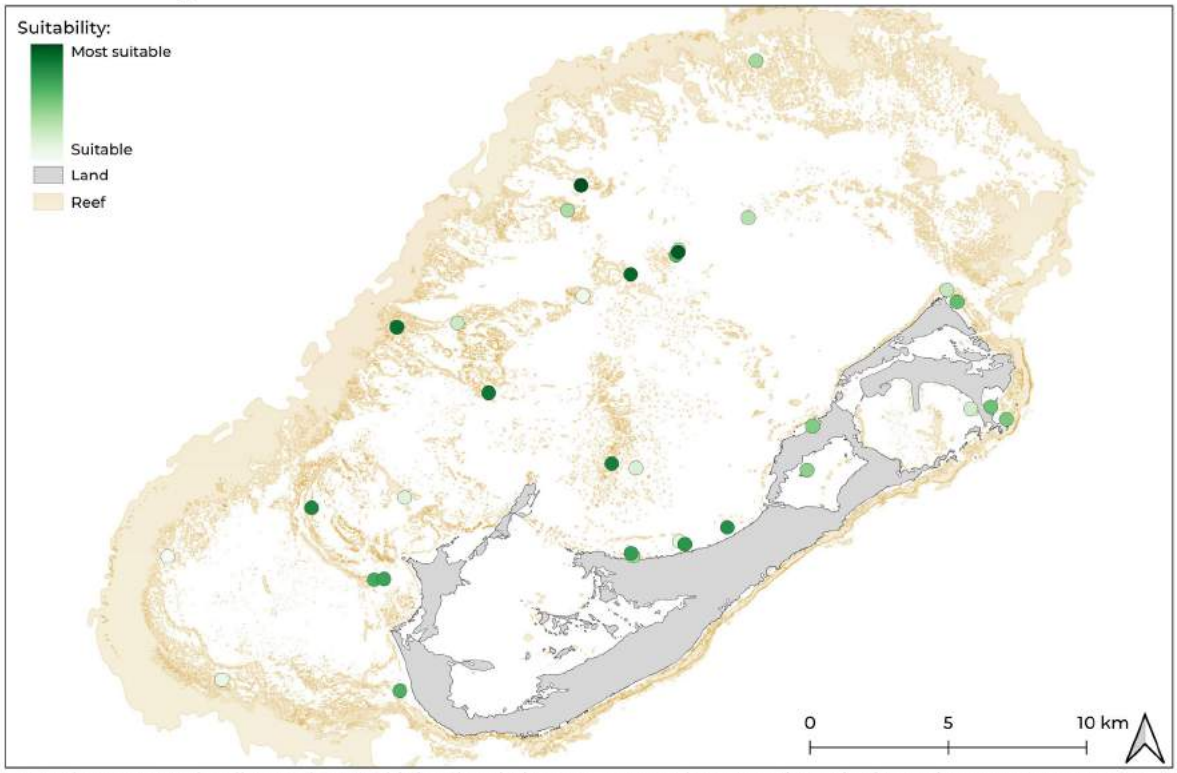
Note: these are NOT legally zoned areas. This is a descriptive map meant only as a starting point for marine resource managers. See the "How to Use These Maps' section for other factors that need to be considered before this activity is permitted.

Map 34 shows additional potential coral restoration areas suggested by Dr. Samia Sarkis in Castle Harbour and along South Road near John Smith's Bay. Justifications include the continuation of a long-term coral nursery programme that is being used to restore corals damaged from the construction of the airport in the 1950s (green dashed lines); the construction of a natural barrier protecting the Causeway Bridge (green cross-hatched lines); mitigation of coastal development projects (green dots); and protection of a vulnerable patch of reef on South Road near John Smith's Bay in an effort to reduce wind and wave-related damage. Reefs mapped by Dr. Thad Murdoch are shown in yellow.

Seagrass

Map 35

Potential seagrass restoration sites

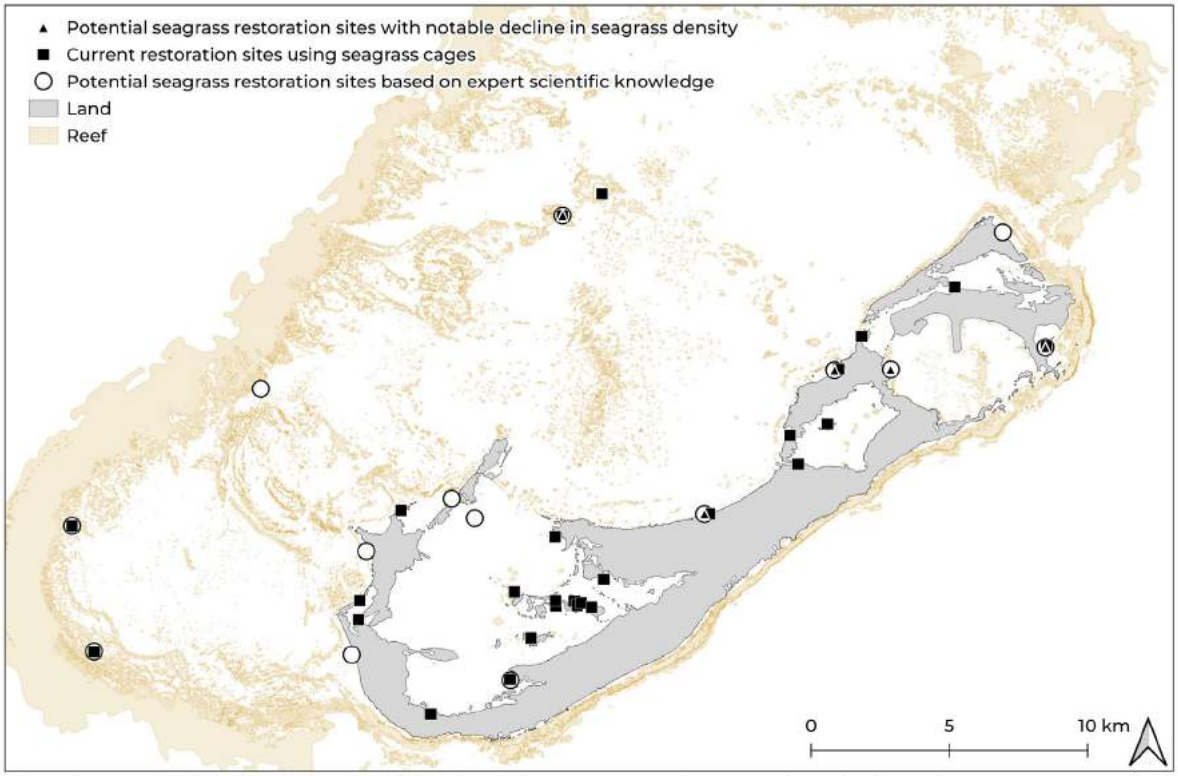


Note: these are NOT legally zoned areas. This is a descriptive map meant only as a starting point for marine resource managers. See the "How to Use These Maps' section for other factors that need to be considered before this activity is permitted.

This map shows the seagrass sites to be given special environmental consideration for restoration. All available seagrass data provided by local experts from 2004 to 2020 were used to identify areas suitable for restoration. The most suitable locations (darkest green) were surveyed more than once, had seagrass in at least one survey and had no seagrass in the most recent survey. Other restoration sites may exist that are not identified in this map; however, all sites identified in this map are potentially suitable for restoration given the aforementioned criteria.

Map 36

Potential seagrass restoration sites as identified by local expert



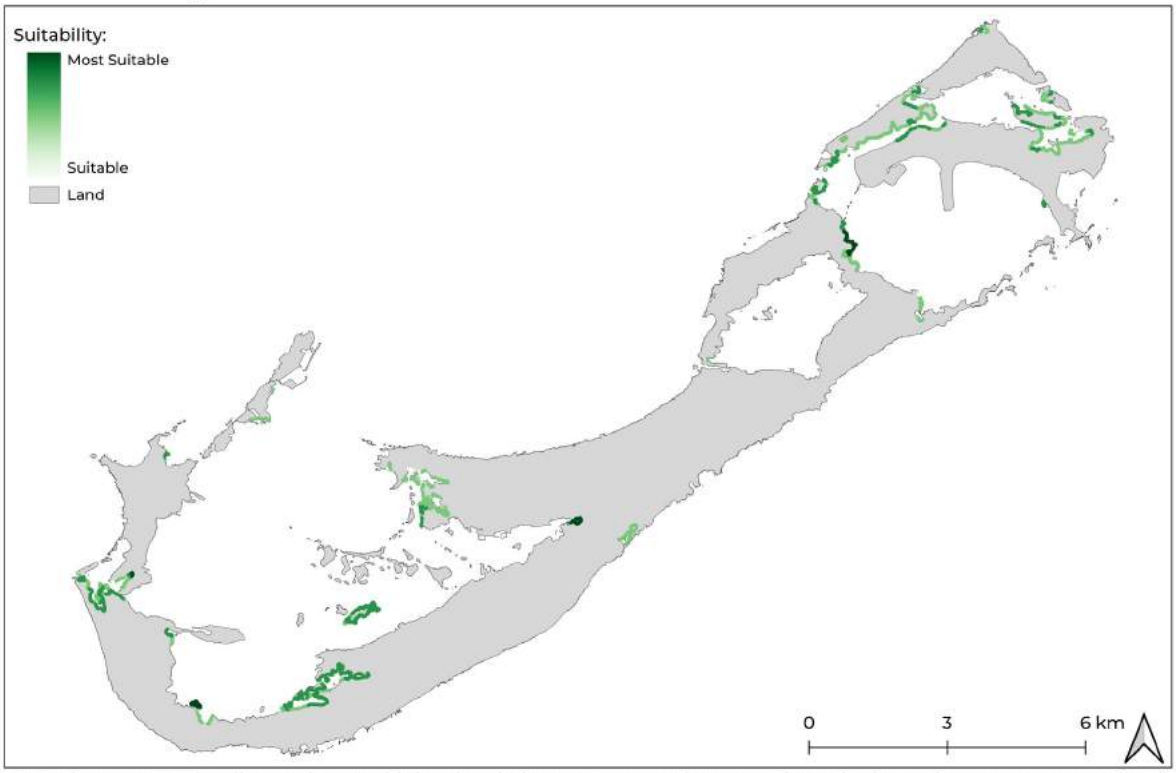
Note: these are NOT legally zoned areas. This is a descriptive map meant only as a starting point for marine resource managers. See the "How to Use These Maps' section for other factors that need to be considered before this activity is permitted.

Map 36 identifies additional areas suitable for seagrass restoration based on a combination of factors. The black triangles indicate surveyed areas with a significant recorded decline in seagrass density. The black squares (not to scale) represent the location of installed turtle exclusion cages, which are used to reduce the impacts of turtle grazing on seagrass meadows as a form of seagrass restoration. These locations should be considered top priority for seagrass restoration as they are currently active project sites that could easily be expanded. Finally, the white circles indicate potential seagrass restoration sites based on expert scientific knowledge. Note that some of these areas overlap, which is to be expected and, in some cases—such as when a triangle and circle overlap—demonstrate the value of local scientific knowledge in identifying marine habitat management needs.

Mangrove and Salt Marsh

Map 37

Potential mangrove and salt marsh restoration areas

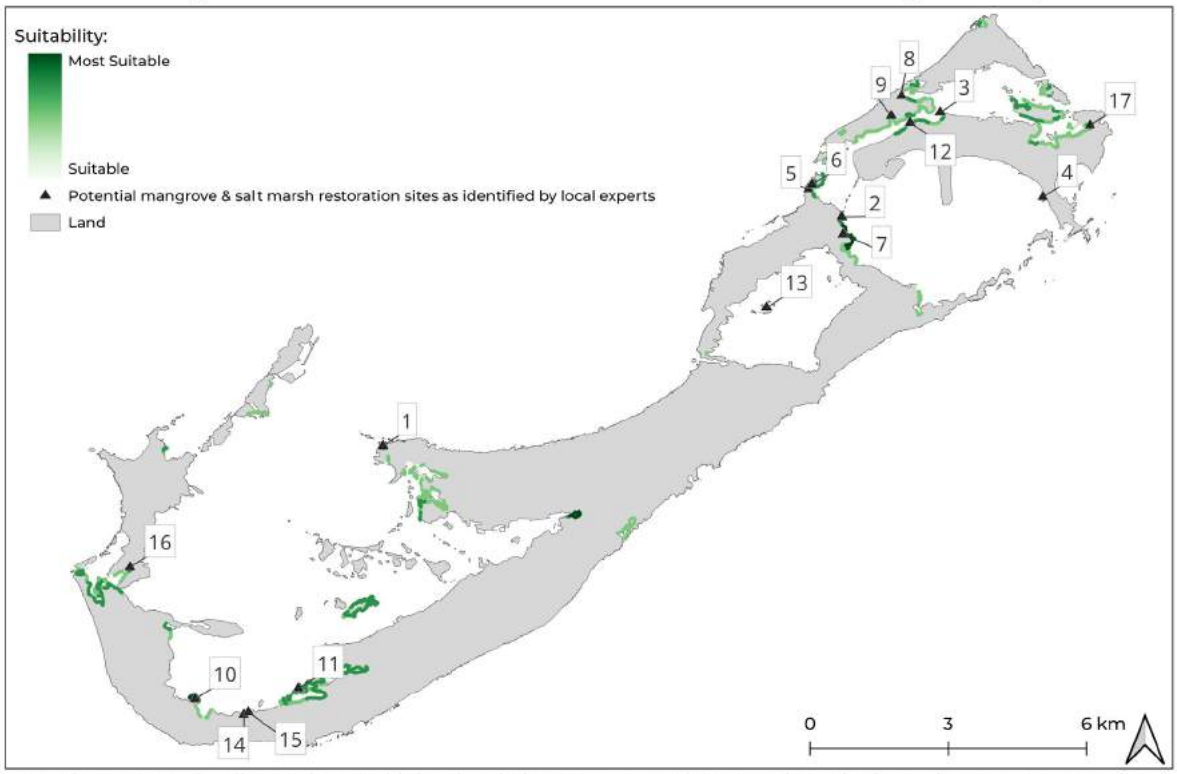


Note: these are NOT legally zoned areas. This is a descriptive map meant only as a starting point for marine resource managers. See the "How to Use These Maps' section for other factors that need to be considered before this activity is permitted.

This map is the final suitability map for mangrove and salt marsh habitat restoration, with areas most suitable for restoration shown in darker green and areas least suitable shown in lighter green. This map combines a variety of ecological data sets, as well as data across five categories that account for environmental and socioeconomic factors such as: potentially suitable substrates and habitats; potential conflicts with stakeholders; prioritisation of restoration within nature reserves, amenity parks, or marine National Parks; and proximity to existing mangrove stands (within 50 metres). Other restoration sites may exist that are not identified in this map; however, all those identified in this map are potentially suitable for restoration and the level of suitability denoted by their respective colour.

Map 38

Potential mangrove and salt marsh restoration areas as identified by local experts



Note: these are NOT legally zoned areas. This is a descriptive map meant only as a starting point for marine resource managers. See the "How to Use These Maps' section for other factors that need to be considered before this activity is permitted.

Map 38 shows an additional data set used in the development of the final suitability map that prioritises areas suitable for mangrove and salt marsh restoration. The black triangles indicate sites suggested for restoration based on expert knowledge. The 17 sites include a mixture of mangrove, salt marsh, and both salt marsh and mangrove habitats. This data set is layered on top of the suitability ranking categories that prioritises areas from most suitable (dark green) to least suitable (light green). Refer to Table 5 for site names.

Table 5

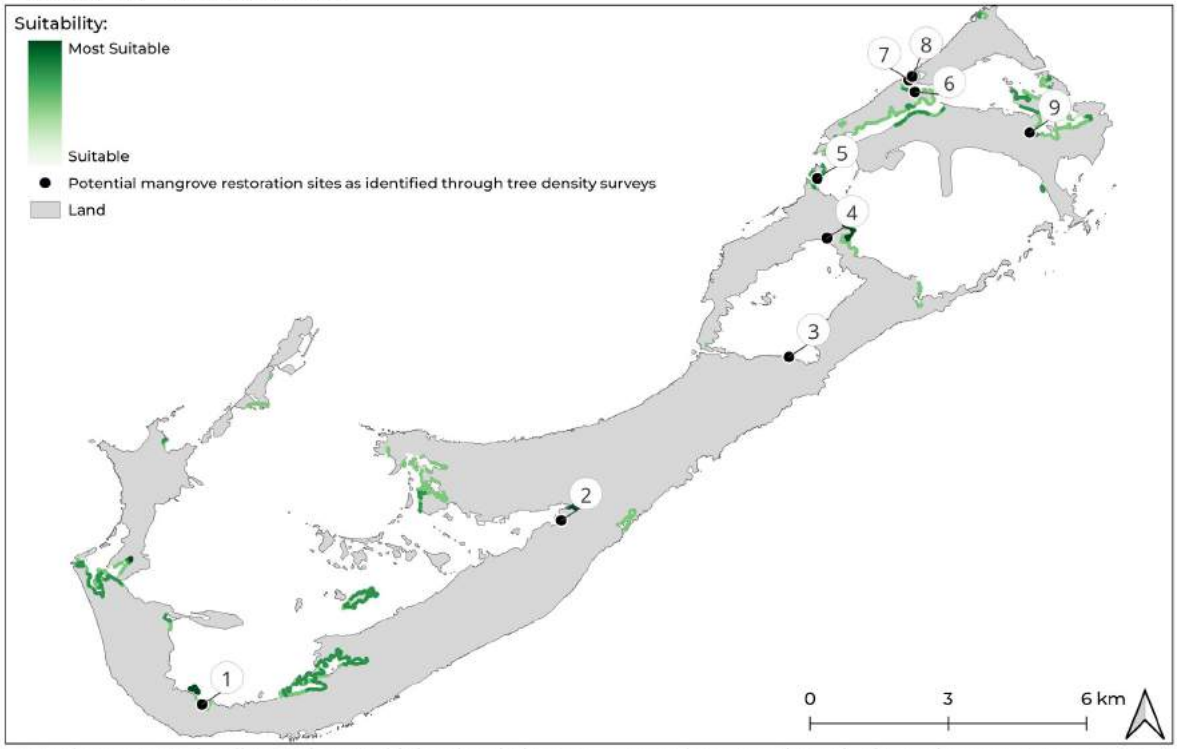
Mangrove and Salt Marsh Restoration Sites Based on Expert Knowledge (Shown in Map 38)

ID	Site Name	Restoration Habitat Type
1	Stovell Bay	Salt marsh and mangrove
2	Blue Hole	Salt marsh and mangrove
3	Stocks Harbour	Salt marsh and mangrove
4	Officers Beach/ Goat Island	Salt marsh

5	Coney Island Road	Salt marsh
6	Coney Island	Salt marsh and mangrove
7	Walsingham Pond	Salt marsh
8	Outer Mullet Bay West	Mangrove
9	Richardson's Bay	Mangrove
10	Buck Island	Mangrove
11	Spectacle Island	Mangrove
12	Ferry Reach South	Mangrove
13	Trunk Island	Mangrove
14	Near 117 Middle Road	Mangrove
15	Near 131 Middle Road	Mangrove
16	Scaur Bay	Mangrove
17	St David's Cricket Club	Mangrove

Map 39

Potential mangrove and salt marsh restoration areas as identified through tree density surveys by Dr. S. R. Smith



Note: these are NOT legally zoned areas. This is a descriptive map meant only as a starting point for marine resource managers. See the "How to Use These Maps' section for other factors that need to be considered before this activity is permitted.

This map shows an additional data set used in the development of the final suitability map that prioritises areas suitable for mangrove and salt marsh restoration. The black dots denote mangrove locations surveyed by Dr. S.R. Smith in 2020 that had scattered trees, making them particularly suitable for restoration through infill planting. This data set is layered on top of the suitability categories that prioritises areas from most suitable (dark green) to least suitable (light green). Refer to Table 6 for site names.

Table 6

Mangrove restoration sites based on surveys by Dr. S.R. Smith (Shown in Map 39)

ID	Site Name
1	Frank's Bay
2	Red Hole
3	Patton's Point

4	Dingle Bay
5	Coney Island South
6	Outer Mullet Bay Southeast
7	Outer Mullet Bay Noth
8	Rocky Hill Park
9	Dolly's Bay West

4.3.3 Potential Use Areas - Aquaculture Areas

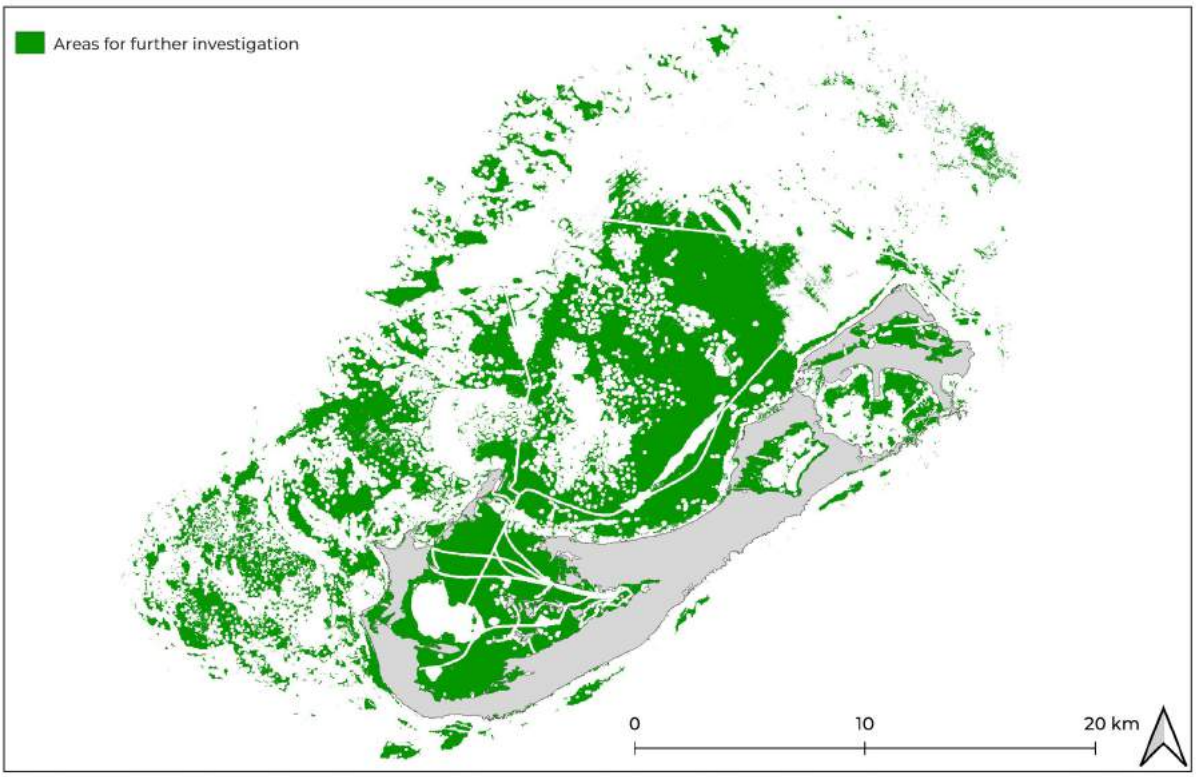
The Potential Aquaculture Areas provide resource managers a preliminary tool to assess which locations might be suitable for further investigation for various aquaculture activities, including offshore submerged (anchored) and floating cages, nearshore submerged longlines, nearshore bottom culture and surface lines, and coastal dock-based systems. Aquaculture is one of the sectors discussed in the Blue Economy Strategy and the Potential Aquaculture Maps facilitate opportunities for investable projects, thus helping to meet the goal of supporting sustainable fisheries.

Technical experts and scientists were consulted by BOPP to provide guidance on creating these aquaculture maps. As with the other Potential Use Area maps, their guidance was used to develop criteria to identify areas that might be suitable for aquaculture activities based on cultivation technology being utilized. These criteria included areas not suitable for aquaculture (such as seasonal closure areas, ferry routes and shipping lanes and cable protection zones), bottom type restrictions, proximity from point source pollution and depth limitations.

The resulting set of maps identifies areas of Bermuda's waters that might be suitable for a variety of aquaculture cultivation technologies. The areas in these maps are not legally binding, but represent recommendations based upon the best available science, as well as feedback from the BOPP Science Committee, the BOPP Ocean Village and stakeholders. It should be noted that such activities will require a comprehensive environmental impact assessment (EIA) and additional feasibility studies. For more information on the methodology used to develop the Potential Use Area maps for Aquaculture, please refer to the "Bermuda Aquaculture Site Suitability" report.

Map 40

Nearshore bottom culture and surface lines (1-15m depths)

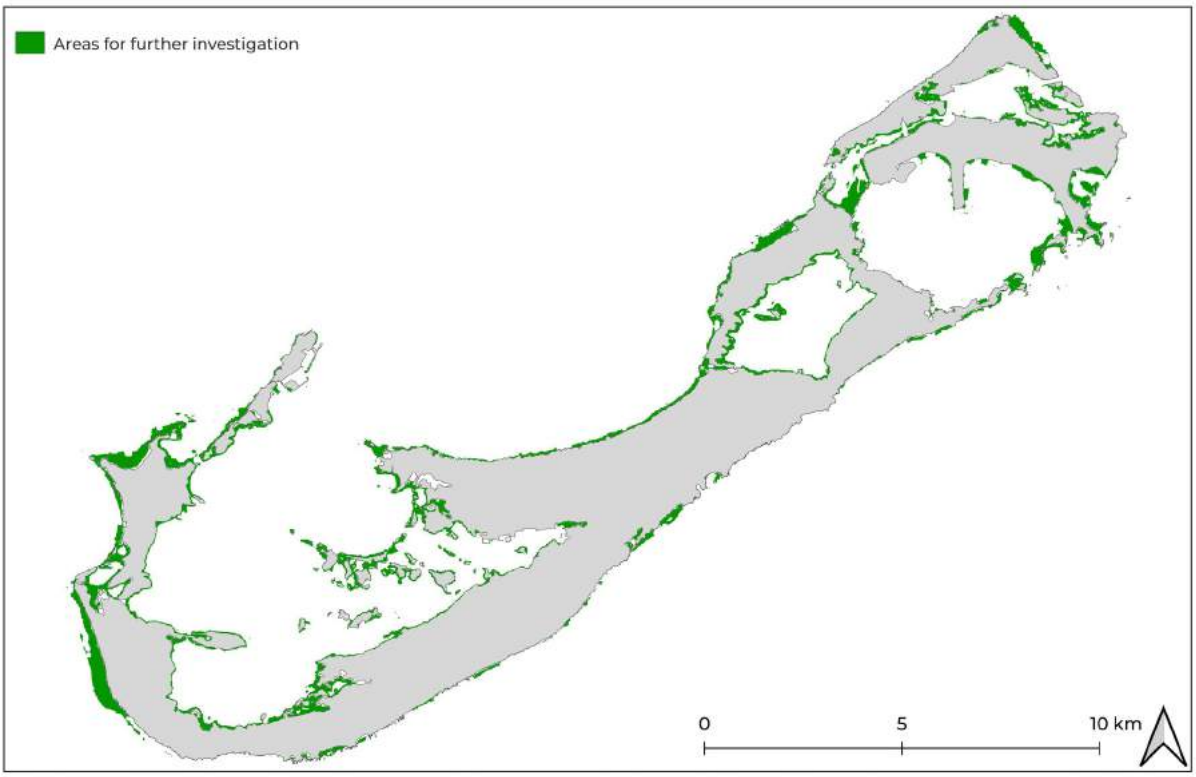


Note: these are NOT legally zoned areas. They are descriptive maps meant only as a starting point for marine resources managers. See the 'How to Use These Maps' section for other factors that need to be considered before this activity is permitted.

This map shows areas suitable for further investigation for nearshore bottom culture and surface lines (depths from 1 to 15 metres). There is no suitability scale; all areas shown in green are considered to be equally suitable for further investigation. Sandy bottoms are optimal but loose rubble bottom can also be used for these aquaculture technologies. Great, Little and Harrington Sound and St. George's Harbour are all considered potentially highly suitable areas despite a lack of available habitat data; however, some parts of these regions have been excluded due to the 15 metre maximum depth limitation of the nearshore bottom culture and surface longline cultivation technologies. In addition, ferry and shipping lanes and submarine cable zones have been buffered and are considered incompatible with this type of aquaculture.

Map 41

Coastal dock-based systems (0-3m depths)

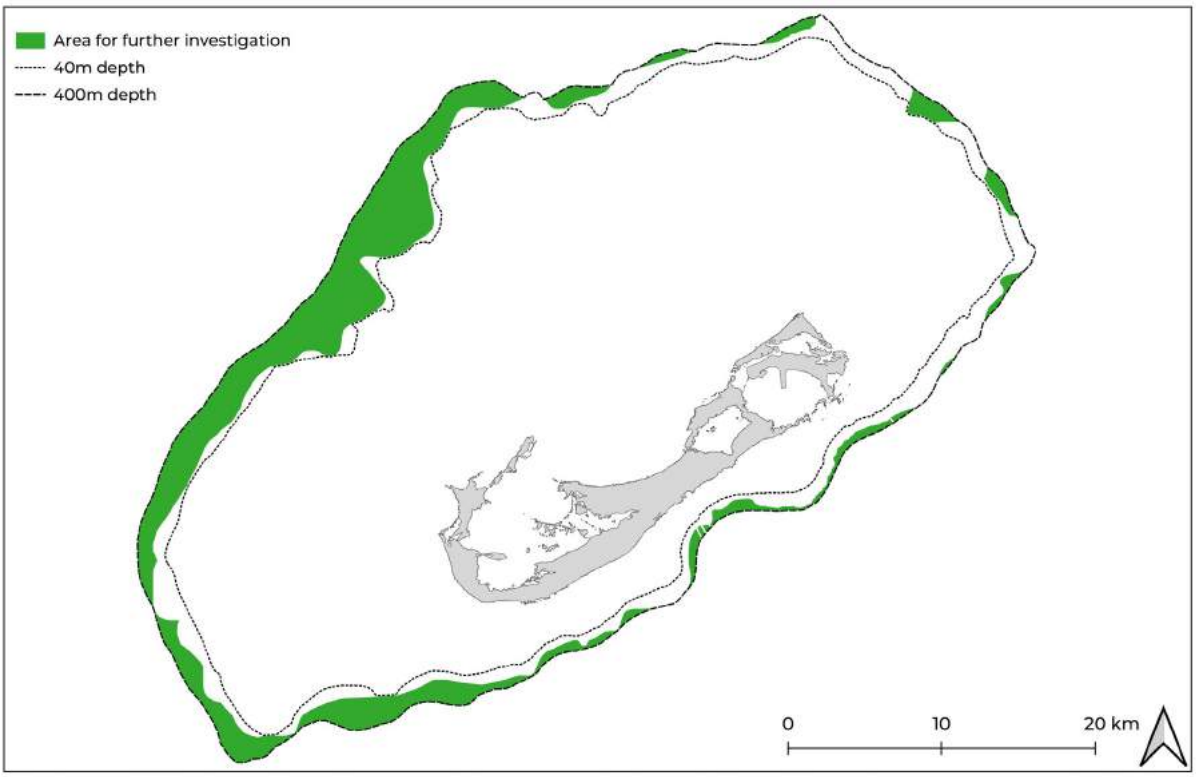


Note: these are NOT legally zoned areas. They are descriptive maps meant only as a starting point for marine resources managers. See the 'How to Use These Maps' section for other factors that need to be considered before this activity is permitted.

Map 41 shows areas suitable for further investigation for coastal dock-based aquaculture systems in depths from 0 to 3 metres. Some coastal areas had to be excluded due to the requirement (for human health and safety) that all aquaculture sites be located at least 100 metres from a pollution source, including dumps, marinas, boatyards and sewage outfalls.

Map 42

Offshore submerged (anchored) and floating cages (40-400m depths)

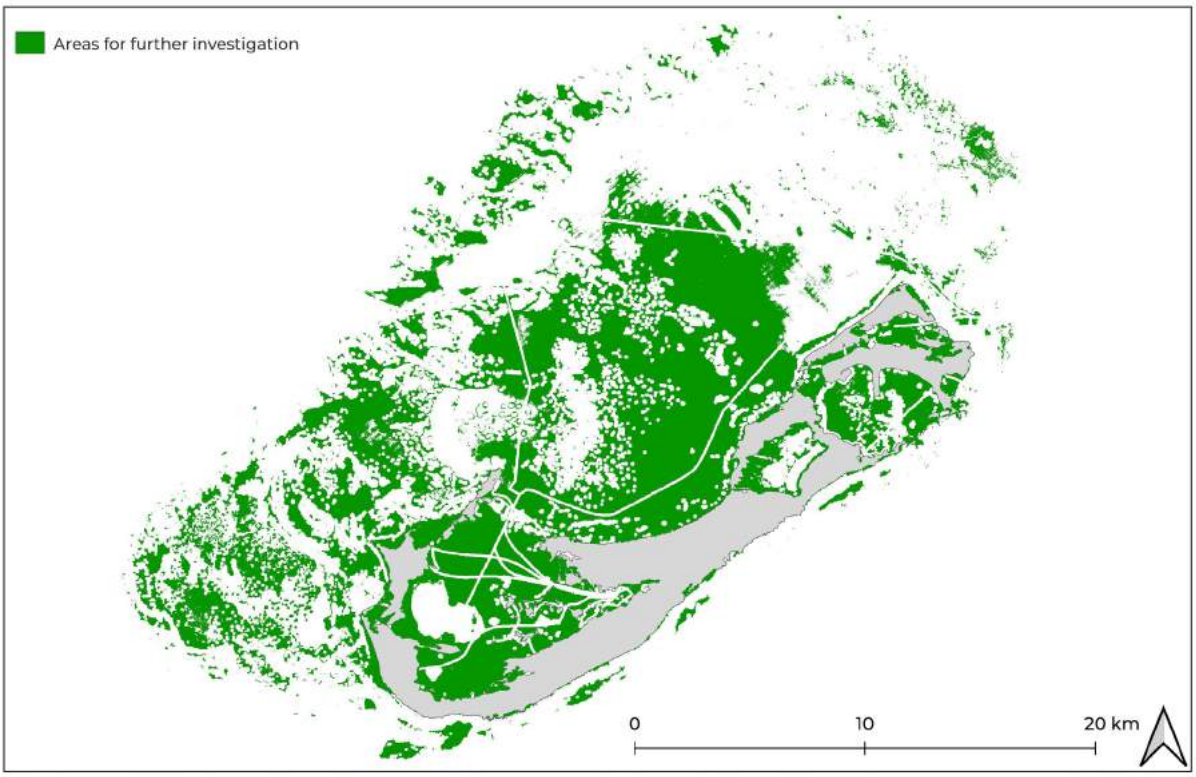


Note: these are NOT legally zoned areas. They are descriptive maps meant only as a starting point for marine resources managers. See the 'How to Use These Maps' section for other factors that need to be considered before this activity is permitted.

This map shows area for further investigation for offshore submerged (anchored) and floating cages in depths from 40 to 400 metres. Again, there is no suitability scale, all areas shown in dark green are considered to be equally suitable for further investigation. Offshore submerged cages are a cultivation technology used for finfish and bivalves, while floating cages are a cultivation technology used for finfish. Anchors for submerged cages should be located at least 50 metres from coral reef areas.

Map 43

Nearshore submerged longlines (2-15m depths)



Note: these are NOT legally zoned areas. They are descriptive maps meant only as a starting point for marine resources managers. See the 'How to Use These Maps' section for other factors that need to be considered before this activity is permitted.

Map 43 shows areas suitable for further investigation for nearshore longline aquaculture in depths from 2 to 15 metres. This cultivation technology is used for bivalves and is limited by many of the constraints as previous technologies, such as ferry and shipping lanes, submarine cable zones, and proximity to coastal pollution sources. Similar to offshore anchored technologies, nearshore submerged longlines must have their anchors located at least 50 metres from coral reef areas.

4.3.4 Additional Considerations for Potential Use Area Maps

Similar to the MPA network, the Potential Use Area maps have priorities for the next iteration of the MSP. Based on stakeholder feedback, the suggestion is to use a combination of economic and social data to identify and map “blue tourism zones” or “blue economy zones” as a fourth Potential Use Area map with the goal of promoting local sustainable ocean-related businesses. By identifying high-use tourism areas, such a map could encourage the use of sustainable blue tourism activities that align with the Blue Economy Strategy (e.g., habitat restoration, popular beaches and dive spots) and offer incentives for local entrepreneurs to develop new or expand upon existing blue tourism businesses, such as reduced red tape, funding opportunities, training and certification, and promotion/marketing.

5. Implementation, Monitoring, and Review

5.1 Implementation

The process of implementing the MSP, including monitoring and periodic reporting will comply with the requirements outlined in the Marine Development Act (MDA) and be detailed in the Monitoring Plan.

The MSP is designed to be forward-looking and adaptive to account for new information, opportunities, and changing circumstances. Progress toward achieving the objectives set out in the MSP will be measured using ecosystem health metrics and blue economic indicators. If evidence supports the need for change, then modifications to the MSP will be made in accordance with the requirements of the legal framework. The framework also provides for periodic review based on the timeline outlined or due to changing ecological, social, or economic triggers identified in the legislation.

Additionally, a process is provided for considering marine-based development including through the use of EIA. It is modeled on the process provided in the terrestrial context.

Because ocean governance in Bermuda is multi-sectoral and involves many different ministries and other entities across government, the governance structure of the MSP must ensure that the ministry responsible for the environment—which has lead oversight authority for MSP—consults with stakeholder ministries and other entities. The MSP's legal framework does not replace or override sectoral legislation that already applies in Bermuda's marine waters. Other existing sectoral entities and statutes remain operative.

The MDA will define MSP governance. As noted previously, DENR will act as the coordinating authority and there is anticipated to be an interdepartmental National Marine Working Group to conduct periodic reviews and otherwise provide guidance on marine spatial planning. Participants would consist of nominees from ministries responsible for environment, fisheries, planning, defense, transport, tourism, energy, and telecommunications; as well as from the RA, BDA, BEDA, and BTA. In addition, an intersectoral working group will be created to focus on monitoring, research, and other objectives as defined by its Terms of Reference.

5.2 Monitoring

Provided below is an initial outline of monitoring priorities based on feedback provided by the BOPP Science Committee. These priorities are provisional and will be finalised in the Monitoring Plan. The Monitoring Plan will be guided by the MSP's PGOs and developed through a collaborative process that incorporates prior and continued feedback received from the BOPP Science Committee, as well as other scientists and technical experts, particularly those with expertise regarding aspects of Bermuda's marine environment. The implementation of the Monitoring Plan will be led by DENR but will leverage the capacity and skills of partners throughout Bermuda. Interested parties should anticipate next steps for Monitoring Plan development in 2024.

Monitoring Plan Priorities: Provisional

Monitoring Plan Priorities: Provisional

Principle Priority:
Annual monitoring of fish diversity, abundance and biomass for 10 years in fully protected areas, highly protected areas and comparable unprotected "control" areas during the same season.

Supporting Priorities:

1. Regular/annual fishery-independent surveys for lobsters and other invertebrates.
2. Transect surveys to evaluate coral community structure and health at reef MPAs and control sites.
3. Surveys of seagrass and associated benthic habitats from shore across the lagoon to the rim reef, following established protocols.
4. Calibrate any new methods against methods used in previous surveys to ensure compatibility and continuity of data.
5. Monitor the above metrics in areas directly adjacent to fully protected areas to examine the effects of spillover.

Fisheries Monitoring

Principle Priority:
Regular data-limited stock assessments for priority species, including black grouper, red hind and lobster.

Supporting Priority:
Fisheries catch data in areas adjacent and non-adjacent to fully protected areas assessed, using logbook data from fisheries and/or targeted experimental fishing.

Tourism Monitoring

Principle Priority:
A baseline evaluation and follow-up survey of the economic impacts of MPA establishment on the local tourism industry, with visitor surveys that include questions about tourists' willingness to pay for nature-based experiences (e.g., snorkel/dive trips) to areas within full protection areas; their prior knowledge of Bermuda's MPAs before visiting the island and whether that impacted their choice of activity or destination.

Supporting Priorities:
Recording of the number of trips to locations in fully protected MPA sites versus other sites, with subsequent calculation of the revenues associated with those for comparison purposes.

Other Monitoring Considerations

As well as those metrics listed, it also is important to consider other indicators of MPA management effectiveness, such as enforcement, governance, level of management, and community and stakeholder engagement. The monitoring plan should consider how to effectively monitor these indicators so they can be applied to global tools and assessment schemes, such as the Management Effectiveness Tracking Tool (METT),[91] Integrated Management Effectiveness Tool (IMET),[92] IUCN Green List Programme[93] and Blue Parks Awards Scheme,[94] among others.

5.3 Review

5.3.1 Review and Revision Process

The Marine Development Act (MDA) will provide a process for periodic review and revision of the Marine Spatial Plan every 10 years.

5.3.2 Development Applications

The Marine Development Act (MDA) will provide a regulated process for considering marine-based development and provide an adaptive, holistic approach to the management of human activities and marine resource usage in the ocean. While the MDA will provide for the management of MPAs and other marine areas, regulation and oversight of commercial activities in Bermuda's marine waters will remain subject to the existing legislation. Where a new commercial activity is not currently subject to management by any existing legal authority, oversight will fall, pursuant to the MDA, to the minister responsible for the environment.

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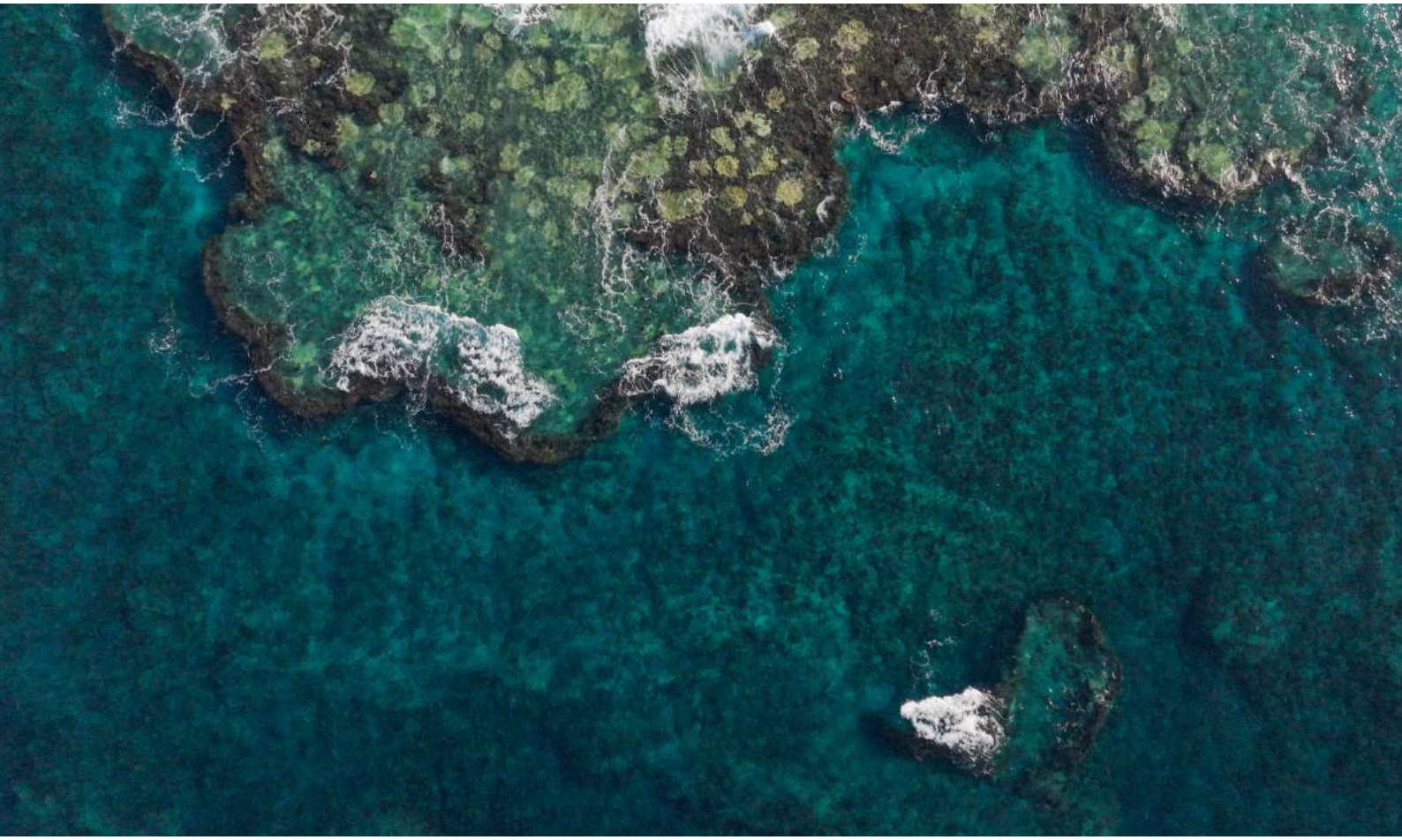
[91] Stolten, S., M. Hockings and N. Dudley. 2021. "Management Effectiveness Tracking Tool: Reporting Progress at Protected Area Sites." Fourth edition. Excel workbook and Guidance. www.protectedplanet.net/en/thematic-areas/protected-areas-management-effectiveness-pame?tab=METT.
[92] Biopama. 2023. n.d. "Integrated Management Effectiveness Tool (IMET)." https://rris.biopama.org/node/18795
[93] IUCN. 2023. "UCN Green List of Protected and Conserved Areas." Gland, Switzerland: International Union for Conservation of Nature. https://iucngreenlist.org/
[94] Marine Conservation Institute. 2023. "Blue Parks." Seattle, Washington: Marine Conservation Institute. https://marine-conservation.org/blueparks.

The planning authority contained within the DOP and the new MDA, respectively, are intended to be complementary but not to overlap. Planning responsibility for facilities connected to land—such as marinas, floating docks, and the like—would remain subject to the DOP and be excluded from the coverage of the Act. Similarly, the MDA would not disturb how Bermuda presently regulates usage of the foreshore or the seabed and subsoil beneath the territorial sea, lands over which the Crown is sovereign.

6. Additional Considerations for the Next MSP

During the development of this MSP, areas were suggested for protection but were not included in this plan due to a high potential for user conflict. It is suggested that the MSP's monitoring plan incorporate efforts to collect data to provide evidence showing whether they justify consideration for additional or expanded MPAs in the next iteration of the MSP. The areas noted as priorities for the next iteration are:

1. Regions identified by local scientific data and scientists that provide a refuge for marine mammals against disturbances from whale watching activities.
2. Offshore areas identified as being of particular importance to marine mammals that would provide protection against shipping activities.
3. Valuable fishing areas that could benefit from additional protection to reduce impacts from shipping traffic, including the suggestion to alter current shipping routes.
4. 'Blue Economy zones,' or equivalent potential use areas, that act as a mechanism to offer incentives and reduce roadblocks for blue economy sector businesses.



Glossary

Automatic identification system (AIS): An automatic tracking system for vessels that uses a combination of GPS, VHF radio, and a transponder unit. The original purpose of AIS was a collision-avoidance system for larger vessels at sea. It is also widely used to monitor national fishing fleets and to help enforce fishing regulations within national or territorial waters.

Bermuda's marine waters: The region that extends from Bermuda's coastline, outward to 200 nautical miles (nm), including the internal waters, territorial sea and Exclusive Economic Zone (EEZ). Bermuda has jurisdiction over the natural resources, marine environment and energy production rights in this region.

Bermuda Ocean Prosperity Programme (BOPP): A partnership between the Government of Bermuda, the Waitt Institute, and the Bermuda Institute of Ocean Sciences (BIOS). The goal of BOPP is to foster the sustainable, profitable and enjoyable use of ocean resources for present and future generations.

Blue Economy: The sustainable use of ocean resources for economic growth, improved livelihoods and increased jobs while preserving the health of ocean ecosystems.

Blue Economy Strategy: A 10-year roadmap, presented by BOPP and developed with the involvement of various government entities, resident member organisations, local scientific institutions, ocean stakeholders and the general public. The Blue Economy Strategy outlines opportunities for economic growth, revenue diversification and improved social equity within Bermuda's blue Economy.

Blue Prosperity Plan: The combined Marine Spatial Plan (MSP) and Blue Economy Strategy which, together, support the continued protection and enhancement of Bermuda's coastal and marine resources and ocean-related industries for current and future generations.

Environmental Impact Assessment (EIA): The aim of an environmental impact assessment is to protect the environment by ensuring that a local planning authority, when deciding whether or not to grant planning permission for a project that is likely to have significant impacts on the environment, does so in the full knowledge of likely significant effects and takes this into account in the decision-making process. The aim of the environmental impact assessment also is to ensure that the public is given early and effective opportunities to participate in decision-making procedures.

Exclusive Economic Zone (EEZ): Area of the ocean, generally extending 200 nautical miles (230 miles) beyond a nation's territorial sea, within which a nation has jurisdiction over both living and nonliving resources, as well as energy production rights.

Fully protected: Fully protected MPAs are those areas where no extractive or destructive activities are allowed; all impacts are minimised (also referred to as no-take fisheries replenishment zone).

Goal: A statement of the general direction or intent; high-level statements of the desired outcomes one hopes to achieve. Goals are intended to be broad and abstract. They are differentiated from objectives in that they cannot be measured. Each goal has associated objectives that define how it will be achieved with a measurable outcome.

Highly protected: Only light extractive activities are allowed with low total impact, with all other impacts minimised. how it will be achieved with a measurable outcome.

Key perfomance indicators (KPIs): measurable and quantifiable metrics used to evaluate and assess the performance of an organisation's activities. A KPI provides targets for performance over time for a specific objective.

Lightly protected: Some protection exists, but moderate to significant extraction and other impacts are allowed.

Marine Development Act ("the Act"): The newly developed legislation that will provide a regulated procedure for considering marine-based development and provide an adaptive, holistic approach to the management of human ocean-based activities and marine resource usage. The Act will provide for the management of MPAs and other marine areas; however, regulation and oversight of commercial activities in Bermuda's marine waters will remain subject to the existing legislation.

Marine protected area (MPA): A clearly defined geographical space that is recognised, dedicated and managed through legal means to achieve the long-term conservation of nature, with associated ecosystem services and cultural values.

Marine spatial planning: A public process that uses the best available information about the natural environment and human uses to make informed decisions about how to manage the ocean. Human activities are given spatial and temporal allocations to achieve ecological, economic and social objectives. It aims to find the right balance of industry and development, while protecting the environment and marine resources for future generations.

Marine Spatial Plan (MSP): The document and supporting legislative framework that results from the marine spatial planning process.

Nearshore area: The marine area between Bermuda's coastline and the 2000 metre depth contour covering the Platform and outlying banks.

Non-spatial objectives: Specific, defined and measurable outcomes that are activities or processes to be achieved during the development of the MSP and subsequent to its adoption, in order to (i) support MSP implementation and management, or (ii) to address future management needs identified in the MSP process.

No-take fisheries replenishment zone: See fully protected marine areas (also referred to as a no-take zone).

Objective: A statement of the desired outcomes or observable behavioural changes that represent the achievement of a goal. Objectives are concrete, detailed, focused and well-defined outcomes of the MSP.

Offshore area: The marine area between the nearshore boundary and the boundary of the EEZ.

Principles, goals, and objectives (PGOs): The approved Principles, Goals, and Objectives that guide the MSP process. Each aspect is defined separately within this glossary.

Platform, the (or the Bermuda Platform): The marine area between Bermuda's coastline and the 100 fathom (approximately 183 metres) contour line. The Bermuda Platform is part of the nearshore area.

Principle: A basic or essential quality or element determining the intrinsic nature or characteristic behaviour of the MSP.

Single use plastics (SUPs): Plastic consumer goods that are designed to only be used once before being disposed of. According to recent research, SUPs comprise over half of the total worldwide production of plastic and account for the top ten most common items found in the International Coastal Clean-up efforts.

Spatial objectives: Specific, defined and measurable outcomes that relate to, occupy or otherwise have the character of physical space. They aim to outline the dimensions of specific locations where human activities can be permitted, restricted or enhanced.

Spillover effect: The outward net movement (or emigration) of larvae, subadults, and/or adults from MPAs to the adjacent fishing grounds.

Territorial sea: Defined as the waters within 12 nm of the baseline. The baseline is measured generally as the mean low water line.

BERMUDA'S
BLUE PROSPERITY PLAN

Photo credit: Ken Wiedemann

BLUE ECONOMY STRATEGY

APRIL 2024, FINAL DRAFT

GOVERNMENT OF BERMUDA
Ministry of Home Affairs

BERMUDA OCEAN
PROSPERITY PROGRAMME

Table of Contents

Table of Contents

Artwork by **Empress O'Loughlin** as part of the 2023 #BermudaIsWorthProtecting Art Contest.

1. Executive Summary

BERMUDA HAS A STRONG FOUNDATION FOR LEADERSHIP IN THE BLUE ECONOMY

The Blue Economy Strategy development began in 2019 with the launch of the Bermuda Ocean Prosperity Programme (BOPP) and informed by a participatory, multi-stakeholder engagement process. Built on a robust **Marine Spatial Plan (MSP)** for growing and maintaining natural resource capital, Bermuda's future Blue Economy supports blue entrepreneurs and enterprises and provides greater job opportunities for a wider cross-section of Bermuda's residents. It will also attract and develop innovative finance and build capacity to contribute to the growth of Blue Economy sectors while sustainably managing the island's ocean resources.

OUR GOALS

BOPP has organised the output of expert analyses and stakeholder input into four goals that are designed to work together:

GOAL 1: Facilitate sustainable fisheries

GOAL 2: Expand sustainable marine tourism

GOAL 3: Accelerate the clean energy transition

GOAL 4: Increase blue investment and blue technologies in Bermuda

SUCCESSFUL EXECUTION REQUIRES FUNDING

The Blue Economy vision and its supporting goals can best be achieved with the support of a targeted funding mechanism. A proposed **Bermuda Ocean Prosperity Fund (Ocean Fund)** will support long-term sustainable growth of Blue Economy industries and implementation of the MSP through two mechanisms:

- **An Investment Programme**, providing repayable and blended finance for investment-ready projects and an associated government-led Green Fund initiative.
- **An Incubator Programme,** providing grant support, business planning and technical assistance to develop a pipeline of projects that may feed into the Investment Programme.

GUIDING PRINCIPLES

Provide social and economic benefits for current and future generations by contributing to food security, poverty eradication, livelihoods, income, employment, health, safety, equity and political stability.

Restore, protect, and maintain the diversity, productivity, resilience, core functions and intrinsic value of marine ecosystems.

Utilise evidence-based decision-making when evaluating new activities, policies, or trade-offs and, in circumstances where evidence is lacking, the burden of proof falls on those advocating for an action.

Adopt a multidisciplinary approach to management and prioritise activities which benefit Bermuda and Bermudians as a whole, instead of a single sector.

Employ participatory, inclusive and transparent governance.

2. Introduction

The Blue Economy is defined by the World Bank Group as "the sustainable use of ocean resources for economic growth, improved livelihoods, jobs and ocean ecosystem health."[2] The Organisation for Economic Co-operation and Development (OECD) estimates that the global Blue Economy accounts for US$1.5 trillion annually.[3] While closely related, the global Blue Economy differs from the ocean economy, which the OECD defines as "the sum of economic activities of ocean-based industries, together with the assets, goods and services provided by marine ecosystems."[4] While an ocean economy and emerging ocean industries are key to our collective future, the long-term potential for job creation and economic growth relies in the sustainable use of ocean resources that is the foundation of a Blue Economy.

Bermuda has an abundance of ocean resources that can fuel Blue Economy activities. The country's unique geographic location, large exclusive economic zone (EEZ) and rich marine biodiversity are only three of a number of examples. When paired with strong Blue Economy industries (e.g., commercial fishing and sustainable marine tourism) and a well-developed financial services sector, these resources can help ensure that Bermuda will benefit from a thriving Blue Economy far into the future.

This document aims to guide the continued development of Bermuda's Blue Economy, positioning the nation as a global leader, as well as a hub for blue financing and investment that benefits Bermuda's residents. Built on a robust Marine Spatial Plan (MSP)—critical for maintaining and enhancing the island's natural marine resources—Bermuda's burgeoning Blue Economy will support blue entrepreneurs and enterprises while providing job opportunities for a wider cross section of its population. Furthermore, it will have the means to attract and develop innovative finance and build capacity while maintaining healthy and productive ecosystems through the sustainable management of common pool resources, such as fish stocks and clean air and water.

Bermuda's Blue Economy presents a meaningful opportunity for the nation to make progress towards the United Nation's Sustainable Development Goals (SDGs), a set of 17 goals that were adopted in 2015 by all United Nations Member States. Particularly relevant to the Blue Economy Strategy is SDG14 ("Life Below Water"), which calls for conserving and sustainably using the oceans, seas and marine resources for sustainable development; and SDG13 ("Climate Action"), which calls for making cities and human settlements

While SDG13 and SDG14 are the primary goals the Blue Economy Strategy supports, there are other goals and related targets that are addressed through various parts of the Blue Economy Strategy, including:

- SDG7: Affordable and Clean Energy
- SDG8: Decent Work and Economic Growth
- SDG9: Industry, Innovation and Infrastructure

[2] The World Bank Group. 2017. *What is the Blue Economy?* https://www.worldbank.org/en/news/infographic/2017/06/06/blue-economy
[3] OECD. 2016. *The Ocean Economy in 2030*. Paris: OECD Publishing. https://doi.org/10.1787/9789264251724-en.
[4] OECD. 2016. *An Overview of the Ocean Economy: Assessments and Recommendations*. Paris: OECD Publishing. https://doi.org/10.1787/9789264251724-en

safe, resilient and sustainable.[5] The set of 17 goals has 169 related targets that help ensure inclusive and prosperous growth for the residents of each Member country. This Strategy aims to guide and provide the mechanisms to support further Blue Economy development in a tangible form by articulating the vision, goals and objectives for Bermuda's Blue Economy and by pointing the way toward successful implementation of these goals. Further work will be required to map out more detailed work plans and activities.

Photo Credit: ***Philippe Rouja***

[5] United Nations. 2015. Transforming our World: The 2030 Agenda for Sustainable Development. New York: UN. https://sdgs.un.org/sites/default/files/publications/21252030%20Agenda%20for%20Sustainable%20Development%20web.pdf.

3. Background

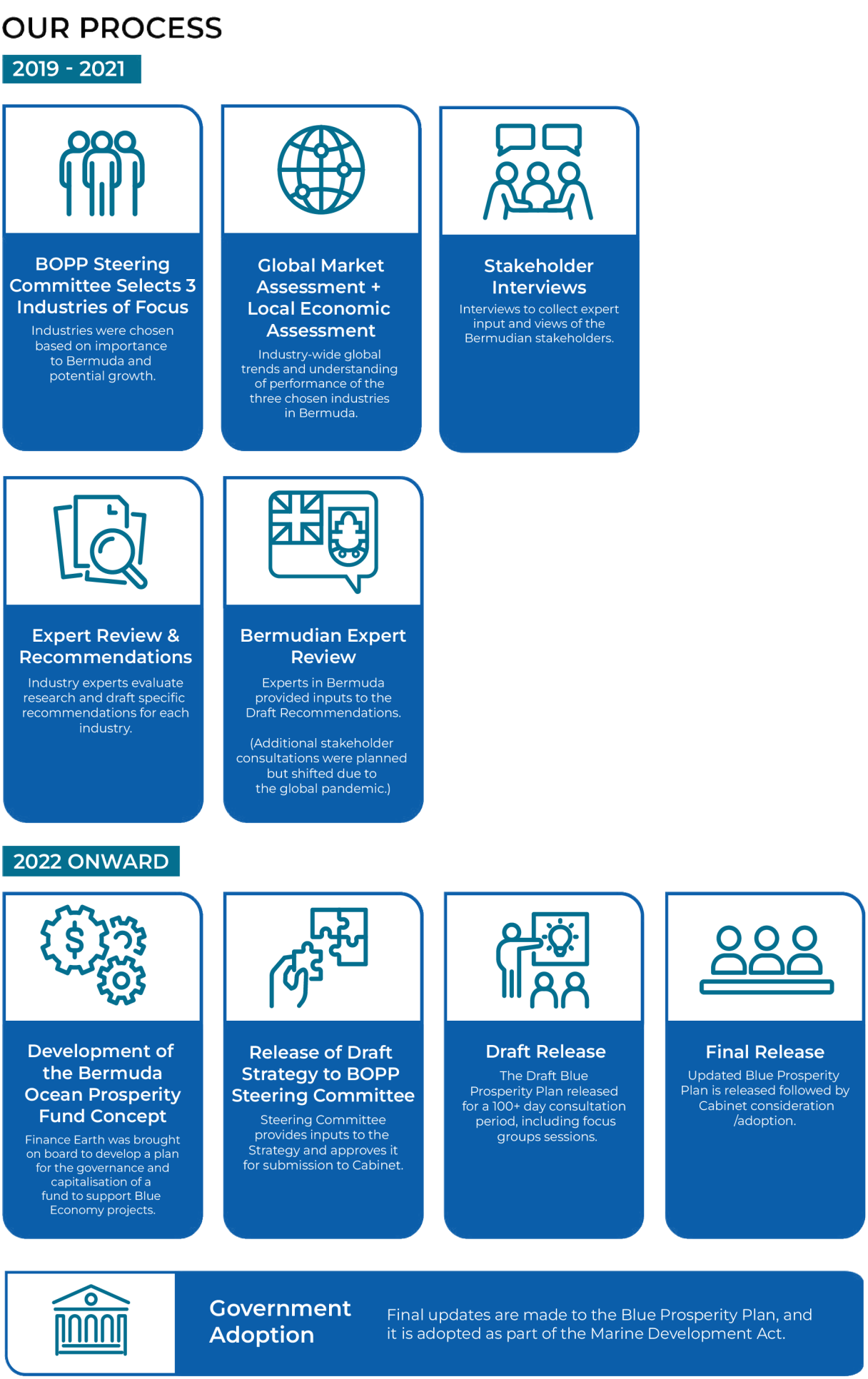
This document was created by the Bermuda Ocean Prosperity Programme (BOPP) over four years, as shown in Figure 1. This process relied on stakeholder consultations, including BOPP's Ocean Village meetings and focus group discussions; public consultations; BOPP's Steering Committee and Blue Economy Subcommittee formation and engagement; and targeted outreach to industry experts. More information on the background of BOPP and stakeholder engagement can be found in the Blue Prosperity Plan background (Section I).

To initiate strategy development and guide its implementation, BOPP's Steering Committee adopted the following set of blue economy principles:

- Provide social and economic benefits to Bermuda's current and future residents by contributing to food security, poverty eradication, livelihoods, income, employment, health, safety, equity and political stability.
- Restore, protect and maintain the diversity, productivity, resilience, core functions and intrinsic value of marine ecosystems.
- Utilise evidence-based decision-making when evaluating new activities, policies or trade-offs and, in circumstances where evidence is lacking, when the burden of proof falls on those advocating for an action.
- Adopt a multidisciplinary approach to management and prioritise activities that will benefit Bermuda and Bermudians as a whole, instead of a single sector.
- Employ participatory, inclusive and transparent governance.

The Steering Committee also voted to initially prioritise three of the four Blue Economy industries: fisheries, ocean renewable energy and blue tourism, since these industries were found to have the greatest potential to initially shape blue economic growth. Using outside expertise, BOPP conducted an initial market evaluation and economic assessment of these industries. An aquaculture analysis was later undertaken to complement and support this research. These initial industry reports, along with research on the potential for a blue investment mechanism, serve as the foundation of the Blue Economy Strategy.

Figure 1: *Blue Economy Strategy Process*



4. Vision

Bermuda seeks a future where marine waters with healthy ecosystems will support a thriving and more resilient ocean-based economy. Built on the framework of a robust MSP to maintain natural capital and enhance ecosystem health while reducing user conflicts, Bermuda will be able to organise, coordinate and support a new and growing cadre of blue entrepreneurs and enterprises that represents a diverse, yet interconnected, array of ocean-related interests. This will provide job opportunities for Bermuda's residents and attract innovative finance that can, in turn, be utilized to help support the sustainable management of Bermuda's marine environment. In 10 years, Bermuda aims to be a leader in the global blue economy and to be known as the Atlantic hub for blue abundance and sustainable equity.

5. Theory of Change

Bermuda's attractiveness as a business jurisdiction and a place to relocate and live is intrinsically linked to the beauty and health of its marine environment. Bermuda is uniquely positioned to play a leading role in the global Blue Economy, possessing natural, institutional and human resources, all with tremendous growth potential that can further benefit the island's residents. By building on Bermuda's blue resources, which will be sustainably managed and protected through effective implementation of the MSP, the Blue Economy Strategy seeks to facilitate equitable economic development that aligns with Blue Economy principles. For example, a local entrepreneur seeking to start an educational marine tourism business that takes visitors on kayak trips to learn about Bermuda's geology, is using the marine environment in a sustainable way while also supporting the Blue Economy guiding principle of "restore, protect and maintain the diversity, productivity, resilience, core functions and intrinsic value of marine ecosystems." This economic activity yields environmental, social and financial benefits that flow back into the local economy and strengthen other emerging Blue Economy industries. Over time, and with additional policies that promote sustainability in the establishment and growth of specific priority sectors, this process can ultimately lead to Bermuda's leadership in the global Blue Economy, as well as equitable benefits for Bermuda's residents, as shown in Figure 2.

Figure 2: *Pathway to Blue Economy Leadership*

6. Strategic Goals & Objectives

6.1 Strategic Goals

The strategic goals serve as the enabling conditions for Bermuda's Blue Economy leadership. For each goal, several objectives—or specific actions—were developed with input from stakeholders across sectors. Many objectives relate to, or are reinforced, by action plans developed to guide the MSP implementation process and, as such, have critical support from relevant government agencies and ministries. Additional measures proposed for the successful implementation of each objective are outlined in Section 8, "Other Implementation Pathways," found later in this document. The Blue Economy Strategy's goals and supporting objectives are as follows:

GOAL 1: Facilitate sustainable fisheries.

Fishermen are the core of Bermuda's society and fishing is one of the oldest industries on the island with significant historical and cultural relevance. In addition, the island's fisheries are an important source of natural capital that supports tourism and provides food security and nutrition, as well as a variety of ecosystem services.

The goal of facilitating sustainable fisheries is to ensure the long-term health and viability of marine ecosystems while meeting the needs of present and future generations of Bermuda's residents. This goal revolves around managing and utilising fisheries resources in a manner that maximises benefits to the residents of Bermuda while maintaining fisheries productivity, biodiversity and ecological balance, as well as minimising negative impacts on the environment and the local community.

This goal is enabled, in part by the MSP, which has 15 approved goals, the first of which is to "facilitate sustainable commercial and recreational fisheries." This goal within the MSP is supported by spatial objectives, which were used to help design the marine protected area network, and focused on ensuring continued access to highly valued fishing grounds and allowing for continuity of fishing for pelagic species. In addition, the goal is also supported by a non-spatial, or management objective, that proposes a more equitable licensing structure for recreational fishermen which will, in turn, provide critical data required for better monitoring and management of fish stocks.

Objectives:

1. Improve fisheries management, monitoring and enforcement.
2. Facilitate sustainable fishing practices and ensure related economic benefits for fishermen.
3. Improve employment opportunities in the commercial fishing sector.
4. Support sustainable consumption of local fish.

GOAL 2: Expand sustainable marine tourism

Tourism is an important economic sector in Bermuda, creating employment opportunities and contributing to residents' overall quality of life, while also having the potential to support sustainable environmental management.

The goal of expanding sustainable marine tourism is to develop and promote sustainable or regenerative tourism activities in Bermuda's marine environments that will bring increased and lasting economic and social benefits while minimising negative impacts on the ecosystem (or, in the case of regenerative tourism, enhancing the local marine environment). The island aims to strike a balance between economic growth through tourism while also being nature positive—that is, having a positive impact on nature and the climate. In alignment with Bermuda's existing strengths, this goal allows the strategy to support the conservation of marine biodiversity, cultural heritage and natural resources.

This goal also is complemented by Bermuda's National Tourism Plan (2019-2026),[6] which outlines seven pillars for success, including a "greener" pillar that aims to make Bermuda one of the "greenest" tourist destinations by 2026, attracting visitors who value and are willing to pay for eco-friendly practices and experiences. The greener pillar proposes activities such as "adding sustainability to the goals of the beach economy" and "promoting sustainable activities on and in our oceans, such as SCUBA, fishing, etc."[7] In addition to beaches and fishing, shipwrecks are a valuable part of the island's ocean-based tourism industry. These historical and cultural treasures provide a source of income and global recognition for Bermuda, while enhancing the overall appeal of Bermuda for businesses, residents and visitors.

Objectives:

1. Ensure the MSP and other future policy developments safeguard and strengthen sustainable marine tourism attractions.
2. Enhance Bermuda's value as a sustainable marine tourism destination by supporting the implementation of coordinated sustainable tourism practices.
3. Improve the local economic benefits of marine tourism.
4. Utilise Bermuda's marine heritage and shipwrecks to maximise sustainable tourism opportunities.

GOAL 3: Accelerate the clean energy transition

Bermuda is highly reliant on imported fossil fuels and its energy costs are among the highest in the world.[8] Given this and related concerns about climate change, the policy of the Government of Bermuda is to diversify its energy production portfolio and transition away from fossil fuels toward renewables and the development of local sources of fuel.

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[6] Bermuda Tourism Authority. 2018. *Bermuda Agility. National Tourism Plan 2019–2026*. Hamilton & New York: Bermuda Tourism Authority. www.gotobermuda.com/sites/default/files/2023-05/updated-bermuda-national-tourism-master-plan-update-may2023.pdf.

[7] Ibid.

[8] Estimated at US$0.42 cents per kilowatt hour compared to the average US$0.12 in the United States. www.visualcapitalist.com/mapped-global-energy-prices-by-country-in-2022.

In the 2019 Integrated Resource Plan,[9] the island set an ambitious goal to be 85 percent powered by renewables by 2035. In October, 2021, Canada-based Algonquin Power & Utilities Corporation—which owns BELCO—announced its commitment to a net-zero target by 2050, stating plans to reduce dependence on fossil fuels and move to 100% renewable energy in line with the IRP.[10] The Blue Economy Strategy supports those goals and provides an additional mandate to accelerate Bermuda's clean energy transition by shifting Bermuda's energy production and consumption from fossil fuels and other non-renewable sources to cleaner, sustainable alternatives. This transition aims to significantly reduce greenhouse gas emissions and promote a more sustainable and resilient national energy grid. Other steps in this direction include the Electricity Amendment Act of 2022,[11] the Electricity (Innovative Licence) Regulations 2023,[12] and the recently established Energy Regulatory Sandbox, the latter of which provides an attractive regulatory environment to encourage investors to pursue and test innovative renewable marine energy technologies in Bermuda.

Objectives:

1. Increase the amount of energy produced by renewable sources, including community solar generation.
2. Support effective financing for new and existing renewable energy generation and technology.
3. Foster electrification of the transportation sector and reduce reliance on fossil fuels.

GOAL 4: Increase blue investment and blue technologies in Bermuda

Blue investment refers to investments made into the blue economy—that is, industries, businesses and projects that promote the sustainable use of ocean resources and contribute to the conservation and restoration of marine ecosystems.

Blue investment can also refer to financing used to support the development or scaling-up of innovative technologies and solutions that address challenges relating to ocean conservation and other target Blue Economy sectors. The development of blue investment opportunities and blue technologies in Bermuda can foster sustainable economic growth while preserving and protecting the marine environment. This goal dovetails closely with the goals outlined above, as financing will be needed to facilitate the transition to sustainability in Bermuda's key Blue Economy industries.

[9] Government of Bermuda. 2019. "Bermuda Integrated Resource Plan: Proposal Consultation." Annex C. Hamilton: Regulatory Authority, Government of Bermuda. https://global-uploads.webflow.com/62670c93ceef61f2e8acc1ce/62ed55360db7168d6826e213_2019%2006%2030%20Bermuda%20IRP.pdf

[10] Bernews. 2021. "Algonquin Aims For Net-Zero by 2050 Target." Hamilton: Bermuda https://bernews.com/2021/10/algonquin-aims-net-zero-2050-target/

[11] Government of Bermuda. 2022. "Electricity Amendment Act (Consequential Amendments) Regulations 2023." BR 40/2023. Hamilton: Regulatory Authority, Government of Bermuda. https://cloudfront.bernews.com/wp-content/uploads/2023/05/Electricity-Amendment-Act-2022-Consequential-Amendments-Regulations-20....pdf

[12] Government of Bermuda. 2023. "Electricity (Innovative Licence) Regulations 2023." BR 41/2023. Hamilton: Regulatory Authority, Government of Bermuda. https://cloudfront.bernews.com/wp-content/uploads/2023/05/Electricity-Innovative-Licence-Regulations-2023-1.pdf

Objectives:

1. Establish a first-of-its-kind Bermuda Ocean Prosperity Fund (Ocean Fund) to support growth in key Blue Economy sectors and implement the MSP.
2. Support blue entrepreneurs and enterprises to thrive and increase employment opportunities.
3. Become a global thought leader in ocean science and research, as well as a hub for ocean and climate finance.
4. Ensure sustainability of blue investment and technologies and safeguard marine resources, in line with the MSP.

7. Implementation

Implementation of Bermuda's Blue Economy Strategy will require a variety of measures and the participation of stakeholders across sectors. Successfully achieving these goals will be predicated on the development of appropriate financing, policies, capacities and partnerships. Below is a partial list of implementation measures, which will need to be articulated in greater detail in the future and augmented with complementary activities.

7.1 Ocean Fund: Overview

The creation of an Ocean Fund is one of many steps required to deliver on the goals and objectives of this Strategy, as well as build momentum to enable multiple projects that create larger-scale transformation across a range of Blue Economy sectors.

> By supporting the sustainable use of the ocean's natural resources, the Ocean Fund seeks to achieve the Blue Economy Strategy's broader goals of sustainable fisheries, marine tourism, clean energy and blue investments while delivering long-term and inclusive economic growth.

This includes outcomes such as improved livelihoods, increased employment opportunities and long-term marine ecosystem health and resilience.

The details of the Ocean Fund will be finalised as part of the Fund development process. Many details of the Fund, however, were clarified during the Strategy's development process, including factors that work to ensure achievement of Blue Economy goals. The following section outlines current thinking on the Ocean Fund's structure and focus.

7.2 Structure

In order to best deliver on the objectives associated with the Blue Prosperity Plan, the Ocean Fund will match the appropriate capital with individual projects across two key "sister" mechanisms: an investment programme and an incubator programme.

- **Investment programme:** This will provide funding for market-ready projects from a variety of sources including repayable loans and blended finance. Blended finance is a valuable tool for blue economy and climate-related projects that uses sources of capital, such as public funding and philanthropic donations, to attract and mobilise private commercial investment that would otherwise not be accessible. The Ocean Fund envisions starting with a market-ready sector, such as renewable energy, in alignment with the complementary Green Fund,[13] to support community solar energy projects. In all countries, terrestrial-based activities that result in greenhouse gas emissions, impact

[13] The Green Fund is a yet-to-be legislated initiative of the Government of Bermuda, intended to provide support for community solar technology on an equitable basis.

on the surrounding ocean, leading to ocean warming and acidification. For this reason, the Ocean Fund will support the island's community solar programme through the Green Fund as this initiative will help offset a portion of Bermuda's carbon emissions. The investment programme will also have a corporate environmental, social and governance (ESG) component for organisations interested in financing marine protection or initiatives such as carbon offsetting as part of their ESG investment portfolios.

- **Incubator programme:** This will provide grant support and technical assistance to accelerate small-scale blue economy projects and pilot testing of new technologies and enterprises. Such support will enable projects to grow to market-ready scale and eventually access loans and other types of financing. Support through the incubator programme will be provided on a competitive basis, according to a set of criteria determined by the Ocean Fund Board, which will take into account factors such as job creation, environmental impact and revenue potential. Training and mentoring for entrepreneurs and enterprises, up to the point of revenue generation, will be a key part of incubation programme activities. Over time, a portfolio of projects from the incubator programme will be transitioned into the investment programme, with the goal of having a continuous pipeline of projects between the two "sister" funding mechanisms.

Blue Dividend: As a thriving Blue Economy relies on a healthy and sustainable marine environment, the blue dividend is currently envisioned as a way to distribute a percentage of investments or profits to fund MSP objectives, such as monitoring of marine resources within the MPA network. In this way, the Blue Economy Strategy will directly support the long-term health and sustained use of the marine resources on which the island's growing Blue Economy depends. Other sources of funds, such as government commitments, donor resources and "blue" levies (i.e., non-extractive user fees), may be needed to complement the blue dividend and deliver on the broader range of Blue Prosperity Plan outcomes. In this case, legislative reform or appropriate amendments to existing legislation, will be required to ensure that "blue" levies, if enacted, are directed to the appropriate activity (i.e., marine conservation and other MSP objectives) and not placed into the general government coffers for nondiscretionary use.

7.3 Governance

The Ocean Fund investment and incubator programmes both will have aligned governance and complementary key performance indicators (KPIs) to coordinate the investment and funding strategy across the portfolio of projects. KPIs will be structured with a specific focus on environmental standards and objectives, ensuring environmental performance targets are met. The governance structure is envisioned to include a mix of public, private and third-sector stakeholders with skills and expertise in developing, financing and advising on projects in the target subsectors, as well as in supporting sustainable development of the blue economy.

A key role of the Ocean Fund governance will be to ensure that investment decisions are made in alignment with the Fund's objectives and the goals, as outlined in the Blue Economy Strategy.

Transparency in governance operations and the Ocean Fund's decision-making and financial allocations will also be important in this regard. The proposed governance will also ensure that environmental concerns are balanced with economic considerations and that the health of Bermuda's marine ecosystems—particularly its coral reefs—is acknowledged as vital to environmental sustainability. This approach will help guarantee sustainable environmental practices while fostering long-term economic growth.

Governance systems, including the KPIs, will provide a level of guarantee that the risks associated with greenwashing are mitigated, as well as provide a mechanism by which to verify the portfolio aligns with overall environmental, social and economic objectives. Maintenance of transparency, accountability and credibility in environmental efforts, in tandem with review mechanisms that safeguard these principles as part of the Ocean Fund, will be a key part of governance.

7.4 Selection Criteria

Eligibility criteria for inclusion in the Ocean Fund will be critical to maintaining compliance with social and environmental objectives, as well as alignment with the ESG requirements of investors. These criteria can also facilitate the reporting of KPIs to interested stakeholders while ensuring adherence to stated objectives and value for money.

Eligibility criteria will be finalised as the Ocean Fund structure is developed and standard processes are put in place; however draft criteria include:

- benefits for nature, island communities and sustainable livelihoods;
- potential for revenue generation;
- stage of business maturity;
- alignment to priority sectors (fisheries, renewables, tourism, marine protection); and
- compliance with prevailing laws and regulations.

Recommendations around KPIs for the Ocean Fund have been drafted to further promote alignment with social, environmental and economic objectives. These will be contained within separate Ocean Fund documents, and additional refinement with key stakeholders and investors may be necessary, following the above criteria.

7.5 Next Steps

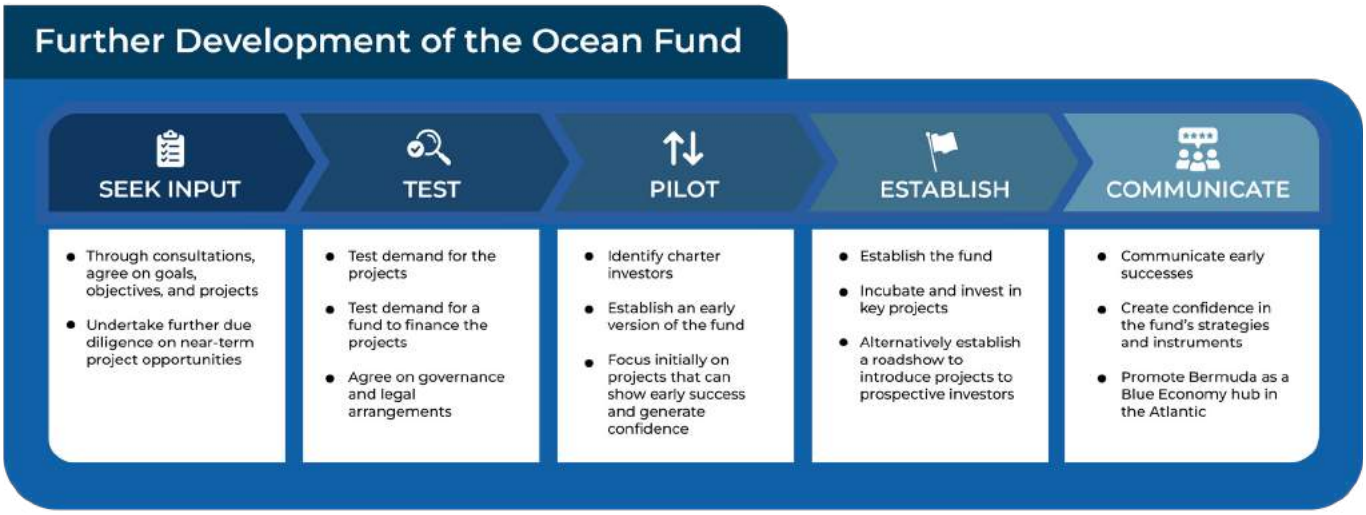
Pathways toward funding, including assessment of potential service providers needed for Ocean Fund establishment and operations, are currently being explored. Going forward, other considerations include raising the financial resources required to establish and initiate Ocean Fund activities, prime among them the development of a Blue Economy investment portfolio.

- **Fundraising.** The Ocean Fund aims to attract investment from a range of sources and to deploy this finance into target blue economy sectors. Fund concept development and testing is ongoing, as is investigating further avenues for Ocean Fund capitalisation. A blue bond is one potential measure that can help finance the Ocean Fund. According to the World Bank Group, a blue bond is "a debt instrument issued … to raise capital

from investors in order to finance marine and ocean-based projects that have positive environmental, economic and climate benefits."[14] The Bermuda Government could issue a blue bond if suitable investors can be identified. Part of a blue bond issuance could help finance the Ocean Fund with a portion (a blue dividend) separated—or ringfenced—to fund small-scale projects while also supporting marine protection objectives. A blue bond issuance should be seen as a medium- to long-term process, which could be raised by the securitisation of revenues (e.g., arrival fees, fuel tax, or cruise ship levies), among other mechanisms. A blue bond can also act to catalyse other types of investment, thus demonstrating strong public sector support.

- **Portfolio development.** Further analysis, development and sourcing of pipeline projects is required to establish a portfolio of environmentally friendly and socially responsible investments. Due diligence will be needed during the scoping process for potential projects in order to ensure alignment with key strategic objectives. Continual identification of companies and assets that align with the Ocean Fund's mission and objectives will also be needed to attract additional investment capital.

Figure 3: *Further Development of the Ocean Fund*



The Ocean Fund is designed to act as a complementary mechanism and catalyst to support financing of Blue Economy and MSP activities that contribute to the ongoing sustainable development of Bermuda. Initial recommendations for further development of the Ocean Fund are summarised in Figure 3.

[14] World Bank. 2018. "Sovereign Blue Bond Issuance: Frequently Asked Questions." Feature Story, October 29. Washington, DC: World Bank. www.worldbank.org/en/news/feature/2018/10/29/sovereign-blue-bond-issuance-frequently-asked-questions

8. Other Implementation Pathways

While impactful, the Ocean Fund, alone, will not facilitate the achievement of Bermuda's Blue Economy goals. A number of other critical measures are required to successfully implement this strategy.

Bermuda's key sectors need to adopt and engage with the Blue Economy Strategy in a meaningful way to maximise its benefits. Capacity building, including the development and enhancement of technical expertise, will be required to ensure that Bermuda's residents can effectively take advantage of new opportunities associated with the growing Blue Economy. Complementary policy and public sector initiatives will necessarily act as critical catalysts for action across sectors. Additional implementation measures and enabling conditions for each goal are briefly outlined below. They include such measures as increased research and innovation support, sustainable resource management, blue tourism guidelines and practices and enhanced environmental protection and pollution control.

GOAL 1: Facilitate sustainable fisheries

Facilitating sustainable fisheries will be achieved through improved fisheries management and enforcement, adoption of sustainable fishing practices and strategic mobilisation of the resulting economic benefits, with the goal of expanding employment opportunities and supporting increased consumption of local fish. While it should be noted that several of these measures are included within action plans for non-spatial objectives within the MSP, implementing these measures will require a variety of supporting actions and pathways, several of which were identified during the development of this Strategy including:

- **Develop a licensing structure** that will allow for better monitoring of catch and improved sustainable management of commercial and recreational fisheries. Streamlined and comprehensive licensing can also facilitate business development and improve access to finance. Initial steps should include a review of the existing licensing structure, as well as global best practices.
- **Deploy innovative technologies and partnerships to enhance local monitoring and enforcement capacity.** These include building on the partnership with the U.K. government's Blue Belt Ocean Shield programme; assessing the role of various new and upcoming technologies in fisheries monitoring and protection to enforce marine protected areas (MPAs); and supporting MSP objectives.
- **Support fishermen's transition toward sustainable practices and increase the sustainable harvest of pelagic species** through the use of innovative technologies. The Government of Bermuda's Department of Environment and Natural Resources, within the Ministry of Home Affairs, can work with partners, such as Blue Belt Ocean Shield and the private sector, to identify and promote such opportunities and establish public-private partnerships to better facilitate adoption of these practices and technologies. This may also involve the creation of a facility for fish processing, grading, and cold storage, which would further increase the ability of local fishermen to increase their sustainable harvest of pelagic species.

- **Further assess and, if possible, pilot renewable energy solutions on fishing vessels** to lower costs and improve the sustainability of the fishing industry, which aligns with broader ambitions to provide access to cleaner, cheaper energy.
- **Partner with fishermen to increase catch value** through marketing and branding campaigns that will raise consumer awareness of Bermuda's sustainable fishing practices, and facilitate sustainable consumption of local fish through awareness-raising programmes and consumer education.
- **Increase and diversify Bermudians' skill base within the maritime industry** and open additional career pathways in the sector by working with strategic partners to develop training and support programs. This could include courses and certification for commercial and recreational users on the use and incorporation of sustainable practices and technologies.

GOAL 2: Expand sustainable marine tourism

Goal two focuses on building Bermuda's sustainable marine tourism industry primarily by enhancing sustainable blue tourism offerings and maximising local economic benefits, while also safeguarding the longevity of such economic activities through the MSP and other future policy developments. Several of these objectives are included within action plans for non-spatial objectives within the MSP; however, additional planning is needed to fully detail implementation of these objectives, some of which include:

- Work with the tourism sector to **build out and enhance sustainable tourism offerings**, including interactive, conservation-based activities, in order to capitalise on increased global demand for sustainable and regenerative travel. This includes working with existing tourism operators to improve the sustainability of current business practices and tourism offerings. .
- **Assess and develop public-private partnerships and trainings** to support further development of a high-value, low-volume/low-impact tourism model.
- Work with the Bermuda Tourism Authority (BTA), the island's destination management organisation, to **increase the focus on sustainable tourism through marketing and increased global awareness** of Bermuda's leadership in eco-friendly tourism.
- **Build out conservation-focused tourism products,** such as coral, seagrass and mangrove restoration, as well as related educational experiences, in line with the MSP.
- **Further develop and integrate sustainable and equitable blue tourism policies** and actions into the BTA's National Tourism Plan in order to ensure equitable industry benefits for Bermudians. This includes working with the BTA to develop advancement opportunities for workers in the tourism sector and improving access to training and professional development.
- **Increase the value of Bermuda's sustainable tourism industry** through certification programmes, as well as adoption of sustainable standards by tour operators through applicable global/regional certification and training providers, including the BTA. This should include partnerships to support the development of local "Blue Tourism" initiatives and a "Blue Concierge" for certified sustainable products in Bermuda.

GOAL 3: Accelerate the clean energy transition

Accelerating the clean energy transition will require increasing renewable energy production, supporting effective financing for new and existing renewable energy technology and fostering electrification of the transportation sector, among other objectives. Some of the following pathways identified to achieve these are included in action plans for non-spatial objectives within the MSP, and include the following:

- **Develop and implement policies that support the electrification of the transportation sector** and other industries.
- **Establish the government's Green Fund to provide support for community solar** on an equitable basis for households of different income levels, reducing the cost of living and fossil fuel consumption.
- **Identify opportunities for greening government buildings**, as well as buildings in the commercial and residential sectors.
- **Facilitate financing for the clean energy transition** across sectors, potentially including favourable tariffs and tax breaks and the provision of favourable loans for renewable energy technologies and energy generation.
- **Establish pilot areas for new and emerging renewable technology,** such as wave technology, with guidance provided by the MSP and in alignment with the Energy Regulatory Sandbox.
- **Require environmental and user impact assessments** for new renewable energy proposals in the marine environment, including offshore wind development, as per the MSP.

GOAL 4: Increase blue investment and blue technologies in Bermuda

Increasing blue investment and technology requires the development of a general funding mechanism to support blue entrepreneurs and enterprises, strategic leadership in ocean science and blue finance and the safeguarding of natural resources to support the above initiatives. These objectives can be achieved, in part, through the following:

- **Further strengthen existing partnerships in ocean science and research**, thus building on Bermuda's long-standing leadership in ocean and atmospheric science and monitoring.
- **Establish new partnerships to pilot and support innovative ocean technologies** for renewable energy, as well as partnerships to support fisheries and MPA monitoring and enforcement, in line with the Blue Prosperity Plan.
- Support the financial sector and build on existing leadership in the re/insurance industries to **further develop climate finance and blue finance mechanisms**, with the goal of establishing Bermuda as the Atlantic hub for blue and climate finance.
- **Explore development of climate insurance products** that can limit the financial impact of hurricanes and other climate-related impacts on the island's coral reefs and/or coastal infrastructure protected by the coral reefs. This may also include exploration of the Caribbean Oceans and Aquaculture Sustainability Facility and parametric insurance

products—potentially under the Caribbean Catastrophic Risk Insurance Facility—for the commercial fishery sector to enhance the resilience of fishermen to negative impacts that can be correlated to climate-related events.

- **Protect natural resources underlying blue investments** and technologies by effectively implementing and enforcing the Blue Prosperity Plan's MPA network, as outlined in the MSP.
- **Require that Ocean Fund investments yield marine protection benefits through a blue dividend,** earmarked to support MSP objectives, such as the management and monitoring of marine resources in MPAs.

9. Other Innovative Financing Mechanisms

One of the main challenges for sustainable finance initiatives, globally, tends to be the limited availability of patient capital and an insufficient supply of financial mechanisms. Bermuda's advanced economic status (i.e., a high GDP per capita) and well-developed financial services sector provide significant capacity to support sustainable finance mechanisms. Still, sustainable finance remains challenging to access and demand continues to outweigh the supply. Among more general challenges, Bermuda ranks among the highest income countries and is, therefore, not eligible for most of the funding opportunities available to other large ocean states.

A coalition of willing partners—from the private sector, public sector, civil society and academia—as well as catalytic finance, will be needed to execute this Strategy and bring its vision to life. A review of sustainable finance options, including environmental fees, fines and levies that can support the transition should be considered. A blue bond, in addition to supporting investment into Bermuda's blue industries and entrepreneurs—as discussed above—could be further used to support complementary areas of sustainable economic development. Payments for ecosystem services can be explored. Innovative forms of finance, including for renewables, sustainable fisheries, tourism, environmental management and capacity building, will be required.

Financial service providers and ESG investors should consider how to align their local sustainable finance programmes with MSP and blue economy implementation. This may include favourable loans for entrepreneurs and small businesses in target sectors. If possible, the Bermuda Government's Economic Investment Residential Certificate[15] policy should also be aligned to support wider blue economy development.

Photo Credit: ***Cory Pukini***

[15] Government of Bermuda. 2023. "Economic Investment & Residential Certificate." (Online). Hamilton: Government of Bermuda. https://www.gov.bm/economic-investment-certificate-and-residential-certificate

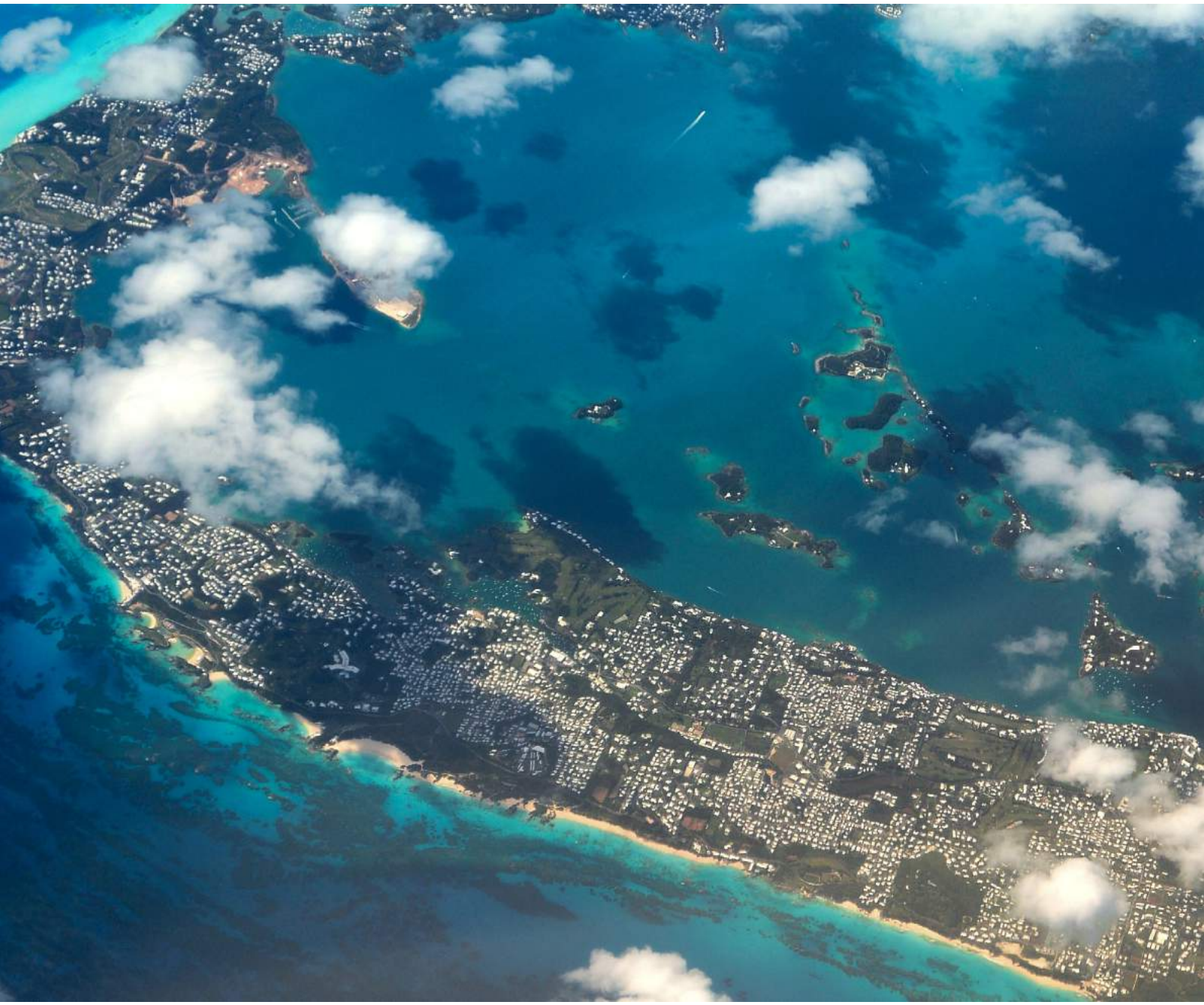
10. Next Steps and Conclusion

While it represents a key step, this document alone will be insufficient to meet Bermuda's Blue Economy goals. Stakeholders across sectors will need to cooperate to further develop and follow through on the recommendations provided here, and develop detailed work plans with clearly assigned tasks and roles. All the goals and objectives within this document require champions and sustained leadership at all levels to come to fruition. Implementing policies across sectors, including a robust ocean governance and enforcement framework, will also help to deliver on the Blue Economy Strategy. Moreover, this is a living document and follow-through will require the monitoring and tracking of progress which, in turn, can be used to update strategic goals, objectives and activities.

If implemented comprehensively, this Strategy can provide meaningful progress toward the development of a sustainable Blue Economy and, at the same time, offer economic growth and equitable distribution of benefits, social well-being and environmental conservation. Underpinned by Bermuda's natural marine resources, this Strategy, as well as its goals and objectives, serves as a guide for further developing Bermuda's Blue Economy and represents an initial blueprint for realising the 10-year vision of becoming the Atlantic hub for blue abundance and sustainable equity.

11. Scope of Authority: Summary of Legal Framework

The Blue Prosperity Plan will rest upon a new Marine Development Act (the "MDA"), which is a legislative framework that provides an integrated, adaptive basis for the marine spatial planning process, as well as guidance on the governance of an independent fund (Ocean Fund) to support long-term ocean management activities and the Blue Economy.



Glossary

Bermuda's marine waters: The region that extends from Bermuda's coastline, outward to 200 nautical miles, including the territorial sea and exclusive economic zone. Bermuda has jurisdiction over the natural resources, marine environment and energy production rights in this region.

Bermuda Ocean Prosperity Fund (Ocean Fund): A mechanism for identifying, nurturing and funding potentially viable projects in the blue economy sectors (i.e., fisheries, tourism, renewables, or other identified areas (e.g., conservation)), which should be in line with the designed governance principles of the fund.

Blue bonds: A new form of financing that operates as an innovative instrument to support ocean conservation.

Blue dividend: Distribution of a percentage of profits on an investment or upfront cost of a sustainable investment to benefit marine conservation and Blue Economy activities. This then can be reinvested in the natural asset base to achieve additional social, environmental and economic benefits.

Blue Economy: The sustainable use of ocean resources for economic growth, improved livelihoods, jobs and ocean ecosystem health.

Blue finance: Finance or monies directly allocated to ocean resources, conservation, or development of ocean industries and projects in Blue Economy sectors.

Common pool resource: Resources, such as forests, pastures and fisheries, that benefit a group of people, but where everyone experiences reduced benefits if each individual is free to pursue their own self-interest. This is because the supply of the common-pool resource is finite (not unlimited) and can be overused, resulting in scarcity or diminished quality of the remaining resource. This is different from a common resource (such as knowledge), in which one person's use of the resource does not diminish everyone else's use or supply of that resource.

Environmental, social and governance: A collection of corporate performance evaluation criteria that assess the robustness of a company's governance mechanisms and its ability to effectively manage its environmental and social impacts.

Exclusive economic zone: The region that extends from Bermuda's coastline, outward to 200 nautical miles. Bermuda has jurisdiction over its natural resources, marine environment and energy production rights in this region.

Fully and highly protected marine areas: Marine protected areas in which no extractive or destructive activities are allowed and all abatable impacts are minimised (also referred to as no-take fisheries replenishment zone).

Goal: A statement of general direction or intent. High-level statements of the desired outcomes to achieve. Goals are intended to be broad and abstract. They are differentiated from objectives in that they cannot be measured. Each goal has associated objectives that define how it will be achieved.

Incubator programme: A structured accelerator approach to supporting the growth of micro, small and medium enterprises and mini-projects that need further business development and support before accessing finance via the Ocean Fund.

Investment programme: A structured plan or strategy that individuals, organisations, or institutions implement to allocate funds or resources, with the goal of generating returns or achieving specific financial objectives. It involves making deliberate choices about where to invest capital, in order to maximise potential gains while managing risk.

Marine protected area (MPA): A clearly defined geographical space that is recognised, dedicated and managed through legal or other effective means to achieve the long-term conservation of nature, with associated ecosystem services and cultural values.

Marine spatial planning: A public process that uses the best available information about the natural environment and human uses to make informed decisions about how to manage the ocean. Human activities are given spatial and temporal allocations to achieve ecological, economic and social objectives. Marine spatial planning aims to find the right balance of industry and development, while protecting the environment and marine resources for future generations.

Natural capital: Stocks of natural assets, including water, air, soil and other living things that generate ecosystem services to sustain human life and contribute to the development of society.

Nearshore area: The marine area between Bermuda's coastline and the 2,000 metre depth contour covering the Bermuda Platform and outlying banks.

Objective: A statement of the desired outcomes or observable behavioural changes that represent the achievement of a goal.

Ocean and climate risk finance: A subsector of the finance and insurance industry that supports blue carbon markets and other climate-related investments, including mitigation and adaptation financing and risk management.

Offshore area: The marine area between the nearshore boundary and the boundary of the exclusive economic zone.

Partially-protected marine areas: Protected marine areas in which only light extractive activities with low total impact are allowed, with all other abatable impacts minimised. Permissible low-impact activities are identified within the management plan for that specific partially protected area, based on the area's objective. Examples of low-impact activities that could be identified within the management plan include sustainable fishing, aquaculture, shipping, renewable energy development and works (e.g., for harbours, dredging and cable maintenance, among others).

Patient capital: Long-term financing, whereby investors are prepared to wait a considerable amount of time before seeing any financial returns.

Pelagic fish: Fish that exist in the pelagic zone and oceanic fish found closer to the surface or mid-depths.

Ringfenced: Guarantee that funds allocated for a particular purpose will not be spent on anything else.

Sustainable: Able to balance social, economic and environmental needs and manage the balance between these three pillars over time.

Sustainable development: Development that meets the needs of the current generation, without compromising the ability of future generations to meet their own needs.

Third sector: Organisations that do not fall within the private or public sector; they usually refer to nongovernmental organisations, community groups, charities and social enterprises.