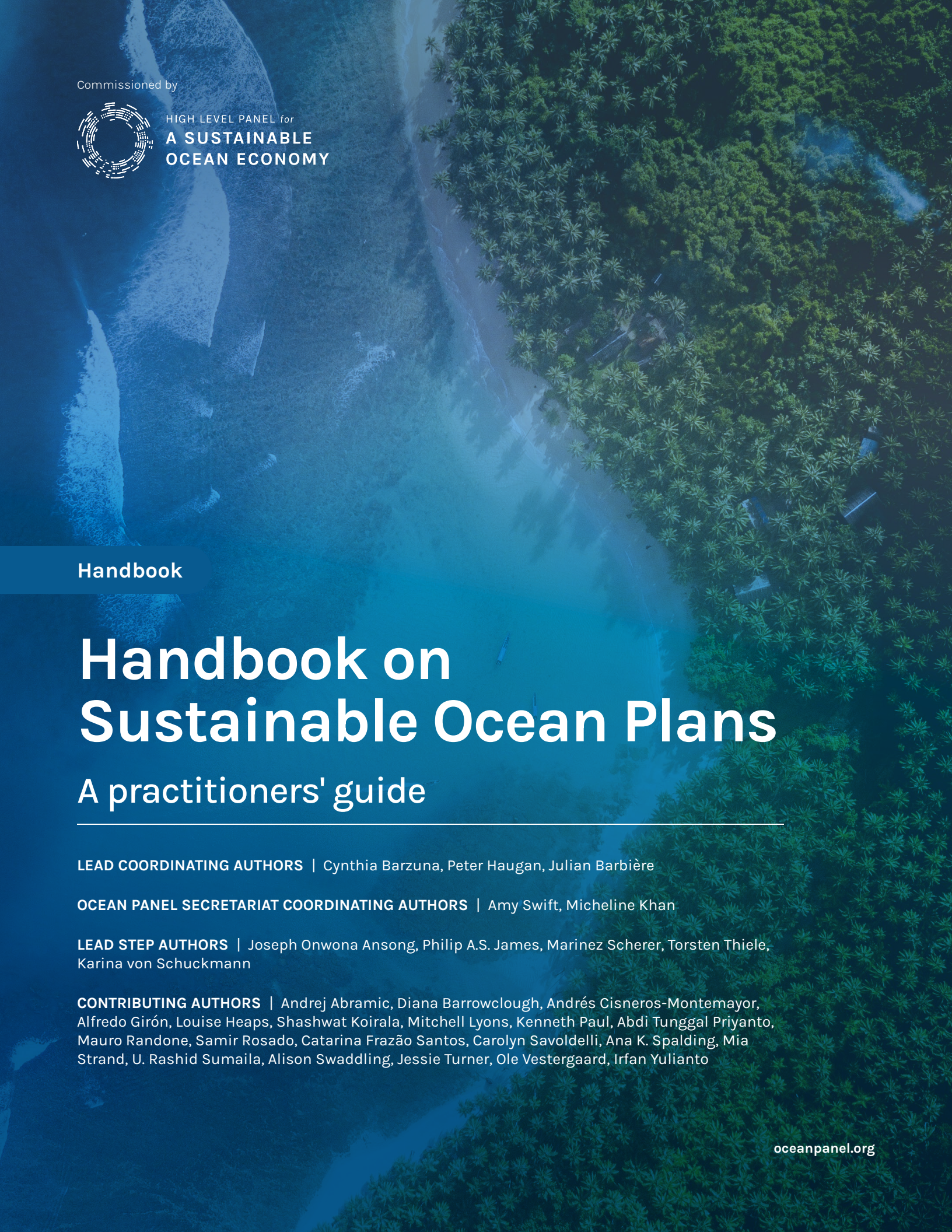

Commissioned by

HIGH LEVEL PANEL *for*
A SUSTAINABLE
OCEAN ECONOMY

Handbook

Handbook on Sustainable Ocean Plans

A practitioners' guide

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About the Ocean Panel

Established in 2018, the High Level Panel for a Sustainable Ocean Economy (Ocean Panel) is a unique initiative made up of serving world leaders who are building momentum for a sustainable ocean economy in which effective protection, sustainable production and equitable prosperity go hand in hand. By working collaboratively with a wide array of stakeholders, the Ocean Panel aims to identify bold solutions that bridge ocean health, wealth and equity and accelerate and scale responsive action worldwide.

This handbook is a step-by-step technical manual to illustrate how to formulate and implement a Sustainable Ocean Plan. It has been commissioned by the Ocean Panel as a contribution to the headline commitment made in 2020 to sustainably manage 100% of the ocean area under national jurisdiction, guided by Sustainable Ocean Plans, by 2025, and in support of other ocean and coastal states joining the commitment to sustainably manage their areas under national jurisdictions by 2030. Note that countries joining the Ocean Panel effort after 2020 may commit to develop and be guided by Sustainable Ocean Plans within five years of joining, with the aim of sustainably managing 100% of the ocean area under national jurisdiction.

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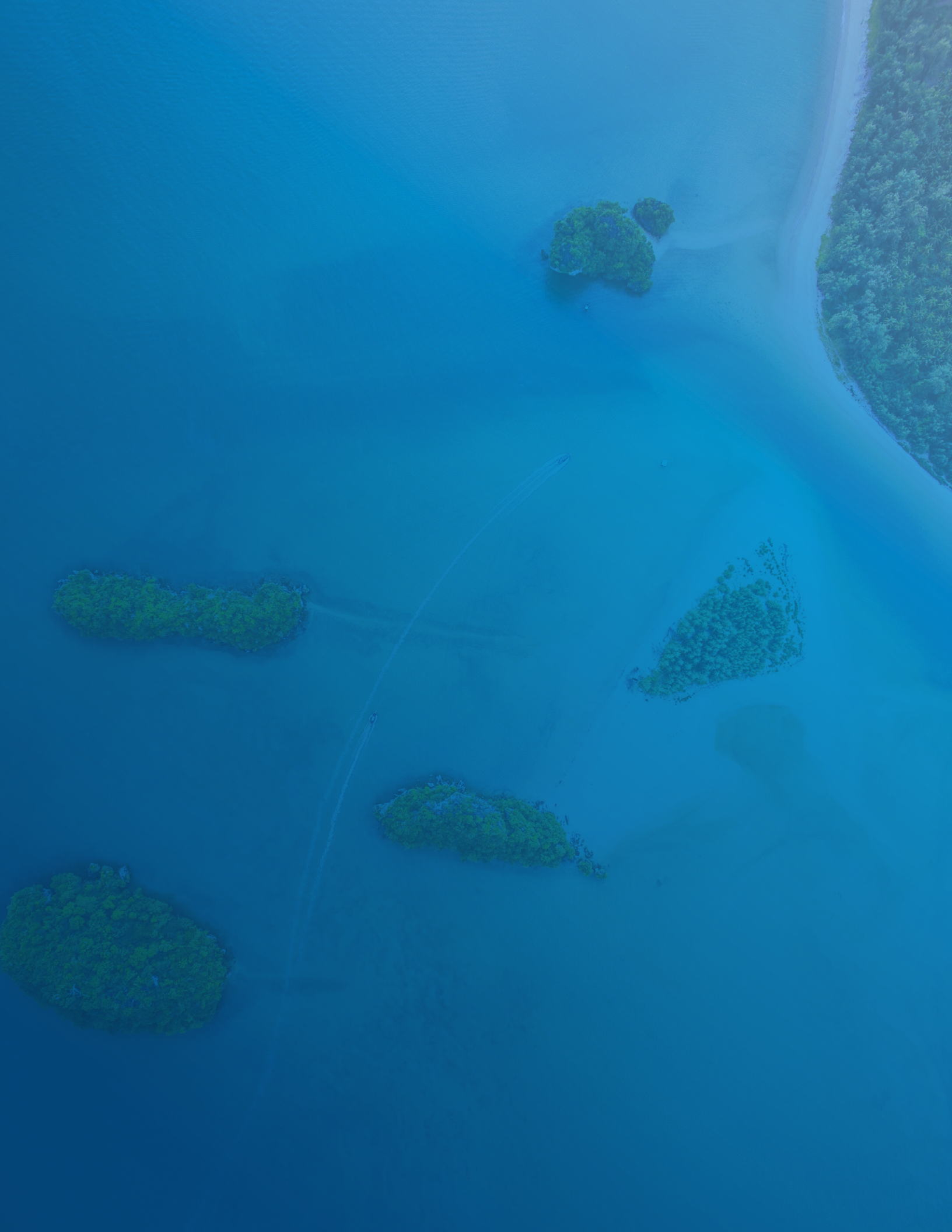

Foreword

In December 2020, the High Level Panel for a Sustainable Ocean Economy (Ocean Panel) released its *Transformations for a Sustainable Ocean Economy: A Vision for Protection, Production and Prosperity.*

In conjunction with this, members of the Ocean Panel committed to sustainably manage 100% of the ocean area under their national jurisdictions, guided by Sustainable Ocean Plans (SOPs), by 2025.* In 2024 they formed the 100% Alliance to urge all coastal and ocean nations to join this commitment to ensure that by 2030 all ocean areas under national jurisdiction are sustainably managed. This group recognises the usefulness of SOP development and implementation as a holistic approach to address policy goals across ocean health, wealth, equity, knowledge and finance.

Momentum is growing to sustainably manage 100% of ocean areas under national jurisdiction, and detailed information on the mechanisms for developing and implementing SOPs is in demand. The Ocean Panel published the guide *100% Sustainable Ocean Management: An Introduction to Sustainable Ocean Plans* as an initial outline of the "who, what, when, where, why and how" of SOPs. As of 2025, 8 of the 18 Ocean Panel members have published their SOPs.

The *Handbook on Sustainable Ocean Plans: A practitioners' guide* aims to provide technical guidance that will support and transform country political goals for SOP production into practical implementation. It emphasises the importance of tailoring these plans to respect each country's cultural, social, economic and environmental conditions. Designed in a "self-assessment" approach, governments, policymakers, civil society, the private sector and local communities can access a suite of best practices, governance models and financial mechanisms to facilitate their own work with the ultimate goal of achieving 100% sustainable ocean management through SOPs.

Sustainable ocean planning is a continuous process. It's ever evolving and must adapt to changing circumstances, challenges and opportunities. It's our hope that this handbook will become the common reference for all those involved in producing and implementing SOPs and will further stimulate commitments to 100% sustainable ocean management.

We thank Ocean Panel members for their continuous commitment to 100% sustainable ocean management and welcome all who wish to join in this worthy endeavour. Only through collective action can we produce a sustainable ocean economy in which effective protection, sustainable production and equitable prosperity go hand in hand.

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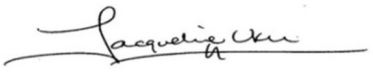

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** Countries that join the Ocean Panel after 2020 are obliged to publish their SOPs within five years of becoming a member.*

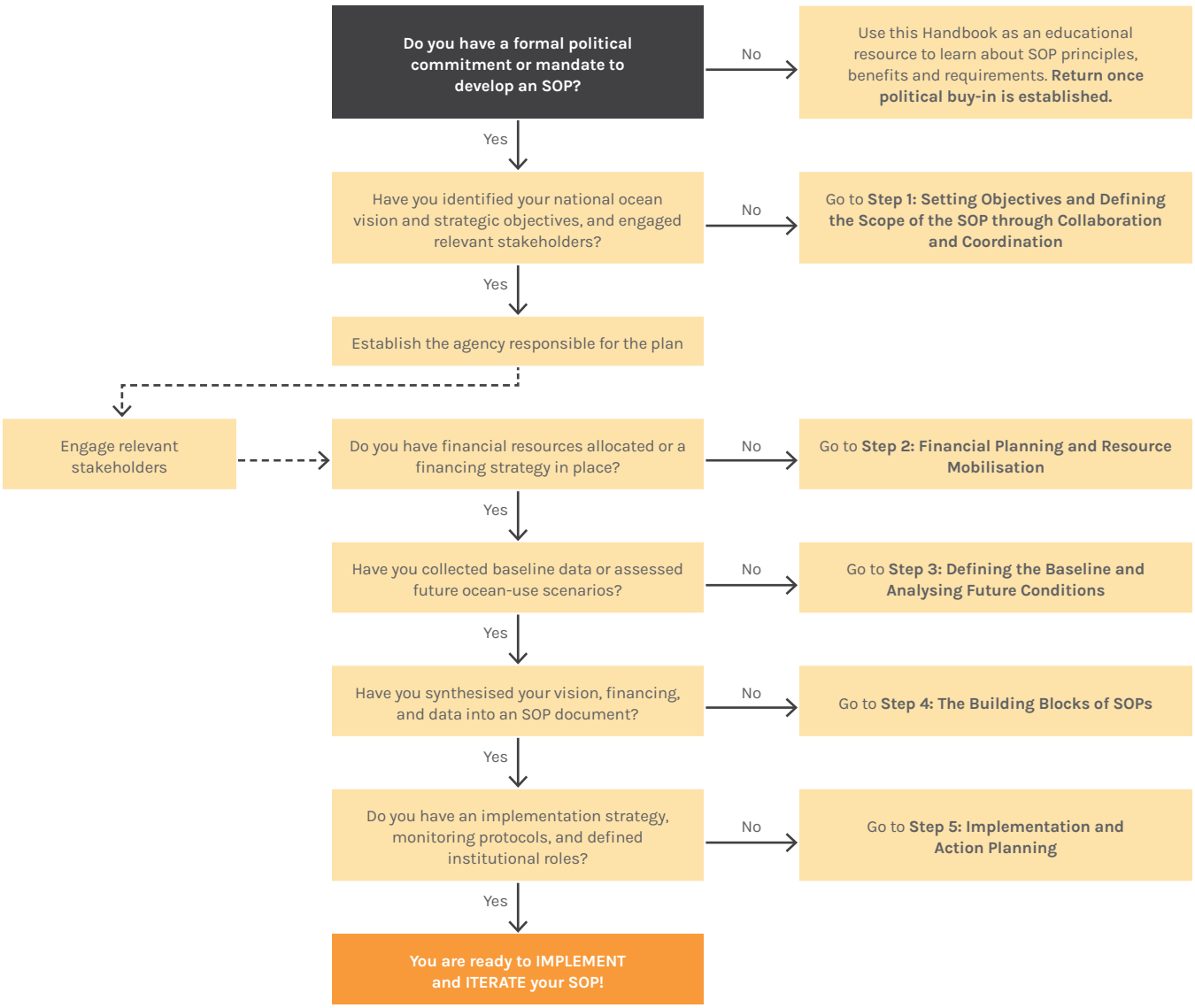
Executive summary

How this handbook supports practitioners of sustainable ocean planning

A political commitment to sustainable ocean planning at the highest level of government is the point of departure for this handbook. The handbook provides guidance to practitioners on how to support and transform political goals into practical implementation while respecting the different cultural, social, economic and environmental conditions in each country. This handbook is designed to provide practitioners with a step-by-step guide as a "self-assessment" approach to developing and implementing Sustainable Ocean Plan (SOPs) (as outlined in Figure ES-1). It provides a comprehensive overview of the financial instruments, analytical tools and data sources available to practitioners, from which they can identify their priorities depending on their context. It's broken down into five steps covered in the following chapters:

- **Step 1: Setting objectives and defining the scope of the SOP through collaboration and coordination** outlines the strategy for integrating policies and sectors, ensuring the plan is integrative and inclusive of all relevant stakeholders and rights holders, including women, youth and Indigenous and local communities.
- **Step 2: Financial planning and resource mobilisation** showcases the budgeting and funding mechanisms to implement an SOP — including integration into national budgets, subnational finance mechanisms and the role of development finance — as well as how to leverage both public and private financing sources.
- **Step 3: Defining the baseline and analysing future conditions** outlines the strategy for collecting baseline environmental and socio-economic data and the tools and methods for effective and integrated data management.
- **Step 4: The building blocks of SOPs** shows how to pull together the above steps to form a cohesive SOP that is integrative, inclusive and iterative.
- **Step 5: Implementation and action planning** summarises the methods needed to develop a phased implementation plan, endorse the SOP and establish an effective and informative monitoring and evaluation framework that includes indicators to track progress.

FIGURE ES-1. **Decision Tree for self-assessment approach to the Handbook**



Source: WRI authors.

By following this handbook, practitioners can design, implement and scale effective SOPs that balance ecological integrity with socio-economic development, ensuring a resilient and sustainable ocean future for all.

Step takeaways

Step 1. Setting objectives and defining the scope of SOPs through collaboration and coordination:

- SOPs are comprehensive frameworks, not stand-alone policies, that integrate various strategies for sustainable marine and coastal ecosystem management.
- SOPs act as an umbrella framework for a government to integrate and balance priorities for enhanced coexistence between humans and marine ecosystems.
- Area-based policies like marine spatial planning, integrated coastal zone management and marine protected areas are fundamental for sustainable ocean planning.
- Ocean planning must uphold human rights, including the rights of Indigenous Peoples, to ensure the active participation of all rights holders and stakeholders.

- SOPs must integrate ocean management with global climate, biodiversity and sustainability goals.
- It's essential to define the scope of the SOP, including geographic boundaries.
- Clear, inspiring vision and guiding principles should be co-developed to direct SOP development and implementation.
- A critical step for SOP implementation is to create a governance structure with a lead authority that fosters intersectoral collaboration. Where relevant, these structures should be inclusive of Indigenous governments to ensure meaningful and equitable participation.

- Stakeholder mapping, engagement and collaboration are essential for an inclusive, participatory, transparent and accountable SOP process.

Step 2. Financial planning and resource mobilisation:

- To effectively mobilise financial resources, the SOP needs to reflect the existing funding landscape and clearly show the opportunities and economic consequences of transitioning to the sustainable ocean economy (SOE).
- Effective policy, regulation and governance, involving the subnational and municipal level, are key to creating an inclusive, supportive enabling environment for effective finance flows in the SOE.
- Public expenditures play an important role in this transition, so SOPs must be linked to fiscal measures.
- Traditional public and private finance methods need to be critically reviewed to identify roadblocks and support their potential to help implement SOPs.
- A focus of new ocean finance is regenerative investment to restore, protect and manage ocean assets to build up blue natural capital and resilience.
- Frameworks and principles embedded in SOPs can help redirect finance flows to strengthen ocean sectors.
- The United Nations Environment Programme Finance Initiative's Sustainable Blue Economy Finance Principles and the nature-positive concept provide relevant guidance for SOPs.
- Early-stage finance and support through incubators, accelerators and impact funds[1] can play an important role in fostering SOE innovation and development, and those pathways should be fully integrated into SOPs.
- Integrating sustainable ocean priorities, including SOE sectors, into sustainable finance taxonomies and agreeing on transparent metrics and indicators are all part of a financially effective SOP design.
- SOPs should also support a systemic approach, using the holistic concept of blue infrastructure finance to support coastal and seascape regeneration, adaptation and resilience.

- By building large blue capital markets, liquid finance flows into the SOE can be facilitated by engaging with large-scale financial actors, asset owners and regulators, including central banks and finance ministries; SOP design can play an important role in building up both domestic markets and links to global capital markets.
- Equally critical is SOP engagement at the local, community and micro-finance levels; this enables those most in need to access finance and play a full role as essential SOE actors.

Step 3. Defining the baseline and analysing future conditions:

- To develop evidence-based, actionable and inclusive SOPs, countries should first establish baselines that are context specific and responsive to likely future scenarios.
- When possible, countries should use diverse approaches for gathering baseline information — from traditional scientific sampling and remote sensing to participatory methods incorporating Indigenous and local knowledge.
- Integration of environmental, economic and social data is crucial for a holistic understanding of ocean social-ecological systems.
- By analysing future trends and developing scenarios, countries can anticipate marine environment changes that may impact SOP design, implementation and effectiveness.
- Robust information for baselines and future conditions can help develop climate-resilient strategies and identify sustainable development opportunities.
- Transparent data management, sharing and standardisation aid in communicating complex spatial information to stakeholders and rights holders.
- Data availability is not evenly distributed across domains, spatially or temporally. Although it's crucial to include the best available data, this should not delay the development of an SOP, which might include strategies to address the gaps and deficiencies.

Step 4. The building blocks of SOPs:

- SOPs must be developed as strategic, actionable plans that set clear goals, objectives, policies, standards and actions across all ocean sectors.
- Objectives should be SMARTIE — specific, measurable, achievable, relevant, time bound, inclusive and equitable — to ensure meaningful progress.
- To avoid fragmentation and enable smooth implementation, policy design must be integrated and regulations aligned across all levels of government.
- A robust governance architecture requires both institutional leadership and collaborative frameworks to ensure cross-sector coordination and accountability.
- Mechanisms like public-private partnerships, maritime clusters and knowledge brokers can enhance innovation, coordination and shared ownership.
- SOP implementation relies on strong financial planning, blending domestic resources with external financing to ensure long-term viability and impact.

Step 5. Implementation and action planning:

- SOP implementation is phased, inclusive, integrated, informed and continuous, moving from institutional coordination and rollout (Phase 1) to ensuring compliance (Phase 2) and then to enforcement (Phase 3), with feedback loops built into each.
- The design of the plan, its legal grounding and institutional cooperation across scales and boundaries all shape implementation success.
- A mix of public, private, Indigenous, civil society and scientific actors should be engaged — with shared accountability — throughout the SOP life cycle.
- Political commitment and long-term resourcing from domestic and external sources must underpin implementation and adaptation efforts.
- A strong monitoring and evaluation framework that includes periodic data collection under FAIR (findable, accessible, interoperable, reusable) and CARE (collective benefit, authority and control, responsibility, ethics) principles, milestone tracking and policy feedback enables SOPs to evolve with science, environmental shifts and societal needs.
- A centralised data platform can unify ocean planning efforts and foster trust through openness and informed decision-making.

Introduction to Sustainable Ocean Plans:

Overview and importance

The ocean is a critical driver of global climate regulation, economic development, biodiversity conservation and human well-being. Covering over 70 percent of Earth's surface, it provides food, livelihoods, energy and ecosystem services to billions of people. However, increasing human activities — such as overfishing, pollution, habitat destruction and climate change — are placing unprecedented pressure on marine ecosystems. To safeguard the ocean's health while ensuring its sustainable use, countries must adopt strategic, knowledge-based and inclusive approaches to ocean policies, planning and management.

In December 2020, the High Level Panel for a Sustainable Ocean Economy (Ocean Panel) solidified a transformative vision for the ocean that emphasises effective protection, sustainable production and equitable prosperity. This vision was articulated through the report *Transformations for a Sustainable Ocean Economy: A Vision for Protection, Production and Prosperity* (*Transformations*) (Ocean Panel 2020), which sets a bold path forward across five critical fields: ocean health, wealth, equity, knowledge and finance. Underlying this transformational agenda is the commitment by the Ocean Panel members[2] to **sustainably manage 100% of all ocean areas under national jurisdiction by 2025, guided by Sustainable Ocean Plans (SOPs)**.[3]

The 100% Alliance, launched at the 79th United Nations General Assembly, consists of a wider group of heads of state and government who have also recognised the value of an SOP covering all areas under national jurisdiction. They see the process of developing and revising an SOP as a useful approach to address ocean policy goals across the domains of ocean health, wealth, equity, knowledge and finance.

SOPs serve as comprehensive, holistic frameworks designed to balance the use and protection of coastal and marine resources at multiple scales and foster long-term economic and social development while ensuring the conservation and integrity of vital coastal and marine ecosystems. SOPs encompass integrated strategies across different ocean sectors and governance scales, from regulatory reforms, policies and strategic economic investments to management frameworks and area-based policies such as integrated coastal zone management (ICZM), marine spatial planning (MSP) and marine protected areas (MPAs). SOPs aim to resolve conflicts over ocean use, promote sustainable economic growth, safeguard marine biodiversity and advance social-ecological systems approaches to ocean governance that recognise the inextricable link between humans and nature. These country-led, multisectoral plans are critical for achieving global commitments such as the Paris Agreement (United Nations Framework Convention on Climate

Change), the Kunming-Montreal Global Biodiversity Framework (GBF; Convention on Biological Diversity), the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) and the United Nations Sustainable Development Goals (SDGs) (see Step 1 and Appendixes B and C for further details).

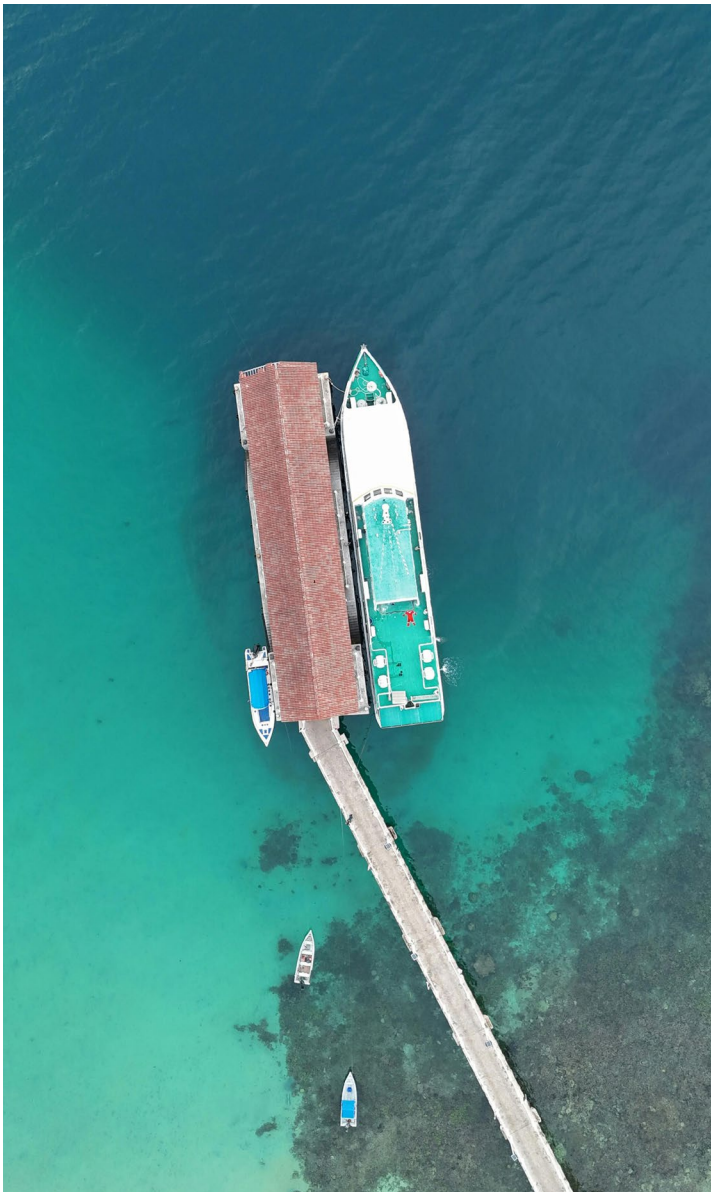
The introduction of SOPs marks an important step towards reconciling the dual objectives of oceanic resource use and environmental stewardship at different scales — from coastal areas to the boundaries of the national jurisdiction. It involves a collaborative, iterative process that engages a broad range of stakeholders and rights holders, including government, industries and Indigenous Peoples and local communities, ensuring that the diverse values and needs of all ocean users are equitably considered and addressed. The inclusive, integrative and iterative nature of this process ensures that SOPs are living frameworks capable of evolving in response to ecological and social changes. In addition, SOPs can adapt to new challenges and opportunities presented by the changing state of marine environments, global economic landscapes and worldviews and priorities.

This chapter establishes an understanding of SOPs not only as policy instruments but also as foundational elements for a sustainable ocean economy (SOE) that align with the 2030 Agenda for Sustainable Development adopted by the United Nations. It underscores the urgent need for all coastal and ocean states to adopt and implement SOPs to achieve sustainably used ocean spaces by 2030. By creating SOPs, coastal and ocean states can establish internal coherence and identify their national ocean priorities, becoming better stewards for all ocean-based activities and furthering economic, security and environmental objectives.

This handbook serves as a guide for practitioners — governments, policymakers, civil society, the private sector and local communities — who are involved in designing, implementing and evaluating SOPs. It provides insights into best practices, governance models, methodologies and financial mechanisms to assist countries in achieving the 100% sustainable ocean management target.

This handbook is multifaceted and designed to serve as a comprehensive guide for practitioners:

- **Educational resource.** The handbook aims to educate its readers about SOPs, including their definition, importance and the core principles underlying their design and implementation. It helps users understand the holistic approaches needed to sustainably manage human use of ocean resources and to identify areas requiring further capacity development.
- **Practical guide.** It serves as a practical tool, offering detailed guidance on the steps required to effectively develop and implement SOPs. This includes methodologies for engaging stakeholders and rights holders, weaving scientific data and Indigenous and traditional knowledge (ITK) systems and applying ecosystem-based management principles. In addition, the handbook outlines the technical elements of SOP implementation related to area-based policies such as MSP, the establishment of legal and regulatory frameworks and adaptive management practices that can respond to new challenges and information.



- **Governance models.** The handbook explores various governance models that facilitate effective SOP implementation, emphasising the need for inclusive and participatory processes that engage all relevant stakeholders and rights holders, including government bodies, local communities, industries and non-governmental organisations (NGOs).
- **Financial mechanisms.** It discusses financial strategies and mechanisms that can support the long-term sustainability of SOPs, including funding options such as blue bonds, public-private partnerships and international financing from conservation and climate funds.
- **Policy integration.** The handbook stresses the importance of integrating SOPs within national and international policy frameworks to ensure they align with global commitments such as the Paris Agreement, the GBF, UNDRIP and the SDGs.
- **Monitoring and evaluation.** It outlines strategies for monitoring and evaluating the effectiveness of SOPs, ensuring they are meeting their goals and providing a basis for continuous improvement and adaptation to changing circumstances.
- **Global and local relevance.** Although the handbook provides global guidance on SOPs, it also emphasises that they should be customised to local and national contexts, recognising the unique environmental, cultural, economic and social conditions of different maritime regions.

The SOP Handbook is intended to be a dynamic resource that not only guides but also inspires stakeholders and rights holders to pursue sustainable ocean management through well-planned and effectively implemented SOPs. Its goal is to equip practitioners with the knowledge and tools necessary to sustainably manage ocean areas, fostering inclusive economic development while preserving coastal and marine environments for future generations.

What are SOPs?

In December 2021, the Ocean Panel (2021) launched *An Introduction to Sustainable Ocean Plans,* establishing a foundational framework for SOPs. Developed through extensive consultation with a range of providers, including technical and financial experts as well as Ocean Panel members and their technical teams, this document provides a clear, shared definition of an SOP and outlines what the commitment to 100% sustainable management entails (Box 1). Released in 2024, the supplementary Blue Paper "Co-producing Sustainable Ocean Plans with Indigenous and Traditional Knowledge Holders" (Strand et al. 2024) provides additional guidance on how to ensure that Indigenous and traditional and local knowledge holders are meaningfully involved in developing and implementing SOPs, underscoring the importance of integrating diverse knowledge systems.

SOPs serve as comprehensive "umbrella" frameworks for creating coherency in ocean-related policies, governance, tools and mechanisms. As detailed in the *Transformations* report, SOPs outline policies and mechanisms designed to promote sustainable ocean use while maximising benefits and value for both present and future generations. SOPs provide strategic frameworks to identify trade-offs and resolve conflicts over ocean use while fostering long-term and inclusive growth in the ocean economy. The plans may incorporate various mechanisms, including regulatory reforms, strategic investments in nascent sectors, MSP, integrated coastal and watershed management and the creation and enforcement of MPAs and other effective area-based conservation measures (OECMs). These measures can support ecological health, economic prosperity, biodiversity conservation, climate change mitigation and adaptation, and the sustainability of fish stocks.

When implementing a comprehensive SOP approach, practitioners can learn from and build on the international practice of MSP over the last

BOX 1. **SOP definition**

A Sustainable Ocean Plan (SOP) is a strategic, knowledge-based and participatory framework that a country develops to ensure the sustainable management of 100% of its ocean areas under national jurisdiction. The plan defines a long-term vision for ocean sustainability and provides an actionable road map that aligns climate action and biodiversity conservation with sustainable use and equitable prosperity. The SOP should serve as a comprehensive and holistic "umbrella" framework that unifies all ocean-related policies, governance, tools and mechanisms and helps align ocean policies with international frameworks and best practices.

two decades. MSP is a key area-based process to sustainably manage human activities within a country's maritime territories.[4] It's a process to allocate human activities as well as priority areas for coastal and marine protection and restoration to achieve a productive, healthy and resilient ocean. As of 2023, the Intergovernmental Oceanographic Commission of the United Nations Educational, Scientific and Cultural Organization (UNESCO-IOC) reports that 126 countries are engaged in MSP — ranging from local and pilot projects to national marine spatial plans rooted in legislation — though only a minority of countries have a legal framework in place to implement their plans (Ahern et al. 2024). National SOP implementation should therefore build on existing MSP processes, which often have a narrower focus, such as setting a spatial zoning process or conflict resolution mechanisms within a given marine space. In such cases, SOPs can achieve a strategic overarching national vision for integrated ocean management. This is why the SOP approach does not replace MSP but rather builds on it, providing a comprehensive umbrella framework for coherency across ocean governance policies, tools and mechanisms. MSP is a core component and has a variable degree of relevance depending on the content and functioning of the marine spatial plan as well as its governance and legal mechanism in place. For more details on how MSP can be integrated into SOPs, see Step 1, "Upholding and respecting human rights, including the rights of Indigenous Peoples."

Attributes and components of SOPs

Though SOPs can be customised to reflect the unique circumstances, needs and context of each country, all share nine consistent attributes (see Box 2). Since the concept was coined and has been put into practice,[5] experts have been dissecting each attribute, its benefits and advantages.

SOPs can be customised to fit the unique circumstances of each country, emphasising a holistic approach that is co-produced with ITK holders, where applicable. This approach not only enhances the relevance and effectiveness of SOPs but also ensures that they are more likely to gain broad support and successfully manage marine resources in a sustainable manner.

SOPs are most impactful when embedded into national development frameworks, climate and biodiversity strategies, and institutional processes — ideally developed through an interinstitutional commission to ensure an iterative process that promotes long-term continuity, cross-sectoral coordination and political ownership. The development of an SOP requires a multidisciplinary skill set, including expertise in marine science, spatial planning, stakeholder engagement, policy analysis and legal and institutional frameworks. Equally important are coordination mechanisms across ministries, data management systems

BOX 2. **The nine attributes that characterise an SOP**

1. **Inclusive:** Sustainable Ocean Plans (SOPs) should include all relevant stakeholders and rights holders in the planning process to ensure diverse perspectives are considered.
2. **Integrative:** Coordination is required between different government agencies (both Indigenous and state) and ocean sectors to ensure a unified approach.
3. **Iterative:** Plans must be adaptable, allowing for updates as new information becomes available or as conditions change.
4. **Place-based:** SOPs should be tailored to the specific marine and coastal environments they are designed to manage, including place-based cultural values.
5. **Ecosystem-based:** Management decisions should recognise and incorporate the complex interactions within marine ecosystems.
6. **Knowledge-based:** Plans should be underpinned by the best available scientific, Indigenous, traditional and local knowledge.
7. **Endorsed:** High-level political endorsement is necessary to ensure the plans are effectively supported and implemented. This should be from both state and Indigenous governments when relevant to the country context.
8. **Financed:** adequate funding must be secured, through public and private sources, to support the long-term implementation of the plans, including support to build and share capacity.
9. **Capacitated:** There must be sufficient capacity — and support to build and enhance existing capacity — in terms of skills, knowledge and resources to effectively develop and implement the plans.

Source: Ocean Panel 2021.

and capacity to translate technical inputs into actionable policy.

Without sufficient political will, integrating various components into a coherent strategy becomes challenging. However, the true value of developing an SOP lies in creating a succession of events that are not only backed by high-level commitments but are also constructed from the bottom up. This requires open, transparent and iterative processes that allow for continuous evaluation and adaptation. Coordination mechanisms must be established to streamline these efforts, which should be solidified through clearly defined public policies. SOPs are to be initiated and mandated by the government at the highest level and integrated in terms of sustainability goals. They therefore will require the following:

- **A knowledge base.** SOPs rely on a scientific approach to guide decision-making processes, incorporating available data from marine biology, oceanography and environmental science as well as inclusion of Indigenous, local and traditional knowledge systems. This knowledge base and scientific foundation helps in predicting outcomes, assessing risks and implementing measures that can sustainably manage ocean resources and build resilience.
- **Adaptive management.** Recognising the dynamic nature of marine ecosystems and the uncertainties associated with environmental changes, SOPs are designed to be adaptive. This flexibility allows them to evolve based on continuous monitoring, assessment and incorporation of new scientific insights as well as the need to address issues emerging from new human activities.
- **Stakeholder and rights holder involvement.** Effective SOPs involve comprehensive stakeholder and rights holder engagement, including local communities, industries and governments. This inclusive approach ensures that the plans reflect a wide range of interests and knowledge systems, facilitating more effective and equitable management strategies and overall ownership from key stakeholders and rights holders.
- **Regulatory frameworks.** SOPs are supported by legal and institutional frameworks that enforce sustainable practices, regulate activities and provide mechanisms for conflict resolution. These regulatory structures are crucial for the effective implementation of SOPs.

SOPs should align with the 2030 Agenda for Sustainable Development (see Appendix C for details), be grounded in integrated ocean ecosystem knowledge, centre equity, address both land- and sea-based environmental pressures and consider the anticipated impacts of climate change. This collection of plans and initiatives must be crafted and executed through processes that are inclusive, participatory, transparent and accountable, forming the basis for sustainable ocean governance.

SOP outputs

As illustrated in Figure 1, an SOP can provide a unifying framework across different policies and tools. From being used to set policies to drafting sectoral plans, SOPs can produce the following outputs:

- Goal setting that integrates policies for sectors such as fisheries, tourism or maritime transport.
- Establishment of coordination mechanisms for sectoral regulations.
- Area-based management aligned with the policies.
- Economic measures and enabling mechanisms for the transformation to sustainability.
- Sectoral policies and regulations consistent with the overall plan.

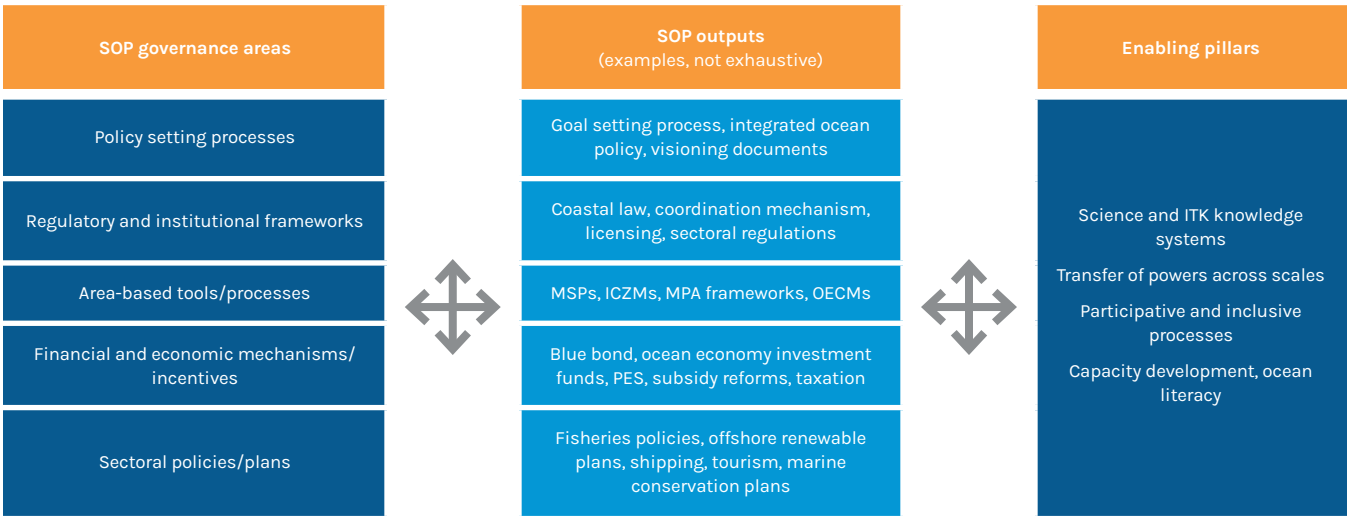
The enabling pillars shown in the right-hand column of Figure 1 include knowledge systems; a willingness and capability to address and, if necessary, adjust the distribution of power between local, regional and national scales; a commitment to inclusive processes; and capacity development and ocean literacy.

Why SOPs are necessary

In our constantly evolving world, dynamic measures, emerging technologies, coherent public policies and timely responses are crucial. To effectively manage urban, rural and marine spaces, more sophisticated tools are useful for spatial planning. Currently, it's common for management to be fragmented across various departments; ministries; governmental agencies; and local, subnational or national governments. This fragmentation is inefficient and hinders strategic coordination. Consequently, the unified approach necessary to effectively integrate and consider various environmental, economic and social variables is lost. To overcome these challenges, SOPs propose a holistic and strategic evaluation of all components. This approach allows for co-production and coordination, ensuring that diverse but interconnected factors are harmonised in approaches such as MSP.

In the midst of a complex transboundary reality where we "share" vital natural resources, our current management models often fail to provide resilient infrastructure, relevant job opportunities and an

FIGURE 1. **SOPs provide a unifying framework across different policies and tools**



Notes: ICZM = integrated coastal zone management; ITK = Indigenous and traditional knowledge; MPA = marine protected area; OECM = other effective area-based conservation measure; PES = payment for ecosystem services; SOP = Sustainable Ocean Plan.

Source: Julian Barbière.

organised and sustainable structuring of uses that could allow greater benefits for the planet and its inhabitants. As we address the interrelated crises of climate and biodiversity, the ocean emerges as a crucial part of the solution. This represents a significant opportunity to harness natural assets for benefits beyond merely confronting challenges.

The ocean could play a substantial role in mitigating climate change through various strategies, including scaling up renewable energy, enhancing blue carbon ecosystems and decarbonising maritime transport (Hoegh-Guldberg et al. 2023). However, a more integrated and ambitious approach to managing the ocean is essential for leveraging its full potential in the climate crisis.

Similarly, integrated management of the ocean might be crucial for global biodiversity conservation. The commitment to sustainably manage 100% of ocean areas under national jurisdiction through SOPs represents a critical shift in ocean governance. This pledge is particularly significant because it seeks to change how we interact with and make decisions about the ocean, aiming to combine environmental sustainability, human well-being and economic benefits by recognising interconnected marine social-ecological systems.

Building on this premise, it's essential to ensure that marine conservation efforts and economic activities align with broader national development objectives and community welfare. This alignment underscores the necessity of integrated ocean management strategies that equitably bring together various ocean priorities, connections and knowledge systems to understand how to best advance co-benefit approaches.

Moreover, the challenges of ratifying international agreements, such as the Biodiversity Beyond National Jurisdiction (BBNJ) Agreement under the United Nations Convention on the Law of the Sea (UNCLOS), must be addressed. Areas within and beyond national jurisdiction are connected, and it's essential to establish a holistic approach that facilitates equitable governance of ocean areas beyond national jurisdiction (ABNJ), the high seas and "the Area."[6] Aligning national actions with global conservation and sustainable use goals sets a foundational framework for comprehensive global ocean governance.

Finally, private sector engagement depends on establishing robust governance structures that provide clarity and security for investors. Creating a strong platform for governance can effectively

meet the demands of diverse stakeholders and rights holders and deliver the structured governance necessary for substantial investment. This structure is vital for harnessing the full potential of the ocean economy, ensuring that it contributes positively to global environmental and economic goals.

The development and implementation of SOPs are driven by urgent global challenges and the need for coordinated, science-based responses to address them together in view of their different relevance and manifestation in each country. Some of these challenges are outlined below:

- **Addressing climate change.** The ocean absorbs over 90 percent of excess heat from global warming and about 25 percent of carbon dioxide emissions, leading to increased sea temperatures, coral bleaching, ocean acidification and rising sea levels. Analysis by Hoegh-Guldberg et al. (2023) shows that ocean-based climate solutions could assist in reducing the "emissions gap" in 2050 by up to 35 percent on a 1.5°C pathway and up to 47 percent on a 2.0°C pathway. However, these opportunities for greenhouse gas (GHG) reductions and sustainable economic growth have not been

adequately prioritised. A more integrated and ambitious approach to ocean management is essential to leverage the ocean's full potential.

- **Combatting biodiversity loss.** Many fish stocks are overexploited or maximally exploited due to unsustainable fishing practices. The proportion of global fish populations classed as "overfished" nearly quadrupled during the last half century, rising from 10 percent in 1974 to almost 38 percent in 2021 (FAO 2024). The ocean hosts undiscovered genetic resources and encompasses vulnerable and valuable coastal and deep-sea areas.
- **Strengthening sustainable and inclusive blue economies.** The ocean contributes US$2.2 trillion annually to the global economy, supporting industries such as fisheries, tourism and renewable energy. However, the benefits from ocean-related economies are inequitably distributed, leading to increased wealth disparities and inequitable blue economies. In 2018, for example, 60 percent of all revenue profited only 100 companies, with the biggest industry being offshore oil and gas (Virdin et al. 2021).
- **Ensuring resilient coastal communities.** More than 40 percent of the global population lives within 100 kilometres of the coast, making this population vulnerable to climate-driven disasters.

SOPs as a pathway to resilience and sustainable development

SOPs are critical tools for ensuring the long-term health and productivity of ocean resources while addressing pressing global challenges like climate change. The effects of climate change — such as rising sea levels, ocean acidification, warming waters and increased frequency of extreme weather events —disrupt marine ecosystems and threaten the livelihoods of coastal communities.

For SOP practitioners, it's essential to integrate climate considerations into ocean planning to achieve sustainable development, climate resilience and biodiversity conservation. Appendix A explores how SOPs contribute to climate mitigation and adaptation. Appendix B provides practical insights for incorporating climate strategies into ocean governance. Appendix C addresses how SOPs contribute towards SDG 14.

Step 1:

Setting objectives and defining the scope of the SOP through collaboration and coordination

KEY TAKEAWAYS:

- SOPs are comprehensive frameworks, not stand-alone policies, that integrate various strategies for sustainable marine and coastal ecosystem management.
- SOPs act as a unifying umbrella framework for governments to integrate and balance priorities for enhanced coexistence between humans and marine ecosystems.
- Area-based policies like MSP, ICZM and MPAs are fundamental for sustainable ocean planning.
- Ocean planning must uphold human rights, including the rights of Indigenous Peoples, to ensure the active participation of all rights holders and stakeholders.
- SOPs must integrate ocean management with global climate, biodiversity and sustainability goals.
- It's essential to define the scope of the SOP, including geographic boundaries.
- Clear, inspiring vision and guiding principles should be co-developed to direct SOP development and implementation.
- A critical step for SOP implementation is to create a governance structure with a lead authority that fosters intersectoral collaboration. Where relevant, these structures should be inclusive of Indigenous governments to ensure meaningful and equitable participation
- Stakeholder mapping, engagement and collaboration are essential for an inclusive, participatory, transparent and accountable SOP process.

This chapter introduces sustainable ocean planning as a crucial strategy for integrating diverse policies and sectors in the pursuit of sustainable ocean management. It establishes the SOP not as an isolated policy but rather as a comprehensive framework that unifies various local, national and international initiatives aimed at the sustainable planning and management of marine and coastal ecosystems, recognising the interdependence of humans and these environments. The chapter emphasises that SOPs provide an overarching umbrella framework for governments to integrate and balance competing priorities and enhance the coexistence between human activities and marine ecosystems through a holistic, ecosystem-based approach (Box 3).

This chapter delves into the foundational steps for establishing an effective SOP. It explores the integration of area-based policies, the importance of upholding human rights, including the rights of Indigenous Peoples, and the necessity of aligning ocean planning with climate, biodiversity and broader sustainability goals. Furthermore, it addresses the importance of defining the scope and geographic boundaries of an SOP, setting a guiding vision and principles and establishing a robust governance structure. Finally, the chapter outlines the critical processes for stakeholder mapping, engagement and collaboration, underscoring the importance

BOX 3. How to understand the "umbrella" nature of SOPs

Sustainable Ocean Plans (SOPs) are integrative frameworks. SOPs are not isolated policies or strategies but rather comprehensive frameworks that integrate various strategies, policies and agreements at the national, subnational, local and even international levels. Think of an SOP as a framework that integrates and connects various existing and future initiatives.

SOPs are higher-level coordination mechanisms. SOPs function as an overarching umbrella framework for governments. This means that they sit at a higher level, overseeing and coordinating the actions of various policies and sectors related to the oceans. The goal of the SOP is to balance different priorities and interests for a better coexistence between human activities and marine ecosystems.

SOPs comprehensively integrate policies. SOPs bring together new and existing policies, plans and mechanisms into a coherent whole. This includes various area-based management approaches, such as marine spatial planning, integrated coastal zone management, marine protected areas and other effective area-based conservation measures. All of these specific tools and policies are considered and coordinated under the SOP umbrella framework.

SOPs incorporate social, cultural, economic and environmental dimensions. An effective SOP must defend and respect human rights and the rights of Indigenous Peoples. Additionally, it must integrate the ocean into climate, biodiversity and sustainability goals. This demonstrates that sustainable ocean planning is not limited to spatial management but also encompasses social, cultural, environmental and economic aspects, making it a true umbrella framework for interconnected concerns.

SOPs align with regional and global commitments. SOPs must align with regional frameworks as well as global commitments such as the Paris Agreement, the Kunming-Montreal Global Biodiversity Framework, and the 2030 Agenda for Sustainable Development. By doing so, SOPs ensure that actions at the national and subnational levels contribute to broader goals, functioning as a mechanism to implement and achieve these commitments within the oceanic context.

SOPs address transboundary challenges. SOPs play a crucial role in addressing challenges that extend beyond national jurisdictions, such as ecosystem connectivity, policy harmonisation and shared resource management. In this sense, SOPs can serve as an umbrella framework for international cooperation on oceanic issues, aligning with the transnational area-based management tools.

In summary, the umbrella nature of the SOP lies in its ability to integrate and coordinate a wide range of policies, strategies, goals and dimensions related to sustainable ocean management — from the implementation of spatial tools to ensuring human rights and alignment with global agendas. It provides a holistic vision and a unifying framework to achieve 100% sustainable ocean governance.

of an inclusive and transparent approach to SOP development and implementation.

SOPs as a strategy to integrate policies and sectors in ocean planning

SOPs are comprehensive, unifying frameworks that integrate new and existing local, national and international strategies, policies and agreements aimed at the sustainable planning and management of marine and coastal ecosystems, recognising humans as an interdependent part of these systems. Rather than serving as a stand-alone policy, the SOP acts as an overarching umbrella framework that embeds ocean and marine issues across multiple sectoral strategies and goals, promoting a holistic, ecosystem-based approach. By balancing diverse priorities and interests, SOPs help national governments advance long-term sustainable development, which aims to achieve 100% sustainable ocean management through enhanced coexistence between humans and marine ecosystems.

Governments must identify and enable ocean actions across multiple policy objectives and sectors for sustainable ocean management amid climate change and increasing human demands for development. Such efforts enable governments to take inventory, prioritise needs and align policies and investments while fostering climate-resilient fisheries and aquaculture, advancing climate-smart conservation, enhancing coastal resilience and habitat restoration, supporting existing stewardship, upgrading infrastructure, upholding the rights of Indigenous Peoples and local coastal communities and evaluating marine carbon dioxide removal strategies. Establishing SOPs requires a comprehensive inventory of regional, national and local information — as well as robust knowledge archiving and management processes — to ensure alignment across policies related to climate change, sustainable development, biodiversity conservation,

food security, poverty alleviation, equity and benefit-sharing. This approach allows governments to assess unique risks and implement effective mitigation and adaptation strategies accordingly.

SOPs should be leveraged to ensure adequate and equitable investments in information, gap analysis, capacity-building and technology development and sharing. This will lead to better outcomes for marine and coastal ecosystems and the human and non-human beings that depend on them (Kimmerer 2014; Alexander et al. 2019; Maxwell et al. 2020).

Integrating area-based policies for sustainable ocean planning

A fundamental step towards sustainable ocean planning is implementing or harmonising existing and new area-based marine and coastal management and governance tools and processes. This step advances the recognition of interdependencies between humans and marine ecosystems and ensures that human activities are managed in a way that balances stewardship, economic development and environmental conservation. Various strategies operate at different levels — including MSP, ICZM, locally managed marine areas, the designation of MPAs and OECMs — and recognise existing ocean and coastal stewardship through Indigenous ocean governance and plans (e.g., Aboriginal-led ocean and coastal management, such as the Mayala Country Plan [MIAC 2019][7]). It's not necessary for a country to implement area-based policies before developing its SOP, but it's vital for the authority that pursues the SOP to adequately recognise and work in harmony with existing ocean stewardship, custodianship and Indigenous Peoples' ocean governance processes. Ideally, the development of SOPs should be in parallel with existing or new area-based approaches to ensure that the management strategies are effectively balanced and coordinated. Failure to do so can lead to policy fragmentation and conflicting mandates that reduce effectiveness. A coherent, aligned planning approach ensures that marine management outcomes are balanced, efficient and durable.

It's important to note that the scale and geographic scope of these initiatives vary widely depending on their objectives. For example, MSP typically applies to territorial seas and to the country's exclusive economic zone (EEZ), providing a framework to allocate ocean space for different uses while minimising conflicts and protecting sensitive habitats and ecosystem services. MSP is, at its core, a public process and aims to consider all voices, interests and priorities in meaningful ways. Thus, MSP can contribute to sustainable ocean planning by ensuring that various activities, such as fishing, shipping and renewable energy development, are coordinated spatially in a sustainable manner (Ansong et al. 2021).

ICZM, on the other hand, primarily focuses on the land-sea interface and shoreline management, promoting coordinated decision-making across terrestrial and marine environments. It also contributes to sustainable ocean planning by ensuring that land-based activities and their impacts (e.g., runoff, contaminants) on the ocean are considered during the SOP process, leading to a more holistic approach to coastal and marine sustainability (Cicin-Sain and Knecht 1998; Kay and Alder 2017).

Meanwhile, MPAs are established at various geographic scales in part to safeguard ecologically sensitive habitats and biodiversity, differing from MSP in the temporal and spatial dimensions (Frazão Santos et al. 2025). Restriction or exclusion zones, such as fisheries restriction zones, complement MPAs by limiting specific activities in fragile areas, therefore helping to restore an ecosystem's structures and functions. OECMs, such as community conservation areas and no-take zones around oil and gas infrastructure or submarine cable corridors, can deliver long-term biodiversity conservation. Although not formally designated as protected areas, OECMs also fall under the SOP umbrella framework. Within an SOP perspective, these tools serve as crucial mechanisms for biodiversity conservation and sectoral management and can also be integrated into broader climate adaptation strategies to increase ecological resilience.

Coastal countries should also follow the Port State Measures Agreement (PSMA), an international treaty designed to combat illegal, unreported and unregulated (IUU) fishing. This key initiative aims to reduce the exploitation of marine resources and protect ocean ecosystems. PSMA tools and policies, along with OECMs, should be considered under the SOP umbrella framework.

However, it's important to emphasise some of the existing critiques and limitations of area-based ocean planning and management approaches: They lack meaningful involvement of local communities (Okafor-Yarwood et al. 2020), exclude Indigenous Peoples and small-scale fishers (Rivers et al. 2023), use top-down and one-size-fits-all approaches (Tafon et al. 2023), show limited attention to sociocultural

dimensions (Gee et al. 2017; Strand et al. 2022) and fail to integrate climate change considerations (Frazão Santos et al. 2020). For these approaches to meaningfully inform and be part of a holistic SOP, the existing shortcomings must be addressed.

By integrating these area-based approaches into a comprehensive ocean management and governance strategy, governments, rights holders and stakeholders can help enhance ecosystem resilience, promote sustainable resource use and strengthen climate mitigation and adaptation efforts. Coordination among these policies ensures that conservation and development goals are aligned, paving the way for a more sustainable and equitable use of marine resources.

Upholding and respecting human rights, including the rights of Indigenous Peoples

A key role of integrated, inclusive and effective sustainable ocean planning is upholding and respecting human rights and the rights of Indigenous Peoples. A recent Blue Paper on "Co-producing Sustainable Ocean Plans with Indigenous and Traditional Knowledge Holders" emphasises the significance of centring Indigenous Peoples rights to advance sustainable ocean planning (Strand et al. 2024). Currently and historically, ocean management and governance have often excluded Indigenous Peoples and coastal communities; this practice exacerbates social and economic inequities and increases climate vulnerability and environmental degradation. To advance ocean planning that prioritises more equitable and sustainable ways of managing the relationship between the ocean and people, we need to ensure that ITK holders play an active role in defining, informing and leading decision-making related to the ocean (Strand et al. 2024; UNESCO-IOC and UNESCO-LINKS 2024a, 2024b).

SOPs should integrate and incorporate the Universal Declaration of Human Rights, the 2007 UNDRIP and the 2018 United Nations Declaration on the Rights of Peasants and Other People Working in Rural Areas (UNDROP). This should be done by ratifying and implementing these declarations on a national scale, aligning them with existing and new policies and laws and continuously engaging with ITK holders throughout these processes. Furthermore, where possible, SOPs must recognise the plurality of knowledge systems, ensuring that all actors, especially Indigenous Peoples and local communities, are represented equitably and can meaningfully contribute to ocean-related decision-making (Strand et al. 2024).

Integrating the ocean across climate, biodiversity and sustainability goals

The ocean plays a critical role in regulating Earth's climate. It absorbs approximately 40 percent of carbon dioxide emissions released into the atmosphere and 90 percent of excess heat generated by fossil fuel combustion. However, increasing carbon dioxide levels are causing ocean acidification, which threatens marine life and ecosystems.

The Intergovernmental Panel on Climate Change (IPCC) is certain that ocean warming and acidification are already affecting food production, including shellfish aquaculture and fisheries in some regions. Across various climate scenarios, the IPCC consistently reports risks to ocean resources, stressing the need for proactive management.

Sustainable ocean planning is essential in bridging ocean management and governance, climate action and biodiversity conservation. It provides a strategic framework for countries to sustainably use ocean resources while addressing climate adaptation and mitigation and preserving marine biodiversity.

Essentially, SOPs can help deliver a practical ecosystem-based management approach by enabling policy coherence across ocean sectors, providing guidance on sustainable use of marine assets within environmentally sustainable limits and reducing overall cumulative human impacts. SOPs therefore provide a valuable mechanism to deliver ocean-related policy objectives in support of broader national development policies and strategies (see Box 4 for an example).

To be effective, an SOP must align with global commitments, such as the Paris Agreement, the GBF, the 2030 Agenda for Sustainable Development and the BBNJ Agreement (for more details on how, see Appendixes B and C). Regional frameworks should also be considered:

- European frameworks, such as the European Green Deal, the Nature Restoration Law, the Habitats Directive, the Marine Strategy Framework Directive and the Marine Spatial Planning Directive.
- Frameworks implemented by the Organisation of Eastern Caribbean States, such as the Biodiversity and Ecosystems Management Framework (2020–35) and the Eastern Caribbean Regional Ocean Policy.
- Pacific Islands Regional Ocean Policy.
- Regional Seas Programme of the United Nations Environment Programme (UNEP).
- Africa Blue Economy Strategy.

Additionally, SOPs must incorporate ecosystem knowledge, address pressures from both land- and sea-based sources and anticipate climate change impacts.

More specifically, SOPs serve as a critical coordinating mechanism for translating ocean commitments into actionable, sector-specific pathways. On the procedural side, SOPs can ensure that ocean-based climate solutions, such as maritime decarbonisation, offshore renewables, blue carbon protection and restoration, and coastal resilience, among others, are systematically integrated into national policy frameworks; this prevents fragmented implementation and fosters cross-ministerial collaboration.

Nationally Determined Contributions (NDCs) to the Paris Agreement could reference SOPs as a key mechanism for the coordinated delivery of ocean-based mitigation and adaptation targets. SOPs could be structured to feed into the NDC development process and reflect NDC updates every five years, ensuring that ocean commitments evolve alongside national climate priorities. SOPs also support the delivery and implementation of these commitments by identifying necessary policy reforms, governance structures and financing strategies, strengthening institutional capacity to scale ocean-climate actions across key sectors, such as fisheries, energy, transport, conservation and coastal infrastructure. This alignment reinforces national ownership and accountability, linking long-term ocean governance with the country's broader climate commitments under the Paris Agreement.

BOX 4. Integration in practice: The Seychelles case study

As an island nation, the Seychelles faces the dual challenge of marine biodiversity loss and climate change vulnerability. However, it's facing this head on and providing a compelling example of Sustainable Ocean Plan (SOP) integration in action. The country has developed its marine spatial plan in alignment with its Nationally Determined Contribution and National Biodiversity Strategy and Action Plan. These were both integrated into its SOP, entitled *Seychelles Blue Economy Strategic Policy Framework and Roadmap: Charting the Future (2018–2030)*. Below are some of the key features:

- **Cross-sectoral governance.** The Ministries of Environment, Energy and Climate Change; Fisheries and Aquaculture; and Finance, Trade and Economic Planning collaborated under a unified planning platform.
- **Climate-smart zoning.** Marine protected areas were established with climate resilience in mind, prioritising protection of blue carbon habitats such as seagrasses and mangroves.
- **Financing.** To fund implementation, the first-ever debt-for-nature swap and sovereign blue bond were used to convert US$21.6 million of national debt. This first sovereign blue bond subsequently raised US$15 million from international investors. The road map outlined how this would be invested to manage and expand marine protected areas, sustainable fisheries and other conservation activities, linking conservation directly to fiscal sustainability.

This showcases the effectiveness of SOPs to bridge national development needs with climate, nature and biodiversity goals, delivering an integrated and implementable plan.

Additionally, the potential to develop renewable energy and protect and restore blue carbon ecosystems offers a myriad of climate mitigation and adaptation pathways. SOPs can enhance these benefits by promoting healthy marine ecosystems and guiding the deployment of marine renewable energy sources.

National accounting and response to these changing ocean conditions will better account for risks as well as opportunities for coastal communities, well-functioning marine ecosystems, seafood security and sustainable ocean economies.

Finally, SOPs can support biodiversity conservation by offering information to establish MPAs and by integrating biodiversity into climate adaptation strategies. However, successful implementation of SOPs requires coherent policy integration across NDCs as well as National Biodiversity Strategies and Action Plans (NBSAPs) under the Convention on Biological Diversity (CBD). In addition, SOPs need to mobilise financial resources and build capacity to address associated challenges.

These actions would ensure successful integration of the ocean across climate, biodiversity and sustainability goals:

- **Embed SOPs in national planning:**
  - Reference SOPs in NDCs and NBSAPs, and vice versa.
  - Align SOP timelines with five-year NDC review cycles.
  - Include SOP targets in national budgets and investment strategies.
- **Ecosystem-based thresholds:**
  - Use best available science to identify thresholds that reflect ecological carrying capacity.
- **Capacity-building:**
  - Train planners and sectoral agencies on ecosystem-based and climate-smart ocean planning.
  - Develop joint data platforms for shared ocean knowledge and scenario planning (see Step 3 for further guidance on data).
- **Policy and legal reform:**
  - Review and update national laws to reduce regulatory fragmentation and empower SOPs as legal frameworks.
- **Finance mobilisation** (see Step 2 for further guidance on financing):
  - Leverage public-private partnerships.
  - Align SOPs with climate finance instruments such as the Green Climate Fund and adaptation funds.

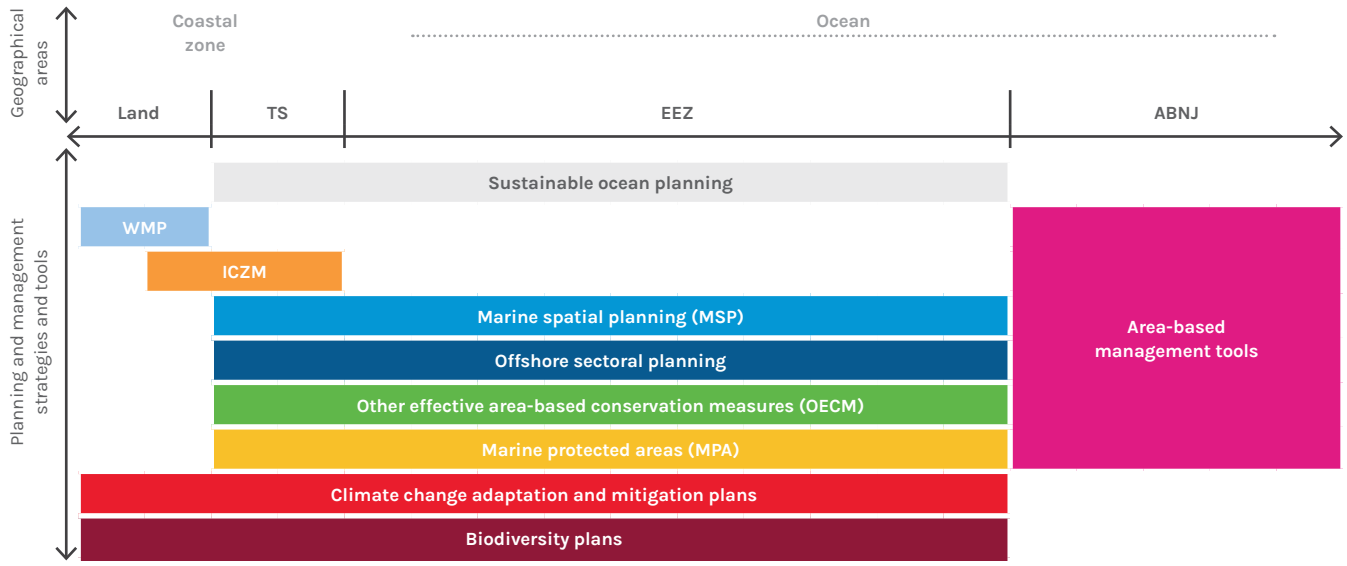
Areas beyond national jurisdiction

As marine ecosystems, resources and human activities often extend beyond national jurisdictions, SOPs play a key role in addressing transboundary challenges. Although SOPs tend to focus on domestic issues, it's important to also consider regional and transboundary ocean challenges. SOPs have the potential to encompass initiatives developed and implemented in ABNJ, such as under the BBNJ Agreement, and to make the following contributions:

- **Ecosystem connectivity.** Marine ecosystems do not follow political boundaries. Therefore, SOPs coordinate transboundary management with area-based management tools to maintain ecological integrity and biodiversity.
- **Harmonisation of policies.** Different countries may have conflicting regulations or priorities. SOPs can provide a framework for aligning countries' area-based management tools and policies across borders, avoiding conflicts and promoting transboundary cooperation.
- **Shared resource management.** Fisheries, shipping routes and offshore energy projects often span multiple nations. SOPs can align with countries' area-based management tools and support an equitable and sustainable management of these shared resources. Examples include the Halibut Treaty, the Treaty on Pacific Coast Albacore Tuna Vessels and Port Privileges, and the Cooperative Vessel Traffic Service between Canada and the United States; the South Tasman Rise Agreement between Australia and New Zealand; and the agreements under the Inter-American Tropical Tuna Commission.

Figure 2 outlines SOPs as a strategy that integrates and balances different policies, plans and treaties related to ocean and coastal planning and management. Further information on the umbrella nature of the SOP is outlined in Box 3.

FIGURE 2. **Different marine policies and plans covered by sustainable ocean planning**



Notes: ABNJ = areas beyond national jurisdiction; EEZ = exclusive economic zone; ICZM = integrated coastal zone management; TS = territorial sea; WMP = watershed management plan. Depending on the country, the geographic boundaries of these plans might be different. In addition, some plans might be divided by different regions of a country, merged with other plans or have a different name. For instance, some WMPs include portions of marine waters; some marine spatial planning processes include the coastal zone and are called coastal and marine spatial plans; some have comprehensive marine spatial plans that include a strategic vision, thus close to the concept of sustainable ocean planning in national waters.

Source: Marinez Scherer and Michele Quesada.

Defining SOP priorities and scope

Defining the scope of an SOP involves identifying the key transformations and policy priorities that reflect a country's long-term environmental, economic and social objectives. It also involves defining the SOP's geographic area and setting up a clear vision and principles for the SOP framework. For a step-by-step breakdown on how to define the scope and develop an SOP, see Box 5.

SOP priorities

The key ocean transformations, such as ocean wealth, health, equity, knowledge and finance (see Box 5), can help guide planning efforts. For instance, a country aiming to protect and restore marine ecosystems may focus on the ocean health transformation, whereas a country concerned with fairness and social inclusion might emphasise ocean equity, which promotes just access to marine resources and benefits for coastal communities. Nevertheless, to qualify as an SOP, all key ocean transformations must be considered and integrated throughout the process.

In addition, tools like MSP, MPAs and ICZM can enhance ocean knowledge by enabling more informed, data-driven decisions. Similarly, efforts to reduce GHG emissions and restore blue carbon ecosystems, such as mangroves and seagrasses, support both ocean finance and ocean health by helping to mitigate climate change and increase carbon storage. Countries may also choose to focus on strengthening food security and supporting the resilience of seafood-based economies, ensuring livelihoods are maintained while preserving ecological balance.

By clearly identifying the transformations that matter most, policymakers, rights holders and stakeholders can work together to design targeted, effective strategies. A well-structured SOP can also help integrate multiple transformations into a single, cohesive framework, aligning diverse ocean priorities to drive meaningful and lasting change.

Setting the scope of the SOP also includes defining the area that should be managed. The SOP is meant to cover 100% of areas under national jurisdiction through policies that might have different geographic scope. A clear definition of the geographic scope and time frame ensures that all relevant marine and coastal areas are included and appropriately

BOX 5. **Developing an SOP**

1. Define the scope: What and where to plan

To get started, consider how the five key Sustainable Ocean Plan (SOP) goals — called *ocean transformations* — are best combined to guide your planning process:

- Ocean health: Protect and restore marine ecosystems.
- Ocean equity: Fair access to marine resources for all, especially coastal communities.
- Ocean wealth: Support jobs and industries like fisheries and tourism.
- Ocean knowledge: Make better decisions using science and data.
- Ocean finance: Finance sustainable ocean use.

Next, delineate which geographic ocean zone the SOP will cover. The plan should aim to include all areas under national jurisdiction, a territorial sea and an exclusive economic zone, though some policies might apply only to certain parts.

2. Turn ideas into action: Key policy areas

After setting the focus, think about how to make progress:

- Use tools and processes like marine spatial planning, marine protected areas and integrated coastal zone management.
- Tackle issues like pollution, climate change and food security.
- Support solutions such as restoring coastal ecosystems and reducing emissions.

3. Create a shared vision

Your plan needs a clear, inspiring vision of what the ocean should look like in the future. This is your "big-picture" goal. Who should help define the vision?

Include the following:

- Government agencies - both local and national.
- Indigenous Peoples and local communities.
- Stakeholders from different sectors (e.g., fishing, tourism, environment).
- Rights holders.
- NGOs, civil society organisations, and scientists

Ask the following questions:

- Why is the ocean important to our country or region?
- What kind of future do we want for our ocean and communities?
- How does this plan connect to our climate goals or economic priorities?

4. Agree on guiding principles

These are the values that will guide your SOP — for example, transparency, inclusivity, sustainability, fairness. The principles should match your vision and reflect the needs of your marine areas.

5. Next steps: Goals and objectives

Once you've defined your scope, vision and principles, you can move on to setting specific goals and actions. These will turn your vision into results (see Step 4, "Goals and objectives," for help).

managed, enabling targeted interventions across diverse ecosystems and human activities. For instance, prioritising the conservation and restoration of coastal habitats improves ecosystem function and aligns with ocean wealth by sustaining fisheries and tourism industries. Addressing marine and land-based pollution, through ICZM, enhances ocean health by preserving water quality and biodiversity. By integrating these transformations and policy themes into a cohesive framework, SOPs can promote a balanced and resilient ocean economy, benefitting both nature and society.

Establishing the vision and principles for SOPs

In the context of SOPs, the vision articulates the desired future state for the ocean, the envisioned relationship(s) people have with the ocean and how people ideally want the ocean to be considered in policies. A clear vision encompasses long-term goals to improve human-ocean coexistence. These goals include preserving marine ecosystems and ensuring sustainable resource use while supporting resilient communities and learning from and respecting existing stewardship and custodianship. The vision provides the foundation for all planning

and decision-making processes, aligning diverse stakeholder interests and ensuring consistency across sectors, institutions and governance levels. Its development must involve top national agencies and institutions, Indigenous Peoples and local communities' representatives or governments and local or sector-specific stakeholders and rights holders, among others, to ensure legitimacy and effective management.

Especially in transnational and/or transboundary management contexts, a regional vision must be adopted to reflect shared priorities and challenges. Stakeholders and rights holders involved in defining a regional vision may include high-level national and international authorities and representatives as well as local, regional and international actors within the area. Representatives relevant to the issues addressed in the transboundary plan (e.g., climate change, fisheries, conservation, pollution, other transnational issues) must be invited to contribute and validate the vision.

The SOP's vision should reflect the importance of harmonising ocean actions across the multiple sectors and policies that a specific government manages or supports. To formulate the SOP vision, consider these questions: Why is ocean and coastal management important in your country or region, and why does it need to be accounted for across an SOP? What does a social-ecological "systems" approach to ocean planning look like? How can ocean planning combine ocean wealth, health and equity? How does the SOP connect to other developing plans and economic transformation agendas?

Vision statement

The vision should be a clear, ambitious and inspiring "picture" of the future. When developing a vision statement, aim for a concise statement reflecting the intended future state of the ocean. Also, consider having more than one statement for different specific objectives, if needed. For example, "By 2030, the marine ecosystems will be healthy, resilient and sustain vibrant communities."

Guiding principles

The guiding principles will inform the development and implementation of the vision. The principles will vary depending on the vision statement defined, which is connected to the geographic scope. See the introduction to this handbook for examples of general principles.

After developing the vision statement and guiding principles, clear and actionable goals and objectives should be established. For more details, see the "Goals and objectives" section. See UNEP (2025) for further guidance on setting the vision and direction for an SOE transition.

Defining a governance structure/framework

Ocean governance refers to the frameworks, policies and practices that regulate the use, conservation and management of marine resources and spaces. It involves multiple institutions, stakeholders and rights holders, including governments, international organisations, Indigenous Peoples, scientists, industries and coastal communities to ensure sustainable and equitable use of ocean resources. This section outlines how to define an effective organisational structure and framework. For information on consolidating this governance architecture, including a list of coordination types and mechanisms, see Step 4, "Delivering the organisational structure and collaborative frameworks."

Establishing an SOP authority is a critical step. At the core of this process is the head of government, who must select and mandate a lead ministry or agency to guide the implementation of the SOP. The institution responsible for leading the development of the SOP can be an existing ministry, an interministerial committee or a new institution or agency (see Table 1). Where relevant, this leadership should recognise Indigenous Peoples' sovereignty and existing governance and stewardship over ocean areas. Exploring opportunities for co-governance is also important here, if not already established, because it increases the likelihood of the SOP being successful (Strand et al. 2024). This leadership ensures that the process aligns with national priorities and sets a clear direction for the country's ocean and coastal management processes. However, it's equally important to incorporate an approach that allows input and engagement from various stakeholders and rights holders, including traditional and local communities, economic sectors, scientists and civil society. This collaborative approach not only strengthens the process but also enhances ownership and support across all sectors (to see more details on coordination types, see Step 4, "Collaborative frameworks").

By placing the overall responsibility with the head of government, countries can demonstrate their commitment and ownership of the SOP. This leadership is crucial for buy-in from all involved

TABLE 1. **Different approaches to establish the lead SOP institution**

COUNTRY	APPROACH	LEAD INSTITUTION
Norway	Existing ministry	Ministry of Climate and Environment
Fiji		Ministry of Environment and Climate Change
Chile	Interministerial/interdepartmental committee	Council of Ministers for the Development of Ocean Policy
United States		National Strategy for a Sustainable Ocean Economy Workgroup of the Ocean Policy Committee
Japan	New authority established within the cabinet secretariat	Headquarters for Ocean Policy

Source: WRI authors.

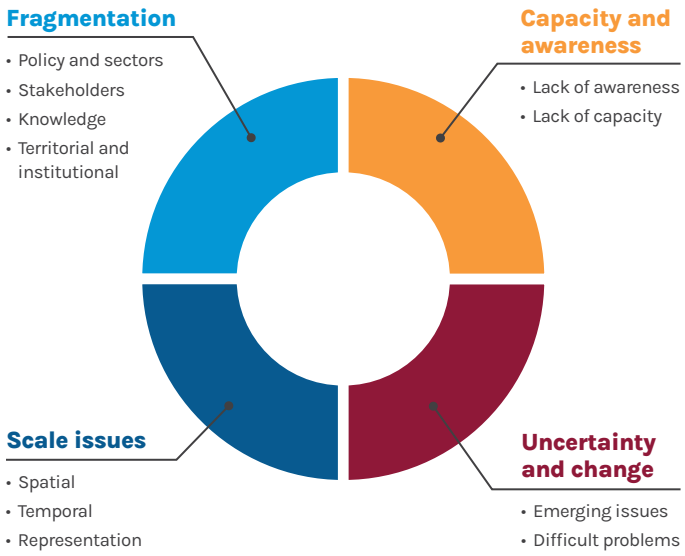
parties, and it signals the government's dedication to sustainable ocean and coastal management. It also plays a vital role in ensuring the allocation of funding and resources because high-level political backing helps identify financial mechanisms, both from national budgets and international sources (for information on funding and resources, see Step 2).

Once the authority for developing the SOP has been established, further steps should focus on fostering collaboration and coordination across all government bodies and sectors, from fisheries to tourism to territory defence or conservation. Effective collaboration ensures that the needs and perspectives of various sectors are considered and integrated into the planning process, creating synergies that strengthen the overall effort.

Establishing a framework for ocean governance is challenging, and it's important to recognise that no single institution can cover all aspects of SOP development. The fragmented nature of knowledge and governance, the challenges of managing multiple temporal and spatial scales and the uncertainties associated with emerging issues such as climate change make it clear that a one-size-fits-all solution is impossible. Furthermore, many decision-makers responsible for managing coastal and marine resources often lack the specialised skills required for effective planning and management. This gap can lead to ineffective policies and practices, highlighting the need for a collaborative, well-coordinated approach. In addition, decision-makers often face challenges related to competing interests, limited resources and conflicting regulations (Figure 3).

Although the head of state must drive the vision and prioritise the SOP work, interministerial and intersectoral bodies can be created to accommodate diverse perspectives, address varying needs and drive the day-to-day planning work (see Box 6).

FIGURE 3. **Key challenges for decision-makers**



Source: Morf et al. 2021.

One effective strategy is to have an interministerial committee or coordinating body that serves as a forum for discussing and integrating policies, programmes and projects related to ocean and coastal management. An institutional assessment could be conducted to identify all institutions and NGOs dealing with ocean and coastal matters (for the list of potential actors, and potential roles and responsibilities, see Step 5, "Assigning roles and responsibilities across sectors"). This body should facilitate coordination among governmental agencies, NGOs, economic sectors and organisations representing local and ITK holder communities. Likewise, stakeholders and rights holders must be included. Indigenous co-governance models (as seen in Canada and Australia at the local planning level) and multisector collaboration contribute

BOX 6. Importance of the lead institution and coordination body

The lead institution, along with the coordination body, is crucial for many reasons:

- **Ensuring long-term commitments** through continuity and consistency in ocean planning and mitigating disruptions due to political or administrative changes.
- **Promoting integration** among all area-based policies under the Sustainable Ocean Plan (SOP) umbrella framework.
- **Coordinating goals** among the different ministries, sectors, authorities and agencies involved.
- **Coordinating stakeholders and rights holders** to adequately recognise that ocean planning involves sectors such as fishing, tourism, energy, conservation and coastal communities. A coordinating body responsible for "objective" facilitation can ensure fair participation and effective conflict resolution.
- **Coordinating capacity-building** because effective management of coastal and marine resources requires a range of specialised skills. A dedicated institution can spearhead capacity-building programmes to address skill gaps among decision-makers.
- **Providing scientific and technical expertise** in marine ecology, socio-economics and governance. Through this expertise, the institution ensures that decisions are based on the best available science and data.
- **Securing resources and funding** so that the lead institution is better positioned to attract national and international funding to support planning, monitoring and enforcement efforts.
- **Representing robust legal authority and enforcement** to implement policies, enforce regulations and ensure compliance with sustainability goals.
- **Integrating policies across sectors** helps to align marine policies with broader objectives such as climate action, biodiversity conservation and economic development, preventing conflicts among various government agencies.
- **Monitoring and adaptation** ensure that the SOP remains a dynamic, ongoing process with continuous monitoring, evaluation and adaptation based on new data and changing conditions.

significantly to more equitable and effective ocean planning. Co-governance agreements "recognise the authority of Indigenous governments and communities for managing ocean areas and aspects such as fisheries and protected areas in collaboration with other levels of government" (Strand et al. 2024, 20). Within this collaborative framework, a lead institution can be assigned to oversee the process.

It's essential to ensure that this coordination body includes representatives from the authorities, forums and/or coordination bodies leading with area-based policies already in place, such as ICZM, MSP, MPAs, climate mitigation and adaptation plans, and fisheries management plans, among others.

One of the main challenges for a coordinating body is to ensure that the various entities represented are not only aware of but also committed to a shared vision, common goals and clear objectives. This alignment is crucial because the actions, policies and regulatory decisions of each entity will directly influence the sustainable management, development and conservation of coastal and ocean areas.

Achieving this alignment requires continuous dialogue, capacity-building efforts and mechanisms for effective communication and collaboration.

Differences in mandates, priorities and institutional cultures can create barriers to integration, so a culture of cooperation and mutual understanding must be fostered.

Additionally, a well-structured coordination process should include regular assessments, progress tracking and adaptive management strategies to ensure that evolving challenges and opportunities are addressed collectively. By strengthening interinstitutional cooperation, the coordinating body can enhance policy coherence, minimise conflicts and maximise the effectiveness of sustainable ocean governance at national, regional and transboundary levels.

When dealing with transboundary, transnational or regional initiatives, institutional assessments must consider the existing international organisations with mandates in the area. It's essential to map out these organisations and understand their roles, competencies and legal frameworks to ensure alignment and avoid overlap or conflict.

A concerted effort must be made to identify the key regional issues that need to be addressed, which will depend on the area's specific challenges and priorities. These may include shared resource

management, biodiversity conservation, climate change adaptation, economic activities and governance structures.

Sectoral bodies, such as those related to fisheries, MPAs, pollution control and maritime transport, should be invited to participate in an intergovernmental and intersectoral committee or commission. This ensures a more integrated and coordinated approach, allowing for better communication, cooperation and joint decision-making among different sectors and countries.

By combining strong leadership with inclusive intersectoral collaboration and a designated lead institution, countries can create a robust, adaptive and resilient framework for an SOP (see Box 7).

Stakeholder mapping, engagement and collaboration mechanisms

As a cornerstone for an SOE, the SOP must be developed and implemented through an inclusive, participatory, transparent and accountable process. This process must be part of all local, national and even international strategies, policies and agreements aimed at the sustainable planning and management of marine and coastal ecosystems within the SOP framework. In addition, the SOP strategy should ensure that the different instruments and policies (e.g., MSP, MPAs, ICZM, OECMs) under the ocean sustainability framework are participatory, transparent and inclusive.

The stakeholder and rights holder engagement process generally lacks coherence when defining *engagement*, describing its role in sustainable ocean management and governance, and identifying who has a legitimate stake in SOP development. Commenting on community, stakeholder and rights holder engagement in general, Lavery (2018) argues that much variability exists in the working language for stakeholder engagement, and concepts such as *engagement, involvement, integration, sensitisation, mobilisation, empowerment* and *trust-building* are often conflated and used interchangeably, even though the goals and outcomes they imply differ substantially (Figure 4).

In many contexts, stakeholder and rights holder engagement processes may merely be tick-box exercises where "participation" of stakeholders and rights holders is merely tokenistic (Sowman and Malan 2018). In this handbook, however, stakeholder engagement denotes a sincere attempt at a truly

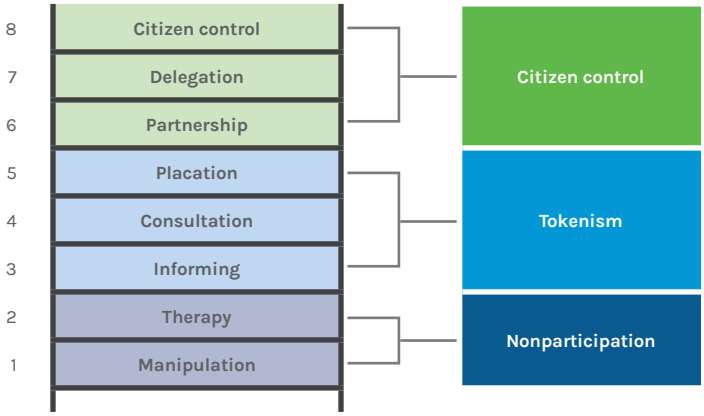
BOX 7. Defining a governance framework/ structure

The following are a few key aspects to define a clear governance framework:

- **High-level political leadership** that recognizes Indigenous Peoples' sovereignty and existing governance systems, led and coordinated by a lead ministry or agency.
- **Involvement of all relevant institutions, stakeholders and rights holders**, including local communities, economic sectors, civil society and scientists, managed by an interministerial and intersectoral coordination body. Where transboundary or regional initiatives occur, institutional mapping must include international and regional organisations, including relevant sectoral bodies, to ensure clarity of roles and coordination and to avoid overlap.
- **Alignment with existing policy frameworks**, such as integrated coastal zone management, marine spatial planning, marine protected areas, climate adaptation plans and fisheries management.
- **Regular monitoring and evaluation** built into the process to ensure progress monitoring and adaptive management.

For examples and a step-by-step guide for consolidating the organisational structure and framework, see Step 4, "Delivering the organisational structure and collaborative frameworks."

FIGURE 4. Arnstein's Ladder of Citizen Participation



Arnstein's Ladder (1969)
Degrees of citizen participation

Source: WRI authors' adaptation of Sherry R. Arnstein's "A Ladder of Citizen Participation," Journal of the American Planning Association, Vol. 35, No. 4, July 1969, pp. 216-224.

collaborative process in which stakeholders, rights holders and facilitators share knowledge in a transparent, reflexive, respectful and reciprocal process (Rivers et al. 2023; and as seen visually in Figure 4). Practitioners can follow various approaches to stakeholder and rights holder engagement, all of which need to be adapted to context and built on existing partnerships.

Stakeholder and rights holder mapping, in particular, can be outlined as a process that takes the following steps:

1. Identifies actors, groups or organisations that will either affect or be affected by the SOP.
2. Analyses the different rights holders and stakeholders, elaborating on their potential influence over, and interest in, various dimensions of ocean planning.
3. Assesses stakeholder and rights holder groups, institutions and actors according to their existing networks.
4. Co-develops a stakeholder engagement plan.
5. Iterates based on feedback.

Each of these five phases is detailed below and summarised in Box 8.

Identifying stakeholders and rights holders

Identify relevant stakeholders and rights holders, with attention to inclusivity. Prioritising inclusivity fosters collaboration, captures a variety of priorities and secures wider support for the SOP. Include representatives across national, regional and local levels from diverse sectors, such as government, private industries, academia and civil society. Part of this work involves developing an iterative database and overview of various stakeholders and rights holders, communities, actors, sectors and organisations. This should include governmental departments, community-based organisations, fishers and Indigenous Peoples. Ensure that "invisible" and underrepresented groups have a voice in the process. For SOPs, the involvement of international agencies (e.g., International Maritime Organization) and regional agreements (e.g., regional seas conventions or fisheries commissions) might be of particular relevance.

Analysing stakeholders and rights holders

Analyse stakeholder and rights holder groups according to characteristics that influence their engagement and involvement, using tools such as the power/influence-interest matrix (Table 2) (Olander and Landin 2005; Reed et al. 2009). This tool

BOX 8. **Stakeholder and rights holder engagement in SOP development**

A sustainable ocean economy requires an inclusive, transparent and accountable Sustainable Ocean Plan (SOP) development process. Stakeholder and rights holder engagement should be a truly collaborative effort, where knowledge is shared transparently, respectfully and reciprocally.

These are the key steps in stakeholder and rights holder engagement:

- **Identify stakeholders and rights holders.** Map relevant actors across sectors (government, private industry, academia, civil society) while ensuring diverse and underrepresented voices are included.
- **Analyse stakeholders and rights holders.** Use tools like the power/influence-interest matrix to assess influence, interest and engagement needs.
- **Assess networks.** Apply social network analysis to understand existing relationships and improve collaboration.
- **Co-develop engagement plans.** Work with stakeholders and rights holders to define participation strategies, adapting them based on feedback.
- **Use practical engagement approaches.** Use public consultations, online platforms, participatory mapping, workshops and social media to ensure transparent and meaningful collaboration.

Storytelling by communities that have seen the impact of SOPs showcases Indigenous and local knowledge of how ocean spaces were safeguarded in the past and should be included in this process. By prioritising inclusivity and adapting to context, stakeholder and rights holder engagement fosters stronger partnerships and broader support for the SOP.

TABLE 2. **Power/influence-interest example for stakeholder and rights holder mapping**

		POWER/INFLUENCE	
		High	**Low**
INTEREST	**High**	These stakeholders and rights holders are both influential and highly invested in sustainable ocean planning and management. They significantly impact the success of the Sustainable Ocean Plan (SOP) development process. Examples include government agencies and coastal managers involved in marine spatial planning.	These stakeholders and rights holders are highly interested but lack significant influence. They require priority engagement to ensure ethical and inclusive planning. This group often consists of informal or marginalised communities, such as coastal residents, informal fishing cooperatives, women and youth.
	Low	These stakeholders and rights holders wield considerable influence but may not be highly interested or directly affected. Engaging them and demonstrating the value of SOP integration is crucial. Examples include international partners and funders.	These stakeholders and rights holders have minimal influence and interest in sustainable ocean planning and management, with indirect impact. Although they require less engagement, periodic updates are recommended because stakeholder and rights holder roles and interests can shift over time.

Source: WRI authors.

classifies stakeholders and rights holders, actors and organisations based on their level of interest in and power over the SOP.

Interest refers to the level of concern, involvement or engagement that an actor has in a particular issue, decision, or outcome. It considers how a stakeholder and rights holder may be affected by a specific issue, project or guideline in terms of their livelihoods, economic opportunities, socio-cultural and recreational connections, identities, heritage and daily lives.

Power can be understood along several different dimensions, such as political, legislative, executive, enforcement and moral:

- Political relevance is determined by an institution's role in addressing policy issues.
- Legislative authority encompasses an actor's capacity to formulate, amend and revoke laws that govern society.
- Executive power is "the capacity and mandate to make decisions (e.g., the distribution of executive power between levels)" (Celliers et al. 2015).
- Enforcement power is the ability to ensure compliance with decisions or regulations (Celliers et al. 2023).
- Moral influence and power involve an actor's ability to present compelling arguments that may sway others.

Assessing existing social networks

Using approaches such as social network analysis, this process identifies existing connections and communication between stakeholder and rights holder groups and actors (see Box 9). Social network analysis is particularly helpful in understanding how institutions, organisations, communities and stakeholders and rights holders are connected and currently interact; this enables practitioners to better comprehend and plan future collaborations and engagements (Prell et al. 2009; Serrat 2017) and build partnerships with existing core stakeholder and rights holder groups.

Assessing existing relationships and networks is also valuable for potential conflict resolution mechanisms and processes, which are often crucial for successful engagements and collaboration across various knowledge systems, sectors, priorities and lived experiences. Some useful approaches — such as building common purpose (Emerson et al. 2017) and finding common ground (Eames 2005) — have become more mainstreamed through consensus-building, mediation and facilitation processes (Emerson et al. 2017). In addition to assessing and identifying existing disagreements and conflicts related to specific sectors, authorities and stakeholder and rights holder groups, attention must be paid to historical animosity and conflicts that continue to impact relationships and opportunities for collaboration. Participatory approaches to collaborative learning and co-production processes

can be helpful at this stage because they prioritise time to build trust and relationality and find commonalities beyond existing disagreements (Keen and Mahanty 2005; Strand 2023). Conflict resolution is further considered in Steps 3 and 5.

Co-developing engagement plans through an iterative process

Practitioners should partner and collaborate with various stakeholder and rights holder groups to co-develop engagement plans that outline how, when and where to best engage and collaborate with people in meaningful ways. For example, their social network analysis should be ground truthed with potential partners, and people should have a say in how and when they will be engaged (i.e., through in-person or online engagements). In the case of Algoa Bay in South Africa, for example, a thorough stakeholder engagement process was conducted and recommendations for how to better recognise Indigenous and local knowledge systems and priorities were co-developed (Rivers et al. 2023). The engagement process found that many people would like to be engaged through their local ward councillors, whom they trust and who regularly engage with them on various issues. These engagement plans need to be continuously adapted and updated based on feedback from stakeholder and rights holder groups and actors; people may change their preferences, and stakeholders and rights holders will change over time.

This iterative approach will refine stakeholder and rights holder engagement. For example, time and resources should be prioritised to pursue stakeholder- and rights holder–led categorisation when possible (Reed et al. 2009). This iterative aspect ensures that stakeholder and rights holder mapping remains relevant and aligns with the wide community aspirations and environmental needs. To streamline this process, people can either access an online document or verify their categorisation and information at an in-person event.

Practical approaches for transparent stakeholder and rights holder engagement

Practitioners should employ diverse engagement tools to help gather insights and encourage collaboration. Integrating these strategies into stakeholder and rights holder engagement ensures that the shared vision reflects the diverse values and goals of all involved groups, fostering inclusivity, transparency and effective decision-making. Table 3 outlines some of these approaches.

For additional material, including templates for stakeholder and rights holder mapping and templates for consultation records, see Appendixes D and E, respectively.

BOX 9. **Social network analysis**

Social network analysis is a method of exploring existing and possible relationships between institutions and stakeholder and rights holder groups. The methodology also looks at formal and informal knowledge networks, which are important to understand what kind of knowledge should inform the Sustainable Ocean Plan (SOP). Social network analysis acknowledges that different institutions are tied to one another through "socially meaningful relations" and therefore emphasises the need to identify and analyse these ties and relations for a comprehensive, interlinked and contextual map of institutional stakeholders and rights holders.[a] Social network analysis assumes that institutional relationships are important and that mapping both formal and informal relationships is necessary to understand knowledge flows and the role of different stakeholders and rights holders.[b]

Social network analysis also analyses hierarchical links. It can help identify important actors and networks that should be prioritised, which is particularly valuable for "disseminating" information to a large number of stakeholders and rights holders (sometimes called *high degree centrality*) and "bridging" distinct stakeholder and rights holder groups (sometimes called *high betweenness centrality*),[c] which will streamline and make the engagement process more efficient and inclusive. There are various open-source tools available to assist with social network analysis, such as Gephi, SocNetV and Cytoscape.

Sources: a. Prell et al. 2009; Serrat 2017; b. Serrat 2017; c. Prell et al. 2009; Serrat 2017.

TABLE 3. **Approaches for transparent stakeholder and rights holder engagement**

APPROACH	DESCRIPTION
Public consultation	Provides opportunities for stakeholders and rights holders to voice their opinions, share concerns and contribute to decision-making processes. It ensures accessibility and transparency in these consultations and fosters trust and inclusivity.
Online platforms for continuous feedback	Digital tools enable ongoing engagement, allowing stakeholders and rights holders to provide input beyond scheduled meetings. Online forums, surveys and collaborative platforms can help maintain transparency and accessibility.
Documentation of community inputs	Recording and systematically analysing community feedback ensures that contributions are acknowledged and integrated into decision-making processes. This documentation promotes accountability and helps track engagement progress over time.
Workshops and focus groups	Facilitate in-depth discussions on key goals and concerns. Interactive spaces should encourage open dialogue among stakeholders and rights holders, allowing participants to share perspectives, address challenges and collaboratively shape the vision for sustainable ocean planning. In-person events should be held at the beginning and final validation of the vision-setting process, fostering connections among a broad range of stakeholders and rights holders.
Interviews and participatory mapping	Gain detailed insights into stakeholder and rights holder priorities and spatial perspectives. Empowering marginalised and underrepresented communities in coastal and ocean planning and management is essential for ensuring an inclusive and equitable process, particularly in its early stages. Mapping coastal and ocean uses and activities that are unmapped or underrepresented ensures that they are better recognised and acknowledged in ocean governance. Participatory mapping involves a process for people to map, identify and preserve natural system relationships and processes. Participatory mapping can be defined as a practice that "strives to make visible the relationship between a place and local communities through the use of cartography"[a] and involves deliberating, documenting and communicating unique perspectives on land and sea use. It highlights the relationships between communities and their environments. This is particularly crucial when working with vulnerable and marginalised groups, such as women and Indigenous communities. The goal is to provide a detailed understanding of how ocean areas are used and valued, the associated economic and cultural activities and the conservation needs and challenges they present. As ocean mapping has a long-standing colonial and imperial history, the aim is also to rebalance the power of "worldmaking" and ensure that coastal communities take an active role in defining and delineating ocean spaces and areas.[b] Additionally, participatory mapping facilitates communication and knowledge-sharing regarding coastal and marine issues while gathering essential spatial data[c].
Surveys, webinars and social media	Expanding engagement through surveys, webinars and social media helps reach stakeholders and rights holders who may be unable to attend in-person meetings due to geographic, financial or time constraints. These tools promote knowledge-sharing, discussions and broader representation in decision-making processes.
Facilitation	Engage professional facilitators to lead workshops and stakeholder and rights holder meetings. Skilled facilitators guide discussions, promote collaboration and mediate conflicts, ensuring a productive and balanced engagement process.

Sources: a. Cochrane and Corbett 2018; b. Strand 2023; c. Burnett 2023.

Step 2:

Financial planning and resource mobilisation

KEY TAKEAWAYS:

- To effectively mobilise financial resources, the SOP needs to reflect the existing funding landscape and clearly show the opportunities and economic consequences of transitioning to the SOE.
- Effective policy, regulation and governance, involving the subnational and municipal level, are key to creating an inclusive, supportive enabling environment for effective finance flows in the SOE.
- Public expenditures play an important role in this transition, so SOPs must be linked to fiscal measures.
- Traditional public and private finance methods need to be critically reviewed to identify roadblocks and support their potential to help implement SOPs.
- A focus of new ocean finance is regenerative investment to restore, protect and manage ocean assets to build up blue natural capital and resilience.
- Frameworks and principles embedded in SOPs can help redirect finance flows to strengthen ocean sectors.
- The Sustainable Blue Economy Finance Principles of the UNEP Finance Initiative (UNEP FI) and the nature-positive concept provide relevant guidance for SOPs.
- Integrating sustainable ocean priorities, including SOE sectors, into sustainable finance taxonomies and agreeing on transparent metrics and indicators are all part of a financially effective SOP design.
- Early-stage finance and support through incubators, accelerators and impact funds can play an important role in fostering SOE innovation and development; those pathways should be fully integrated into SOPs.
- SOPs should also support a systemic approach, using the holistic concept of blue infrastructure finance to support coastal and seascape regeneration, adaptation and resilience.
- By building large blue capital markets, liquid finance flows into the SOE can be facilitated by engaging with large-scale financial actors, asset owners and regulators, including central banks and finance ministries; SOP design can play an important role in building up both domestic markets and linkages to global capital markets.
- Equally critical is SOP engagement at local, community and micro-finance levels; this enables those most in need to access finance and play a full role as essential SOE actors.

Financial planning and resource mobilisation are integral parts of SOPs. For this step to be effective, adequate and accessible resources must be provided to SOP designers and implementers. The economic and financial reasoning of the specific SOP must be consistent and clear throughout in order to build a thriving national SOE that engages all stakeholders and rights holders.

The ocean has enormous value — estimated in 2015 to be $24 trillion globally — contributing economic benefits of up to $2.5 trillion annually (Hoegh-Guldberg et al. 2015). International trade of ocean products and services alone accounted for some $2.2 trillion in 2023 and generated employment for millions of people (UNCTAD 2025c). Financial flows into three marine sectors in the Southwest Indian Ocean alone were estimated to be $20 billion in terms of credit between 2017 and 2023 and over $7 billion in terms of investments as of 2023 (WWF 2024).

However, unsustainable development — termed the "Blue Acceleration" by Jouffray et al. (2020) — is contributing to a climate and biodiversity crisis in the ocean, which poses significant risks not only to society (particularly those living in coastal communities) but also to businesses. One study indicated that under a business-as-usual scenario (Representative Concentration Pathway [RCP] 8.5) the aggregated value at risk across six global ocean economy sectors was up to $8.4 trillion in assets and revenues from 2020 to 2035 (Kennedy et al. 2021). If immediate action is taken to align with the Paris Agreement (RCP 4.5 scenario) and SDG targets, these losses could be reduced by over $5.1 trillion. Mangrove restoration alone has been estimated to save roughly $65 billion per year in terms of storm and flood damage (Pérez-Cirera et al. 2021).

SOP finance can provide the funds necessary to develop a sustainable economy that protects and benefits the planet and meets the needs of all people (Rockström et al. 2009). To achieve this, we need to build inclusive, ecologically regenerative economies that allow degraded marine ecosystems to recover and equitably distribute their benefits (see Box 10).

By designing the SOP in a way that effectively delivers ocean finance to the SOE, governments can help to facilitate this transition and solve these financing issues.

- **Too much finance currently supports unsustainable development pathways.** This is further exacerbated by market distortions due to significant levels of harmful subsidies. Given the size of current real ocean economy sectors and markets, big gains will occur when mainstream finance is redirected towards sustainable development pathways. This must be integral to the successful delivery of SOPs. Governments need to ensure that financial regulation and market policies, incentives and practices align with the goals and objectives of the SOE and SOPs.
- **Insufficient finance is directed towards regeneration, including restoration, protection and sustainable management of ocean ecosystems**, which are the bedrock of a sustainable ocean economy. In the last decade, a total of $13 billion was invested in the SOE through philanthropy and overseas development assistance (Lewis et al. 2023). To ensure that the ocean's natural assets are restored, protected and sustainably managed, dedicated finance for biodiversity conservation and nature-based solutions will be required (see Box 11). This should be seen as a long-term investment of patient capital to sustain the natural capital and resource base of the national economy, avoiding the substantive social and economic costs associated with climate change impacts and biodiversity loss.

BOX 10. Sustainable ocean/blue economy definitions

The World Wide Fund for Nature (WWF) defines a sustainable blue economy as having these characteristics:

- Provides social and economic benefits for current and future generations.
- Restores, protects and maintains diverse, productive and resilient marine ecosystems.
- Based on clean technologies, renewable energy and circular material flows.

The High Level Panel for a Sustainable Ocean Economy (Ocean Panel) defines a sustainable ocean economy as the "development of the ocean economy in a way that balances the needs of people, planet and prosperity." It is development that ensures the "long-term, sustainable use of ocean resources in ways that preserve the health and resilience of marine ecosystems and improve livelihoods and jobs, balancing protection and production."[a]

Source: a. Winther et al. 2020.

BOX 11. **Funding gap in nature-based solutions**

According to the United Nations Environment Programme's 2023 *State of Finance for Nature* report, only US$200 billion is currently targeted at nature-based solutions. "Every day, finance ministers, [chief executive officers], investors, and development bankers, direct trillions of dollars. It's time to shift those dollars from the energy and infrastructure of the past, towards a cleaner more resilient future." —Simon Stiell, UN Climate Chief

- **US$7 trillion: Annual financial flows with direct negative impacts on nature**
- **US$200 billion: Annual funding for nature-based solutions**

Source: UNEP 2023.

At the Fifth United Nations Oceans Forum, held in March 2025, the chair recommended a Blue Deal approach to finance and regulation that would better balance the economic, environmental and cultural and social needs for the ocean. This approach would align with similar arguments for regulation and financial sector reform in the broader "green" or climate-aligned development space, which requires an integrated approach (UNCTAD 2025a, 2025b).

The emerging nature-positive concept focuses on measurable net-positive biodiversity outcomes by improving the abundance, diversity, integrity and resilience of species, ecosystems and natural processes. The nature-positive goal is designed to drive society to deliver a measurable absolute improvement in the state of nature against a defined baseline, which will in turn improve nature's ability to contribute to human well-being.

Budgeting and funding mechanisms for SOP implementation

For an SOP to effectively support its identified policy goals, it must include reliable funding mechanisms for its implementation. These mechanisms should be considered during the early phase of sustainable ocean planning. This section outlines useful funding mechanisms for SOP implementation, including through public budgets.

Creating an inclusive and supportive enabling environment for finance through policy, regulation and governance

Alongside encouraging and facilitating the creation of robust ocean/blue finance, governments play a significant role in creating a supportive enabling environment. Their support and endorsement can help reduce the risk profile of investment into the SOE and attract sustainable finance. Ocean finance, however, faces particular barriers. In addition to data and capacity challenges, governance challenges include tenure questions, regulatory gaps and inconsistencies, lack of transparency and an inability to monitor, control and survey huge tracts of the ocean. To turn ocean sustainability challenges into opportunities and support the transition to an ocean economy that is sustainable and inclusive, governments need to strengthen key aspects of the enabling environment:

- **Protect natural assets as the foundation of an SOE.** The SOP should be considered a national priority. Strong natural resource management plans and the use of tools that build the resilience and integrity of the ocean, such as MPAs and nature-based solutions are crucial. Ecosystem-based marine spatial plans should be considered a critical part of strengthening and securing, and can reduce conflicts and address cumulative impacts.
- **Formulate a strong vision to guide SOP development.** The vision should be based on the principles for a sustainable ocean economy and articulate what the SOP can and should deliver in terms of social and economic resilience and prosperity (for more information, see Step 1). The Sustainable Blue Economy Finance Principles offer an overarching global framework for the delivery of an SOE; therefore, they're relevant to all ocean users that are financing, being financed or regulating the ocean economy. Although targeted at the finance sector, the principles were endorsed by the Portuguese government (an Ocean Panel member) during the Second UN Ocean Conference in Lisbon, for instance.
- **Strengthen governance to de-risk the enabling environment.** One of the most important aspects is ensuring there is effective consultation with stakeholders and rights holders. Likewise, strong, integrated governance across ministries, especially finance and sectoral ministries, is essential for a joined-up approach, ensuring that future development plans align with biodiversity,

climate change and social commitments as well as SOP objectives and other sectors. A lack of multisectoral, multistakeholder and rights holder planning presents a high-risk environment to financiers and governments alike. Therefore, all ministries should coordinate their efforts to ensure that the SOP goals and objectives of environmental, social and economic resilience are front and centre for all development decisions.

- **Use fiscal incentives and disincentives through taxes, levies and regulations.** They can create a more level playing field for those aligning with the SOPs. Within an expanding marketplace, the lack of a level playing field creates challenges for environmental, social and governance front-runners in the finance sector. To enable the SOE transition, incentives and disincentives should be regulated and strategically applied to encourage finance sector actors to apply strong environmental guardrails, guidelines and safeguards and to embolden sustainability entrepreneurs. Significant opportunities exist for designing and implementing fiscal instruments that support the development of a sustainable ocean economy and discourage unsustainable business-as-usual approaches.
- **Improve data and transparency.** The ocean has significant data and transparency challenges, particularly in the Global South, due to accessibility issues and complex supply chains. This represents a particular risk to the finance sector, which is data driven and strongly prefers to follow precedents. Ocean-specific data are also typically aggregated with terrestrial data in national accounts, making it difficult to derive insights into the marine environment and ocean-based sectors. Therefore, better data must be made available to further de-risk the enabling environment. Governments can improve data and data accessibility by disaggregating marine data within national accounts (e.g., through ocean economy satellite accounts; for further details, see Step 3, “Impact mitigation strategy”); building national, regional and global data infrastructure; investing in targeted research; and creating new tools and platforms that make the data accessible to the finance sector and other users, thus supporting sound decision-making in future SOE developments. Increasing transparency and traceability and encouraging new non-competitive data streams to be collected at source and shared with resource managers by real ocean economy sectors would also enable a more adaptive, real-time management approach and respond to the data needs of finance sector and resource managers. In addition, governments should encourage and seek finance for new technologies that support rapid and real-time data collection.
- **Create innovative finance instruments to implement SOPs.** These new instruments should be more accessible to micro, small and medium enterprises (MSMEs) and coastal communities in developing countries, particularly those involving women and marginalised populations. This might include deploying blended finance, debt conversion, blue bonds and other new finance mechanisms. Blended finance opportunities can provide up-front finance to take on risk. Likewise, multilateral development banks can make investments in the sustainable ocean economy more attractive to the private sector through financial instruments and guarantees, risk management instruments and technical assistance. Official development assistance (ODA) also provides a catalytic opportunity to improve the commercial viability of investments in sustainable activities and businesses, helping to create new sustainable products and markets, including through new investment vehicles and instruments.
- **Build the capacity of stakeholders and rights holders and encourage the development of a pipeline of MSME projects** (see Step 2 "Communities and micro-finance").
- **Facilitate public-private partnerships as a mechanism for ocean activities when positive revenue flows and future profits are expected.** Such partnerships should be encouraged even if the immediate business case may need the support of a public or non-profit institution’s provision of capital at concessional rates or even a grant. This is typically provided through a publicly owned development bank or through a special vehicle created with a government ministry or department, public banks, private banks and the private investor or investors. Alternatively, if the public partner does not provide or guarantee capital, it could de-risk the demand; for example, when governments provide the private partner assurances of a steady revenue stream by guaranteeing a minimum level of purchases of the partnership’s goods or services (e.g., wind-generated electricity guaranteed to be purchased by a coastal municipality, waste-management collection, low-carbon coastal shipping services). It’s obvious why there are such high hopes for these investment vehicles; after all, there are massive needs for long-term capital investment, domestic resources are usually rather strained, and

trillions of dollars are seemingly available in private international capital markets. Complex projects, such as Rotterdam's port expansion — particularly the Maasvlakte 2 project — can be successfully structured as a public-private partnership. This expansion project aimed to increase the port's capacity for container and chemical traffic, and involved significant land reclamation and infrastructure development.

However, as noted at the start of this section, harnessing private capital to finance mixed public-private activities has proven more difficult than many envisaged. Despite several decades of effort, private finance has remained difficult to tap, and the amount harnessed through public-private partnerships is much less than anticipated. Private investors may have good business reasons for not investing in some areas, and the burden to attract them may cost more than the benefits provided. Although some partnerships may succeed in meeting the agreed goal (e.g., construction and/or operation of a service by a certain date), it's worth noting that as a general feature — not restricted to the ocean scenario — they can be difficult to design and operate in ways that are equitable for both sides of the partnership. In the water sector, where such partnerships were introduced decades ago, several governments have been cancelling contracts or pulling out early, despite the penalties, because they found the contingent liabilities and other costs much greater than expected. Many advanced economies that had been early adopters of public-private partnerships (or what were sometimes called private finance initiatives) no longer use them. In several cases, the cost of capital raised through public-private partnerships proved to be more expensive than if the governments had simply borrowed the funds and implemented the projects themselves through the public sector. In other cases, the process of designing and awarding tenders proved fraught with difficulties, and it's not uncommon for contracts to be renegotiated several times — even after tenders have been awarded. To the extent that public-private partnerships are a potential source for SOE financing, public development banks at global, national and regional levels are the most likely partners (see "Leveraging public and private financing sources"). They take on the heavy lifting for public-private partnerships and are an essential part of any solution for financing sustainable oceans.

- **Use insurance products to create risk transfer opportunities and attract further SOE financing.** It's important to ensure that the enabling environment, including regulatory environment, supports the use of strategic insurance products such as parametric insurance. These insurance products allow for risk transfer and therefore enable swift restoration actions post-event. For example, the wind speed–triggered parametric insurance introduced for a 100-kilometre stretch in Quintana Roo, Mexico, resulted in the swift payout of $800,000 for coral reef restoration after Hurricane Delta in 2020 (TNC 2024). It's also important to build the resilience of natural assets and reach a level of preparedness before such an event to further attract viable insurance opportunities and enable the natural assets recover.
- **Encourage collaboration.** Collaboration between investors, funders, industry, the public sector and other stakeholders and rights holders empowers them to exchange knowledge and data and jointly address ocean-based challenges.

Integration into the national budget and other fiscal measures

Public expenditures offer crucial funding to implement SOPs. Yet before this financing can be allocated in a national budget, legal policy frameworks must be in place to integrate ocean planning instruments and budgetary allocations. This can be achieved by directly linking national budget lines to the outcomes and outputs outlined in a country's national ocean plans or by ensuring that SOPs closely align with sectoral or cross-sectoral instruments (e.g., national development plans) that traditionally guide the allocation of domestic resources (OECD 2023).

Having a clear accounting of public expenditures for sustainable ocean initiatives is key. Since ocean-related responsibilities (and budgets) are spread across multiple ministries/public entities, measuring the precise amount of public funding for SOPs is complicated (OECD 2025c). This information gap can make it difficult for governments to identify gaps/redundancies in funding, and it hinders efforts to monitor and evaluate the effectiveness of public expenditures. Through efforts such as public expenditure reviews and budget-tagging exercises, national governments can address this foundational barrier and effectively channel public funding to SOP implementation.

In addition to regulatory and information-based instruments, national governments have multiple economic tools at their disposal to fund and incentivise the sustainable use of ocean resources (Table 4). Some of these instruments (e.g., taxes, fees) can prompt private actors to internalise the social costs of their activities and encourage a shift towards a more sustainable ocean economy, but they can also be a source of revenue for governments.

Subnational finance mechanisms

Subnational governments and municipalities are important players in funding ocean economy policy. The Organisation for Economic Co-operation and Development (OECD) shows that local and regional governments tend to invest in three main areas when it comes to the ocean economy: boosting businesses, jobs and innovation; infrastructure (e.g., ports, coastal defence infrastructure); and environmental protection (OECD 2024). Coastal cities, in particular, are economic powerhouses — with the world's 1,000 largest cities contributing 60 percent of global gross domestic product (GDP) — but they face specific challenges from issues such as sea level rise and will need to finance managed retreat (Ocean & Climate Platform 2025).

Many of the economic instruments available to local and regional governments mirror those of national governments. Taxes and subsidies enable subnational governments to "tip the playing field" in favour of more sustainable practices or sectors, and instruments like payments for ecosystem services compensate ecosystem managers (e.g., landowners, local communities) for the additional cost of protecting ecosystems such as wetlands and the services that they provide. More specifically, in the case of waste management, which typically falls within the purview of local authorities, extended producer responsibility schemes make waste producers financially or organisationally responsible for taking back used goods and waste for adequate sorting and treatment. This incentivises eco-design and shifts the responsibility of pollution control upstream, towards producers and away from subnational authorities.

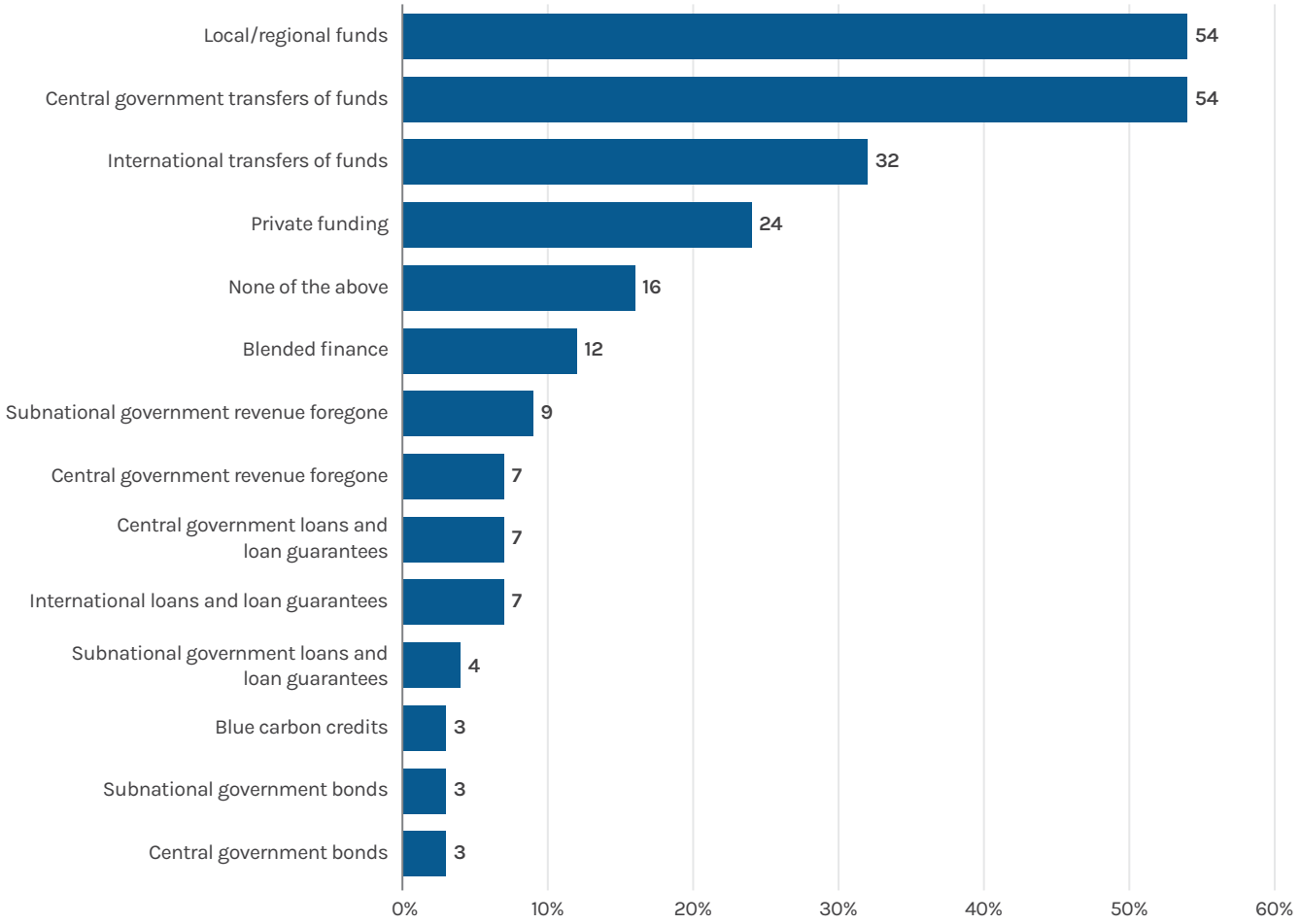
Subnational governments can fund the implementation of ocean economy policy in a myriad of ways (see Figure 5). Subnational funds and transfers from central governments represent the largest sources of funding for ocean economy policy at the subnational level, according to the OECD's Global Survey on Localising the Blue Economy (OECD 2024). International transfers from supranational

TABLE 4. **Economic instruments relevant to SOPs**

INSTRUMENT	DESCRIPTION	EXAMPLE
Taxes	Based on the polluter-pays principle, taxes can be used to place an additional cost on the use of ocean resources and/or emissions of a pollutant at sea.	Taxes on dumping waste and other pollutants at sea.
Fees and charges	A required payment to a general government whereby the payer receives something more or less proportionate to the magnitude of the fee/charge.	Fishing licence fee or entry fee to a marine protected area.
Tradeable permit schemes	A system whereby rights to harvest or access certain resources are distributed among users and can be traded. If permits are auctioned, these schemes can generate revenue for the government.	Tradeable quotas for fisheries.
Subsidies	Government transfers that can incentivise activities in line with Sustainable Ocean Plans (SOPs). Removal of harmful subsidies can redirect funding for activities at odds with SOPs.	Positive: Subsidies that incentivise the uptake of energy-efficient technology in coastal tourism. Harmful: Subsidies that incentivise overfishing.
Payments for ecosystem services	Based on the beneficiary-pays principle, these are voluntary transactions between service users and providers that are conditional on specified rules/resource management criteria.	Payments for the restoration of mangroves.
Biodiversity offsets	Mechanisms whereby the unavoidable effects of development are offset through payments to restoration elsewhere.	Can be used to compensate for the development of infrastructure related to ports, tourism, etc.

Source: Adapted from OECD (2020b).

FIGURE 5. **Funding mechanisms for the blue (ocean) economy for subnational governments**



Note: Based on 68 responses from cities, regions, basin organisations and small island developing states to the question: "2.5.2. Through which mechanisms does your city/region government receive funds to finance activities towards the implementation of a resilient, inclusive, sustainable and circular blue economy?". Survey respondents were invited to select one of the following options: "yes" or "no".

Source: OECD 2024.

governments, international and non-governmental organisations are also a significant source of funding for ocean economy priorities at the subnational level. In many cases, national governments receive these funds before allocating them to subnational ones. The European Union is a major funder of ocean economy projects at the national and subnational levels; for example, the city of Lisbon, Portugal, financed part of its Sea Hub (Hub do Mar) with EU Recovery and Resilience Facility funds.

However, subnational governments can be constrained by their ability to leverage financing sources to fund ocean economy priorities, especially compared to their national counterparts. Notably, unitary countries are subject to the "golden rule," which restricts subnational borrowing to finance long-term investment in infrastructure and large equipment. Issuing bonds is forbidden at the subnational level in most unitary OECD countries, and globally, many local governments are deprived of access to any form of loans due to poor fiscal capacity and creditworthiness and to strict borrowing rules.

The role of development finance

For many countries, development finance (namely, ODA) is a small but critical source of external finance, including for their ocean priorities. Current estimates show that ocean-related ODA is quite small (only about 1 percent of total global ODA). Therefore, ODA allocations must align with a country's SOP priorities to ensure the most efficient use a finite source of finance. For practitioners in recipient countries, integrating SOPs into aid coordination mechanisms/practices is key to leveraging development finance for SOP implementation (OECD 2023). Providing

countries, meanwhile, have a role in not only helping partner countries set up SOPs (through financial and capacity support) but also in ensuring that their ODA activities broadly align with each country's SOPs (OECD 2025c). This reflects the familiar principles of aid effectiveness (Fourth High Level Forum on Aid Effectiveness 2011).

Development finance is also a critical lever in mobilising other sources of finance, both public and private (OECD 2025c):

- **Domestic public finance.** By supporting public finance management (including for the ocean), development assistance can strengthen the capacity of domestic public finance to set up and implement SOPs. Development assistance, when channelled as budget support — especially in countries with strong public finance management systems — can efficiently advance a country's SOP.
- **Private finance.** Development assistance can mobilise private capital through direct and indirect channels. Directly, development assistance can be used to de-risk investments and attract private investments. Indirectly, development assistance can be used to strengthen the underlying enabling conditions (e.g., by developing capacities, supporting data collection) to incentivise the flow of private finance.

Leveraging public and private financing sources

Traditional finance structures that support the SOE, including current risks (i.e., business cases to redirect)

Public banks (i.e., banks owned by a government or public authority and with a public-oriented mandate) are traditional finance institutions in the sense that they have been in existence for hundreds of years. Their numbers continue to grow; many new banks emerged during the last decade, and long-standing ones significantly increased their operations during this period of renewed appreciation for their role (UNCTAD 2019). Whether at the national, regional or global level, public banks are an essential public tool for the heavy lifting needed to finance sustainable ocean economies. In addition to providing technical and managerial expertise, they can provide patient and catalytic capital that goes beyond what is possible for private banks or funds because they are governed by a different principle. They can follow public policy priorities and not the shorter-term priority of the profit motive. Although economic activities that have reasonably clear property rights, the potential to capture revenues and the ability to make a profit can attract private finance — as is evident in the trillions of dollars transacted annually in ocean-related goods and services — this will not be the case for some of the most important investments upon which those profitable activities depend. For many sustainable ocean activities, especially those with conservation elements, it is necessary to call upon one or more of the 500+ public banks that currently exist across the globe.

Public banks will be especially useful in cases where governments already face macroeconomic challenges, such as high debt or limited fiscal capacities. They can also assist with the usual project-level barriers to raising funds for sustainable ocean activities. These barriers could be lack of technical capacity to plan and manage the project, lack of information about project implementation and its impact, the high capital costs or any of the usual non-excludable characteristics of public goods that deter private finance. Public banks — especially regional banks with better credit ratings — can access global financial markets at considerably lower interest rates and use these finances to invest in sustainable ocean projects, either with governments or with the private sector. OECD data shows that for sustainable ocean activities, ODA and other public sources vastly outweigh either philanthropy or private sector finances, and much of the ODA goes through public development banks. In turn, these banks can increase the capital available by carrying out project feasibility studies, pre-project planning, technical management expertise and co-financing with the private sector. Public banks can provide cities and municipalities with highly concessional loans or grants for wastewater investments that ensure clean water enters the ocean, with non-concessional loans to finance the transition to renewable energy for coastal transport or shipping, and provide financing for national government-level projects. They also often partner with philanthropic or nature conservancy interests.

For activities that cross national boundaries, as is often the case with ocean investments, regional or global public banks are essential when no strong national public bank can take this anchor role. For this, the International Finance Corporation, the World Bank (see Box 12) and the regional banks (e.g., the Asian Development Bank or the Caribbean's CAF) are likely to be needed. Public bank involvement is often on a large scale (such as the Asian Development Bank's loans for decarbonisation of shipping), and

BOX 12. **PROBLUE's support for SOPs**

PROBLUE, the World Bank's multidonor trust fund, has played a significant role in supporting the development of Sustainable Ocean Plans (SOPs) in both Mexico and Ghana.

Mexico. In Mexico, PROBLUE funding helped define and formulate the country's SOP. This support was part of a broader initiative coordinated by the Secretariat of Agriculture and Rural Development and the National Fisheries Institute, in collaboration with the Secretariat of Foreign Affairs. The project aimed to strengthen Mexico's National System of Fishing Refuge Areas, focusing on public policies, capacities and governance. Additionally, Mexico's SOP development was guided by the Ocean Panel's framework, emphasising inclusivity and integration of environmental, social and economic aspects.

Ghana. In Ghana, PROBLUE funds were allocated to support the preparation of an SOP as part of the West Africa Coastal Areas Resilience Investment Project 2. This initiative aimed to strengthen national marine spatial planning processes and accelerate the development of Ghana's SOP. The support included capacity-building efforts to enhance the country's ability to sustainably manage its marine resources. This involved several regional and local workshops as well as a national-level consultation, which brought together stakeholders from government, academia, civil society, traditional authorities and the private sector. These engagements strengthened institutional capacity, improved cross-sectoral coordination, enhanced data-sharing practices and built national ownership of the SOP process, laying the groundwork for long-term sustainable ocean governance.

These examples illustrate PROBLUE's commitment to assisting countries in developing comprehensive and sustainable approaches to ocean management.

Source: World Bank 2024.

small projects can find it hard to gain sufficient scale to make a bankable activity. However, the Asian Infrastructure Investment Bank and the Belize Bank are two public banks that launched training and financial support for very small-scale fisherfolk in their member countries. In the Belize case, the public bank works with a WWF collaboration, showing the role of public-public partnerships in this important space. Unfortunately, not many banks specifically focus on blue activities, and those that do are likely to see blue activities as a subset of green or climate change–related lending. There are some exceptions; currently, some regional and national public banks are working together to support an ocean financing coalition, and others are strengthening their blue capacities.

This comes at a time when public banks are being reappraised and lauded for their essential role in raising climate-related finance, particularly in light of the somewhat disappointing record of private sector investors or even climate funds. In efforts to launch blue bonds or other blue-related innovative financial mechanisms, the foundational role of the public bank is usually assumed. It seems highly likely that a public bank will be the first stop for any project scaling up and redirecting finance towards sustainable ocean investments.

Creating new streams of finance to restore, protect and sustainably manage ocean assets and build ocean resilience

Without investments to restore, protect and sustainably manage the ocean's natural assets, the ocean system will be pushed to the limits of its carrying capacity. Of course, the most immediate concern is how this will affect some of the most vulnerable citizens in coastal communities. If managed sustainably, however, the ocean does have enormous capacity to regenerate and provide substantial gains to society and business. If we want a system that is resilient for the long term, we must manage and avert ocean risks by investing in ecosystem integrity and resilience and build a strong natural capital resource base:

- **Redirect harmful subsidies.** In the case of ocean fisheries, harmful subsidies (i.e., those that can stimulate overcapacity, overfishing and illegal fishing) receive over 20 percent ($ 22 billion a year) of their gross revenues as government subsidies (Planet Tracker 2024). These harmful subsidies must be repurposed towards supporting sustainable ocean economy projects and approaches, such as strong monitoring, control and surveillance to address IUU fishing. The entering into force of the World Trade Organisation's Agreement on Fisheries Subsidies on the 15th September is a significant step forward to achieving this.
- **Substantially scale public and private sector financing into restoring, protecting and sustainably managing the nation's ocean and coastal natural assets.** The ocean's natural assets are the bedrock of an ocean economy, delivering a myriad of essential goods and services that underpin critical societal needs and business interests. While business-as-usual practices are being powered by trillions of dollars of mainstream finance, only a small fraction of

finance is being targeted at restoring, protecting and sustainably managing biodiversity. This needs to be substantially scaled to secure the long-term environmental, social and economic resilience and security of coastal states.

Principles, frameworks, guidance and other tools for mainstream finance to redirect investment, capital and trade towards SOE financing

To redirect mainstream finance, key actions should be taken within traditional mainstream finance systems:

- **Enable the creation of a robust SOE finance ecosystem underpinned by strong principles, guidelines and frameworks.** To direct capital and development policies towards SOE pathways, governments and regulators should seek a strong vision and establish guardrails to support sustainable financing decisions. These must be underpinned by commonly agreed ocean-based principles, accountability frameworks, guidance, criteria and metrics and supported by robust regulation, including the use of incentives and disincentives. Although ocean criteria and metrics are not well incorporated into the global finance system, progress towards building a robust blue finance ecosystem has been made and should be further developed:
  - **Align future development and finance regulations, policies and practices with the Sustainable Blue Economy Finance Principles as a vision for the SOE.** The principles provide the first global ocean framework to guide finance decisions and development policy towards the most sustainable development pathways. Developed by WWF, the European Commission, the European Investment Bank and the Prince of Wales International Sustainability Unit in 2018, the principles are now hosted by the Sustainable Blue Economy Finance Initiative of the United Nations Environment Programme Finance Initiative (UNEP FI) (UNEP FI n.d.). This knowledge management platform has 88 members and represents more than $11 trillion in assets under management. The principles have also been adopted by 44 signatories, including both public and private sector partners (the World Bank, the European Investment Bank, Asian Development Bank, Bank of Qingdao, Rockefeller Capital Management, Axa XL), and have been endorsed by the Government of Portugal and the EU High-Level Expert Group on Sustainable Finance. The principles align with SDG 14 and complement existing frameworks governing responsible investment (the Equator Principles, United Nations Principles for Responsible Investment). They are designed to provide guardrails and guidelines for future sustainable financing of the ocean and ensure that ocean-related finance delivers long-term value without having a negative impact on marine ecosystems or on efforts to reduce carbon emissions. As such, the principles are relevant to all ocean users that are financing, being financed, or regulating the ocean economy. Because the principles offer an overarching framework for the emerging ocean finance ecosystem**,** it's important to seek linkages and alignment between the principles and other functional parts of the ocean finance ecosystem. These are made up of seven principles that align blue with green finance and a further seven that address blue specificities, including science-led guidance, and thus fitting with SOPs.
  - **Use SOE criteria and metrics that align with biodiversity and climate goals and objectives to strengthen compliance and support decision-making that aligns with the impact mitigation strategy** (for more information, see Step 3, "Impact mitigation strategy"). UNEP FI's SOE guidance offers a complementary set of criteria to support the implementation of the Sustainable Blue Economy Finance Principles and guide sustainable development decisions within the ocean economy (UNEP FI 2021b, 2022). This publicly available guidance covers eight maritime sectors (aquaculture, commercial fisheries, coastal tourism, shipping, ports, marine renewable energy, solid waste disposal, natural infrastructure) and provides clear, actionable and granular science-based criteria categorising activities that should be avoided, those that would need to be transitioned through policy and targeted finance interventions and those that should be proactively sought out, financed and implemented. As a minimum, regulations should be in place to prevent future financing of activities that undermine the SOP, such as harmful and illegal fishing activities.
  - **Encourage greater transparency through disclosure across capital markets to gain a clear picture of the impacts of the real ocean economy.** Consistent reporting can be achieved by adopting common sustainable

ocean economy metrics, offered by UNEP FI's SOE guidance. The Taskforce on Nature-related Financial Disclosures (TNFD) is a corporate disclosure framework for finance institutions to report and act on evolving nature-related risks (TNFD 2023). By providing criteria and metrics on nature-related impacts and dependencies, it aims to increase transparency across the sector and encourages consistent reporting. The TNFD's focus is broad in terms of biodiversity, but many ocean sectors are now being considered and criteria developed, strongly aligning with UNEP FI's Sustainable Blue Economy guidance.

- **Sustainable ocean economy sectors should also be included in national "sustainable" finance taxonomies.** These classification systems provide regulators and financiers with clarity on the activities, assets and project categories that deliver on key climate, green and blue, social and sustainable objectives (Pfaff et al. 2021). By providing environmental performance criteria to define what constitutes sustainable activities across different sectors (WWF 2022), they deliver integrity within the sustainable financial market and allow governments to track capital flows to "sustainable" sectors; this enables them to assess whether sufficient capital is flowing to the targeted sectors to meet national biodiversity and climate commitments (Jena and Tandon 2025).

  Under the EU green taxonomy, introduced in 2020, economic activities must substantially contribute to one or more environmental objectives of the taxonomy, do no significant harm to any other environmental objectives of the taxonomy and respect social safeguards. To guide the second category, UNEP FI's guidance includes a recommended exclusion list for activities that cause significant harm to nature and people (UNEP FI 2021a). Given the significant contribution of the ocean to national economies (Hoegh-Guldberg et al. 2015) and the risks associated with unsustainable business-as-usual practices (Kennedy et al. 2021), the development of blue taxonomies and their integration with national policies and development plans should be prioritised. Current sustainable finance taxonomies — 47 as of April 2024 (SBFN 2024) — are primarily based on terrestrial sectors, however, so targeted action is needed to scale the blue dimension.

  At a minimum, sustainable blue finance taxonomies need to be forward-looking and grounded in robust ocean science to incentivise and guide the corporate transition to operate within planetary boundaries. Successful implementation of sustainable blue finance taxonomies should address regulatory integration, harmonisation and improvements in data availability. Alignment through a common set of principles (e.g., the Sustainable Blue Economy Finance Principles), definitions and sustainability objectives would ensure that ocean-related technical screening criteria and performance metrics align with climate and biodiversity commitments and are interoperable across markets. They should also be reviewed regularly to integrate the latest environmental science and technology innovations, and they should be consistent with international guidance (e.g., the UNEP FI guidance) and corporate disclosure standards (e.g., the Task Force on Climate-related Financial Disclosures and the TNFD). Having mandatory reporting requirements, as is the case for the European Union and China, is also key (OECD 2020a).

- **Strengthen ocean literacy across public and private finance sectors.** Although the climate message is gaining traction across the finance sector, the risks associated with the ocean-climate nexus, such as through ocean degradation and plastic pollution, and the subsequent impact on industry is not always understood (Ford et al. 2022). The uptake, alignment and adoption of standardised sustainable ocean economy frameworks, principles, guidance, tools, criteria and metrics will require regulators and the finance sector to view ocean risks as material and to fully recognise the strong opportunities offered by a "sustainable" ocean economy. Therefore, ocean literacy must be strengthened across the finance sector so that the materiality of the risks associated with unsustainable ocean economy practices and the potential opportunities offered by sustainable ocean economy opportunities is understood and built into decision-making frameworks. Platforms like UNEP FI's Sustainable Blue Economy Finance Initiative provide important knowledge management and ocean literacy opportunities for public and private financiers (UNEP n.d.).

Industry sector pathways for mobilising public and private financing for the SOE

As the risks associated with nature loss grow, businesses and financial institutions are increasingly recognising the strategic importance of integrating nature-positive approaches into their operations. The World Economic Forum's *Global Risks Report 2025* underscores this urgency, highlighting that 5 of the top 10 global risks over the next decade are environmental, including extreme weather, biodiversity loss and resource shortages (WEF 2025a). By proactively addressing nature-related risks, companies can navigate regulatory changes, mitigate physical and systemic risks, and unlock early opportunities. A nature-positive approach, which aims to halt and reverse nature loss by 2030 and achieve full recovery by 2050, offers a pathway for businesses to contribute to global and national sustainability objectives.

For ocean-based industries, nature-positive strategies must be adopted to support marine conservation and climate resilience while ensuring long-term economic viability. The Nature Positive Transitions report series by the World Economic Forum, World Business Council for Sustainable Development, WWF and others highlights sector-specific pathways that align industry action with ocean health in key sectors (WEF 2025b):

- **Energy**, specifically for the scale-up of offshore energy and the accelerated deployment of renewables while ensuring that MSP minimises habitat disruption.
- **Shipping**, which can reduce its environmental footprint by leveraging low-carbon fuels.
- **Coastal and maritime infrastructure**, where the integration of nature-based solutions, such as mangrove restoration, enhances coastal resilience and protects biodiversity.
- **Tourism**, which can transition towards low-impact, MPA-based tourism models, supports conservation and local economies.

By adopting these sectoral pathways, businesses can play a pivotal role in reinforcing national efforts to protect marine ecosystems while accelerating the transition to a sustainable ocean economy. These strategies not only drive industry transformations but also support governments in fulfilling international commitments under the Paris Agreement, the GBF and SDG 14. By aligning public policies and financial incentives with industry priorities, they create an enabling environment for systemic change (WWF 2025).

A well-coordinated approach that integrates industrial action with SOPs is essential to strengthen marine governance. It stimulates blue economic growth and ensures a sustainable, resilient, regenerative and economically viable ocean economy.

Private finance flows into innovative nature financing mechanisms — including biodiversity credits, impact investments and blended finance mechanisms — have grown from $9.4 billion to $102 billion between 2020 to 2024, an elevenfold increase (Smith et al. 2024). Natural capital is emerging as a viable asset class that offers both financial and sustainability benefits. Over 40 percent of surveyed investors are allocating capital to private debt or equity aimed at protecting or enhancing nature.

As outlined in the World Economic Forum's briefing paper "Financing the Nature-Positive Transition" (WEF 2024), the identification of nature-positive sectoral pathways greatly contributes to further scaling up the mobilisation of funding. Financiers and investors can support real economy companies in their nature-positive journey — and therefore encourage ocean-positive action — in three main ways: in-value-chain transformation, beyond-value-chain investment and system transformation.

The in-value-chain approach involves financing the transition of corporate business practices within existing operations to reduce environmental harm. Investments in low-carbon technologies, such as alternative fuels for shipping, regenerative aquaculture and circular economy initiatives, can drive material reductions in ecological impact. Business model innovations, including regenerative agriculture and sustainable fisheries, further support the transition. Sector-specific nature-positive pathways provide financiers with targeted investment opportunities, helping prioritise high-impact initiatives that deliver both environmental and economic returns. For instance, customer data platform data reveals that companies addressing the global water crisis reported a combined opportunity of $436 billion in 2022, with an average gain of over $250 million per company.

Beyond-value-chain investment extends beyond direct business operations, enabling conservation

and restoration efforts. Protecting and restoring marine and coastal ecosystems (e.g., mangroves, coral reefs, seagrass beds) can enhance biodiversity while improving resilience against climate risks. Innovative financial instruments, such as blue bonds and tailored impact investments, are key to unlocking capital for sustainable ocean projects. Blended finance mechanisms, which combine public capital to de-risk investments and attract commercial financing, have proven particularly effective in scaling conservation efforts by distributing risks at the project level.

System transformation focuses on the broader changes necessary to create an enabling environment for investments that support the regenerative ocean economy. Industry sector pathways provide a structured approach to identifying regulatory gaps, policy needs and market incentives that drive capital towards ocean-positive solutions. Capacity-building and knowledge-sharing among stakeholders and rights holders, including local communities and small businesses, foster widespread adoption of sustainable practices and improve access to financing. Strengthened regulatory frameworks offer clarity and stability for investors, making nature-positive investments more predictable and attractive. In parallel, raising awareness and advocating for policies that promote sustainable economic practices helps drive systemic change.

Investment for impact: The role of venture funds, incubators and accelerators

Impact investment and innovation are essential to achieving 100% SOPs, enabling solutions that mitigate or avoid the impact of human activities or creating economic opportunities by regenerating ocean health. However, innovation cannot scale without dedicated investment and structured support from entrepreneur-supporting organisations such as incubators, accelerators and venture funds. These entities provide crucial early-stage capital, mentorship and market access to ocean-positive start-ups, enabling them to develop and deploy solutions that address pressing ocean challenges. Impact investment in ocean innovation is already reshaping industries and demonstrating the potential of technology-driven interventions. For example, Blue Ocean Gear has developed smart buoy technology that reduces ghost fishing gear while simultaneously collecting real-time ocean data, increasing both sustainability and efficiency in fisheries. Similarly, Nature Metrics is revolutionising biodiversity monitoring for offshore industries, including wind energy, by using environmental DNA (eDNA) analysis to measure ecological impact and assess biodiversity. In addition, Saildrone is advancing autonomous ocean drones for scalable, cost-effective oceanographic data collection, enabling better decision-making for conservation and industry alike. These innovations showcase how investment-backed solutions can drive systemic change and create real economic value.

The ocean impact innovation and investment ecosystem has grown significantly in recent years, fostering a robust pipeline of ocean-positive ventures. The global ocean impact investment and innovation ecosystem 1000 Ocean Startups has a goal to support 1,000 ocean-positive start-ups by the end of the UN Decade of Ocean Science for Sustainable Development (2021–2030) (Ocean Decade). The coalition unites 55 leading entrepreneur-supporting organisations dedicated to scaling ocean solutions. Collectively, these organisations manage over $2.5 billion in assets under management and have incubated, accelerated, mentored and invested in more than 500 start-ups. In parallel, the Ocean Impact Navigator has emerged as the most widely used framework for measuring the positive impact of ocean investments. Developed by 1000 Ocean

Startups and SystemIQ, with support from Builders Vision, SWEN Capital Partners and the Ocean Decade's Global Ecosystem for Ocean Solutions programme, the framework provides 34 prioritised key performance indicators across six impact areas. These indicators were reviewed by more than a dozen members of the Ocean Panel's Expert Network. By harmonising measurement and reporting, the Ocean Impact Navigator helps investors and innovators track progress, identify high-impact interventions and mobilise further capital towards sustainable ocean solutions.

Despite the remarkable acceleration in ocean innovation and investment this decade, significant gaps remain in scaling innovation for ocean impact. Many ocean sectors still lack sufficient investment, particularly in emerging economies where ocean innovation ecosystems are underdeveloped. Ensuring that countries implementing SOPs have access to financial mechanisms such as blue bonds could help mobilise capital for deploying innovative and nature-positive solutions at scale[8]. Additionally, early-stage ocean innovations frequently face a dual challenge: They must compete on both price and demonstrate real ocean-positive impact. Incumbent solutions, however, typically compete on price alone. This dynamic makes it harder for transformative technologies to scale as rapidly as needed. Polygone Systems, which has developed the first passive filter system for micro-plastics, exemplifies how regulatory and financial mechanisms, such as polluter-pays policies, could accelerate the deployment of solutions that are already commercially viable but face barriers due to the lack of enforcement or incentives. Without stronger policy alignment and financing frameworks that support nature-positive alternatives, the status quo of environmental degradation remains the easier, cheaper option. Similarly, Abalobi's digital tools for small-scale fishers enhance sustainability and market access yet require financial and policy support to integrate into broader ocean planning frameworks. Addressing these gaps will require targeted interventions, including public-private partnerships that de-risk investment in ocean innovation, greater emphasis on blended finance structures and policies that incentivise nature-positive technologies over status quo approaches. These mechanisms must be strengthened to unlock the full potential of ocean innovation and accelerate the transition to a regenerative ocean economy.

Blue infrastructure finance for systemic regeneration of marine ecosystems

The development of SOPs facilitates the comprehensive and systematic assessment of coasts and seascapes, which is critical to infrastructure investment (Adshead et al. 2019). For the SOP practitioner, this means early engagement with stakeholders directly involved in the production and maintenance of said large infrastructures. This includes local authorities, developers, businesses, logistics providers utilities and regulators. The focus needs to be on how the mitigation hierarchy will be employed and how any potential ecosystem impacts and regeneration benefits will be measured, reported, monitored and monetised.

Nature-based solutions and blue natural capital considerations can optimise infrastructure finance planning and implementation. Coastal and marine areas are key for many human economic activities, yet they are also critically exposed to climate change, pollution and habitat degradation. Urban systems and coastal communities rely on biodiversity to support blue food resilience, and coastal ecosystems are crucial for climate-smart investments. Integrating nature-based solutions into grey-green infrastructure approaches delivers better outcomes for nature and people. This approach is also financially sound and allows risk reallocation to those with the appropriate risk appetite by using market mechanisms such as guarantees and insurance. Infrastructure developers and financiers require clear guidance on how to safeguard coastal and marine areas — reducing stressors and strengthening resilience and regeneration — based on robust and precise metrics.

In countries with limited institutional capacity, this may require increased technical capacity to design and implement projects based on targeted technical assistance alongside efforts to scale up spending. Effective crowding in of private finance is key to deliver on SDG14 (life below water). Warming, acidification and oxygen loss have synergistic effects. Together with other harmful human activities, such as overfishing and marine pollution, these impact marine and human health as well as livelihoods. Strategies that prioritise cross-sectoral infrastructure investments and policies in the energy, water, wastewater and solid waste sectors can help to build robust finance cases. Developing countries urgently need additional adaptation and infrastructure finance that delivers win-win solutions.

Blue capital markets

SOP practitioners need a solid understanding of local and global capital markets, financial products and actors. Engaging with financial actors and understanding risk and return are integral parts of adequately implementing their SOPs. From a government perspective, this means that the finance and economics/planning ministries need to be involved, as do central banks and financial regulators. The latter are increasingly concerned about the systemic risks from environmental and climate factors, so the SOP approach will be one way to help address these challenges.

Transformative SOP finance requires a much wider concept of investable opportunities as well as access for regenerative ocean businesses to the entire range of financial products. It also means that investors need to have all the benefits that come from the transparency, competition and liquidity offered by international markets in traditional asset classes. Innovative financing, including accessing capital markets, represents a promising opportunity for delivering ocean solutions, including for critically threatened ecosystems and for the ABNJ (Thiele and Gerber 2017). Large pools of private capital can only be accessed if both newer market entrants (e.g., impact investors, family offices, fintech) and traditional asset owners (e.g., as pension funds and other institutional investors) can be convinced that the new structures and mechanisms to facilitate the flow of funds into the ocean sector have the same robust characteristics as other investments. Corporate climate bonds for renewables, blue bonds for ocean solutions and environmental impact (Minderoo Foundation et al. 2024), and sustainability bonds (e.g., for coastal resilience and nature-based infrastructure) offer formats that deliver cash up front to key SOP efforts and include performance-based components that could allow for effective risk transfers and faster delivery. The Pacific Ocean finance paper by Walsh (2018) summarises efforts in that region. A key constraint for private funding of ocean solutions is the lack of clear metrics and parameters for investment. Progress made over the last few years includes increased engagement of the insurance industry around the concept of ocean risk (Niehörster and Murnane 2018), the development of a blue natural capital approach and the launch of key principles for sustainable fisheries (Environmental Defense Fund et al. 2018) and for ocean economy finance (UNEP FI n.d.).

Ocean finance innovation needs to move beyond early adopters to the main markets of major lending banks, large asset managers and pension funds, and key capital market structurers to deliver effective private sector funding at scale. Municipalities and other public bodies are already active in the capital markets and are therefore well-placed to use thematic bonds such as blue bonds to raise finance to allow for coastal restoration and resilience projects. Other stakeholders and rights holders could provide the performance element, such as is done with social impact bonds, which would require clear metrics to be set and monitored. Blue bonds for coastal resilience will, however, require a pipeline of projects with appropriate risk-reward profiles — these being the financial considerations for investors. A blue bond is successful if its pricing reflects investor risk perception and it is fully allocated at launch. More broadly, blue bonds deliver multiple benefits, including delivery on policy commitments. Further issuers can be corporations, particularly if they are already rated in the bond markets and have sufficient investments in the blue natural capital space. In the longer term, a transparent and financially effective transaction could be a non-recourse project bond for a coastal resilience project itself, which would mean that the capital markets instrument would be used to fully transfer the risk to the buyer of the bond; therefore, the local entities would not need to use their borrowing capacity. Financial institutions can also be effective issuers, including for risk management purposes. Large European banks already are dependent on and exposed to the impacts on ecosystem services, with considerable value at risk. Researchers have calculated that for every dollar in the equity-holding portfolios of Europe's 10 largest banks, 26 cents are highly dependent on ecosystem services (Mundaca and Heintze 2024).

Communities and micro-finance

Coastal communities are critical stakeholders and rights holders in the delivery of SOPs, but they face an uncertain future. Although coastal ecosystems offer substantive goods and services that support their societal needs, these ecosystems are becoming severely degraded due to escalating threats from the rapid expansion of coastal development, land-based pollution and climate-related impacts. Coastal communities are also themselves developing in ways that don't always serve their long-term needs, with limited scope for transitioning to more sustainable development pathways. Coastal communities also play a distinctive, critical role as stewards of coastal

ecosystems. Although many self-organise to deliver key functions relating to restoration and protection, these roles are seldom formalised or financed — and, if they are, they mainly rely on grant funding to support key conservation functions. It's critical to empower and support coastal communities to enable them to move towards a sustainable ocean economy that delivers long-term environmental, social and economic resilience and equity.

One of the biggest challenges that coastal communities face when trying to secure localised, sustainable development is access to finance. Despite the fact that MSMEs are a significant contributor to local economies, an estimated 40 percent of formal MSMEs in developing countries are believed to have unmet financing needs (SMEConnect 2024). Specific challenges to accessing finance include economies of scale, higher transaction costs, low or slow return profiles, governance and capacity challenges and representing a higher risk prospect to private sector financiers. Sustainable ocean economy MSMEs are doubly disadvantaged because they operate in a sector with few precedents and uncertain revenue profiles, which means that scaling and replication are often more complex than for terrestrial sectors. This is coupled with the fact that SDG 14 is among the least-funded SDGs by ODA and philanthropic development funding. The paucity of data and the lack of ocean literacy among private sector financiers also present substantive barriers to financing. Consequently, there is simply insufficient scalable and investible pipelines of projects available.

If we are to seek the transition to an equitable and inclusive sustainable ocean economy at the community level and secure the successful delivery of SOPs, new capital flows must be proactively directed to support the "sustainable" development objectives of coastal communities and thereby create social value while securing resilient ecosystems. The gap between grant-based projects and revenue-generating and self-sustaining sustainable ocean economy enterprises must be bridged to attract and scale new streams of finance.

Several key actions must be taken through SOPs to enable this transition:

- **A supportive enabling environment is key to attracting finance and facilitating this transition**, including strengthening on-the-ground governance structures and ensuring that national and local policy, planning and development on the coast focus on building the resilience of coastal ecosystems while aligning with the sustainable development ambitions of coastal communities. This should go hand in hand with providing capacity-building opportunities for community-led businesses and civil society organisations in the sustainable use of marine resources and projects related to nature-based solutions.
- **Local sustainable economic development should prioritise identifying pipeline opportunities and creating incubation and acceleration opportunities.** This should include strengthening capacities in business planning, technical skills, financial management and good governance. In terms of selecting and investing in a pipeline, a robust set of criteria would need to be developed and agreed upon to ensure clear guardrails and safeguards for what to seek out, what to transition and what to avoid as well as how to engage with coastal communities. Again, tried and tested principles and criteria should be used in developing these, such as those offered by the Sustainable Blue Economy Finance Principles and associated guidance.
- **Development funding and seed investments should be made available for start-ups.** While innovative finance mechanisms should be proactively explored, it's also important to recognise and support the critical role of tried and tested forms of micro-finance and facilitate greater engagement in sustainable ocean economy opportunities. The inclusion of village-level micro-finance schemes within financial regulation should also be explored to further enable access to finance.
- **Aggregation models for pipelines and revenue streams should also be explored, developed and supported to facilitate scalability and replicability and reduce transaction costs.** Investors could then finance multiple interventions through a single investment. This would improve the attractiveness of investments by adjusting the risk-return profile and reducing transaction costs, but it relies on the development of a sufficient volume of high-quality aligned projects.
- **Robust multistakeholder and rights holder governance should be encouraged.** This would ensure that local communities are fully engaged and that their voices inform and shape policies to enable financial flows, particularly in terms of securing equitable rights and tenure and supporting strong governance and benefit arrangements.

Step 3:

Defining the baseline and analysing potential future conditions

KEY TAKEAWAYS:

- To develop evidence-based, actionable and inclusive SOPs, countries should first establish baselines that are context specific and responsive to likely future scenarios.
- When possible, countries should use diverse approaches for gathering baseline information — from traditional scientific sampling and remote sensing to participatory methods incorporating Indigenous and local knowledge.
- Integration of environmental, economic and social data is crucial for a holistic understanding of ocean social-ecological systems.
- By analysing future trends and developing scenarios, countries can anticipate marine environment changes that may impact SOP design, implementation and effectiveness.
- Robust information for baselines and future conditions can help develop climate-resilient strategies and identify sustainable development opportunities.
- Transparent data management, sharing and standardisation aid in communicating complex spatial information to stakeholders and rights holders.
- Data availability is not evenly distributed across domains, spatially or temporally. Although it's crucial to include the best available data, this should not delay the development of an SOP, which might include strategies to address the gaps and deficiencies.

Effective sustainable ocean planning requires a comprehensive understanding of both current conditions and future scenarios that may impact marine and coastal environments. Step 3 represents a critical phase in the planning process. In this step, baseline environmental, economic and social conditions are documented and analysed, providing the foundation upon which management decisions, policies and monitoring frameworks will be built. Step 3 outlines methodologies for collecting, managing and analysing baseline data that capture the complex interrelationships between ecosystems, human activities and governance structures within the planning area. Where possible, baseline data should be open and accessible to support transparency and accountability. Understanding these baseline conditions is essential for identifying key issues, opportunities and threats that should be addressed through the sustainable ocean planning process. A robust baseline assessment enables marine planners to do the following:

- Understand the current state of marine and coastal ecosystems.
- Identify existing patterns of human use and economic activity.
- Document social dependencies on ocean resources and spaces.

- Establish measurable reference points against which future changes can be evaluated.
- Inform the development of scenarios and projections for future conditions.
- Develop a place-based, ecosystem-based and knowledge-based SOP.

Step 3 is designed to help countries realise the attributes of effective SOPs. Rather than prescribing uniform data processes, it equips users with practical, adaptable guidance to establish baselines and build context-responsive baseline plans. Throughout the following discussion on data, accounting and indicators of benefits for the ocean economy, it's important to establish the desired goals and strategies for ocean development. Specific goals and objectives, including desired timelines and quantitative baselines, are an essential first step to decide the best ways to track progress. These can be defined following the establishment of the goals and objectives of the SOP itself. For more on defining SOP goals and objectives, see Step 4, "Goals and objectives."

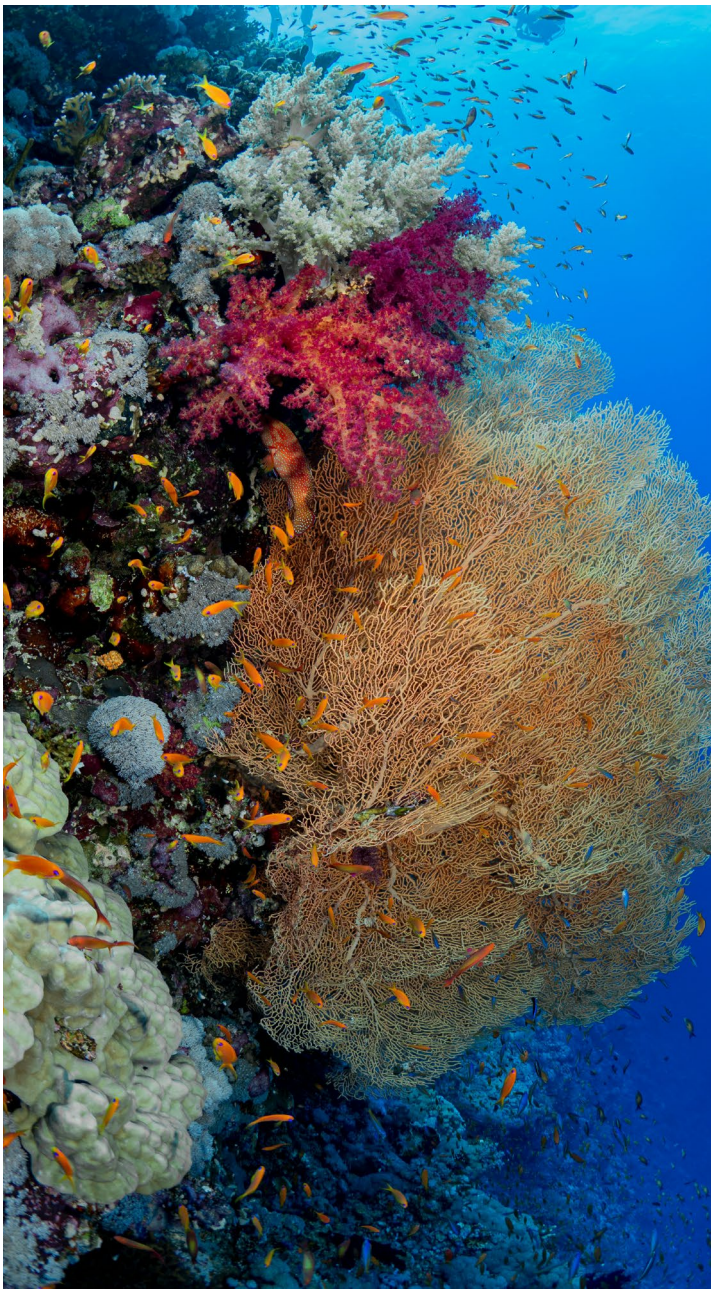
Identifying and collecting baseline environmental, economic and social data for sustainable ocean planning

Environmental, economic and social conditions are deeply interconnected in coastal and marine systems, and a social-ecological systems approach recognises this complexity. This approach to baseline data collection and future planning supports a more holistic, inclusive and place-based understanding, which is critical for developing SOPs that reflect a country's realities.

Data availability

Before discussing the specific types of data and the uses of these data, it's worth a short diversion to discuss accessibility and availability. Data-sharing, access and discovery are central to a robust data-driven SOP, however, the process is fraught with challenges that span technical, legal and organisational domains. A primary need, and thus potential challenge, rests in establishing robust protocols for the secure and compliant exchange of data. The very nature of an SOP means that these protocols need to be shared across government and public institutions as well as external actors. This includes defining clear data governance frameworks, standardising data formats to ensure interoperability across disparate systems and implementing strong security measures to prevent unauthorised access and breaches.

Furthermore, data discovery presents its own set of complexities. Organisations often struggle to locate relevant data across numerous systems and applications as well as data that is uncatalogued or forgotten. This lack of visibility hinders practitioners from effectively leveraging existing information. Inconsistent data quality, lack of proper metadata and the sheer volume of data compound the issue and make manual discovery unfeasible.



Finally, data access is frequently impeded by concerns over privacy, security risks and regulatory compliance. Granting appropriate access while protecting sensitive information requires meticulous attention to user roles, authentication methods and continuous monitoring. Beyond technicalities, a lack of trust between potential data sharers, unclear data ownership and the administrative burden of negotiating data-sharing agreements further inhibit the free and responsible flow of valuable information.

Environmental data: Understanding ocean conditions and ecosystems

Through comprehensive environmental data collection, practitioners gain a thorough understanding of the current state of the marine environment and can anticipate future conditions, including the cumulative impacts of human activities, land-based influences and the pervasive effects of climate change. This understanding forms the bedrock of informed decision-making, enabling planners and managers to design strategies that are both effective and resilient.

The dynamic nature of marine ecosystems and the evolving pressures upon them necessitate that SOPs themselves are continuous, ever evolving and adaptive to changing circumstances, challenges and opportunities. This inherent need for adaptability implies that environmental data collection cannot be a singular, static exercise conducted only at the inception of a plan. Instead, it demands the establishment of ongoing monitoring programmes and sustained data streams. Such continuous data input is essential to feed the iterative cycles of adaptive management, where new information informs adjustments to strategies and actions, ensuring that SOPs remain relevant and effective over time. Consequently, SOPs should be designed with explicit mechanisms for periodic review and revision, driven by the latest environmental data and assessments. This elevates the role of environmental data from a purely descriptive function to one that is actively prescriptive in the ongoing governance and stewardship of ocean spaces.

Developing, strengthening and linking national ocean databases, such as Marine Spatial Data Infrastructure, can enhance the organisation and accessibility of marine environmental data to support SOPs. Databases that house relevant information should adopt open data principles, where appropriate, to further enhance transparency and collaboration across institutions and knowledge holders.

A range of environmental data collection methods are useful to SOP development and monitoring. Detailed and spatially explicit data are especially valuable for refining details, spatial planning and assessing SOP effectiveness over time. Appendix F provides an overview of some relevant tools and approaches for effective environmental data collection processes, including benthic habitat mapping and ecosystem assessments.

However, the absence of resources or the lack of capacity for detailed environmental data collection should not be considered barriers to SOPs. The approaches outlined here are designed to be flexible to diverse national contexts and data capacities. The scale and coarseness of SOPs and their underlying data will be determined by the policymakers, stakeholders and rights holders involved.

Economic data: Capturing the ocean's value

Practitioners need a good understanding of the ocean economy to develop their SOE and plan its implementation. Without such baseline information, trade-offs will be unknown and the balance of industries difficult, if not impossible, to understand. In the case of market benefits from the ocean, the development of ocean economy satellite accounts (OESAs) (or subsets thereof, discussed below) allows a deep understanding of the contribution of ocean sectors to a country's economy and provides a baseline for developing an SOE.

Likewise, practitioners should understand how much public expenditure is directed towards the ocean. With this knowledge, they can use the levers of government spending to create an SOE and identify areas from which additional funds can be redirected and raised. This includes investments in sustainable management, capacity-building and establishing new ocean sectors as well as resources to create policy infrastructure and capacity to establish appropriate regulations and licensing schemes. It's also important to track public or private expenditures that may have negative effects, such as support for unsustainable extraction and use of ocean resources or severely under-resourcing critical programmes.

Ocean economy satellite accounts

Economic data are commonly standardised through the system of national accounts to create statistics such as GDP. Often, however, these indicators are not disaggregated to track economic performance in ocean-related sectors or areas. Developing data to understand the ocean's role in an economy

provides crucial insights into resource and effort allocation, risk analysis and mitigation, and developmental priorities (Box 13). These insights provide the baseline for developing an SOP and can be gained by developing an OESA, a subset of the national accounts.

The following list includes some of the economic data that might be included in an OESA:

- Traditional maritime sectors: shipping and port measurements for cargo volumes, vessel movements, port infrastructure.
- Fisheries and aquaculture: catch volumes, farming output, fleet capacity.
- Offshore energy: oil/gas production, renewable energy generation.
- Coastal tourism: visitor numbers, revenue.
- Marine biotechnology developments.
- Maritime workforce statistics (employment numbers by sector, wage levels, skills distribution).

Specific sectors of interest can be identified by compiling an OESA or by using expert and stakeholder and rights holder judgement. Once these specific sectors are identified, countries may want to undertake a sector-specific OESA. A sector-specific OESA allows information to be distilled on specific areas of interest, such as an ocean-tourism satellite account that focuses on understanding how much a country's tourist economy depends on the ocean. This is particularly important where an ocean economy (or economy in general) is highly dependent upon a single or limited number of economic sectors.

The more granular an account is, the more data that is required and the greater the effort required by national statistical agencies. Although a lack of data should not be an obstacle in most cases to baselining the ocean economy, a balance between granularity, effort and reward is needed. There are methodologies available for quick assessments of the size of an ocean economy that are based on the system of national accounts data but use greater amounts of secondary data or expert judgement. Whether or not the analysis fully aligns with the system of national accounts, the important factor is that the size of the ocean economy is robustly assessed and can be replicated to track progress.

Ocean economy expenditure assessment

OESA analysis based on the system of national accounts focuses on the production and employment of the ocean economy and takes little account of the public expenditure on the ocean. Yet developing a good understanding of how much public expenditure is directed towards the ocean, blue economy or ocean-pressure creators is crucial to be able to make appropriate adjustments and reallocations to achieve an SOE. To do this, countries can undertake a blue public expenditure assessment. The review is based on standard public expenditure review methodologies, but like the OESA, it focuses on the ocean. It can help identify and baseline areas with insufficient or excessive expenditure and also find missed opportunities to generate revenues from beneficiaries of the ocean. With a baseline established, countries will understand how to shift public expenditure and revenue generation to achieve an SOE. Without such information, trade-offs will be unknown and decisions around the expenditure needed to get there will be difficult to understand.

BOX 13. Caribbean Development Bank example

The Caribbean Development Bank undertook a study using the system of national accounts to measure the ocean economy. For Jamaica, an ocean economy satellite account was estimated to have "a measurable and direct impact of 6.9% of GDP [gross domestic product] in 2017 and an average contribution of 6.7% for the period 2012 to 2017. This value is based on the computation of GVA [gross value added] of the activities that are directly related to the country's marine resources. The single largest activity is visitor accommodation (just under 3.5% of GDP in 2017) and also notable is the contribution of maritime transport to GVA, a little more than 2% in 2017."

As this example demonstrates, even the most basic of ocean economy satellite accounts can identify where the greatest industrial activity is occurring and, consequently, which sectors are most exposed to ocean risk.

Source: Ram et al. 2019.

Social data: Centring people in ocean planning

Collecting social and demographic data

While the importance of environmental and economic data is well recognised, the crucial role of social data to inform ocean governance priorities often needs more attention. Closely tied to economic dimensions, *social data* refers to information that captures the characteristics, experiences, relationships and values of the people connected to and impacted by changes in marine and coastal spaces. This includes demographic

data, cultural practices, health and well-being indicators, governance roles, community perceptions and more (Bennett 2019; McKinley et al. 2020). Incorporating social data into SOPs is paramount for multiple reasons:

- **Understanding human-ocean interactions.** Social data provide valuable insights into how people interact with the ocean, including their interdependence on marine resources, cultural connections and recreational uses (Earth System Governance 2022). This understanding is crucial for developing plans that are both effective and equitable. It ensures that management decisions consider the interdependences of coastal populations and the ocean, including the diverse ways in which people rely on, value and sustain it.
- **Promoting equity and inclusion.** Incorporating social data into SOPs helps ensure that the needs, rights and responsibilities of ocean users are embedded throughout the planning process, not only to identify and address inequities but also to prevent them from arising. SOPs should ensure that the benefits of ocean resources are shared fairly and that vulnerable communities are not disproportionately impacted by management decisions. They should move beyond distributing benefits after decisions are made and instead build equitable data into the decision-making structure, ensuring that vulnerable communities are recognised as contributors from the start, that all stakeholders and rights holders have a voice in the planning process and that the needs of marginalised groups are considered. Social data can help identify communities that are interdependent on the ocean and inform strategies to mitigate impacts and support adaptation and resilience measures. For example, social data on ocean dependence, access and customary use can inform spatial planning decisions, knowledge of community governance systems and stewardship responsibilities can guide co-management arrangements and lived experiences can co-define success and shape monitoring frameworks.
- **Enhancing stakeholder and rights holder engagement.** Effective SOPs require the active participation of diverse stakeholders and rights holders, including local communities, Indigenous Peoples and ocean-dependent industries. Social data helps practitioners understand stakeholder and rights holder perspectives, knowledge, values and concerns, which leads to more informed, inclusive and collaborative planning processes. By incorporating social data, SOPs can move beyond simply considering people as "impacts" to recognising them as beneficiaries of ecosystem services and as ocean stewards (Le Cornu et al. 2014).
- **Measuring social impacts.** SOPs should not only focus on environmental and economic outcomes but also consider their social impacts. Setting baselines and evaluating future scenarios that incorporate social data ensure that SOPs contribute to societal well-being by assessing their potential effects on community health, social cohesion, cultural heritage and other factors. See Step 5 for more on monitoring and evaluation.
- **Building resilience.** Coastal communities are often vulnerable to the impacts of climate change, such as sea level rise and ocean acidification. Social data help assess and disaggregate community vulnerability and build resilience by identifying social factors that influence adaptive capacity. This includes understanding inequitable exposure to risk, community perceptions of risk, social networks and access to resources, which can inform strategies to enhance community preparedness and response to climate-related challenges.
- **Aligning with broader ocean data strategies.** The importance of social data extends beyond individual SOPs. A coordinated, inclusive national ocean data strategy should encompass scientific, management, social and cultural considerations (ORAP 2024). This highlights the need to bring social data into broader ocean data management systems to ensure a holistic understanding of human-ocean interactions.
- **Ensuring long-term success of SOPs.** Incorporating social data can lead to greater stakeholder and rights holder buy-in, reduce conflicts and promote more effective implementation of SOPs (Earth System Governance 2022). By understanding and addressing social factors, SOPs can create a more inclusive, collaborative planning process, ultimately contributing to their long-term success in achieving sustainability goals.

To effectively include the human element, SOPs should incorporate a wide range of social data (Table 5).

A variety of methods can be used to better understand social data or, ideally, to co-produce SOPs with ITK holders (see Strand et al. [2024]). All methods should use participatory mapping approaches and involve ocean users in developing SOPs. These

TABLE 5. **Social data examples**

CONSIDERATION	DESCRIPTION	DATA
Ocean dependency	Captures the extent to which communities and industries rely on the ocean for livelihoods, food security and cultural practices.	• Employment in ocean-related sectors (e.g., fishing, tourism, transportation). • Contribution of marine resources to local economies. • Role of seafood in food and nutrition security. • Culturally significant practices and areas tied to identity. The data reveal which communities and sectors will be most impacted by ocean management decisions and to what extent, minimising conflict and ensuring SOPs provide benefits to humans and the environment.
Well-being and quality of life	Assesses the social well-being of coastal communities.	• Health indicators (e.g., access to health care, disease prevalence). • Education levels and access to educational opportunities. • Social cohesion and community engagement. • Housing affordability and access to essential services. The data show how ocean management decisions might affect coastal residents' quality of life and ensure that SOPs contribute to social well-being.
Cultural values and heritage	The ocean holds significant cultural and spiritual value for many communities, particularly Indigenous Peoples.	• Cultural beliefs and practices associated with the ocean. • Indigenous and traditional knowledge systems related to marine resource management. • Cultural heritage sites and areas of cultural significance. The data can ensure that cultural values and heritage are protected by and included in SOPs, recognising the important role of culture in shaping human-ocean interactions.
Governance and institutions	Examines the governance structures, legal frameworks and institutional arrangements that influence ocean management.	• Existing policies and regulations related to ocean use. • Stakeholder and rights holder participation mechanisms and decision-making processes. • Institutional capacity for ocean management and enforcement. The data clarify the existing governance landscape and identify opportunities for strengthening ocean governance through SOPs.
Equity	Considers the historical and current injustice in the distribution of benefits and burdens associated with ocean use and management and actively aims to address and redress these historic and systemic disadvantages.[a]	• Identifying and addressing potential social inequities through tailored treatment that recognises that people have not had the same opportunities. • Considering the impacts of ocean management decisions on different social groups, such as marginalised communities, Indigenous Peoples, women and youth. The data can ensure that SOPs promote fairness and justice, and that SOPs contribute to equitable access to ocean resources and benefits.

Source: a. Minow 2021.

techniques involve community members in mapping long-term ecosystem change and their traditional territories as well as identifying important resources and areas. This could involve co-creating maps that better consider traditional fishing grounds, sacred sites and areas of ecological importance. It has been effective in collaboration with remote sensing data and in identifying historical management issues that might not achieve the attention needed. World Resources Institute's Ocean Dependence Framework establishes a structured approach for assessing how coastal communities rely on marine ecosystems economically, nutritionally and culturally; the framework helps to identify areas where ocean planning must account for vulnerability, traditional knowledge and the equitable distribution of benefits and climate impacts. Several tools can be used for this process, such as ArcGIS, GeoJSON.io and the SeaSketch Ocean Use Survey. See Appendix F for example approaches to transparent stakeholder and rights holder engagement for data collection and social data collection methods. For

more SOP development approaches, see the Blue Paper "Co-producing Sustainable Ocean Plans with Indigenous and Traditional Knowledge Holders" (Strand et al. 2024).

Partnering with ITK holders

ITK systems offer invaluable insights into the complexities of marine ecosystems. They provide unique perspectives that complement scientific data and can hugely enhance the effectiveness and sustainability of SOPs (Strand et al. 2024). The knowledge-based principle that sets the basis for the SOP underscores that the plans should be underpinned by scientific, local and Indigenous knowledge systems (UNESCO-IOC 2025). Indigenous Peoples and local communities have a long history of sustainably managing marine resources, and their knowledge systems are essential for developing effective and equitable SOPs. These communities possess a wealth of knowledge about the ocean that has been accumulated over generations. This knowledge is often holistic and interconnected, reflecting a deep understanding of human-ocean relationships.

ITK systems can encompass a sophisticated understanding of the marine environment, including topics with limited study, such as relationships between species, migratory patterns, breeding grounds and cultural significance. Indigenous and traditional communities are often disadvantaged by policies that deny their fishing rights, restrict their access to coastal areas and exclude them from ocean decision-making. Excluding Indigenous and traditional communities from ocean planning not only creates injustice but also directly conflicts with sustainable and equitable ocean planning. Conversely, meaningfully involving knowledge holders and partnering with Indigenous Peoples and traditional communities enables steps towards the creation of equitable and sustainable ocean use.

Co-producing SOPs with ITK holders is essential for achieving equity, restorative justice and decolonisation in ocean governance (Strand et al. 2024), but the process needs to be tailored to local contexts. ITK systems are deeply rooted in specific ecosystems, landscapes and cultural understandings of nature, they are vital for a more comprehensive understanding of the environment.

Community engagement through co-production is crucial for the success of SOPs. Engaging with local communities in meaningful ways, where they are partners in the process, ensures that their needs and perspectives are considered during the planning process. It fosters a sense of ownership and responsibility for sustainably managing ocean areas and resources. It also empowers communities to lead, plan and implement initiatives and can foster two-way learning between decision-makers and local communities. The inclusion of ITK systems in SOPs needs to be completed in a sensitive and culturally appropriate manner. It must be a partnership with knowledge holders, not an extraction.

Importantly, funding and resources should be allocated for Indigenous Peoples and local communities to lead the collection of oral histories through storytelling, chants and other techniques, where necessary. Documenting ITK narratives and stories is crucial for preserving cultural and traditional knowledge within the SOP and its implementation. Another valuable approach is knowledge co-production, in which researchers and Indigenous knowledge holders work alongside each other as equal partners, or co-researchers, to better understand how ITK systems can best inform SOPs. As emphasised in the Blue Paper dedicated to this topic, success in these collaborations "requires that different types of knowledge and worldviews are equally valued and safe ethical spaces are intentionally created that nurture individual relationships, build trust, highlight common ground and provide cross-cultural connections through ceremony or other means" (Strand et al. 2024). Alongside more spatial approaches, such as participatory community mapping, these community-led approaches can provide insights into the cultural and ecological importance of species and areas. Adhering to the CARE principles (collective benefit, authority and control, responsibility, ethics) ensures that Indigenous data are governed in ways that respect community rights and priorities (Carroll et al. 2020). For further details, see Step 5, "Guidelines for data collection and annual reporting on SOP milestones".

The cultural context should be carefully considered when interpreting and recognising ITK systems in SOPs. This interpretation should be done in partnership with knowledge holders to ensure it accurately portrays their worldviews and understanding. Techniques could include the following:

- **Collaborative analysis.** ITK holders are involved in the interpretation process, which ensures that their knowledge is accurately represented and understood. This could involve joint workshops or meetings during which ITK holders and researchers analyse data together.

- **Triangulation.** ITK data are combined with scientific data and other sources of information to provide a more comprehensive understanding of the marine environment. For example, pairing ITK observations of fish behaviour with scientific data on fish migration patterns can provide a more complete picture of the species' ecology.

ITK is exceedingly valuable for developing and implementing SOPs. It should be incorporated into SOPs in various ways:

- **Informing baseline assessments.** ITK systems can provide valuable information on the historical and current status of marine ecosystems, including species distribution, abundance and habitat health. For example, ITK systems can help to establish historical baselines for fish populations, which can be used to assess the impacts of fishing and other human activities.
- **Identifying culturally significant areas.** ITK systems can help identify areas of cultural or spiritual importance to Indigenous and local communities, ensuring that these areas are protected and managed appropriately, ideally through Indigenous governance or co-governance agreements. This could involve incorporating traditional knowledge about important areas for cultural ceremonies into SOPs.
- **Developing sustainable management strategies.** ITK systems can inform the development of sustainable fishing practices, MPA design and other management strategies that are tailored to local contexts and consider the needs of Indigenous and local communities. For example, ITK systems can provide insights into traditional fishing methods that are more sustainable than modern practices.
- **Monitoring and evaluation.** ITK systems can be used to monitor the effectiveness of SOPs and evaluate their impact on marine ecosystems and local communities. This could involve incorporating ITK system indicators into monitoring programmes or using ITK-based methods to assess the health of marine ecosystems.

In summary, ITK systems are invaluable for developing and implementing SOPs. By partnering with ITK holders — while upholding their governance rights and ensuring culturally grounded interpretation — practitioners can support more effective, sustainable and equitable planning. These partnerships contribute to the long-term health of the ocean and the well-being of coastal communities by including diverse perspectives and promoting collaborative management. Recognising and respecting ITK systems is not only an ethical imperative but also a practical necessity for achieving truly sustainable ocean governance.

Tools and methodologies for effective and integrated data analysis

Decision support systems for resource allocation and scenario planning

Decision support systems combine spatial data, scenario modelling and multicriteria analysis to support evidence-based decisions, which can be used to achieve ambitions in ecological protection and to meet socio-economic needs.

Cumulative impact assessment tools

Cumulative impact assessment (CIA) tools are essential for identifying ecological hot spots, evaluating the combined pressures of human activities and guiding planners towards sustainable, ecosystem-based decisions in sustainable ocean planning and are widely applied in MSP (Menegon et al. 2018; Hammar et al. 2020). These tools are used to evaluate the combined effects of multiple human activities and environmental pressures on marine ecosystems. Rather than assessing each activity in isolation, they provide a holistic view of how all existing and planned activities interact with and affect the environment (Halpern et al. 2008).

CIA tools analyse current environmental conditions by integrating diverse spatial data related to marine ecosystems and human activities. They compile information on existing ecological baselines (e.g., habitat types, species distributions, water-quality indicators) and currently operative human activities (e.g., fishing, shipping, aquaculture, offshore energy projects) to identify the specific pressures these activities exert on marine ecosystems. In MSP processes, much of this data is actively generated and structured as part of the planning process, which then feeds directly into cumulative pressure and impact assessments. Outside of MSP, CIA tools often rely on existing or aggregated data sources. In both cases, the goal is to identify how multiple human activities interact to affect marine ecosystems over time.

Once the spatial data are integrated, CIA tools assess how the pressures overlap and interact, creating detailed pressure maps that highlight areas of high, medium and low impact. The assessment considers not only the intensity and frequency of these activities but also the sensitivity and resilience of affected ecosystems. By modelling the cumulative effects of overlapping pressures, these tools generate probabilistic impact maps that reveal likely ecological stress hot spots, providing a comprehensive baseline for decision-makers. This data-driven approach ensures that planners and policymakers accurately understand how various activities contribute to environmental degradation, helping them make informed decisions regarding resource management and conservation.

This process plays a crucial role in promoting sustainable ocean planning by enabling scenario analysis, conflict resolution and ecosystem-based decision-making. Planners can model and compare different development scenarios, assessing how changes in marine activities might increase or reduce cumulative impacts. By simulating the effects of new policies, restrictions or mitigation strategies, these tools help identify planning options that balance economic development with environmental sustainability.

Multicriteria decision analysis

Multicriteria decision analysis (MCDA) is a structured decision-making approach used to evaluate and prioritise different options when multiple, often conflicting, criteria need to be considered. It provides a systematic framework to compare alternative scenarios by assigning weights to each criterion based on its relative importance and then calculating a composite score for each option. This allows decision-makers to balance environmental, economic and social factors when selecting the most suitable outcome. MCDA is widely used in environmental management and, increasingly, in planning of the sea and ocean to support transparent, evidence-based decisions.

In the context of MSP, MCDA is commonly applied to suitability zoning, which identifies the most appropriate areas for specific maritime activities (e.g., aquaculture, offshore wind farms, conservation areas). The process typically begins by defining a comprehensive set of criteria that influences suitability, including the sensitivity of coastal and marine environments, conservation objectives, oceanographic potential, climate change projections, existing coastal land uses, ongoing maritime activities, socio-economic factors and governance goals. Each criterion is then assigned a weight, reflecting its relative importance in relation to the overall planning objectives and governance priorities. These priorities may include achieving environmental and economic sustainability, minimising conflicts with existing coastal and marine uses and promoting the introduction of new maritime activities that can enhance local social and economic development.

By combining these weighted criteria, it's possible to model and compare different policy options and generate suitability zoning scenarios that balance ecological protection, economic opportunities and social benefits (Abramic et al. 2024). This multicriteria approach ensures that all

relevant factors are considered in an integrated, transparent way, allowing decision-makers to explore how different planning strategies align with sustainability objectives and stakeholder and rights holder priorities.

This approach is especially valuable when decision-makers need to balance competing interests — such as economic development and environmental protection — and ensure that spatial plans align with sustainability goals. MCDA also helps engage stakeholders and rights holders because the transparent weighting process allows different perspectives to be included in the decision-making process, enhancing legitimacy and acceptance of the final spatial plan.

Collaborative and Participatory Geographic Information Systems tools

Collaborative and Participatory Geographic Information Systems tools are interactive, map-based platforms designed to support stakeholder and rights holder participation and collaborative decision-making in processes like MSP. These tools allow planners, scientists, policymakers, industry representatives and the public to view, analyse and contribute spatial data in real time, helping to co-create spatial plans that reflect diverse perspectives and interests. One well-known example is SeaSketch, a web-based collaborative mapping platform developed at the University of California, Santa Barbara. SeaSketch allows users to draw proposed zones for different maritime activities (e.g., fishing areas, conservation zones, offshore energy sites), view relevant environmental and socio-economic data and see the potential impacts of their proposals. Stakeholders and rights holders can comment on each other's plans, fostering transparency and building consensus through data-driven dialogue.

Ocean accounting

Ocean accounts are a valuable tool for sustainable ocean planning. They provide a comprehensive, integrated approach to measuring the ocean's economic, social and environmental value. By organising ocean data in a common framework, ocean accounts enable decision-makers to better understand the complex interactions between human activities and the marine environment, leading to more informed and sustainable decisions about ocean use and conservation.

Ocean accounts are a structured compilation of consistent and comparable information concerning marine and coastal environments (environmental domain), including related social circumstances (social domain) and economic activity (economic domain), aligned with existing standards (see Appendix G). Ocean accounts cover aspects such as the extent and condition of marine ecosystems (e.g., mangroves), the economic activities related to the ocean (e.g., fisheries) and the social conditions of coastal communities (e.g., employment and cultural heritage). The framework describes the interactions between the ocean economy and the ocean environment, the stocks and changes in stocks (flows) of ocean assets (natural capital) that provide benefits to people and the social and governance factors affecting the status and condition of environmental assets and associated benefits (Harwell et al. 2019).

Ocean accounts are important for sustainable ocean planning because they provide a holistic view of the ocean and its resources, enabling decision-makers to move beyond a narrow GDP-based perspective and providing a way to understand success over time. Ocean accounts enable decision-makers to perform these specific tasks:

- **Track the performance of ocean policy and planning** by providing a framework for measuring progress towards sustainable ocean management consistently over time.
- **Identify areas for conservation and restoration** by providing standardised information and a consistent evidence base that supports spatial planning decisions and enhances the accuracy of cumulative impact modelling.
- **Identify and measure the economic significance of various activities**, such as artisanal and industrial fisheries, while also evaluating the value of ecosystem services from mangroves and coral reefs and estimating the economic impact of marine-based tourism.
- **Balance the needs of different ocean users** by promoting collaboration among governments, industries and local communities.
- **Identify potential protected areas for vulnerable marine habitats and species**, enhancing a region's resilience to climate change and human-induced pressures.
- **Foster data-sharing and stakeholder and rights holder partnerships** by providing a common information base for all stakeholders and rights holders involved in ocean planning and management.

The Global Ocean Accounts Partnership is an international initiative that promotes the development and implementation of ocean accounts and provides guidance, tools and resources to countries. Developing and implementing ocean accounts requires a systematic, methodical approach to ocean data. When developing ocean accounts, it's vital that practitioners identify data gaps, ensure sufficient capacity-building and tackle methodological challenges in measuring the economic and social value of ocean resources (e.g., cultural heritage and biodiversity).

Despite these challenges, ocean accounts offer significant opportunities for sustainable ocean planning:

- **Improving decision-making.** By providing a comprehensive and integrated view of the ocean's value, ocean accounts help to ensure that SOPs and subsequent planning are based on a sound understanding of the trade-offs involved.
- **Increasing stakeholder and rights holder engagement.** Ocean accounts help to engage a wider range of stakeholders and rights holders in ocean planning and management, facilitating dialogue and collaboration among different user groups.
- **Enhancing transparency and accountability.** By making ocean data more accessible and understandable, ocean accounts help to provide accountability for SOPs and ensure that ocean resources are managed in a sustainable, equitable manner.
- **Leveraging SOPs for investments.** SOPs can be leveraged to promote adequate and equitable investments in climate–ocean change information, gaps analysis and capacity or technology that result in better outcomes for ocean ecosystems and people. The monitoring framework based on international standards (i.e., ocean accounts) will provide additional support.

Approximately 30 countries globally have some form of ocean account. Indonesia has some of the most advanced ocean accounts, especially under the environmental domain, and has developed a detailed dashboard presenting these.[9]

Impact mitigation strategy: Step-by-step approach for assessing and minimising ecosystem and social impacts

Sustainable ocean planning requires a robust and precautionary impact mitigation strategy to ensure the continued functioning of marine ecosystems and their benefits. This approach aligns with existing frameworks, regulations and best practices for MSP and ecosystem-based management, such as those outlined by the CBD's GBF (Haugen et al. 2024), and sectoral guidelines, such as the International Convention for the Prevention of Pollution from Ships and the Precautionary Approach to Fisheries Management by the Food and Agriculture Organization of the United Nations (FAO).

MSP provides a crucial tool for implementing ecosystem-based management (see Step 1 section "Integrating area-based policies for sustainable ocean planning"), helping to protect and restore ocean health while reducing user conflicts (UNEP 2011; Environmental Law Institute n.d.). More recently, MSP has moved towards a more complete inclusion of equity and justice considerations common in the broader planning field. It now recognises both ecological and social goals and impacts. This section outlines a step-by-step approach for assessing and minimising such impacts, with detailed guidelines for activities with unavoidable effects. This can involve compensatory measures, where appropriate, or avoiding or limiting activities when effects are deemed unacceptable.

Phase 1: Impact assessment

The first phase in any assessment involves a detailed evaluation of the potential impacts of planned (or proposed) activities on marine ecosystems from established baselines that reflect existing impacts. This can involve many of the approaches in the "Identifying and collecting baseline environmental, economic and social data for sustainable ocean planning" section, including ecological models, evidence from past experiences and discussions with local communities and experts to highlight potential ecological and social impacts that may not be predicted by existing models. These are some of the common approaches:

- **Ecosystem health and resilience.** Assessing the baseline status of the marine ecosystem and the associated impacts of various stressors is essential for prioritising management measures and setting targets for ecosystem health (see

Appendix F for the relevant data collection methodologies).

- **Scientific data and modelling.** Using the best available scientific data, including ecological surveys, oceanographic modelling and species distribution data, to assess potential impacts (Haugen et al. 2024). This includes developing conceptual ecosystem models that involve scientists, managers and stakeholders and rights holders to adequately identify ecosystem elements and define long-term sustainability goals (Harwell et al. 2019).
- **Indigenous and local knowledge.** Local resource users and traditional stewards of coastal and marine areas hold unique knowledge both about baseline conditions and the likely impacts of development or other forms of environmental change (see "Social data: Centring people in ocean planning").
- **Ecosystem-based approach.** This approach considers the interconnectedness of species, habitats and ecosystem processes and evaluates the cumulative impacts of multiple activities (BirdLife International 2021; Environmental Law Institute n.d.).

Guidelines for an ecosystem-based fisheries management approach include those developed by NOAA Fisheries, which has outlined six key guidelines that promote the sustainable management of living marine resources:

1. **Identify management objectives.** Define clear, measurable objectives for the ecosystem and fisheries.
2. **Develop a strategic plan.** Develop a comprehensive plan that considers the interactions among ecosystem components and human activities.
3. **Prioritise science.** Use the best available science to inform management decisions.
4. **Analyse trade-offs.** Evaluate the trade-offs among different management options and stakeholder and rights holder interests.
5. **Provide management advice.** Offer science-based advice to decision-makers on how to achieve management objectives.
6. **Maintain productive, resilient ecosystems.** Implement management measures that contribute to the long-term health and productivity of the ecosystem (Link 2016).

There is growing recognition that combining Indigenous and Western scientific knowledge strengthens ecosystem-based fisheries management; including multiple perspectives offers a more sustainable path for managing resources. (Frid et al. 2023). These guidelines provide a valuable framework for integrating the impact mitigation strategy into a holistic approach to ocean planning.

Phase 2: Avoidance and minimisation

Avoiding negative impacts is, of course, a first-best strategy, so Phase 1 involves a comprehensive assessment of the potential impacts. This assessment enables Phase 2 to implement stringent measures to avoid and minimise harm to the marine environment. This includes the following avoidance and minimisation measures:

- **Spatial and temporal planning.** Strategically locate activities to avoid ecologically sensitive areas, such as culturally important areas, critical habitats, spawning grounds and migratory routes, and schedule activities to minimise disturbance during critical periods (BirdLife International 2021). This includes considering long-term threats like sea level rise and incorporating proactive adaptation plans, especially for coastal cities or rural areas that rely on coasts and the ocean for their livelihoods, to ensure that ocean planning strategies and implemented sectors are viable and sustainable in the long term (Nicholls 2011).
- **Technological advancements.** Employ innovative technologies and practices that reduce environmental footprints, such as quieter vessels, fishing gear with reduced bycatch and renewable energy sources (European Commission 2024). This can also involve the use of technologies to provide more direct local benefits to coastal communities, such as ocean renewable energy for rural electrification aside from national-scale emissions reductions.
- **Pollution prevention.** Implement stringent measures to prevent and control pollution from all sources, including land-based activities, vessels and offshore installations. The identification of point and non-point sources of pollution is critical; although coastlines or oceanic gyres are places of pollution accumulation (including plastics but also many other persistent organic pollutants), most pollution may not ultimately originate in ocean industries or coastal areas.

Phase 3: Mitigation measures

This phase involves developing and implementing specific mitigation measures to address the identified impacts (for an example, see Box 14). Mitigation measures include the following:

- **Best management practices.** Implement industry-specific best management practices to minimise impacts, such as turtle excluder devices in fishing gear and ballast water management in shipping (Innes et al. 2015).
- **Environmental impact assessments.** Conduct thorough environmental impact assessments for all major activities to evaluate potential impacts and identify mitigation measures (BirdLife International 2021).
- **Monitoring and adaptive management.** Establish monitoring programmes to track the effectiveness of mitigation measures and adapt management strategies as needed (EPA 2015).
- **Regulatory requirements.** Mitigation measures should be selected and implemented in accordance with relevant regulations and policies. For example, the following permit criteria apply to ocean and coastal use under the Washington State Shoreline Management Act:
  - **Demonstrated need.** A significant local, state or national need must exist for the proposed use or activity.
  - **No reasonable alternative.** No reasonable alternative is available to meet the public need for the proposed use or activity.
  - **No significant adverse impacts.** The proposed use or activity should not result in likely long-term significant adverse impacts to coastal or marine resources or uses (eCFR 2025).

These types of mitigation can be applied in the context of ocean planning to address a wide range of potential impacts.

BOX 14. Case study: Mitigation under the National Environmental Policy Act

The US National Environmental Policy Act provides a framework for considering environmental impacts in federal decision-making. The act defines five types of mitigation:

- **Avoiding impacts.** Avoid impacts altogether by not taking a certain action or parts of an action.
- **Minimising impacts.** Limit the degree or magnitude of the action and its implementation.
- **Rectifying impacts.** Repair, rehabilitate or restore the affected environment.
- **Reducing or eliminating impacts over time.** Reduce or eliminate the impact over time by preserving and maintaining operations during the life of the action.
- **Compensating for impacts.** Compensate for unavoidable losses of resources by replacing or providing substitute resources or environments.

Phase 4: Compensatory measures for unavoidable impacts

In cases where impacts are unavoidable, compensatory measures must be implemented to offset the residual effects (Table 6).

Compensatory measures are a crucial component of impact mitigation, but they are not without challenges. It can be difficult to measure biodiversity losses and gains in the marine environment, and the success of restoration efforts can vary (Boffa Miskell 2021). In some cases, it may be impossible to fully compensate for the loss of unique or irreplaceable habitats (Cuvelier et al. 2018).

Effectiveness of mitigation strategies. The effectiveness of impact mitigation strategies depends on various factors, including the nature and scale of the activity, the ecological sensitivity of the affected area and the rigor of the assessment and monitoring programmes. Scientific literature and reports provide insights into the effectiveness of different mitigation strategies (Trebilco et al. 2022). For example, well-designed MPAs can effectively protect biodiversity and enhance fish stocks (Earth Journalism Network 2025). However, the success of compensatory measures, such as habitat restoration, can vary and depends on factors such as site selection, restoration techniques and long-term monitoring (Boffa Miskell 2021).

Relevant legislation and policies. Ocean planning and impact mitigation are guided by various laws and policies. One such law is Australia's Environment Protection and Biodiversity Conservation Act, which mandates environmental impact assessments and the use of avoidance, minimisation and compensation measures to mitigate the effects of marine activities on biodiversity. Chile also has an Environmental Impact Assessment System that ensures that marine and aquaculture developments go through impact assessments, including compulsory mitigation of environmental effects.

TABLE 6. **Compensatory measures**

COMPENSATORY MEASURE	DESCRIPTION	BENEFITS	LIMITATIONS
Habitat restoration	Restores degraded habitats, such as mangroves, coral reefs, wetlands and seagrass beds, to compensate for habitat loss or damage.[a]	Helps restore ecosystem function, biodiversity and resilience.	Can be challenging to achieve full recovery of degraded habitats; success depends on site selection, restoration techniques and long-term monitoring.[b]
Creation of artificial habitats	Constructs artificial reefs or other structures to provide habitat for marine organisms.[c]	Creates new habitat for fish and other marine life. Can enhance biodiversity and support fisheries.	May not fully replicate the functions of natural habitats; requires careful design and placement to avoid negative impacts.
Species translocation	Relocates species to suitable habitats to compensate for population declines or habitat loss.[b]	Can help to restore populations of threatened or endangered species.	May be challenging to ensure the survival and successful establishment of translocated species; requires careful selection of suitable habitats and monitoring of populations.
Marine protected areas (MPAs)	Establishes MPAs to conserve biodiversity and enhance ecosystem resilience.[d]	Protects critical habitats and species; can enhance fish stocks and ecosystem services.	Requires effective management and enforcement to achieve conservation goals; may displace and redistribute some human activities.
Payments for ecosystem services (PES)	Implements PES schemes to incentivise conservation and sustainable use of marine resources.[e]	Provides economic incentives for conservation and sustainable practices; can help align economic activities with ecological goals.	Requires careful design and implementation to ensure effectiveness and avoid unintended consequences.

Sources: a. NOAA n.d.; b. Boffa Miskell 2021; c. EPA 2015; d. Earth Journalism Network 2025; e. Innes et al. 2015.

Synthesis and recommendations

A robust impact mitigation strategy is crucial for sustainable ocean planning. By following a step-by-step approach that prioritises avoidance, minimisation and compensation for unavoidable impacts, we can ensure the long-term health and productivity of marine ecosystems. This strategy should be implemented within a broader ecosystem-based management framework, closely coordinated with sectoral approaches, such as ecosystem-based fisheries management, and guided by relevant legislation and policies, such as those in Australia and Chile.

Adaptive management and stakeholder and rights holder engagement are essential for the success of impact mitigation. Continuous monitoring and evaluation of mitigation measures are necessary to assess their effectiveness and adapt management strategies as needed. Stakeholders and rights holders — including local communities, industries and scientific experts — must be engaged to ensure that ocean planning decisions are informed by diverse perspectives and knowledge.

Geospatial data for illustrating jurisdictional claims, activity zones, protected areas and critical ecosystems

Identifying, compiling, validating, analysing and publishing spatial data supports evidence-based decision-making in ocean management (GOAP 2021; United Nations 2024). Planners can establish a solid foundation of spatial information to support sustainable ocean management decisions. Regular updates and refinements to this framework will ensure it continues to provide relevant information for adaptive management over time. This section presents examples of some of the tools and data sets available at the time of publication.

The vital first step is to determine what geospatial data are needed to inform the sustainable ocean planning process, meeting the place-based, ecosystem-based and knowledge-based attributes of SOPs. This will involve a range of considerations that may not always be relevant to individual country situations; nevertheless, they should be considered during the planning process. These are some of the key spatial data categories:

- **Jurisdictional boundaries:** Maritime boundaries, EEZs, territorial seas, contiguous zones, extended continental shelf claims.
- **Ecosystem extent and distribution:** Coral reefs, seagrass beds, mangroves, kelp forests, other critical marine habitats.
- **Ecosystem condition:** Health indicators for key ecosystems, pollution levels, water-quality parameters.
- **Human activities:** Fishing grounds, shipping lanes, tourism areas, aquaculture sites, offshore energy infrastructure, mining areas.
- **Area-based management tools:** MPAs, marine reserves, fisheries management, locally managed marine areas, OECMs.
- **Socio-economic data:** Coastal population centres, fishing communities, tourism hot spots, cultural heritage sites.

Practitioners should select data with the correct spatial and temporal resolution for their planning area and goals. The data should support baseline assessments, track changes over time and address the key planning questions. Practitioners should also consider whether the data align with national and international frameworks (e.g., MSP, the United Nations System of Environmental-Economic Accounting, SDGs) and, when possible, consider how the data can be stored and shared transparently through easily accessible technologies.

Geospatial data needs are diverse and specific to country contexts. For further detail on sourcing and accessing data, see Appendix G.

Selecting relevant indicators

Indicators must be relevant and indicative of the problem at hand and the solution's success or failure. These will be highly contextual and dependent on specific SOP objectives and approaches, but they should cover the three pillars of sustainable development to be useful in monitoring and evaluation: environmental, economic and social (for

more details, see Step 5, "Monitoring, evaluation and adaptive management protocols ").

This section discusses possible indicators to consider when developing an SOP; this is not intended to be an exhaustive discussion, and practitioners should keep in mind that not every SOP will include all of these indicators. It considers indicators from the Global Ocean Observing System (GOOS), the World Meteorological Organization's Global Climate Observing System (GCOS), the OECD, the initial SOP guide updated to reflect the new multilateral environmental agreements and also some of those that might be used in an ocean account. Table 7 outlines a few examples of these candidate indicators, which are mapped to the existing *Transformations* agenda action areas (for the full list, see Appendix H). Some of these indicators are implemented in the 2030 Agenda for Sustainable Development, which also includes indicators for means of implementation ("MOI-type indicators" hereinafter). MOI-type indicators are usually classified under the themes of technology, capacity-building and climate finance.

OECD

The OECD has developed a comprehensive set of indicators covering a wide range of topics relevant to national policymaking. These indicators are designed to provide a standardised, comparable way to measure progress across different countries and over time. They are organised into various themes, including economy, education, environment, health, innovation and technology, jobs and society. Specific initiatives curate relevant indicators, such as the OECD's Sustainable Ocean Economy Programme, which supports the development of indicators and data to measure the ocean economy, promote sustainable use of marine resources and inform MSP and ocean economy strategies across countries. Although the OECD does not have a specific set of indicators dedicated to SOPs, many of its existing indicators can be used to measure progress towards achieving their goals. For example, innovation indicators track progress towards developing new technologies and practices that support an SOE and should be considered for indicators for designing, implementing and monitoring a country's SOP.

GOOS

GOOS is an international programme that coordinates observations of the world's oceans. GOOS has identified Essential Ocean Variables (EOVs) that are critical for understanding and managing the ocean (see Appendix I). These variables are measured using a variety of platforms, including satellites, ships and buoys. The data are collected using a variety of platforms and can be used to support a wide range of applications, including climate monitoring, weather forecasting and ocean health assessments.

The EOVs collected by GOOS are not isolated variables but rather interconnected components of a

TABLE 7. **Example indicators for the different Transformations agenda areas from the SOP guide, GOOS and the OECD**

AREA	CANDIDATE INDICATOR
Ocean wealth	Proportion of fish stocks within biologically sustainable levels (SDG Target 14.4, Indicator 14.4.1, Tier I). This indicator aligns with the United Nations System of Environmental-Economic Accounting and, more specifically, with its asset accounts (Agriculture, Forestry and Fisheries).
Ocean health	Ocean warming (GCOS global climate indicator; GOOS indicator).
Ocean equity	Degree of application of a legal/regulatory/policy/institutional framework that recognises and protects access rights for small-scale fisheries (SDG Target 14.b, Indicator 14.b.1, Tier I); MOI-type indicator.
Ocean knowledge	Progress by countries in the proportion of students ("Formal Education" category) and number of community members ("Community Engagement" category) engaged in ocean sustainability actions (United Nations Decade of Ocean Science strategy document indicators).[a]
Ocean finance	Official development assistance, public expenditure and private expenditure on conservation and sustainable use of biodiversity and ecosystems (Target 18 under the Post-2020 Global Biodiversity Framework, Headline Indicator 18.0.1); MOI-type indicator.

Notes: GCOS = Global Climate Observing System; GOOS = Global Ocean Observing System; MOI = means of implementation; SDG = Sustainable Development Goal.
Source: a. UNESCO-IOC 2020.

complex system. For example, ocean surface stress influences ocean circulation, which in turn affects the distribution of nutrients and the abundance of phytoplankton, ultimately impacting ocean food supplies. EOVs play a critical role in addressing pressing ocean issues, such as climate change, pollution and overfishing. For example, monitoring sea surface temperature and sea ice provides crucial information for understanding and predicting climate change impacts on the ocean as well as the sea level risk and risk exposure of coastal cities. Monitoring ocean colour and nutrient levels helps assess the health of marine ecosystems and the impacts of pollution. By providing a comprehensive view of the ocean, EOVs enable informed decision-making for ocean management and conservation.

EOV data can help define the scope of an SOP by providing a comprehensive set of data and biophysical characteristics to help identify key issues and set clear objectives for sustainable ocean management. EOV data can further identify priority areas for management efforts; for example, ocean acidification data can inform strategies to protect vulnerable marine ecosystems, and data on fish abundance and distribution can guide sustainable fisheries management measures as well as observing system maintenance and developments. The international collaboration behind the GOOS EOV collection provides a track record of changes over time; therefore, it's possible to assess the effectiveness of management actions and make necessary adjustments through adaptive management practices to ensure the plan is achieving its objectives.

Building on draft indicators from the Transformations agenda areas

The *Introduction to Sustainable Ocean Plans*, published by the Ocean Panel in 2021, provides a set of candidate indicators for the five critical areas of the *Transformations*. These indicators are based on the SDGs and the CBD (see Appendix H).

Since the development of the first candidate indicators produced by the Ocean Panel, the GBF has been agreed upon. These are some of the potential indicators to help develop SOPs (for the full list, see Appendix H):

- **Spatial planning and protected areas.** Target 1.1: Percentage of land and seas covered by biodiversity-inclusive spatial plans.
- **Ocean health and ecosystem services.** Goal B.1/ Target 11.1: Services provided by ecosystems.
- **Sustainable use and management.** Target 9.1: Benefits from the sustainable use of wild species.
- **Finance and implementation** (many of which are complemented by OECD indicators). Goal D.1/Target 19: International public funding, including ODA for conservation and sustainable use of biodiversity and ecosystems.

Additional "number of country" indicators could guide the development of SOPs to ensure the underlying policies developed complement the GBF indicators; examples include Target 8.b (number of countries with agreed policies to minimise the impact of climate change and ocean acidification on biodiversity) and Target 9.b (number of countries with policies to sustainably manage, use [and trade] wild species).

Ocean accounting indicators

The ocean accounting approach does not have required indicators; much like an SOP, it's up to the individual country to determine which indicators are appropriate. Table 8 provides a draft set of indicators for the environmental and economic domains, although it's not an exhaustive list of ocean accounting indicators (see also Appendix H). Those relevant to the social domain should be considered vital to the framework.

The increasing recognition of social data's importance is reflected in major international frameworks and agreements. The UN Ocean Decade explicitly calls for integration of social sciences and local knowledge in ocean planning. The Ocean Panel emphasises that successful ocean economy transitions require robust social data to ensure equitable outcomes. Additionally, the CBD's GBF highlights the necessity of incorporating social considerations in marine conservation efforts. The Global Ocean Accounts Platform describes social indicators in detail in its "Social Accounts Briefing Paper" by Shellock and James (2024). Listed below are some of those indicators that might be useful to inform SOPs:

- Number of women with leadership roles in the community.
- Proportion of women in ocean industries.
- Proportion of a population or community working in different ocean industries.
- Household income from different ocean industries.
- Dependence on extraction of resources (e.g., from mangroves: wood, crabs, fish, herbs).

TABLE 8. **Ocean accounting indicators**

CATEGORY	METRIC	DESCRIPTION	UNITS	OA GUIDANCE AVAILABLE
Ecosystem extent	Asset extent	Total area of a specific ecosystem (e.g., coral reef, seagrass, mangrove).	km^2	✓
Ecosystem condition	Critical condition measures	Measures critical to measurement of ecosystem health (e.g., live coral cover).	N/A	✓
	Coral Reef Health Index	Composite measure of coral cover, diversity and mortality.	N/A	In progress
Ecosystem services	Coastal protection value	Number of homes and infrastructure protected, valued in physical and monetary terms.	Number/ US$	✓
	Reef fish production	Annual reef fish biomass production, potentially through resource rent.	Tonnes/ US$/ year	✓
	Nature-based tourism revenue	Direct tourism income from marine ecosystems.	Tonnes/ year	✓
	Carbon sequestration	Carbon sequestered by coastal ecosystems.	Tonnes/ US$/ year	✓
Socio-economic indicators	Ocean economy GDP	Annual blue carbon sequestration.	tCO_2e/year	In progress
	Tourism employment	Economic returns from marine resources.	US$	✓
	Fisheries employment	Jobs supported by marine tourism.	Number	✓
Governance	Marine protected area coverage	Total area of protected marine ecosystems.	km^2	✓
Financial flows	Conservation investment	Annual spending on marine conservation.	US$	In progress
	Resource user fees	Revenue from marine resource permits/fees.	US$	In progress
	Blue finance flows	Investment in sustainable ocean projects.	US$	In progress
	Environmental damage costs	Loss of asset value.	US$	In progress

Notes: US dollars are used as exemplary currency for monetary valuation. GDP = gross domestic product; N/A = not applicable; OA = ocean account; tCO_2e = tonnes of carbon dioxide equivalent; ✓ = compilation guidance exists in international standards.

Source: Pers. Comm. 2024.

- Fish and seafood consumption per capita.
- Proportion of population living in food poverty.

Social data serve several crucial functions in ocean planning and management (for further information on the benefits of ocean indicators for society, see Step 5, "Guidelines for data collection and annual reporting on SOP milestones"). First, social data help identify vulnerable populations and communities most dependent on marine resources, enabling more targeted and effective interventions. Second, the data reveal power dynamics and access issues that might otherwise be overlooked in traditional economic analyses. Third, social data support the development of more equitable benefit-sharing mechanisms by illuminating how different groups use and value ocean resources.

The Shellock and James (2024) briefing document provides many more indicators for practitioners to consider when assessing the social dimension of SOPs. It also indicates potential domestic and international data sources for these indicators.

Practitioners should also review the 14 draft social account dimensions from Shellock et al. (forthcoming) and consider including their relevant indicators (Figure 6). Alternatively, practitioners can contact the Global Ocean Accounts Partnership for further advice.

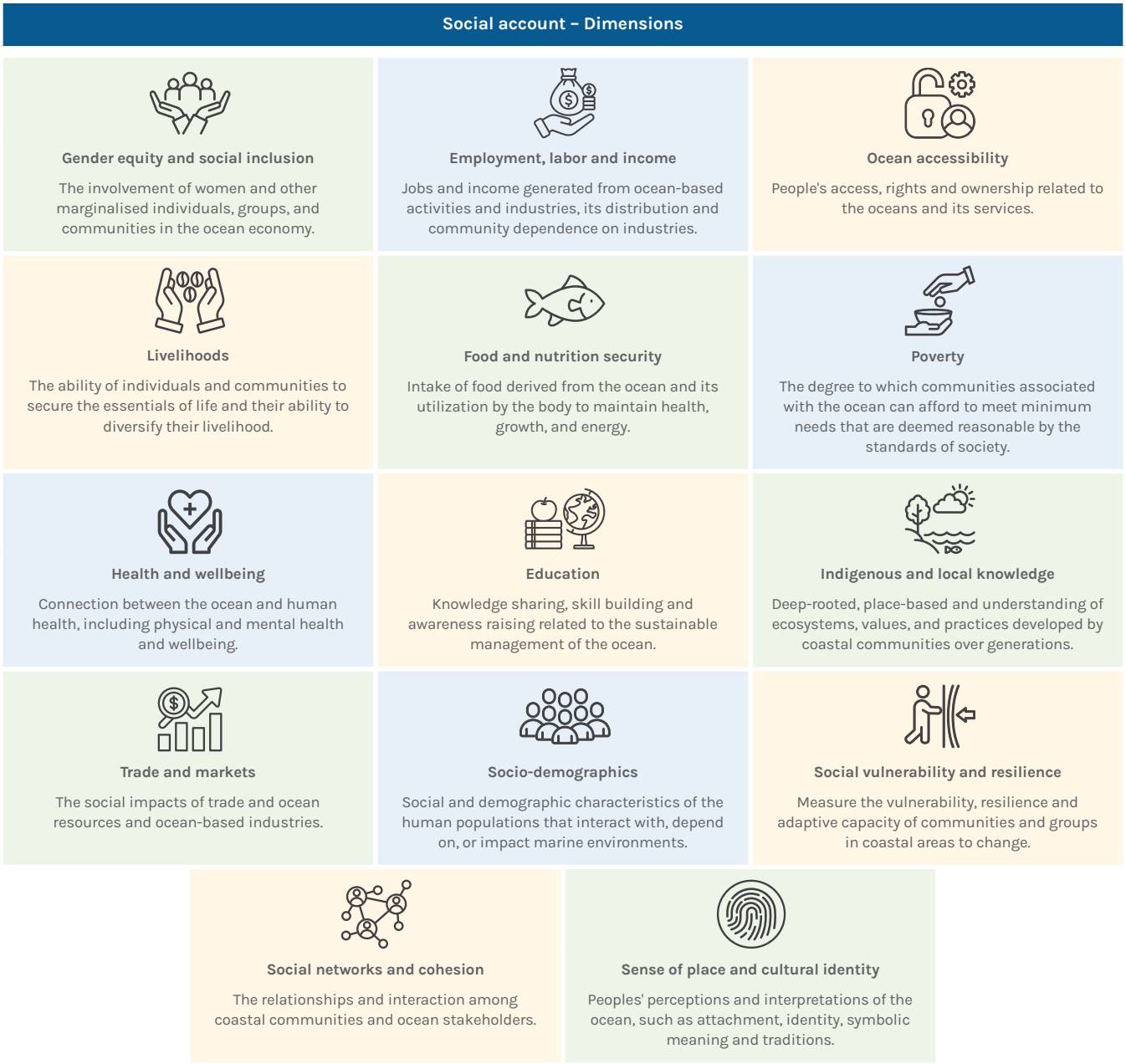
Projecting potential future conditions to identify opportunities, risks and threats

Projecting possible future conditions is crucial in forward planning. These factors are intertwined, and changes in one area can have cascading effects on others, making projections challenging. For example, climate change impacts on marine ecosystems can affect fisheries production, leading to economic consequences for coastal communities. Therefore, ocean planning must use an integrated approach that considers the interrelationships between these factors and their combined influence on the long-term sustainability of ocean and coastal environments. This section lists multiple projection tools, but only some will be relevant to each unique situation.

Economic outlook

Economic modelling uses quantitative models to simulate economic activities and predict future trends. Examples could include input-output models and computable general equilibrium models. This approach can incorporate various factors, such as market dynamics, technological advancements and policy interventions, to provide insights into the potential economic impacts of different ocean planning scenarios. However, economic modelling may simplify complex economic relationships and rely on assumptions that may not always hold true in the future due to uncertainties in the process. Cost-benefit analysis evaluates the economic costs and benefits of different ocean planning options to help achieve sustainable ocean use, such as assessing the economic viability of different management strategies (e.g., for an MPA). Valuation of ecosystem services assigns economic value to the benefits provided by marine ecosystems, such as estimating the value of carbon sequestration by coastal wetlands. By quantifying these benefits, planners can better understand the economic implications of different ocean management decisions. However, it can be challenging to accurately value ecosystem services because many of them are not traded in markets.

FIGURE 6. **Draft social account dimensions**



Source: Shellock et al. forthcoming.

Environmental outlook

Approaches for projecting environmental conditions include the following:

- **Climate models.** These models simulate Earth's climate system and project future changes in temperature, sea level, ocean acidification and other climate-related variables. These projections can inform ocean planning by providing insights into the potential impacts of climate change on marine ecosystems and coastal communities. For sustainable ocean planning, these models can also show how climate change and new oceanographic conditions may affect marine uses and the sustainability of maritime sectors:
  - Certain maritime sectors could see increased potential. For example, rising sea temperatures may create favourable conditions for the

sustainable aquaculture of species that were previously not economically viable under past climate conditions.

- Conversely, other maritime sectors could face new limitations or even lose their economic potential due to changing climate conditions. For instance, increasing instability in wind patterns could reduce the economic feasibility of offshore wind energy projects.

- **Ecosystem models.** These models simulate the interactions between different components of marine ecosystems, such as food webs, nutrient cycles and habitat dynamics. They can be used to project how ecosystems may respond to changes in environmental conditions, such as those caused by climate change or pollution.
- **Species distribution models.** These models predict the distribution of marine species based on their environmental preferences. They can be used to project how distributions may shift in response to changing environmental conditions, which can inform conservation planning and marine spatial planning.

Furthermore, climate and ecosystem models could be applied to analyse how ecosystems and species may respond to the introduction of new maritime uses, helping to identify sustainable solutions through spatial planning processes. These models can simulate how changes in environmental conditions — combined with new human activities — might affect species distribution, habitat quality and overall ecosystem health. A particularly relevant example would be the use of ecosystem models to assess how the biomass of key species might change with the introduction of new maritime activities, such as aquaculture or offshore wind farms. These analyses could help determine whether these new uses are compatible with the long-term sustainability goals for the area, ensuring that they do not undermine biodiversity, ecosystem resilience or the delivery of essential ecosystem services.

Such modelling approaches could also provide insights into potential synergies or conflicts between different marine sectors. For example, offshore wind farms could create artificial reef structures that enhance local biodiversity or change the distribution of certain species, including the fish stocks (Couce Montero et al. 2025).

By integrating these predictive tools into the planning process, policymakers and stakeholders and rights holders can better anticipate ecological responses to new developments, identify suitable areas for sustainable maritime activities and adapt management strategies to minimise environmental impacts while maximising socio-economic benefits. This science-based approach ensures that ocean planning supports both environmental protection and the sustainable growth of maritime sectors.

Social approaches and local knowledge

To understand the past and accurately project future conditions, practitioners must incorporate social approaches and local knowledge in their SOPs. Social approaches include the following:

- **Stakeholder and rights holder engagement.** Meaningful engagement enables stakeholders and rights holders to share their knowledge, perspectives and opinions about the future conditions based on lived experiences.
- **Social impact assessments.** These assessments evaluate the potential social and cultural impacts of different ocean planning options. They help identify potential conflicts and ensure that the plan considers the needs of vulnerable communities.

- **Traditional ecological knowledge.** Traditional ecological knowledge often includes detailed observations of marine species, their habitats and their interactions as well as traditional fishing practices and conservation methods. These time series observations are necessary to understand how ecosystems or marine species might react to developments in the marine space. Yet, in many cases, modelling cannot be performed because this information does not exist on a localised scale over many years; therefore, traditional knowledge could be the best opportunity to assess the future.

Other approaches: The Delphi method

The Delphi method is a structured process for gathering expert opinions and reaching consensus on complex issues. It tends to require less data than those explained above, but it can be particularly useful in data-poor environments. The Delphi method involves a series of questionnaires and feedback rounds, allowing experts to refine their judgements based on the collective knowledge of the group. In ocean planning, this method can be used to develop future scenarios, assess the likelihood and impact of future events, identify priorities for ocean planning and then develop consensus on management strategies. The Delphi method is a versatile tool that can be applied to various aspects of ocean planning. Its structured process is particularly useful in complex and uncertain situations where diverse perspectives need to be considered. By incorporating the Delphi method into ocean planning, decision-making can be more informed, inclusive and effective.

Documenting and analysing baseline environmental, economic and social conditions provides a robust evidence-base for sustainable ocean planning. It supports countries in understanding ecosystems, human uses and governance systems; identifying social and economic dependencies; and establishing measurable reference points to track changes (see Step 5). By using diverse data collection methods well suited to individual country contexts, planners can better understand the complex interconnections shaping ocean spaces and ensure that decisions are grounded in the nine essential attributes of an SOP.

Step 4:

The building blocks of SOPs

KEY TAKEAWAYS:

- SOPs must be developed as strategic, actionable plans that set clear goals, objectives, policies, standards and actions across all ocean sectors.
- Objectives should be SMARTIE — specific, measurable, achievable, relevant, time bound, inclusive and equitable — to ensure meaningful progress.
- To avoid fragmentation and enable smooth implementation, policy design must be integrated and regulations aligned across all levels of government.
- A robust governance architecture requires both institutional leadership and collaborative frameworks to ensure cross-sector coordination and accountability.
- Mechanisms like public-private partnerships, maritime clusters and knowledge brokers can enhance innovation, coordination and shared ownership.
- SOP implementation relies on strong financial planning, blending domestic resources with external financing to ensure long-term viability and impact.

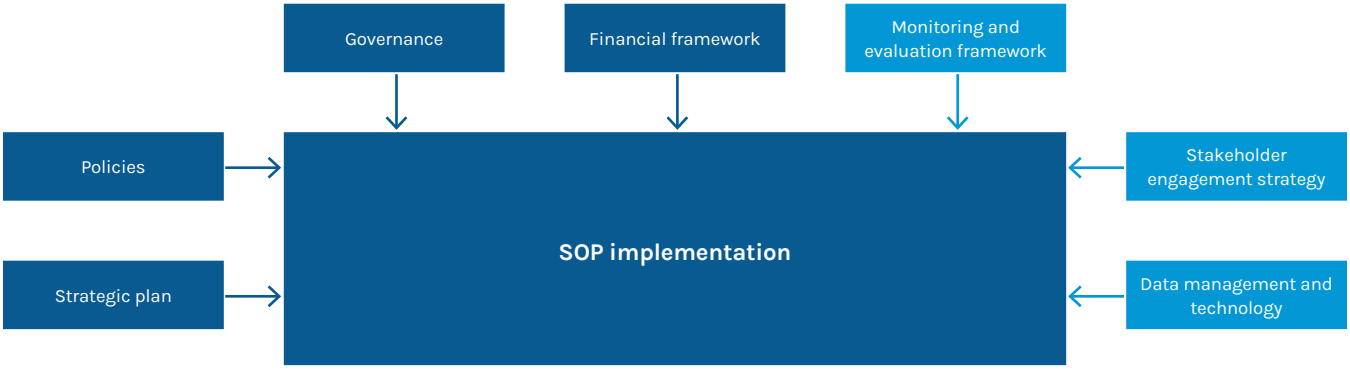
An effective SOP will provide the necessary components and guidance on how to transition from business-as-usual planning to the effective implementation of the SOP (UNEP 2025). The enabling conditions and components needed to transition from planning to implementation include developing a mixture of effective strategic plans (as described in the previous sections), policies and related governance frameworks for implementation. Step 4 focuses on the consolidating steps involved in the development of a strategic plan, policies, governance architecture and a financial framework (Figure 7).

Building the strategic plan

The SOP must be a strategic plan that is meaningful for all marine-related sectors, government agencies, industry, the private sector, civil society and other stakeholders and rights holders. Its development must include the following key components:

- **Strategic plan:** Identifies the goals, objectives, policies, guidelines, standards and actions for the sustainable development of the marine area.
- **Policies:** A system of instruments that supports the transition to an SOE, including national and subnational laws, regulations, institutional and governance reforms, industrial policies, monitoring and enforcement. Sector policies

FIGURE 7. **Outline of SOP implementation and guidance requirements**



Source: WRI authors.

articulate how existing ocean economy sectors (e.g., energy, fisheries, mariculture, shipping, tourism, mining) will develop and evolve to realise the transformations, and they consider the compatibility of emerging ocean activities. These policies and legislation provide businesses, investors, governments, communities and Indigenous Peoples with clear guidance for the SOP and its implementation.

- **Governance architecture:** Defines the decision-making structures, processes and roles and ensures sufficient institutional capacity (e.g., skills and knowledge in relevant agencies) for developing, implementing, monitoring, evaluating, enforcement and improving the SOP.
- **Financial framework:** Sets out the sufficient long-term financial resources for development, implementation, monitoring, evaluation and improvement of the SOP actions. Funding mechanisms must come from domestic resources (where feasible) and can be supplemented by funding from development banks, ODA, philanthropies and other sources (see Step 2).

Goals and objectives

As outlined in Step 1, the goals and objectives of the SOP must reflect and guide the sustainable use of the ocean and provide the needed governance framework and capacity for its implementation. Goals can cover a wide range of national priorities but should consider the three pillars of sustainable development: environmental, economic and social. Ultimately, the goals of the SOP must also align with the SDGs, the GBF and the Paris Agreement to ensure comprehensive and cohesive progress towards global sustainability targets. The SOP's objectives must reflect the desired outcomes, vision and principles, and behavioural changes that ensure the achievement of its goals. The objectives must be SMARTIE:

- **Specific:** Precise, concrete and targeting specific areas to improve the sustainable ocean economy.
- **Measurable:** Able to verify the achievement and progress of the SOP through indicators.
- **Achievable:** Realistically achievable within the context, knowledge and available resources.
- **Relevant:** Directly linked to the drivers and goals of the SOP.
- **Time bound:** Timelines for expected results and evaluation of achievements.
- **Inclusive:** Considers those involved and impacted into processes, activities and decision-making/policymaking in a way that addresses power imbalances.
- **Equitable:** Fairness in addressing injustice and sharing benefits across stakeholder and rights holder groups.

A good way to ensure that an objective is SMARTIE (Morf et al. 2021) is to follow a structure like this:

By _____ (a certain date), **implement a** _____ (law, policy, programme, project or institutional structure — or an aspect of one of these) **to achieve** _____ (some sort of measurable progress towards an SOP goal).

The differences between goals and objectives should also be considered when developing SOPs (Table 9).

TABLE 9. **The differences between goals and objectives when developing an SOP**

GOAL	OBJECTIVE
Broad	Narrow
General intentions	Precise
Intangible	Tangible
Abstract	Concrete
Can't be measured	Measurable

Source: WRI authors.

BOX 15. Fiji's National Ocean Policy goals

For its National Ocean Policy, Fiji outlined seven key goals in order to achieve 100% sustainable management of its ocean area under national jurisdiction:

Goal 1. COOPERATION: Harmonise and promote an integrated and cooperative approach to managing the ocean in a manner that promotes security, strives for sustainability and ensures prosperity for all Fijians.

Goal 2. SUSTAINABILITY: Protect, restore and improve ocean ecosystems and enhance climate resilience and biodiversity so benefits can be equitably shared through the sustainable management of 100 percent of Fiji's ocean within national jurisdiction.

Goal 3. SECURITY: Safeguard assets and ensure regulatory compliance for multidimensional maritime security for 100 percent of Fiji's ocean within national jurisdiction.

Goal 4. PEOPLE: Promote a people-centred approach to ocean management by sharing benefits in an equitable and inclusive way that respects rights, traditions and culture.

Goal 5. DEVELOPMENT: Establish a solid foundation for sustainable development, which includes facilitating ocean-based opportunities and innovations to ensure healthy ecosystems and secure economic livelihoods.

Goal 6. KNOWLEDGE: Integrate traditional knowledge, heritage and cultural practices with knowledge acquired from scientific research to provide a holistic platform that can meet the contemporary challenges of the ocean.

Goal 7. ADVOCACY: Engage in regional and global advocacy that aligns with and fortifies ongoing national endeavors while recognising the interconnected nature of the ocean, the ocean-climate nexus, and the need for ambitious ocean management.

Source: Republic of Fiji 2020.

Developing the SOP goals and objectives

For the SOP goals and objectives to be widely accepted and successfully implemented, their development will require the committed participation of all relevant government departments and advisory bodies as well as non-governmental stakeholders and rights holders. The goals must be developed as high-level statements of the general direction, intent and desired outcome the SOP seeks to achieve. The goals must be strategic and consider the SOP vision as well as short-, medium- and long-term objectives (see Step 1). The following are steps for developing the SOP goals and objectives:

- Conduct a full analysis of legislation, policies, plans and agreements at the different governance levels, including international, national and province/county to understand policy targets, drivers and needs.
- Check the goals, objectives and targets of existing marine-related policies and plans to ensure that the SOP conforms to these strategies and plans. The SOP goals and objectives must be in line with the SOP vision, 2030 Agenda for Sustainable Development and GBF targets, and they must build on integrated ocean management and ecosystem knowledge.
- Define initial goals and objectives based on the review of the goals, objectives and targets of existing marine-related policies and plans. The goals and objectives of an effective SOP must reflect the nine SOP attributes (inclusive, integrative, iterative, place-based, ecosystem-based, knowledge-based, endorsed, financed and capacitated) and the five SOP outcomes (ocean health, ocean wealth, ocean finance, ocean equity and ocean knowledge).
- Engage and agree with government departments and stakeholders and rights holders on their key and shared inspiration for the SOP. The SOP must ensure effective protection, sustainable production and equitable prosperity as well as time-bound goals and objectives.
- Amend the goals and objectives based on the stakeholder and rights holder consultation and ensure that they're realistic and achievable.

This structured approach to setting the SOP goals and objectives not only helps in tracking progress but also ensures that every action will contribute towards tangible outcomes (for an example, see Box 15). Getting broad agreement on the goals and objectives first — before moving onto actions —includes the

various stakeholders and rights holders in the process and helps achieve their buy-in. By combining a visionary outlook with actionable SMARTIE targets, the SOP process can effectively integrate diverse perspectives and foster a collaborative, accountable and forward-thinking framework for sustainable ocean governance.

SOP actions

The SOP actions can be understood as measures taken to achieve each of the SOP goals and objectives. These actions lead to the needed transition to a sustainable ocean economy, and they enable appropriate actors to develop their own related actions, which can be integrated into their operational approaches. This allows for ownership of the SOP actions to be devolved to the most appropriate level and organisation while maintaining overall guidance by the SOP. Box 16 introduces a guiding framework for planning a sustainable ocean economy transition tailored to a country's unique setting and needs.

The actions identified within the SOP underpin the targets and outcomes set out in national policies (across sectors and policy areas) as well as the enabling conditions needed to ensure the delivery and implementation of the SOP (see Boxes 17 and 18). The following are the steps for developing the SOP actions:

- For each SOP goal and objective, identify the actions that will lead to a transition. The actions for each SOP goal could consider the following SOP themes: sector management actions; legal framework; stakeholder and rights holder engagement and coordination; research priorities; awareness, outreach and education; internal process change; data and evidence; financing and investment; and enforcement considerations.
- Define cross-sectoral actions that ensure coordination and coherence across policy delivery institutions.
- Prioritise the actions that can best achieve the goals and objectives, taking into consideration actions that are already underway. Related actions can be combined to avoid duplication. The actions can be prioritised based on their feasibility, affordability and impact. They can be rated based on low, medium and high priorities.
- Describe the selected actions by specifying how each will be delivered and why that action is the best approach to address issues under a specific goal or objective.
- Define the timeline for the delivery and implementation of each SOP action. This could be designed based on months, quarters and years. A clearly defined timeline allows each relevant stakeholder and rights holder to incorporate planned inputs and outputs of actions into sector-level schedules.
- Identify the lead and supporting agencies responsible for each action. Identify if and where additional assistance may be needed for the delivery of each action.

BOX 16. **Enabling a sustainable ocean economy transition in practice**

Enabling a comprehensive, impactful transition to a sustainable ocean economy requires holistic and integrated approaches that protect ocean health while promoting sustainable use of ocean resources for human well-being. The United Nations Environmental Programme (UNEP) has developed a practical "systems" approach to identify sustainable, resilient and equitable ocean economy transition pathways that can support Sustainable Ocean Plan design and implementation to achieve ocean sustainability. Its stepwise Sustainable Blue Economy Transition Framework outlines the core elements and transition pathways towards a sustainable ocean economy tailored to a country's unique settings and needs. The framework helps identify and practically deliver cohesive policy to achieve four main goals:

- **Goal 1:** Protect, restore and maintain healthy and resilient ecosystems.
- **Goal 2:** Deliver equity, equality and inclusivity in sustainable ocean economy processes and outcomes.
- **Goal 3:** Build climate stability and resilience.
- **Goal 4:** Enable circular economy approaches for sustainable consumption and production, reducing pollution and waste.

These goals guide countries in developing a transition pathway towards a sustainable ocean economy, determined by national priorities and circumstances, and steer change through integrated policy and management.

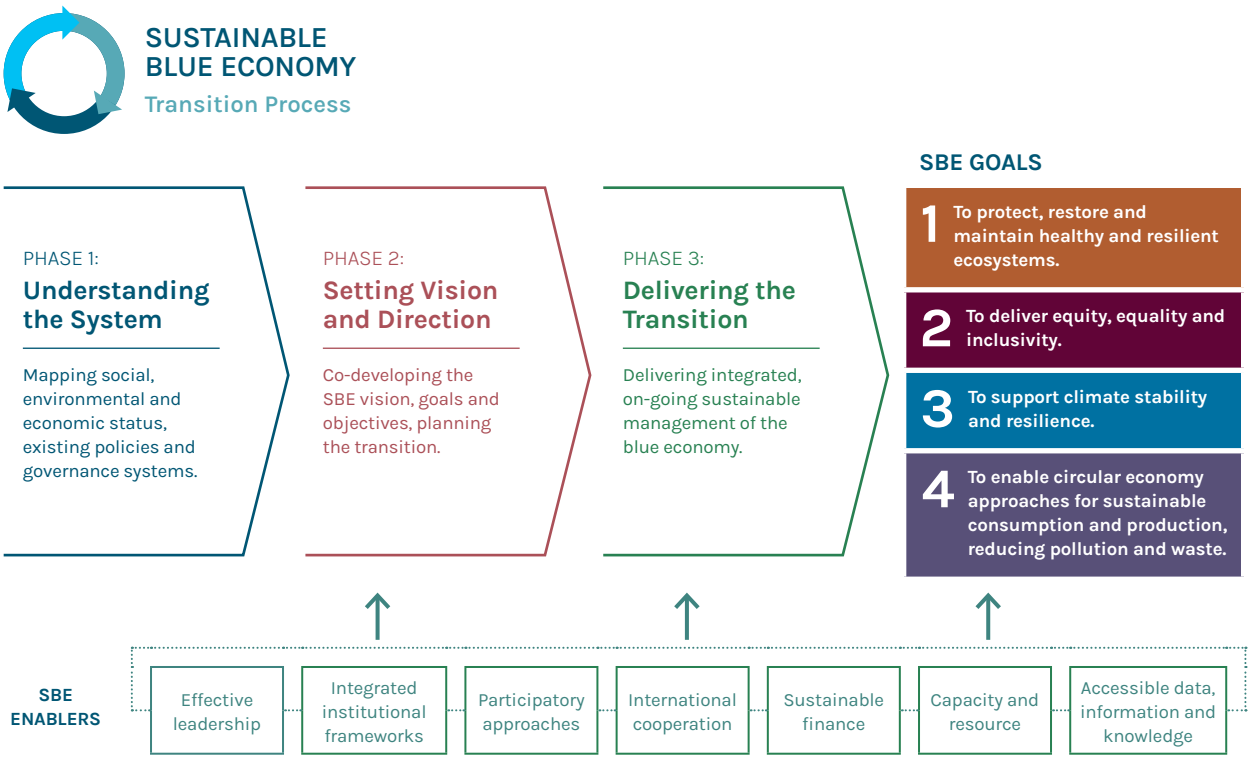
BOX 16. Enabling a sustainable ocean economy transition in practice (cont.)

The framework is structured around three phases of transition:

- **Phase 1. Understanding the system:** Tools and approaches to bring together an understanding of the current situation in a country that is shared across stakeholders and rights holders as a foundation for change.
- **Phase 2. Setting vision and direction:** How to co-develop a collectively shared vision, underpinned by specific goals and outcomes at a national or local level to guide the transition.
- **Phase 3. Delivering the transition:** An overview of how a sustainable ocean economy transition can be delivered through ongoing, everyday processes of decision-making, marine planning and evidence-based, adaptive management approaches.

To initiate the transition process, a sustainable ocean economy Rapid Readiness Assessment tool helps evaluate a country's existing governance and legal framework, institutional mechanisms and political landscape to identify entry points, gaps and recommendations for priority actions, including resource needs. It further identifies key enabling actions that make the sustainable ocean economy transition tangible and real.

FIGURE B16.1. UNEP Sustainable Blue Economy Transition Framework



Note: SBE = sustainable blue economy.
Source: UNEP 2025.

BOX 17. Goals, objectives and actions for the 2024 US National Strategy for a Sustainable Ocean Economy

In 2024, under the Biden administration, the United States announced its National Strategy for a Sustainable Ocean Economy. The strategy included a series of goals, with specific objectives and actions to direct efforts towards 100% sustainable management of the ocean under its national jurisdiction. One example of this breakdown is illustrated below:

GOAL 3. ADVANCE SUSTAINABLE AND JUST ECONOMIC DEVELOPMENT

Objective 1. Develop sustainable ocean industries and infrastructure

Key opportunities for action:

- Use evolving science and ecosystem-based fishery management to support sustainable US wild capture production and assist states in achieving sustainable fisheries in their waters. Incorporating ecosystem interactions and uncertainties into precautionary fishery management will protect stocks, reduce overfishing and build a more resilient fishery in the face of climate impacts.
- Promote fisheries and seafood, including aquaculture, as a critical element of global food and nutrition security in initiatives, programmes and national and international dialogues, including through the United Nations.
- Prevent overfishing in federally managed fisheries, work to reduce bycatch and develop international partnerships to minimise overfishing of stocks that migrate across boundaries and between exclusive economic zones.
- Build and sustain federal climate-ready fisheries that are prepared for, informed by and can respond promptly to the impacts of climate change on fisheries-related species, habitats, fishing sectors, communities and other sectors that may affect fisheries. The National Oceanic and Atmospheric Administration's Inflation Reduction Act investments in climate-ready fisheries support building a dynamic fisheries management system that incorporates climate and ecosystem environmental data to support management decisions.
- Support diverse and sustainably managed aquaculture through an efficient and strategic regulatory approach that considers and mitigates impacts on wild stocks, protected resources, essential fish habitat and marine ecosystems.
- Continue negotiating, developing and integrating updated guidelines for sustainable aquaculture into US aquaculture development. The guidelines developed through the Committee on Fisheries by the Food and Agriculture Organization of the United Nations (FAO) provide practical guidance for promoting implementation of the Code of Conduct for Responsible Fisheries and engaging and enabling aquaculture to effectively participate in the implementing the 2030 Agenda for Sustainable Development.
- Combat illegal, unreported and unregulated fishing through information-sharing and innovative technologies for monitoring and intelligence support facilitated through whole-of-government mechanisms such as the Maritime Security and Fisheries Enforcement Act Interagency Working Group, 156 agency initiatives and multilateral coalitions, including by working with regional fisheries management organisations and encouraging other countries to become parties to the FAO's Agreement on Port State Measures to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing.

Source: Ocean Policy Committee 2024.

BOX 18. **Chile's National Ocean Program, 2023**

In 2023, Chile released its National Ocean Program. Serving as its Sustainable Ocean Plan (SOP), this road map towards 100% sustainable ocean management was broken down into specific actions and subsequent tasks, including the responsible and associated ministries to clearly identify those accountable. Tables B18-1 and B18-2 showcase some of those actions and tasks taken directly from the SOP.

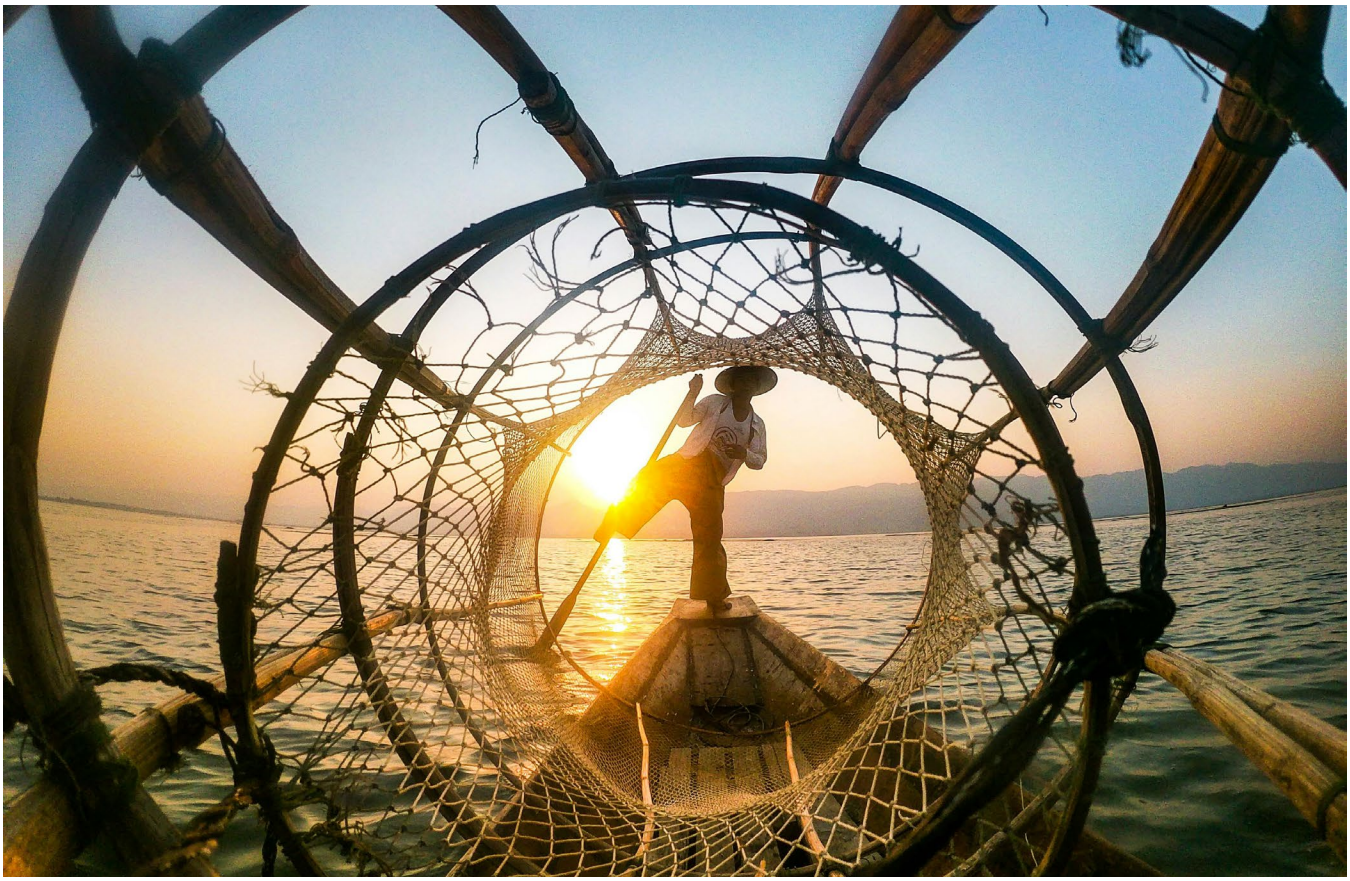
TABLE B18-1. **Biodiversity action and tasks**

ACTION	EVALUATE THE CONSERVATION STATUS OF MARINE BIODIVERSITY.
Description/ specific tasks	• Update the inventory of marine ecosystems with information from different governmental and semi-governmental institutions, academics and non-governmental organisations, prioritising information from marine protected areas, both coastal and oceanic, articulating with institutions that have relative information to the state of conservation of ecosystems. • Carry out a study to evaluate the conservation status of marine ecosystems in Chile.
Responsible	Ministry of Environment
Some associated institutions	Undersecretariat of Fisheries and Aquaculture; National Fisheries and Aquaculture Service; Fisheries Development Institute; Ministry of National Defense, Navy; centres for academic research; non-governmental organisations
Deadlines	2030

TABLE B18-2. **Cross-sectoral action and tasks**

ACTION	FORMALISE THE NATIONAL MARITIME ADMINISTRATION COORDINATION COMMITTEE.
Description/ specific tasks	Regulate, via supreme decree, the National Maritime Administration Coordination Committee, establishing its structure, organisation, functions and coordination and work mechanisms, with a view to promoting and verifying compliance with the responsibilities assumed by the State of Chile within the framework of international regulations, as well as the national regulations referring to maritime and port matters.
Responsible	Ministry of National Defense, Navy
Some Associated institutions	Ministry of Foreign Affairs; Ministry of Labour and Social Security; Ministry of Energy; Ministry of Environment; Ministry of Mining; Ministry of Transportation and Communications; Ministry of Health; Ministry of Science, Technology, Knowledge and Innovation
Deadlines	2030

Source: Government of Chile, Ministry of Foreign Affairs (2023).



Policy integration and regulatory adjustments

Suitable enabling conditions, such as policy integration and regulatory adjustments, are often needed at the local and national level to ensure the successful delivery and implementation of the SOP. To ensure coherence across all levels of governance, stakeholders and rights holders must be engaged from the start. This should involve all relevant stakeholders and rights holders, including government agencies, local communities, industry representatives and relevant NGOs. Meaningful stakeholder and rights holder input in developing the SOP, as well as in reviewing and developing implementing laws and amendments, will ensure wide-ranging input and buy-in to the process early on. This will lead to higher levels of acceptance and support, smoother implementation, successful completion of actions and achievement of desired goals and outcomes. Cross-sectoral coordination can help ensure policies are integrated and mutually supportive (see further details below). The following activities aim to integrate SOP policies with existing national and local policies to maintain coherence across all levels of governance:

- Assess existing national and local policies to understand the interlinkages between policy requirements and delivery agencies. This will help identify areas of overlap, duplication of efforts, conflicts and synergies.
- Identify areas where there are trade-offs and opportunities for policy coherence through the SOP.
- Define and engage with stakeholders and rights holders so they understand the value of the SOP, its differences with other policies/plans and how it can support as well as coordinate with existing policies and area-based management approaches.
- Develop recommendations for regulatory adjustment to enhance further coherence between the SOP and existing policies and area-based management approaches.

In some cases, the effective development and implementation of the SOP will require ongoing regulatory adjustments and policy redesign. Once any required new laws are enacted and any amendments

to existing laws and regulations are completed, further adjustments may be necessary. These can be made either in line with the regular review process of the SOP or as needed, such as when subsequent amendments to other instruments have knock-on effects for the SOP and its implementation. Regulatory adjustments can help build public trust and provide legitimacy for both existing and new government agencies to implement the SOP, depending on the specific context.

SOPs often emphasise the importance of policy integration to maintain coherence across all levels of governance. Policy integration aligns SOP policies with existing national and local policies, such as marine spatial plans and sector-level plans. By integrating these policies, SOPs can create a unified framework that supports sustainable development and effective management of ocean resources.

To implement SOP goals, objectives and actions, countries will need to develop interconnected spatial plans at different scales (local, subnational, national and regional). Ensuring interconnectivity of policies, plans and projects enables local actions to contribute to broader national and regional goals. Coordination and coherence across governance scales must be guaranteed both vertically with the overarching SOP (e.g., under a nested approach) and horizontally among the different sector or subregional plans. The SOP must be a framework that supports multiscale spatial planning. A multiscale spatial plan can be delivered by applying the principle of spatial subsidiarity, which states that spatial challenges — facilitated by appropriate structure, resources, abilities and processes at national and international levels — must be dealt with at the lowest possible and appropriate scale.

A multiscale spatial plan approach through the SOP can help coordinate across the following key elements:

- **Objectives:** Common values and strategic interests/objectives for different policies, plans and planning areas.
- **Processes and methods:** Coordination of data collection and assessments, data coherence, coordination of stakeholder and rights holder engagement between groups at different levels (from national to local and the other way around) or among different subregional planning areas.
- **Timelines:** Timing aligned with related policies and reporting requirements as well as between the different authorities responsible for sector policy delivery.

Delivering the organisational structure and collaborative frameworks

As described in Step 1, SOP development and implementation requires the establishment and strengthening of institutions, organisational structures and collaborative processes to sustainably manage ocean activities and their impacts. The establishment and strengthening of two key structures are important for consolidating an effective governance architecture for sustainable ocean planning: organisational structure and collaborative frameworks.

Organisational structure

As outlined in Step 1, an organisational structure is required for the technical and functional delivery of the SOP activities as well as to define responsibilities for achieving the SOP vision and goals. The SOP aims to provide a framework and guidance to support integration across other marine management approaches, such as ICZM, MSP, watershed management and sector approaches. The SOP does not replace existing sector management approaches

but provides a holistic, integrated and strategic vision for them. SOP implementation is therefore the responsibility of all sector agencies responsible for marine management. Implementing cross-sector SOP actions will require a lead authority to take ownership to ensure their delivery. It's important that the institutions leading SOP development and implementation are supported with financial and human resources and have credibility to lead the process. The following are the steps for establishing the institutions, stakeholders and rights holders responsible for the SOP:

- Carry out a legal and governance assessment to understand the decision-making frameworks and remits of sector agencies to inform which institutions are or will be responsible for the various aspects of the SOP.
- Define or establish the appropriate authority to lead and support the development and implementation of the SOP.
- Outline the roles, responsibilities and interaction between institutions for SOP development and implementation. Clearly outline who is responsible, who is accountable, who will be consulted and who will be informed.
- Visually design an organisational chart of the governance structure by showing the hierarchy and connections between the institutions, stakeholders and rights holders responsible for the SOP.
- Establish or use existing relevant multisectoral advisory bodies, such as SOP committees, working groups and planning teams, to ensure that a participatory approach is applied in SOP development and implementation.

Collaborative frameworks

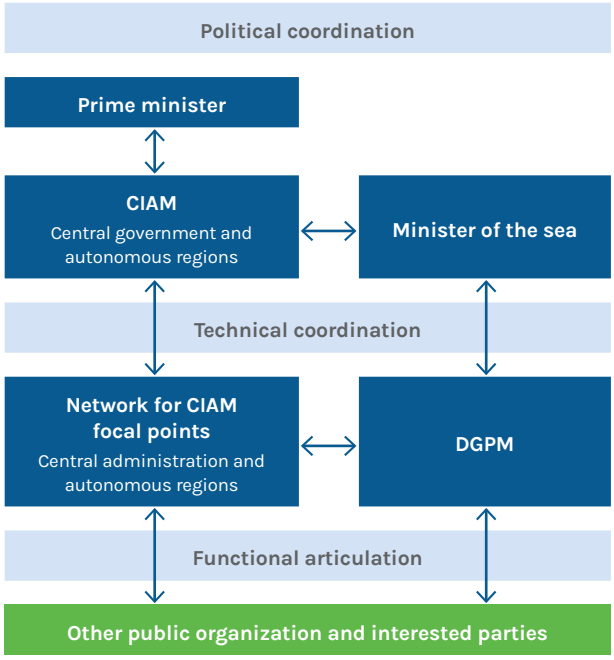
A collaborative framework for the SOP can help facilitate clear communication, coordinate the different ways of working and support teamwork across the different agencies involved in the SOP. As outlined in Step 1, this ensures that all entities align with the shared vision (see Box 19 for a country example). Different coordination types are needed to facilitate integrated ocean management, and they must be considered during SOP development and implementation:

- **Strategic and political coordination** must provide clear, strategic guidance at the national level to support coordination between national and regional agencies, stakeholders and rights holders, and partners. It oversees the coordination between ministries and/or departments and the distribution of investments and resources.
- **Cross-institutional coordination** is needed to clarify the roles and functions of different institutions and mitigate disputes between different agencies. This allows for effective management of trade-offs between conflicting policy objectives. A formalised, cross-sectoral coordination body with a mandate can provide such coordination across institutional systems.
- **Planning and policy coordination** ensures alignment between the technical delivery of MPA designations, watershed management, ICZM,

BOX 19. Governance model for Portugal's National Ocean Strategy 2021–2030

The governance model for Portugal's National Ocean Strategy ensures that political coordination is assured by the Interministerial Commission for Maritime Affairs, including strategic direction, cross-institutional coordination and decision-making on the ocean. The Directorate-General for Maritime Policy oversees the technical planning and policy coordination that supports the implementation, monitoring and revision of the strategy.

FIGURE B19-1. **Governance model for Portugal's National Ocean Strategy 2021–2030**



Source: DGPM 2021.

terrestrial planning and MSP. This coordination can occur during policy and plan preparation, when operational issues arise where agencies cooperate in implementing cross-sector decisions or to ensure that decisions made by one institution do not impact negatively on other institutions.

- **International coordination** ensures that shared ecosystems and marine resources between countries are sustainably managed through bilateral, multilateral and regional cooperation as an essential basis for sound ocean management. This cooperation type is in line with the United Nations Convention on the Law of the Sea, in which countries have a general duty to cooperate at global and regional levels to protect and preserve the marine environment.

These are some of the coordination mechanisms that must be established and strengthened for the SOP to be effective:

- **Maritime clusters:** A network of businesses; research, development and innovation units; and training institutes. These clusters are sometimes supported by national or local authorities, and they cooperate with the aim of technology innovation and increasing the performance of maritime industries.
- **Bridging organisations:** Organisations or bodies that facilitate communication and cross-scale linkages among individual actors, usually as separate entities rather than embedded in other organisations.
- **Knowledge brokers:** Brokers that facilitate interaction and engagement between scientists, Indigenous Peoples and policymakers and help strengthen research impact. They're typically embedded within academia and develop relationships between those who are producing evidence and those who are using it.
- **Public-private partnerships:** Partnerships formed between government and private sector organisations to deliver specific services or benefits. This can be used as a financial strategy and mechanism to drive investment and support the long-term sustainability of SOPs.
- **Maritime coalitions or alliances:** Partnerships among organisations working in pursuit of a common goal while maintaining organisational independence. This could mean aligning programmes or administrative functions or adopting complementary strategies to support the transition to an SOE.

- **Cross-sectoral coordination body:** This body can include cross-sectoral working groups or committees and Indigenous Peoples. It brings together different agencies across sectors to prepare and deliver the SOP goals, objectives and actions.

The following activities can be considered when establishing and strengthening coordination mechanisms to support the SOP:

- Assess the coordination and collaboration needs for SOP development and implementation. These needs must be benchmarked against best practices and based on the country's context and priorities.
- Establish new coordination networks, partnerships and entities to ensure coordination across sectors and at regional and international levels.
- Formulate recommendations for relevant public authorities to harness existing coordination practices for the benefit of Indigenous Peoples and stakeholders and rights holders.
- Promote cooperation between key SOP actors, stakeholders and rights holders (business; research, education and training institutes; public authorities), accelerators, incubators and financial intermediaries.

- Undertake concrete joint activities (e.g., joint investment in ocean science, research and innovation; pilot projects; developing cooperation strategies and practices).
- Promote capacity-building and knowledge transfer activities (e.g., exchanging good practices, transferring capacity and enhancing mutual learning to foster multilevel collaboration).
- Improve the involvement of coordination networks, partnerships and entities in the policymaking and SOP processes.
- Provide investments for Indigenous-led and community-led projects that will contribute to the knowledge base of SOPs.

For a list of roles and responsibilities for different sector actors, see Step 5, "Assigning roles and responsibilities across sectors."

Financial framework

An important step in the SOP and action plan process is to develop a financial framework for SOP development and implementation. The financial framework must support the achievements of the SOP goals, objectives and outcomes and provide opportunities to unlock SOP funding as well as finance for other sector management approaches. The following are activities to allocate funds and resources based on the SOP action plan:

- Allocate resourcing and costing requirements for each action. It's not necessary to identify and know all the cost points, but it's advisable to identify both cash and non-cash resource needs for each action.
- Use rough estimates to give a sense of the cost and resource requirements of each action and activity.
- Consider both budgets that are currently available and those that are in the process of being secured for sustainable ocean planning.
- It's advisable to set up an oversight financial mechanism to ensure that actions and activities are carried out in line with the budgetary limits.

To ensure ownership by the national government, its budget should include cash and non-cash (e.g., staff cost) allocations for SOP preparation and implementation. Additional funding strategies could be explored for sustainable ocean planning, including ocean-use fees, loans, philanthropic grants, ODA and, in specific contexts, blue bonds and debt conversion (see Step 2).

Step 5:

Implementation and action planning

KEY TAKEAWAYS:

- SOP implementation is phased, inclusive, integrated, informed and continuous, moving from institutional coordination and rollout (Phase 1) to ensuring compliance (Phase 2) and then to enforcement (Phase 3), with feedback loops built into each.
- The design of the plan, its legal grounding and institutional cooperation across scales and boundaries all shape implementation success.
- A mix of public, private, Indigenous, civil society and scientific actors should be engaged — with shared accountability — throughout the SOP life cycle.
- Political commitment and long-term resourcing from domestic and external sources must underpin implementation and adaptation efforts.
- A strong monitoring and evaluation framework that includes periodic data collection under FAIR and CARE principles, milestone tracking and policy feedback enables SOPs to evolve with science, environmental shifts and societal needs.
- A centralised data platform can unify ocean planning efforts and foster trust through openness and informed decision-making.

A healthy ocean supports human well-being, regulates global climate, sustains a range of biodiversity and delivers other various benefits to people and the planet (Halpern et al. 2012; von Schuckmann et al. 2020; Sumaila 2021; IPCC 2022; Frazão Santos et al. 2024). Multiple competing social, environmental and economic interests have arisen that highlight the ocean as a highly contested space, presenting a major challenge for the implementation of sustainable pathways such as an SOP (Bennett et al. 2017; IPCC 2022). Although scientific evidence indicates that implementing sustainability measures and ecosystem-based strategies are effective in facing environmental pressures such as climate change (IPCC 2022), integrated approaches are required to equip societies with information to inform sustainable ocean planning relevant to environmental change and the local sociocultural context (Wedding et al. 2024). This is a political and social process informed by both the natural and social sciences (Zaucha and Gee 2019).

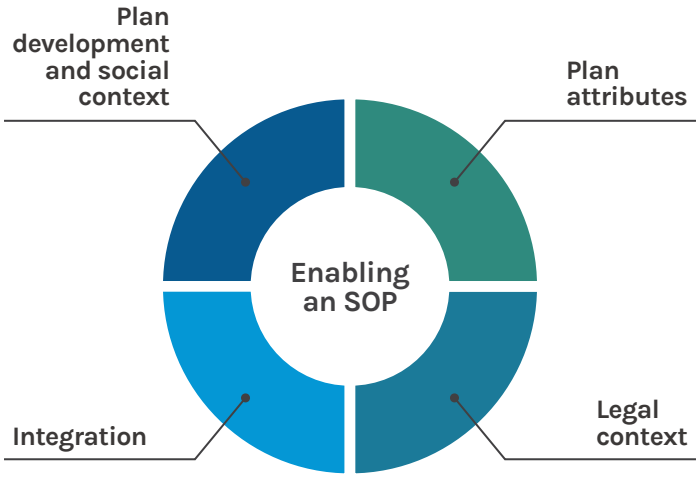
The SOP is the foundation for implementing such needed transformations. It aims to achieve the long-term health of ocean ecosystems as an underpinning for thriving economies and societies (IPCC 2023). To advance sustainable ocean planning, it's crucial to develop methods that connect its process and outcome evaluations and to critically assess external factors that may influence the implementation and

performance. For an integrated approach, enabling conditions within four major categories should be considered: plan attributes, plan development and social context, integration, and legal context (Zuercher et al. 2022) (Figure 8).

Plan attributes. Several basic factors can affect the success of an SOP. For example, the type of plan — whether it's focused on providing information, setting a strategic vision or enforcing regulations — makes a big difference. Zuercher et al. (2022) have identified several influencing conditions for MSP attributes that can be useful and adapted for an SOP. These include ensuring sufficient institutional capacity for implementing and managing the plan as well as investing in strengthening said capacity to enable ocean literacy and foster public awareness for sustainable practices. Additionally, practitioners must define clear objectives early in the planning process. They should also carefully evaluate the types, quality, spatial scale, thematic resolution, temporal dimensions and relevance of data used for monitoring, evaluation and updates during implementation. To quantify and assess trade-offs and cumulative impacts, they should engage in discussions within designated forums and carefully consider the costs and benefits to marginalised communities. Also, adaptive management is crucial for implementing an SOP. The plan should regularly be reviewed and updated to ensure that its goals remain relevant, effective and robust, meeting the dynamic demands of marine environments and communities (Zentner et al. 2023).

Plan development and social context. This aspect emphasises the value to engage stakeholders and rights holders, consider social equity, respect cultural values, assess social impacts, build community capacity and ensure adaptability to changing social conditions. A diverse range of stakeholders and rights holders, including government agencies, scientists, industry representatives, NGOs and local communities, should be engaged to foster collaboration and dialogue (IPCC 2022). An SOP cannot serve as a transformative approach to ocean governance without addressing power dynamics in the planning process, including power imbalances between stakeholders and rights holders and planners (Zuercher et al. 2022). Therefore, intentional efforts must be made to empower marginalised groups and ensure that their voices are heard, overcoming exclusion and promoting inclusive participation. Inclusive governance prioritises equity and justice and connects to scientific, Indigenous, local, practitioner and other forms of knowledge; it has been shown to be more effective and sustainable

FIGURE 8. **Graphic overview of the four major categories of enabling conditions**



Note: By adhering to these categories, a country can develop and implement a Sustainable Ocean Plan (SOP) that effectively balances environmental protection, economic development and social equity.

Source: Adapted after methodology initially produced by Zuercher et al. (2022) for marine spatial planning.

because it's locally appropriate and leads to more legitimate, relevant and effective actions (IPCC 2022). Both procedural and distributional justice are essential to ensure that stakeholders and rights holders have genuine decision-making power and influence during the plan development process (Jentoft 2017; Ntona and Morgera 2018). It is crucial therefore that information examining whether planners anticipated and worked to address inequities in the distribution of benefits and harms among different groups is collected and assessed to determine whether these forms of justice were reached (Bennett et al. 2021). Transparency and accountability are also key to ensuring that decision-making processes and the use of resources are conducted with clarity and openness. This involves establishing mechanisms that allow for the tracking of progress and the enforcement of compliance, thereby fostering a culture of responsibility and trust (Zuercher et al. 2022).

Integration. The following types of integration were identified as fundamental conditions for the successful implementation and coordination of MSPs and subsequently can be used for the SOP process:

- **Cross-boundary integration** involves coordination across social, ecological, administrative and jurisdictional boundaries (Gilek et al. 2018; Kidd et al. 2020). This condition evaluates whether the plan addresses transboundary issues, engages in

formal and informal collaboration and facilitates the exchange of information across relevant boundaries (Ehler and Douvere 2009; Papageorgiou and Kyvelou 2018; Asprogerakas et al. 2020). Jurisdiction over marine and coastal spaces often spans multiple agencies, so it's important to integrate across levels of government — from multinational collaborations to local zoning strategies (Zuercher et al. 2022).

- **Vertical integration** between national, subnational and local governing bodies must be clearly defined in terms of scope, with efforts made to address incompatible policies and conflicting priorities (Portman 2011; Vince and Day 2020). In addition, lawmakers at all levels must accept the plan for successful adoption and implementation (Olsen et al. 2014).
- **Policy and sectoral integration** is a condition that examines whether a plan effectively addresses and integrates the interests of various ocean use sectors and social, environmental and economic concerns (Olsen et al. 2014). It also evaluates the equity of sectoral participation and the coherence between the plan and existing policies or statutory instruments in the region.

- **Knowledge integration** ensures that diverse knowledge types, including Indigenous and local knowledge systems, are integrated into the SOP implementation process. It ensures that these are reflected in the plan outputs identifying how and why they're prioritised as well as how this knowledge is shared and communicated among stakeholders and rights holders (Kirk 2015; Fairbanks et al. 2019; Saunders et al. 2020) and among experts (Chatterjee 2024; Frazão Santos et al. 2024; Pradhan et al. 2025).
- **Ecosystem-based approaches integration** ensures the sustainability and resilience of marine ecosystems (Winther et al. 2020). This requires integrating ocean management with other national policies, such as climate change mitigation, biodiversity conservation and economic development, to ensure a holistic and sustainable use of marine resources (Foley et al. 2010; Domínguez-Tejo et al. 2016; Ansong et al. 2017; Voyer et al. 2021).

Legal context. Besides political will and leadership, SOP implementation requires a robust legal and policy framework, with its governance exercised through legal, administrative and other social processes. Both academics and practitioners acknowledge this essential role of legal authority (Albotoush and Tan Shau-Hwai 2021). Hence, authority for SOP implementation must be established prior to planning to continuously assess and adjust to changes in the legal status over time (Ehler and Douvere 2009; Collie et al. 2013). The legal framework for the SOP needs to document whether this authority was granted through existing or new laws by administrative actions, or whether the plan depends on the statutory authority of other institutions (e.g., sectoral agencies) with the legal power to compel these institutions to act. Moreover, it's essential to assess whether the plan adheres to relevant local, Indigenous, national and international laws, policies and agreements; SOP actions must be consistent with global commitments to foster cooperation and compliance. Particularly, the leadership, acknowledgement and inclusion of rights holders (or claim holders) — often Indigenous Peoples and local communities — in the SOP decision-making processes is fundamental to equitable and just ocean and coastal management (Ban et al. 2008; Ban and Frid 2018; Saunders et al. 2020; Bennett et al. 2021). Emerging governance challenges due to climate change, such as disruptions to cultures, resource availability and territorial sovereignty, as well as shifts in risk and responsibility boundaries, can be faced with arrangements that involve diverse

actors and emphasise inclusivity, fairness and adaptability in the complex ocean environment (IPCC 2022). Enforcement mechanisms and incentives for plan compliance are necessary for effective SOP implementation (Ostrom 1990). An important aspect here relates to whether planners are aware of and understand the motivations of those using ocean spaces and resources, which can enable managers and those tasked with enforcing an SOP to address underlying barriers to compliance (Agardy et al. 2011).

Developing a phased implementation plan

The SOP implementation process converts the plan into action or operating programmes. As part of the implementation process, designated government institutions or newly created bodies (interministerial coordinating councils) will begin the new management actions set out in the approved strategy plan (see Step 4). Effective implementation is key to the success of any SOP. However, implementation faces a complex landscape that demands a variety of changes and adjustments to ensure success (Sachs et al. 2019). Implementing the plan is an iterative process that requires continuous monitoring, evaluation and updates to ensure its effectiveness (Ocean Panel 2021). Well-informed regular reviews and updates to the SOP are necessary to adapt to new scientific findings, technological advancements and changing societal priorities through careful management of resources, risks and stakeholder and rights holder engagement. The results of a plan are intrinsically linked to the steps taken for implementation, the subsequent actions and the wider socio-economic and policy environments that influence SOP progress (Carneiro 2013).

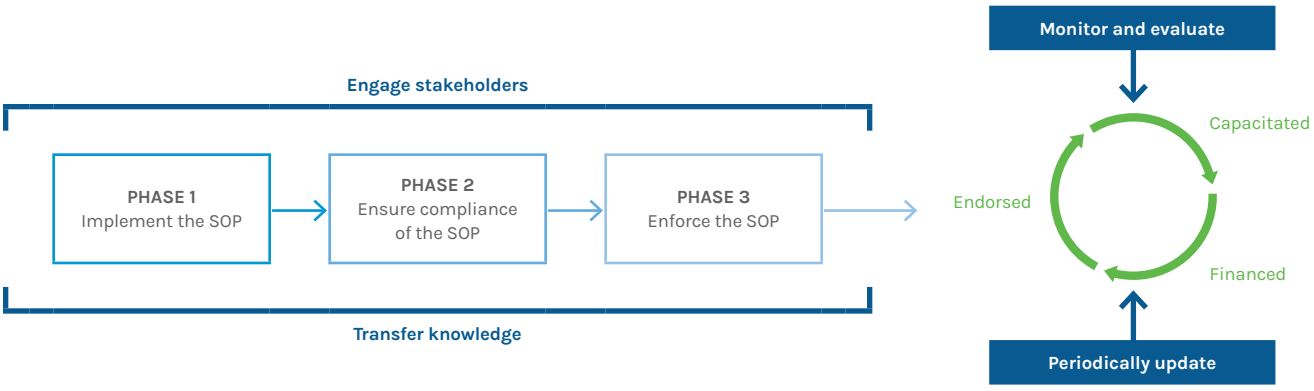
Following Ehler and Douvere (2009), three phases should be considered for the implementation (Figure 9).

Phase 1: Implementation

Once the necessary official government approvals have been obtained, the SOP is formally established and the implementation phase can begin. In most cases, countries will not create a single overarching marine management agency; instead, an interagency or interministerial council will be formed, or a lead agency will be designated to coordinate and oversee the SOP implementation process (see Steps 1 and 4). The implementation process becomes operational once this institutional arrangement is actively functioning on an ongoing basis. Typically, existing sector-specific management institutions will carry out most actions towards implementing the plan. These diverse actors can use the SOP as guides for permitting and other responsibilities. Implementation actions can also be coordinated across different levels of government, with each level taking responsibility for its jurisdiction. For example, federal agencies might manage actions in offshore waters while state or provincial agencies handle actions in waters within their jurisdictions, and local governments may oversee land-use planning and development. These actions are coordinated through the SOP for the entire designated marine area.

To achieve the SOP objectives, several implementation steps for monitoring and evaluation can be taken; these include setting baseline

FIGURE 9. **SOP implementation across three phases**



Notes: Stakeholder and rights holder engagement and transdisciplinary knowledge transfer guide the process, which leads to a plan that has all three impact attributes (endorsed, financed and capacitated). Implementing a Sustainable Ocean Plan is an iterative process that requires periodic monitoring, evaluation and updates to ensure its effectiveness.

Source: Adapted from Ehler and Douvere 2009.

indicators and clear short-, medium- and long-term performance targets. In this case, the approval mechanism for each sector in the cross-sectoral role and responsibility agreement needs to be jointly prepared and agreed upon. Targets serve an important function in sustainable development strategies. They bring together the necessary components to enable action on a given goal: a predetermined time frame, a quantifiable outcome, financial resources and an institutional framework with the mandate and capacity for performing the action.

Next, establish monitoring systems. Ocean data monitoring programmes can collect field data (monthly, quarterly, annually) through satellite tracking/monitoring to track illegal fishing and habitat destruction. They can also conduct oceanographic studies and predict ocean trends based on historical data and periodic environmental impact assessments. Citizen science programmes can assist these efforts with real-time reporting to assess the health of coral reefs and marine species and monitor ocean health indicators.

In addition, implement regular analysis, evaluation and reporting. For example, analyse collected data and identify the trends and challenges, and establish annual progress reviews and sustainability audits. Evaluation involves critical reflection to understand situations and innovate for new and better solutions. It can deepen understanding of complex connections, link the various dimensions of sustainable development and identify interventions, improvements and solutions that can accelerate and transform the impact of SOP implementation and achieve targets. Through such insights, evaluation contributes to learning, decision-making and action. Periodic evaluation and impact assessment — such as mid-term and long-term evaluations with international data benchmarks (SDG 14, the CBD's GBF, the Paris Agreement, etc.) — are needed to assess the effectiveness of policies, governance and stakeholder and rights holder involvement.

The next stage is the adaptive management process. The adaptive management approach revises policies based on changing environmental and economic conditions as well as stakeholder and rights holder input. In addition, it encourages innovation and continuous improvement in sustainable ocean management. This process allows for timely adjustments in policies, strategies and interventions. It helps practitioners see when and what to improve and what they can do to support or accelerate positive developments. It also allows for learning and adaption in the management process. Where necessary, practitioners can modify approaches to respond to a range of influences, including politics, socioeconomics, uncertainty and so on. Targets and indicators can also be adjusted if they become redundant or irrelevant or no longer perform as expected.

Finally, to ensure that SOPs are accepted by the public, practitioners should prepare transparent reports and increase public awareness by sharing these reports through government websites and international ocean databases. Real-time data portals are helpful for transparency and can communicate the findings of the monitoring and evaluation process to the public.

Phase 2: Ensure compliance with the SOP

Compliance means that relevant ocean users are conforming to the specific management actions required in the SOP. The effectiveness of the SOP depends on how well its management actions are designed; clear, well-structured actions are more likely to lead to successful compliance, whereas poorly designed actions make compliance and desired outcomes harder to achieve. Compliance and enforcement are critical components of good governance and the rule of law, but they're often weak points in the SOP process. For regulations like zoning, permits and licences to be effective, they should be clear, understandable and reflective of practical realities. Requirements must define which activities are subject to the regulations, outline how compliance will be assessed and allow flexibility for adjustments as needed. Single-sector management institutions will need to implement the plans while aligning their programmes with the SOP. Promoting voluntary compliance can be supported through public education, stakeholder and rights holder agreements, technical assistance, self-regulation and the installation of physical markers to highlight key areas.

Phase 3: Enforce the SOP

Enforcement is the set of actions that governments take to achieve compliance with regulations of human activities to correct or halt situations that damage the marine environment or the public. Government enforcement typically involves inspections to assess compliance, negotiations with violators to develop solutions for compliance and legal action to compel adherence, including penalties or permit withdrawals when necessary. NGOs may also participate in enforcement by detecting violations, negotiating with offenders and,

in some cases, taking legal action either against violators or the government for non-enforcement. Certain industries, such as banking and insurance, may indirectly support enforcement by ensuring compliance with SOP requirements before granting loans or issuing insurance policies. The effectiveness of the SOP depends on its ability to enforce approved plans and regulations because unauthorised developments would undermine its goals. Enforcement should integrate across sectors, with clear, transparent communication to stakeholders and rights holders, who are more likely to support enforcement when policies and procedures are consistently applied.

Endorsing an SOP

One of the key attributes for impactful ocean planning is endorsement (Ocean Panel 2021). A successful plan must be officially endorsed at the highest political levels, such as by the president, prime minister or relevant subnational leaders, including Indigenous Peoples when applicable. This endorsement should extend into institutional support within government agencies, ensuring the ongoing development, refinement and implementation of the SOP. Political backing creates legitimacy, attracts the necessary high-level attention and ensures long-term commitment to the plan's success. SOPs are national strategies. Thus, the development of and agreement on an implementation approach is a shared duty, and effective implementation involves cross-jurisdictional and cross-sectoral responsibility. SOP implementation requires a strong, integrated and synchronous policy and regulatory framework that becomes the basis for the stakeholders and rights holders involved in its implementation. Thus, the SOP must be a strategic policy product that articulates the national marine vision. These national priorities then guide collective action for a better ocean future.

To ensure that the SOP that is prepared and implemented is a shared agenda, the plan must be officially included in the substance of the short-, medium- and long-term national development planning policies, which explicitly state the objectives and strategies for achieving each SOP indicator. Achievement of the SOP objectives is a collective action carried out by various government institutions at the centre and supported by institutions, stakeholders and rights holders, including NGOs, academics and coastal communities in the regions. The SOP implementation framework needs government regulations that officially mandate the arrangement of tasks and functions of each institution, stakeholder and rights holder involved in each stage of SOP implementation. This includes the appointment of central government institutions tasked with coordinating other institutions and stakeholders and rights holders both at the centre and in the regions, including advisory teams. Included in the government regulations are the mandate and arrangements for the implementation of data integration to support monitoring, evaluation and updating of plans in accordance with the objectives of the SOP. The national development plan and the integrated and synchronous SOP implementation work plan provide a guarantee of the implementation of priority programmes and SOP action plans within a certain period.

Assigning roles and responsibilities across sectors

Ocean governance actors or stakeholders and rights holders are organised across a variety of sectors, including international organisations, national and subnational governments, civil society (e.g., science, non-profits, local communities and Indigenous Peoples, etc.) and a range of ocean industries (Spalding and de Ycaza 2020). Each plays a key role in enabling, developing a phased implementation plan and endorsing SOPs. Ensuring a balanced mix of participation and engagement across sectors is essential to reduce conflict and ensure legitimacy and support for the plan (for details on how to approach stakeholder and rights holder mapping, see Step 1, "Stakeholder mapping, engagement and collaboration mechanisms"). Importantly, for a successful phased implementation process, stakeholders and rights holders across sectors must be engaged and knowledge transferred across all phases (implementation, compliance and enforcement).

International institutions include agencies within the United Nations and affiliated organisations (United Nations Development Programme, FAO, UNESCO-IOC, International Seabed Authority); multilateral funding agencies, such as the World Bank and the Inter-American Development Bank; as well as other intergovernmental organisations, such as the International Council for the Exploration of the Sea and various regional fisheries management organisations. The main roles and responsibilities of these institutions, as they relate to SOPs, include providing funding (through ODA or international agency loans), regional coordination, building science capacity and showcasing experiences and global collaboration across shared management interests. Global science and knowledge entities and initiatives (e.g., UN Ocean Decade) are uniquely positioned to share and transfer knowledge as well as guide and inform global data collection — all critical for inclusion in SOP development, implementation and revision processes.

National and subnational governments, as implementers and adopters of international agreements and commitments, play a key role in effective enabling, implementation and endorsement. They provide the political backing and base funding needed for all aspects of the plans; complementing, as needed, with funding from outside sources such as international banks, philanthropy, or industry. National or subnational government roles and responsibilities also include establishing the necessary institutional structure and coordination required for effective implementation across jurisdictions and sectors (within government and beyond) (Juda 2003). This might involve creating a new interagency coordination body or assigning a decision-making authority that oversees activities across existing agencies (for details on how to define this government framework, see Step 1, "Defining a governance structure/framework," and for examples and consolidation practices, see Step 4, "Delivering the organisational structure and collaborative frameworks"). Governments are also responsible for enforcement, which might involve taking regular legal action, establishing penalties and engaging in other activities that promote compliance. Lastly, while knowledge generation and transfer is often led by other stakeholders and rights holders, governments have a critical role to play in ensuring institutional capacity and expertise is in place within the public sector for those tasked with leading SOP efforts.

Civil society includes scientists and academic institutions, NGOs, and local communities and Indigenous Peoples. These diverse stakeholders and rights holders play a crucial role in sustainable ocean management by reflecting broad societal priorities and perspectives that need to be included in the development of SOPs. They often serve as a connector between the public sector and the resources and spaces that are being managed. They mediate activities on the ground to promote voluntary compliance by recognising local relationships with and traditional uses of the marine environment, and they hold governments and other powerful stakeholders and rights holders accountable to existing regulations about responsible use of resources. Civil society stakeholders and rights holders — in particular, scientific entities — have the unique ability to generate new knowledge and document existing or traditional knowledge that is critical to the planning process. New information might be able to fill knowledge gaps and serve as evidence for decision-making now and into the future (Chen and Ganapin 2016).

Finally, stakeholders from **ocean industries** have the primary responsibility to steward resource use, such as the production of food or energy from the sea. The main ocean industries include tourism, fisheries, aquaculture, energy, shipping and seabed mining (Merrie et al. 2014; Young 2015; Ehlers 2016; Haas et al. 2019); they're usually structured as private corporations or cooperatives. The industry sector also increasingly serves as a knowledge

provider and leads in technological advances; the sector is expanding to include not just ocean innovation in terms of technology but also new finance and insurance tools that aim to both support local communities and finance governance efforts such as SOPs.

Monitoring and evaluation protocols

Selecting ocean indicators

It's impossible to make the case — and impractical to develop and implement policies or plans — for synergistic action if the underlying rationale, benefits and risks (political, economic, environmental and social) of SOPs are not widely monitored, known and recognised (Chatterjee 2024). Because SOPs aim to achieve the long-term health of ocean ecosystems as the underpinning for thriving economies and societies (IPCC 2023), monitoring and evaluation must be based on a wide range of knowledge systems across the three pillars of sustainable development: environmental, economic and social.

Indicators for these three pillars are built on scientific research and data; they're essential tools that support the SOP by providing consistent and comprehensive data (for further details on identifying appropriate indicators for specific data requirements see Step 3 "Selecting relevant indicators") that can be used for implementation monitoring and updates (von Schuckmann et al. 2020; Ocean Panel 2021) as well as to produce expert assessments and reports as part of the SOP implementation. To be effective, these indicators must be carefully selected to align with the specific objectives of the SOP. For an example of successful indicator selection and visualisation see Box 20 on the Sustainable Development Goal dashboard.

Furthermore, in addition to specific SOP objectives, the monitoring and evaluation framework must consider how each of the different marine policies, plans and regulations included within the plan are monitored and evaluated. As mentioned in Step 4, one way to do this is to ensure that the goals and objectives of the SOP align with the goals and objectives of the various policies and regulations that underpin the SOP. Specific indicators, based on actions for each of the goals and objectives, can then be developed across the three pillars.

Ocean indicators for the environmental pillar. Ecosystem services are the environmental processes and functions that have monetary or intrinsic value for human society and have been described as "nature's contribution to people" (Tallis et al. 2010; Costanza et al. 2014; Díaz et al. 2018). Marine ecosystem services are generated throughout the ocean, from shallow water to the deep sea (Armstrong et al. 2012; Thurber et al. 2014). Although all ecosystem services are interconnected (Leadley et al. 2014), they can be broadly divided into provisioning services, regulating services, supporting services and cultural services (von Schuckmann et al. 2020). Environmental pressures such as climate change impacts on the ocean will negatively affect the chance of achieving the SDGs and sustaining their benefits (IPCC 2022) (Figure 10). Hence, it's essential to ensure regular, state-of-the-art and evidence-based monitoring of the ocean, including its physics, biogeochemistry, biodiversity and ecosystems.

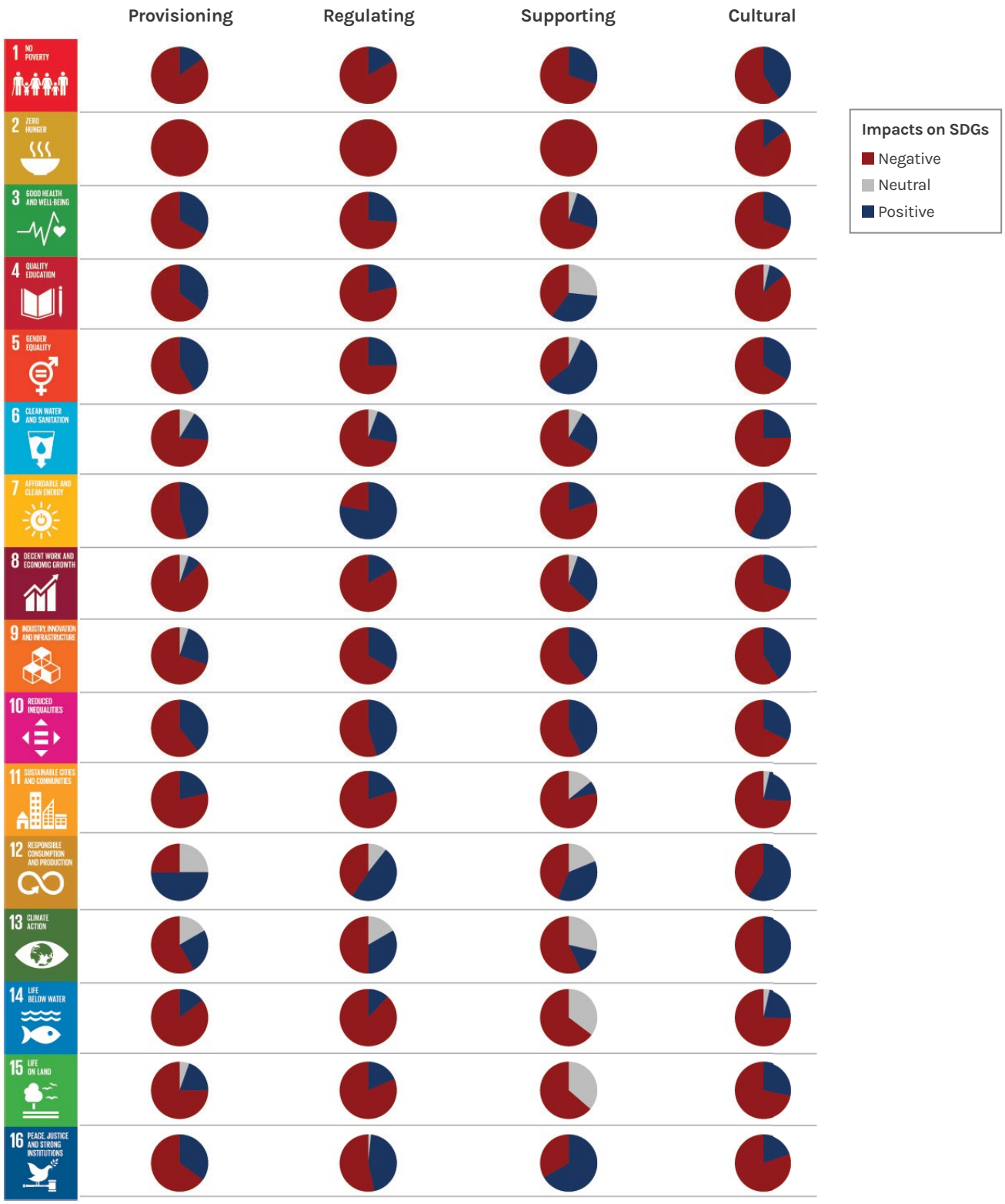
Ocean indicators for the economic pillar. Ocean indicators for the economic pillar of sustainable development are metrics that help assess the relationship between ocean health and economic performance. These indicators are crucial for understanding how ocean-related industries and ecosystems contribute to economic growth while ensuring sustainability. Policymaking and economic analyses rely heavily on statistics and international comparisons, and the demand for

BOX 20. Case study example: Sustainable Development Goal Dashboard

Designed by the Secretariat of the Pacific Community and United Nations Development Programme, the Sustainable Development Goal (SDG) Dashboard uses indicator-based evaluation and implementation to monitor progress on the SDGs. This complements the Pacific Community's *First Quadrennial Pacific Sustainable Development Report*[a] and is adapted from a design originally created by the Organisation for Economic Co-operation and Development.[b] The SDG Progress Wheels offer a quick visual of target progress, with all indicators referencing the official UN SDG list, along with any Pacific-specific variations. This dashboard serves as the regional platform for the 16 Pacific Island Countries and Territories that are members of the Pacific Islands Forum. It contains data on 132 Pacific sustainable development indicators, selected by the region and endorsed by forum leaders in the *Pacific Roadmap for Sustainable Development*,[c] enabling progress monitoring towards the 2030 Agenda for Sustainable Development. Data are sourced from national censuses, civil registries, health and education systems, satellite data and reports from countries and development partners.

Source: a. Pacific Islands Forum Secretariat 2018; b. Pacific Data Hub n.d.; c. Pacific SDGs Taskforce 2018.

FIGURE 10. **Climate impacts on ecosystem services**



Notes: The figure summarises the types of relationships (negative, neutral and positive) between impacted marine ecosystem services (provisioning, regulating, supporting and cultural) and the Sustainable Development Goals (SDGs) based on literature review and expert-based analysis (Singh et al. 2019). Pie charts represent the proportion of targets within SDGs that a particular ocean SDG target contributes to according to the literature reviewed and expert-based analysis presented in Singh et al. (2019).

Source: IPCC 2022.

high-frequency, reliable and easily accessible data is increasing. To respond to this demand, the OECD has created the Short-Term Indicators Dashboard, which covers Group of 20 countries and selected regional aggregates, enabling users to follow key macroeconomic developments using interactive charts and tables (OECD 2025b). The OECD has defined six evaluation criteria — relevance, coherence, effectiveness, efficiency, impact and sustainability — and two principles for their use. These criteria describe the desired attributes of all development interventions (policies, programmes and projects): They should be relevant to the context, coherent, achieve results in an efficient way and have positive, lasting impacts for sustainable development. Underlying key indicators serve as the basis upon which evaluative judgements are made (OECD 2025a). Also, these economic pillar indicators can establish a new benchmark for government resilience for strengthening public integrity. Based on primary data sources and validated by countries, several specific indicators help bolster global efforts in support of, for example, the quality of strategic frameworks, the accountability of public policymaking, and the effectiveness of internal control and risk management (OECD 2025a).

Ocean indicators for the social pillar. The implementation of effective ocean protection and sustainable production is expected to promote balanced benefits from ecological, economic and social aspects over time. On the social side, benefits are linked to equitable prosperity, though these are often undervalued or overlooked in assessments compared to ecological and economic gains (Chan et al. 2012; Halpern et al. 2012; Stanton 2012; Sumaila 2021). These are some of the social benefits of implementing SOPs (Craig et al. 2022):

- Improved and equitable livelihoods, income-generating opportunities and human well-being, especially for coastal and local communities and Indigenous Peoples.
- Enhanced food and nutrition security.
- Improved health from clean air, clean water, clean beaches and safe seafood.
- Sustained opportunities for time in nature, recreation, education (acquiring knowledge and practical skills), exploration and inspiration.
- Improved stewardship of ocean-related social and spiritual values, including cultural heritage practices and areas.

Social indicators in SOPs measure the well-being, equity and resilience of people and communities that depend on the ocean, both within and between generations (Sumaila 2004). These indicators help track the social, economic and cultural impacts of ocean policies and activities, ensuring that sustainable ocean management benefits society as a whole (Bowen et al. 2006). The social indicators addressed to measure the quality of life for coastal and marine-dependent communities ensure fair access to marine resources, jobs and decision-making processes; track how communities are adapting to climate change, disasters and economic shifts in ocean industries; protect traditional knowledge and historical sites linked to the ocean; and provide data-driven insights for sustainable and inclusive ocean governance supporting the decision-making processes (Murphy 2012; Elliott 2013; Atkins et al. 2024). Social indicators promote consideration for the social resilience to the livelihoods and well-being over time (Burdon 2020) and align with national and international SDGs. Moreover, they elevate the relevance to ocean-dependent communities and marine resource management and assess the implementation of sustainability goals in coastal areas. They must be measured quantitatively and calculate trend data series to obtain reliable and easily updated information (Aubry and Elliott 2006; Atkins et al. 2024). They should prioritise equity and exclusivity related to justice in accessibility to ocean resources, decision-making and economic opportunities, and they should consider equality of local community rights and gender in the SOP planning and implementation process (Österblom et al. 2023; Bennett et al. 2025). Also, ocean indicators of the social pillar recognise the traditional knowledge, cultural heritage and marine management rights of Indigenous Peoples; this helps to strengthen community capacity to adapt to the impacts of climate change, thereby supporting long-term planning for climate resilience (Frazão Santos et al. 2023). Indicators should also reflect how community involvement in SOP implementation and decision-making processes is prioritised, while strengthening inclusive governance and co-management practices (Sumaila and Domínguez-Torreiro 2010; Crosman et al. 2021).

Candidate indicators have been identified, but they're fragmented and not comprehensive (for a non-exhaustive list, see Appendix H). Emerging national ocean accounts might provide insights into the ocean-related economic, social and environmental data that countries are starting to collect and could be relevant indicators of progress on sustainable ocean management (for further details, see Appendix H). However, some new indicators may need to be identified or created.

Guidelines for data collection and annual reporting on SOP milestones

Data integration in the form of a single data portal can help implement ocean planning by consolidating available data and enabling regional ocean planners and ocean users to visualise and analyse ocean resources and human use information (Lathrop et al. 2017). A single data portal can regulate and implement data governance for central agencies and regional agencies, supporting their ocean planning, implementation, evaluation and control. It can collect accurate, up-to-date, integrated, accountable and easily accessible data and share the information between these agencies to encourage openness and transparency.

It's essential for any data collection to follow FAIR (findable, accessible, interoperable, reusable) and CARE (collective benefit, authority and control, responsibility, ethics) principles (Carroll et al. 2021). FAIR principles provide metadata for traceability, facilitate interinstitute and cross-discipline data analysis, ensure data provenance, use data analytics and artificial intelligence methods to readily share and explore data and secure archiving that guarantees long-term preservation (Tanhua et al. 2019; Scheffler et al. 2022). In recent decades, ocean data managers, in close collaboration with international organisations, have played an active role in improving environmental data standardisation, accessibility and interoperability through different projects; this has enhanced access to observation data at all stages of the data life cycle and fostered the development of integrated services targeted to research, regulatory and operational users (Le Traon et al. 2019). The CARE principles are essential guidelines for fostering sustainable, inclusive practices, particularly in environmental and ocean conservation efforts (Carroll et al. 2020). These principles emphasise the importance of working together with diverse stakeholders and rights holders to ensure transparency and accountability in decision-making, take responsibility for actions that affect the environment (Sumaila 2024) and ensure equitable access and benefits for all communities (Bender et al. 2022).

Enabling the optimal use of research data and methods can be challenging and complex with multiple stakeholders and rights holders: Researchers want to share their data; professional data publishers offer their services; software and tool builders provide data analysis and processing services; funding agencies (private and public) are increasingly concerned with proper data stewardship; and the data science community mines, integrates and analyses the output to advance discovery. Fit-for-purpose data management systems are vitally important because they ensure that essential data are not only collected but also retained. Data management systems that facilitate free and open access, use and interpretation of data and products must be included as an essential element of the SOP process. Effective data management is based on collaboration across activities, including observing, metadata and data assembly, quality assurance and control, and data publication (Tanhua et al. 2019).

The development and adoption of common standards for data/metadata (Keeley et al. 2010) and sharing protocols (Pouliquen et al. 2010) take time, coordination and careful testing (de La Beaujardière et al. 2010; Hankin et al. 2010). Best practices and standards for data management are increasingly being implemented by many observing networks and projects on national or continental scales. To achieve optimal use of research data and methods, common community and international standards

and best practices for data systems need to be respected. To implement these practices, well-defined workflows must be followed, and a sustained infrastructure must be in place to support the flow of data from the initial observing systems to the eventual users (Pearlman et al. 2019). Professional data management is an essential element of the FAIRness of an observing system and should be designed and properly funded as part of the cost of collecting the observations. Coordination is needed to define and agree on the best processes to be used so that data are delivered to the system from various networks or individual data providers through a data exchange backbone facilitated by appropriate tools and services to serve a wide data flow path from acquisition to user services (Figure 11).

Establishing a monitoring and evaluation framework

Implementing the SOP, committing to drive action and publicly reporting against progress is a shared responsibility of all ocean guardians, managers, businesses and users in line with their respective priorities, responsibilities and capacity (Moura and Zaykoski 2016). Sustainable ocean planning aims to account for this by incorporating adaptive management into the ocean planning cycle. This iterative process aims to improve management outcomes over time by monitoring and evaluating changed conditions, assessing the relative effectiveness of management measures and responding with adjustments to the plan.

FIGURE 11-A. **The integrated data system: Recommendations for the data system**

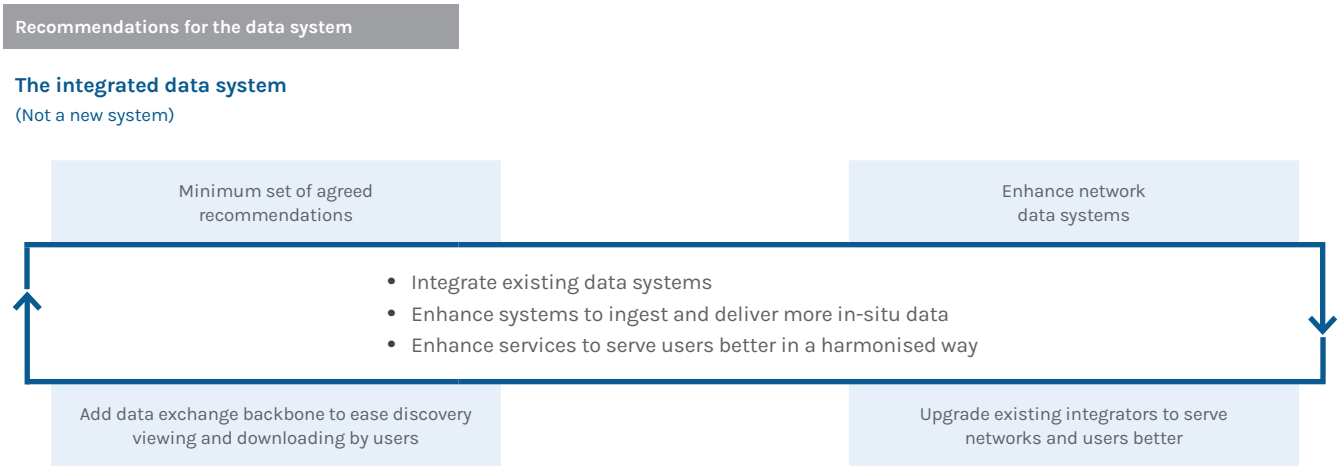
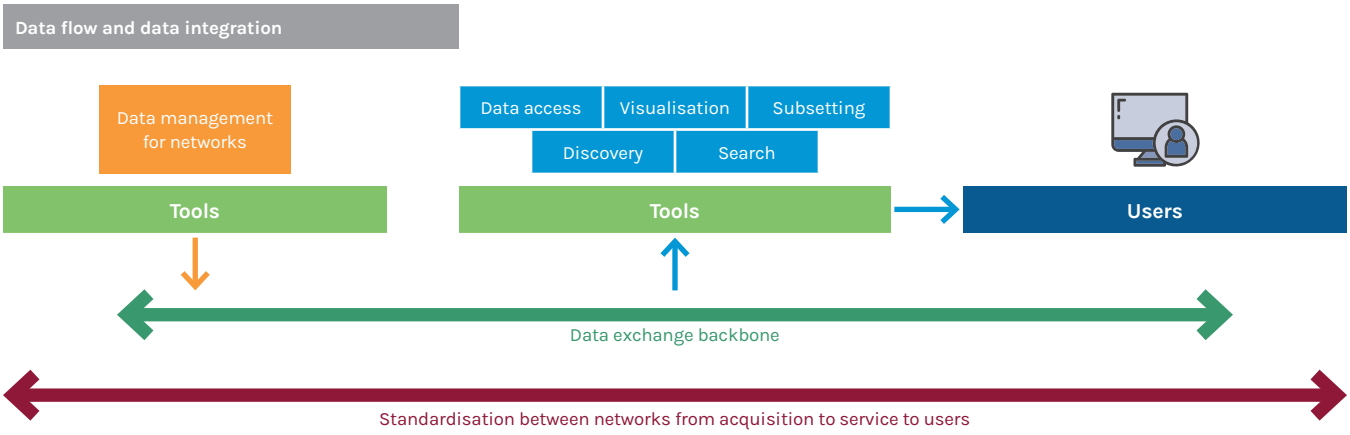


FIGURE 11-B. **The integrated data system: Data flow and data integration**



Notes: Panel a presents a schematic of a view of an integrated data system. Panel b presents a schematic representation of data flow from observing units through a data exchange backbone and, ultimately, to users.

Source: Adapted from Tanhua et al. (2019).

Monitoring and evaluation refers to tracking and assessing the condition of a particular suite of biophysical, socio-economic and institutional and governance systems the plan seeks to affect (Frazão Santos et al. 2024). It establishes a system of accountability for specified planning authorities' actions that, together, constitute plan implementation and compliance. This stage is necessary to ensure that the party responsible for implementing the SOP has carried out what is stated in the plan. Planners need to consider the condition of these systems over time to inform whether and how management actions are updated, regardless of whether a change can be attributed to plan implementation (Moura and Zaykoski 2016). This step is needed to provide a basis for how the conditions of biodiversity, economy and community welfare change, what the impacts are and how to respond to changes in conditions and the occurrence of these impacts on the substance of the SOP.

Framework components

The proposed framework components for monitoring and evaluation include data analysis, evaluation, adaptive management and transparent reporting and public awareness. To enhance the effectiveness of an SOP, evaluating the impacts of SOP implementation is crucial, and the framework aligns with the four enabling conditions outlined in Figure 11.

Data analysis compares new field data with baseline values, assesses stakeholder and rights holder inputs and environmental changes to assess progress, identifies early environmental degradation trends (reduction of coral cover, declining fish stocks, etc.) and determines the performance of policy interventions and the need for adjustment. The analysis must also measure the impact of specific SOP elements, such as whether regulatory measures are reducing environmental pressures or if strategic objectives are enhancing community welfare. Findings on impacts should be reported regularly in a single data portal to ensure openness and transparency and facilitate communication between stakeholders and rights holders.

Evaluations are periodically carried out by planners to assess SOP implementation effectiveness, governance and stakeholder and rights holder involvement. Impact evaluations can evaluate progress against global frameworks, such as the targets of SDG 14 (life below water). They can also assess jurisdictional boundaries and legal and administrative processes that enable compliance

with SOP regulations and whether governance structures allow for adaptive responses to new environmental or socio-economic challenges. Impact evaluation should be tailored to the plan's type and objectives, ensuring that assessments accurately reflect whether the SOP's regulatory measures, strategic visions and informational goals achieve intended environmental, social and economic outcomes. The evaluation should also include gap analyses in achieving an SOE and identify key barriers to investment, such as inadequate funding mechanisms and misaligned economic incentives. They should also identify opportunities to develop mitigation strategies, such as innovative public and private investment approaches to support ocean health and governance (Sumaila et al. 2021). Other essential aspects for achieving a sustainable ocean economy include the importance of social equity, environmental sustainability and economic viability as interconnected facets, advocating for evidence-based, collaborative planning that prioritises local benefits and ensures that ocean economies deliver on social, environmental and economic goals (Cisneros-Montemayor et al. 2021).

Public consultations, seminars and public discussions across stakeholders and rights holders are carried out to implement feedback loops involving all stakeholders and rights holders, including Indigenous and local communities to ensure Indigenous and local knowledge are integrated into decision-making. Public consultations and stakeholder and rights holder seminars can assess whether SOP objectives align with community well-being goals, adjusting policies to address any disparities or unintended consequences. As the ocean environment and ocean use continue to change at a rapid pace, there is an opportunity to build on these existing engagement mechanisms, and potentially establish new forums, to strengthen national ocean coordination and collaboration.

Feedback loops are carried out as a basis for promoting policy revision to advocate for regulatory changes and improved funding allocations.

Adaptive management includes making iterative adjustments to the objectives, policies and strategies of sustainable ocean planning and implementation as well as proposing new interventions to improve the approach in achieving SOP targets. Adaptive management is carried out through, among others, the adoption of new data and findings, and adjusting objectives and strategies based on climate change, socio-economic dynamics and scientific advances. Adaptive management adjustments should be informed by impact evaluations that capture community feedback, and should leverage impact evaluation outcomes to enhance cross-boundary policies.

For indicators that have not been achieved or are considered weak, targeted policy interventions should be developed through a collaborative process. These interventions should define clear objectives and strategies to address gaps and enhance effectiveness. A stakeholder-inclusive approach is essential to ensure that local communities, industry representatives and other key actors actively participate in setting and refining goals based on evaluation outcomes.

As part of the adaptive management process, data on policy adjustments and their impacts should be transparently shared. Regular updates on SOP implementation progress and indicator achievements should be communicated through accessible platforms and public engagement efforts. This ongoing exchange of information fosters accountability, strengthens stakeholder and rights holder trust and ensures that decision-making remains responsive to evolving environmental and socio-economic conditions.

Appendices

Appendix A: Climate change adaptation and mitigation through SOPs

SOPs can directly support climate change mitigation outcomes by implementing actions that enhance ocean-based carbon sinks, reduce marine and coastal emissions and increase ecosystem resilience.

Blue carbon ecosystem conservation and restoration

SOPs can play an essential role in prioritising the protection, restoration and sustainable management of blue carbon ecosystems such as mangroves, seagrasses, and salt marshes — ecosystems recognised globally for their high capacity to sequester and store carbon. Through SOPs, governments can set clear, measurable targets **for** conserving and restoring these ecosystems, aligned with national climate mitigation goals and international commitments under the Paris Agreement.

For example, an SOP could outline a national objective to restore 10,000 hectares of degraded mangroves by 2030, with estimated carbon sequestration benefits that can be incorporated into national GHG inventories under IPCC guidelines (including the 2013 Wetlands Supplement). SOPs can also identify **policy instruments and financing mechanisms** to support restoration — such as incentives for local communities, integration with climate adaptation initiatives and alignment with ecosystem-based adaptation strategies.

In addition, **SOPs can establish monitoring, reporting and verification systems** to track changes in blue carbon stocks, providing transparent data for biennial transparency reports (BTRs) and enabling countries to link ocean-based mitigation outcomes to their NDCs. By embedding blue carbon strategies into SOPs, countries can turn commitments into actionable steps that advance both climate and biodiversity goals.

Integration into GHG inventories

SOP measures contributing to carbon sequestration should be accounted for in national GHG inventories under IPCC guidelines (e.g., Wetlands Supplement). **SOPs can include monitoring and reporting frameworks to ensure that restored or conserved blue carbon ecosystems are quantified and included in national accounting.** The Ocean Panel's report *The Ocean as a Solution to Climate Change: Updated Opportunities for Action* underscores the potential contribution of ocean-based measures to achieving up to 35 percent of the emissions reductions needed by 2050 to keep global warming below 1.5°C, reinforcing the importance of integrating these measures into national mitigation strategies and inventories (Hoegh-Guldberg et al. 2023).

MPAs with carbon benefits

Expanding MPAs as part of an SOP can safeguard critical blue carbon ecosystems such as mangroves, seagrasses and salt marshes, thereby preventing emissions from degradation and enhancing carbon sequestration. **SOPs can establish clear targets and criteria for identifying and prioritising MPAs that deliver both biodiversity and climate mitigation benefits.** Importantly, SOPs can mandate that these areas be systematically monitored for carbon stocks and fluxes using standardised methodologies aligned with IPCC guidelines. The data can be used to support the inclusion of ocean-based mitigation outcomes in a country's NDCs under the Paris Agreement, as well as in BTRs, enhancing the visibility of marine climate action within national and international reporting frameworks. Furthermore, SOPs can provide a governance framework to coordinate agencies responsible for biodiversity conservation, fisheries and climate policy, facilitating the integration of MPA-related mitigation outcomes into climate finance proposals and national climate strategies.

Sustainable fisheries and emissions reduction

SOPs can play a key role in decarbonising the fisheries sector through a combination of regulatory, financial and capacity-building measures (Ocean Panel 2021). Beyond promoting gear modifications and vessel efficiency improvements to reduce fuel consumption, SOPs can establish clear pathways to transition towards low-carbon fishing practices. This may include incentivising the adoption of alternative propulsion systems (e.g., hybrid or electric vessels), phasing out high-emission fleets, promoting shorter supply chains and facilitating access to green finance to modernise fisheries (Hoegh-Guldberg et al. 2023).

SOPs can also integrate climate-smart fisheries management measures, such as spatial and temporal closures that reduce unnecessary fuel use (e.g., avoiding fishing in distant areas during low-yield periods), as well as policies that encourage landing catches closer to home ports to minimise transport emissions (FAO 2022). Data generated from implementing these measures — such as reductions in fuel consumption per unit catch — can be linked to national GHG inventories, reported under the energy or agriculture sectors following IPCC 2006 guidelines and the 2013 Wetlands Supplement (IPCC 2014), and reflected in NDCs and BTRs under the Paris Agreement.

Furthermore, SOPs can provide a framework for cross-sectoral coordination to align fisheries policies with national climate targets, bridging ministries of fisheries, energy and environment. They can help mobilise technical assistance and international finance (e.g., through the Global Environment Facility, Green Climate Fund or blue natural capital financing mechanisms) to support decarbonisation efforts in small-scale and industrial fisheries (World Bank 2020). By embedding decarbonisation objectives within fisheries management under SOPs, countries can operationalise ocean-based mitigation as part of their broader national climate commitments (Ocean Panel 2020; Hoegh-Guldberg et al. 2023).

Co-benefits for adaptation and mitigation

SOPs offer a unique opportunity to integrate mitigation and adaptation objectives by prioritising nature-based solutions that deliver multiple benefits. By protecting, restoring and sustainably managing coastal ecosystems such as mangroves, seagrasses and salt marshes, SOPs not only safeguard critical natural infrastructure that reduces coastal erosion, buffers storm surges and enhances fisheries productivity, but they also maintain and increase blue carbon sequestration capacity (IPCC 2019).

These dual benefits position SOPs as a platform for integrated climate action, enabling countries to align coastal and marine management with national adaptation plans, NDCs, and biodiversity commitments under the GBF. The measures implemented under SOPs can contribute directly to climate resilience while providing quantifiable mitigation outcomes, which — if properly monitored — can be incorporated into national GHG inventories and reported under the Paris Agreement transparency framework (IPCC 2014; UNFCCC 2023).

Furthermore, SOPs can facilitate cross-sectoral coordination to ensure that coastal protection measures, infrastructure development and ecosystem-based adaptation strategies work synergistically rather than in conflict. By embedding adaptation and mitigation co-benefits into MSP and policy development, SOPs can help leverage international finance (e.g., Green Climate Fund, Adaptation Fund) and technical support for scalable implementation, particularly in vulnerable coastal regions.

Alignment with the Paris Agreement

SOPs can function as an actionable implementation framework for achieving a country's NDCs under the Paris Agreement, particularly for targets and measures related to ocean and coastal ecosystems. By embedding specific ocean-based mitigation and adaptation measures within SOPs — such as blue carbon ecosystem restoration, sustainable fisheries management and MSP — governments can operationalise their NDC pledges through coherent, cross-sectoral marine governance (Table A-1).

SOPs provide a structured platform to translate NDC commitments into policy and practice, ensuring that ocean-related climate actions are integrated into national development strategies, supported by regulatory mechanisms and monitored through robust data systems. Countries can explicitly reference SOP measures in their NDCs to highlight alignment with global climate goals and to demonstrate national leadership in ocean-climate action.

Moreover, SOPs facilitate the collection of ocean-relevant data and indicators — such as changes in carbon stocks, emission reductions in fisheries and coastal protection outcomes

— that can feed into BTRs and national GHG inventories, enhancing compliance with the Paris Agreement's enhanced transparency framework. By creating this institutional and technical linkage, SOPs not only support implementation but also improve a country's capacity to track, report and communicate progress on its climate commitments while positioning ocean action as a core component of national climate policy.

TABLE A-1. **SOP mitigation and adaptation strategies**

STRATEGY	WHY IT MATTERS	HOW TO INTEGRATE INTO SUSTAINABLE OCEAN PLAN
Protect and restore blue carbon ecosystems	Mangroves, seagrasses and salt marshes sequester carbon up to 10 times faster than terrestrial forests and 4–6 times the rate of tropical forests, and they provide natural coastal defenses.	• Include blue carbon strategies in marine spatial planning. • Identify priority sites for conservation and restoration. • Establish financial incentives (e.g., carbon credits) to fund initiatives. • Align blue carbon conservation with Nationally Determined Contributions.
Sustainably manage fisheries to lower carbon footprints	Unsustainable fishing increases emissions through excessive fuel use and ecosystem degradation, causing reduced sequestration as well as lost or wasted food products.	• Implement ecosystem-based fisheries management. • Promote low-impact fishing gear and fuel-efficient practices. • Support sustainable aquaculture with lower carbon footprints. • Integrate fisheries management with climate-smart food security policies.
Advance marine renewable energy	Offshore wind, wave and tidal energy reduce reliance on fossil fuels.	• Identify suitable zones for renewable energy in marine spatial plans. • Streamline permitting and regulatory processes. • Ensure environmental assessments consider biodiversity and community concerns. • Foster public-private partnerships to drive investment.
Strengthen coastal protection with nature-based solutions	Coral reefs and mangroves reduce storm surge impacts and coastal erosion.	• Prioritise nature-based solutions in coastal adaptation. • Map and restore degraded ecosystems. • Promote hybrid solutions combining natural and built infrastructure. • Engage local communities in conservation and stewardship. • Prioritise regenerative, nature-positive tourism.
Use climate-resilient marine spatial planning (MSP)	MSP balances ocean uses while factoring climate risks.	• Incorporate climate projections into MSP decision-making. • Designate climate refugia for sensitive species and habitats. • Use dynamic spatial management for shifting ecosystems. • Review MSP periodically as climate conditions evolve.
Strengthen ocean monitoring and early warning systems	Real-time ocean data enables timely responses to climate threats.	• Invest in ocean observation and monitoring technologies. • Develop climate risk tools for coastal communities and industries. • Establish early warning systems for extreme weather and algal blooms. • Integrate monitoring data into decision-making and response.

Source: WRI authors.

Appendix B: The role of SOPs in global ocean governance

SOPs serve as an integrative platform linking national ocean management actions with international commitments and global governance frameworks. This appendix outlines how SOPs can translate global declarations and agreements into practical, implementable measures at the national level while also positioning countries as active contributors to global ocean goals (Table B-1).

A key insight is that SOPs are not only tools to meet domestic goals but also mechanisms for countries to comply with, report to and advance global ocean governance agendas through actionable, country-specific pathways (Tables B-2 through B-5).

TABLE B-1. **SOPs operationalise international commitments through national action**

GLOBAL FRAMEWORK	HOW SUSTAINABLE OCEAN PLANS DELIVER AT THE NATIONAL LEVEL
Paris Agreement (2015)	Sustainable Ocean Plans (SOPs) provide a governance framework for integrating ocean-based climate solutions into national climate commitments under the Paris Agreement. By embedding actions such as blue carbon ecosystem restoration, low-carbon fisheries and marine renewable energy zones into Nationally Determined Contributions (NDCs), national adaptation plans and long-term low greenhouse gas emissions development strategies, SOPs align national ocean policies with global climate goals. SOPs also establish institutional coordination mechanisms that bring together multiple government ministries — environment, fisheries, energy, planning — and foster inclusive decision-making platforms that actively engage Indigenous Peoples and local communities, women and marginalised groups as co-stewards of marine resources. Through their monitoring and reporting structures, SOPs generate disaggregated, community-informed data that can be integrated into national greenhouse gas inventories following Intergovernmental Panel on Climate Change guidelines and reported through biennial transparency reports under the Paris Agreement's enhanced transparency framework. Furthermore, by embedding principles of equity and participatory governance, SOPs strengthen the legitimacy and effectiveness of ocean-climate action while improving access to international climate finance — including the Green Climate Fund and Adaptation Fund — by aligning projects with NDC priorities and global funding eligibility criteria.
Kunming-Montreal Global Biodiversity Framework (GBF)	SOPs serve as practical instruments for implementing the GBF at the national level. Specifically, SOPs facilitate the achievement of Target 3, which aims to conserve at least 30 percent of coastal and marine areas by 2030 through ecologically representative, well-connected and equitably governed systems of protected areas and other effective area-based conservation measures. Beyond Target 3, SOPs contribute to multiple GBF targets by integrating ocean conservation and sustainable use into National Biodiversity Strategies and Action Plans (NBSAPs). This integration ensures that marine and coastal biodiversity considerations are embedded across various sectors, including fisheries, tourism and climate adaptation. For instance, SOPs can support the following: • **Target 1.** Implementing spatial planning approaches to manage land- and sea-use change. • **Target 2.** Restoring degraded marine and coastal ecosystems. • **Target 6.** Reducing pollution in marine environments. • **Target 8.** Minimising the impacts of climate change and ocean acidification on biodiversity. • **Target 10.** Ensuring sustainable use of marine resources. By aligning SOP measures with NBSAP priorities, countries can ensure coherence across their conservation efforts and facilitate reporting under the Convention on Biological Diversity's monitoring framework.
Sustainable Development Goals (SDGs; especially SDGs 2, 13 and 14)	SOPs serve as integral tools for advancing multiple SDGs by embedding ocean-related actions into national development strategies and reporting frameworks: • **SDG 1: No poverty.** SOPs promote sustainable ocean-based livelihoods, fisheries, aquaculture and tourism, creating jobs and income in coastal communities and Small Island Developing States. By ensuring equitable access to marine resources, SOPs contribute to poverty reduction and economic resilience. • **SDG 2: Zero hunger.** By promoting sustainable aquaculture and fisheries, SOPs aid in ensuring food security and improved nutrition, directly impacting SDG 2.

TABLE B-1. **SOPs operationalise international commitments through national action (cont.)**

GLOBAL FRAMEWORK	HOW SUSTAINABLE OCEAN PLANS DELIVER AT THE NATIONAL LEVEL
Sustainable Development Goals (SDGs; especially SDGs 2, 13 and 14) (cont.)	• **SDG 5: Gender equality.** SOPs can integrate gender-responsive approaches to ensure women's participation in ocean governance, fisheries management and marine conservation initiatives, addressing structural inequalities in ocean sectors. • **SDG 6: Clean water and sanitation.** SOPs address marine pollution sources (e.g., land-based runoff, wastewater discharge) and promote integrated coastal watershed management, improving water quality and ecosystem health. • **SDG 7: Affordable and clean energy**. SOPs facilitate marine renewable energy (offshore wind, wave, tidal) planning, siting and permitting as part of national clean energy transitions. • **SDG 8: Decent work and economic growth.** SOPs foster sustainable ocean economy sectors, improving labour standards in fisheries, aquaculture, maritime transport and eco-tourism while balancing economic growth with sustainability. • **SDG 9: Industry, innovation and infrastructure.** SOPs encourage innovation in sustainable marine technologies, monitoring systems, and low-carbon maritime industries, supporting sustainable infrastructure development. • **SDG 11: Sustainable cities and communities.** SOPs contribute to urban resilience by protecting coastal zones, reducing exposure to sea level rise and integrating coastal ecosystem services into city planning. • **SDG 12: Responsible consumption and production.** SOPs promote sustainable seafood certification, traceability and reduction of bycatch and marine resource waste, encouraging responsible marine resource consumption. • **SDG 13: Climate action.** SOPs support climate adaptation and mitigation efforts by enhancing coastal resilience and promoting blue carbon ecosystems, aligning with national climate strategies and contributing to SDG 13 targets. • **SDG 14: Life below water.** SOPs contribute to targets such as conserving marine ecosystems, reducing marine pollution and regulating harvesting to restore fish stocks. By designating marine protected areas and promoting sustainable fisheries, SOPs help countries meet their commitments under SDG 14. • **SDG 15: Life on land.** SOPs integrate land-sea interactions by linking terrestrial watershed management with marine ecosystem health, recognising upstream impacts on coastal and marine biodiversity. • **SDG 17: Partnerships for the goals**. SOPs build multistakeholder partnerships across governments, civil society, the private sector, academia and international organisations to co-develop and implement sustainable ocean management. By aligning SOP initiatives with these SDGs, countries can effectively monitor and report progress through national SDG reporting mechanisms, ensuring that ocean-related actions are integrated into broader sustainable development efforts.
UN Decade of Ocean Science	In April 2024, the Barcelona Declaration was adopted during the 2024 UN Ocean Decade Conference. This declaration identifies priority areas for ocean knowledge and science generation within the framework of the Ocean Decade, emphasising the need for transformative science-based solutions for a healthy and resilient ocean. The Ocean Decade Programme on Sustainable Ocean Planning has been co-designed to respond to the recommendations of the Ocean Panel's agenda, particularly the goal of achieving 100% sustainable ocean planning. This programme serves as an umbrella framework for marine policies, aiming to integrate scientific knowledge into policymaking processes and to promote sustainable ocean management practices. By aligning SOPs with the objectives of the UN Ocean Decade and the Barcelona Declaration, countries can take the following actions: • **Integrate scientific knowledge into policy.** SOPs facilitate the incorporation of cutting-edge ocean science into national and regional policy frameworks, ensuring that decisions are informed by the best available data. • **Promote collaborative research.** The SOP programme encourages partnerships among governments, research institutions and stakeholders to co-design and co-deliver solutions for sustainable ocean management. • **Enhance capacity-building.** Through the SOP programme, resources are allocated to build capacities in ocean science, particularly in developing countries, to support equitable participation in ocean governance. • **Support monitoring and evaluation.** SOPs contribute to the development of indicators and monitoring frameworks to assess progress towards sustainable ocean planning goals.

TABLE B-1. **SOPs operationalise international commitments through national action (cont.)**

GLOBAL FRAMEWORK	HOW SUSTAINABLE OCEAN PLANS DELIVER AT THE NATIONAL LEVEL
UN Decade of Ocean Science (cont.)	By embedding SOPs within the broader context of the UN Ocean Decade and adhering to the principles outlined in the Barcelona Declaration, nations can ensure that their ocean governance strategies are both scientifically robust and aligned with global sustainability objectives.
Oceans20 Communiqué	In November 2024, Oceans20 (O20) — a permanent engagement group in the Group of 20 (G20) — released its first communiqué. This called for G20 leaders to integrate the ocean into their climate, trade and development agendas. It included 10 priority themes, with the first theme being to promote a sustainable and equitable ocean economy. Under this theme, O20 encourages the commitment to 100% sustainable ocean management by 2030, "leverag[ing] models like the Ocean Action 2030 Sustainable Ocean Plans (SOPs)."[a] SOPs are therefore a clear delivery mechanism of the sustainable ocean economy that has been recognised by this group and encouraged to adopt. By aligning SOPs with the other themes and priority actions outlined in this document, nations can ensure they're sharing in the commitment to 100% sustainable ocean management.
Unpacking Ocean Finance for Climate Action	This road map for the United Nations Framework Convention on Climate Change recognises SOPs as a policy mechanism that can clarify and enhance allocation of climate finance to ocean-based solutions. It identifies SOPs as a clear development strategy that can assist with building investor and industry confidence in the ocean. By building SOPs as an investment plan, nations can ensure the participation of the private sector.[b]
Blue Thread: Aligning National Climate and Biodiversity Strategies	This policy brief, which focuses on ensuring the holistic and coherent implementation of overlapping climate and biodiversity strategies, highlights how SOPs align with the Ocean Breakthroughs. By interconnecting SOP development with the Ocean Breakthroughs, nations can ensure linkages between biodiversity and climate objectives and strengthen policy coherence.[c]

Sources: a. O20 2024; b. Ocean & Climate Platform and ORRAA 2024; c. Lecerf et al. 2024.

TABLE B-2. **From declarations to national policy: Making global commitments tangible**

GLOBAL DECLARATION/ POLITICAL COMMITMENT	PRACTICAL SUSTAINABLE OCEAN PLAN INTEGRATION AT THE NATIONAL LEVEL
Joint Declaration on Ocean and Climate Action (2023)[a]	Sustainable Ocean Plan (SOPs) respond directly to this declaration's call for urgent, integrated action to align ocean governance with climate goals. SOPs provide a road map towards 100% sustainable ocean management by 2030, establish milestones, enhance cross-ministry coordination and ensure inclusion of ocean-climate linkages in national and international reporting.
Apia Commonwealth Ocean Declaration (2024)[b]	The declaration encourages the development and implementation of national SOPs as a mechanism for achieving responsible and effective ocean management of 100% of marine waters, informed by the best available science and traditional knowledge. SOPs are supported by the Commonwealth Blue Charter, its Action Groups, technical assistance programmes and the newly established Blue Charter Centre of Excellence at the Cyprus Marine and Maritime Institute, providing coordination, capacity-building and knowledge-sharing platforms to enable implementation.
Barcelona Statement (UN Decade of Ocean Science for Sustainable Development, 2024)[c]	The Barcelona Statement explicitly calls for the Ocean Decade to "underpin evidence-based Sustainable Ocean Plans at the national level and in relevant transboundary areas." This recognises SOPs as critical tools for translating ocean science into policy action, ensuring that national and regional ocean governance frameworks are grounded in the best available evidence. By embedding SOPs within the Ocean Decade's objectives, countries are encouraged to establish science-policy interfaces that guide marine spatial planning, biodiversity protection, and sustainable use of ocean resources.
Declaration of Nassau for Sustainable Development in the Americas (2023)[d]	The Declaration of Nassau for Sustainable Development in the Americas (2023) underscores the proactive conservation, sustainable management and protection of the ocean and other bodies of water, explicitly recognising their critical role in both climate change mitigation and adaptation. Although the declaration does not explicitly use the term *Sustainable Ocean Plan*, its emphasis on integrated ocean stewardship, nature-based solutions and ecosystem-based approaches provides a strong governance framework within which SOPs can be operationalised.

TABLE B-2. **From declarations to national policy: Making global commitments tangible (cont.)**

GLOBAL DECLARATION/ POLITICAL COMMITMENT	PRACTICAL SUSTAINABLE OCEAN PLAN INTEGRATION AT THE NATIONAL LEVEL
Declaration of Nassau for Sustainable Development in the Americas (2023)[d] (cont.)	SOPs can serve as the national-level mechanism to fulfil these commitments, translating hemispheric goals into actionable plans by aligning marine conservation, restoration of coastal and marine ecosystems (e.g., mangroves, coral reefs, seagrass beds) and sustainable use initiatives with national climate strategies, National Biodiversity Strategies and Action Plans and Sustainable Development Goal implementation. Furthermore, the declaration's call to promote responsible stewardship and integrate ecosystem-based adaptation measures into national policies supports embedding SOPs as a tool for policy coherence and cross-sectoral coordination across climate, biodiversity and sustainable development agendas.
UN Ocean Conference Zero Draft Declaration (2025)[e]	The Zero Draft of the Political Declaration for the third UN Ocean Conference, held in June 2025 in Nice, France, outlines a comprehensive framework for accelerating action to conserve and sustainably use the ocean, seas and marine resources.

Sources: Ocean Panel 2023; Commonwealth Secretariat 2024; UNESCO-IOC 2024; OAS 2023; United Nations 2025

TABLE B-3. **Core SOP components: National action supporting global governance**

SUSTAINABLE OCEAN PLAN (SOP) COMPONENT	GLOBAL REPORTING/POLICY ALIGNMENT
Blue carbon ecosystem targets	Directly linked to Nationally Determined Contribution (NDC) commitments for mitigation and adaptation; reported through biennial transparency reports, Convention on Biological Diversity (CBD) national reports; support national blue carbon inventories per Wetlands Supplement of the Intergovernmental Panel on Climate Change (IPCC); enable countries to account for coastal carbon sinks towards national greenhouse gas (GHG) targets.
Marine protected areas (MPAs) (30 percent goal)	Count towards CBD Target 3 (30x30) and Sustainable Development Goal (SDG) 14.5; reported in CBD national reports and National Biodiversity Strategies and Action Plans; contributes to regional/global MPA coverage metrics (e.g., Protected Planet database); demonstrate national implementation of global biodiversity commitments.
Low-carbon fisheries measures	Incorporated into sectoral targets under NDCs (energy, agriculture, fisheries); reported via national GHG inventories under IPCC guidelines; align with SDG12.3 and the Food and Agriculture Organization's Code of Conduct for Responsible Fisheries and Voluntary Guidelines on Sustainable Small-Scale Fisheries; support decarbonisation and sustainable food systems.
Marine renewable energy zones	Support national renewable energy targets under SDG 7; align with NDC energy sector targets and the long-term low GHG emissions development strategies of the United Nations Framework Convention on Climate Change (UNFCCC); reported in national clean energy transition strategies; enable reporting of marine-based clean energy expansion.
Adaptation measures	Contribute to national adaptation plans, adaptation communications under UNFCCC and Sendai Framework for Disaster Risk Reduction; coastal ecosystem-based adaptation co-benefits reported under CBD, SDGs and UNFCCC; strengthen links between ocean action, climate resilience and disaster risk management.
Ocean monitoring systems	Support implementation of the UN Decade of Ocean Science (SDG 14.a), contribute to Global Ocean Observing System and feed data into SDG indicator 14.1.1b; provide national ocean monitoring data for integration into global marine science and policy platforms; enable evidence-based ocean governance.

Source: WRI authors.

TABLE B-4. **Institutionalising SOPs: National systems that support global governance**

INSTITUTIONAL MECHANISM	DESCRIPTION
Cabinet-level endorsement or legislative adoption	Gives the Sustainable Ocean Plan (SOP) legal authority to align national agencies, enforce ocean zoning and secure budget allocations for implementation.
SOP coordination mechanisms (e.g., interministerial SOP committee)	Enable cross-sectoral governance by linking fisheries, environment, energy, tourism and other relevant ministries to coordinate SOP implementation.
Integrated reporting templates within SOP	Allow SOP outputs to be submitted simultaneously to the Convention on Biological Diversity (CBD), the United Nations Framework Convention on Climate Change (UNFCCC), Sustainable Development Goals (SDGs) and UN Ocean Decade frameworks, reducing duplication and increasing reporting efficiency and transparency.
Annual SOP progress reviews aligned with global reporting cycles	Synchronise SOP reviews with biennial transparency reports (UNFCCC), CBD reporting and SDG voluntary national reviews, enhancing coherence and streamlining accountability.

Source: WRI authors.

TABLE B-5. **Why SOPs are an interlinking platform for global and national ocean governance**

DIMENSION	HOW SUSTAINABLE OCEAN PLANS ENABLE INTEGRATION
National legal and policy instruments	Align Sustainable Ocean Plan (SOP) measures with existing national laws, marine policies, biodiversity strategies and climate action plans.
International agreements and reporting obligations	Bridge national actions with reporting under Sustainable Development Goals, Convention on Biological Diversity, United Nations Framework Convention on Climate Change, Paris Agreement and other multilateral commitments.
Cross-sectoral ocean uses	Coordinate fisheries, tourism, energy, conservation, transport and other ocean sectors under an integrated management framework.
Stakeholder engagement and co-production	Institutionalise inclusive participation of Indigenous Peoples, local communities, private sector and civil society in ocean governance.
Summary statement	By embedding SOPs into national planning systems, countries transform global commitments into localised, actionable road maps while maintaining upward reporting lines to international frameworks.

Source: WRI authors.

Appendix C: How SOPs contribute to SDG 14, life below water

SDG 14, life below water, aims to conserve and sustainably use the ocean, seas and marine resources for sustainable development. An SOP serves as a practical mechanism to achieve SDG 14 by integrating science-based policies, multisectoral governance and sustainable financing into national ocean management. Table C-1 examines how SOPs directly contribute to each of the SDG 14 targets.

TABLE C-1. How SOPs support SDG 14 targets

SUSTAINABLE DEVELOPMENT GOAL 14 TARGET	HOW SUSTAINABLE OCEAN PLANS SUPPORT THIS TARGET
14.1: Reduce marine pollution	• Marine spatial planning to control discharges. • Land-sea linkages for upstream pollution. • Plastic reduction and circular economy measures.
14.2: Protect and restore ecosystems	• Ecosystem-based management. • Expand marine protected areas (MPAs), ecological corridors. • Nature-based solutions for mangrove, coral, seagrass restoration.
14.3: Reduce ocean acidification	• Blue carbon conservation. • Ocean pH monitoring systems. • Connect to global acidification science networks.
14.4: Sustainably manage fisheries	• Science-based management (total allowable catches, closures). • Sustainable certification schemes. • Monitoring, control, surveillance systems.
14.5: Conserve 30 percent of marine areas	• MPA designation for biodiversity/climate refugia. • Co-managed MPAs with Indigenous Peoples and local communities. • Link MPAs to sustainable finance (blue bonds, trust funds).
14.6: End harmful fisheries subsidies	• Reform subsidies towards sustainability. • Support small-scale fisheries. • Transparency in subsidy reporting.
14.7: Increase sustainable economic benefits	• National ocean economy strategies. • Investment in sustainable aquaculture. • Revenue-sharing for local communities.
14.a: Increase scientific knowledge	• Establish knowledge platform (e.g., UN Ocean Decade's Sustainable Ocean Planning Programme). • Integrate traditional knowledge. • Ocean data/innovation platforms.
14.b: Support small-scale fisheries	• Legal recognition of small-scale fisheries. • Market access through certification. • Co-managed fisheries governance.
14.c: Strengthen ocean governance	• Align laws with United Nations Convention on the Law of the Sea, Convention on Biological Diversity, Paris Agreement. • Interagency ocean councils for cross-sectoral governance.

Source: WRI authors.

Appendix D: Templates for stakeholder and rights holder mapping

Showcased below are example templates that can be used to identify key stakeholders and rights holders involved or affected by an SOP (Table D-1), to categorise their power/influence-interest matrix (Table D-2) and to devise an engagement plan (Table D-3).

TABLE D-1. **Stakeholder identification template**

STAKEHOLDER NAME	ORGANISATION	SECTOR	ROLE/INTEREST IN SOP	INFLUENCE LEVEL	INTEREST LEVEL	CONTACT INFO
Example name	Example organisation	Fisheries	Sustainable use of marine resources	High	High	Email/phone

Note: SOP = Sustainable Ocean Plan.
Source: WRI authors.

TABLE D-2. **Stakeholder power/influence-interest matrix**

STAKEHOLDER GROUP	HIGH INFLUENCE, HIGH INTEREST	HIGH INFLUENCE, LOW INTEREST	LOW INFLUENCE, HIGH INTEREST	LOW INFLUENCE, LOW INTEREST
Government agencies	Example	Example	Example	Example
Private sector	Example	Example	Example	Example
Non-governmental organisations	Example	Example	Example	Example
Academia	Example	Example	Example	Example
Local communities	Example	Example	Example	Example

Source: WRI authors.

TABLE D-3. **Stakeholder engagement plan**

STAKEHOLDER GROUP	PREFERRED ENGAGEMENT METHOD	KEY CONCERNS	EXPECTED CONTRIBUTIONS	ENGAGEMENT FREQUENCY	RESPONSIBLE PARTY
Fisheries sector	Workshops, surveys	Fishing access, sustainability	Provide sector specific knowledge	Quarterly	SOP team
Environmental NGOs	Reports, webinars	Conservation priorities	Scientific data, advocacy	Biannually	SOP team
Local communities	Public Meetings, Social Media	Livelihood impacts	Traditional and local knowledge	Monthly	Community liaison

Notes: NGO = non-governmental organisations; SOP = Sustainable Ocean Plan.
Source: WRI authors.

Appendix E: Templates for consultation records

Template 1: Stakeholder and rights holder meeting record

Meeting title: _____

Date and time: _____

Location/platform: _____

Facilitator(s): _____

Participants (name and organisation): _____

Objectives:

- Key discussion points: _____
- Stakeholder and rights holder feedback: _____
- Action items and next steps: _____
- Additional comments: _____

Template 2: Survey/questionnaire response summary

Survey title: _____

Date conducted: _____

Target audience: _____

Total responses: _____

Key findings:

- Common themes: _____
- Challenges identified: _____
- Recommendations based on feedback: _____

Template 3: Public consultation event report

Event title: _____

Date and time: _____

Location/platform: _____

Organiser(s): _____

Number of attendees: _____

Objectives:

- Summary of presentations: _____
- Public comments and concerns: _____

Proposed solutions and responses: _____

Conclusion and follow-up actions: _____

Contact information for further inquiries _____

Appendix F: Relevant data collection methodologies

Benthic habitat mapping

Benthic (seafloor) habitat mapping is useful for sustainable ocean planning because it provides information needed to understand and protect marine ecosystems. Benthic maps help practitioners understand ecosystem functions by identifying feeding, shelter and breeding grounds (Galparsoro et al. 2014). They also support conservation by highlighting vulnerable habitats and informing the creation of MPAs and fisheries management. Furthermore, these maps enable sustainable development by assessing the present impacts of human activities and aiding in infrastructure placement (Harris 2012). They enhance decision-making by providing spatial context, facilitating communication and, alongside other relevant variables, serve as a baseline for monitoring environmental changes (Schill et al. 2011).

Several methods are used to sample benthic habitats. Remote sensing techniques include satellite imagery for large-scale mapping in clear, shallow waters; airborne lidar for high-resolution data in coastal areas; and sonar, including multibeam echosounders for deeper waters and side-scan sonar for identifying seabed features (Misiuk and Brown 2024). Additionally, traditional ecological knowledge has been proven cost-effective and accurate for large-scale benthic surveys (Teixeira et al. 2013).

In situ methods involve underwater video and photography, diving surveys, sediment sampling, biological sampling and the use of remotely operated vehicles (ROVs) for data collection in challenging environments (Misiuk and Brown 2024). Integrated approaches, which combine remote sensing and in situ data, are considered the best practice, and habitat modelling applies multiparameter models to predict habitat distribution.

Classifying benthic habitats with common terminology is crucial for data-sharing and comparison. This involves using habitat classification schemes such as the European Nature Information System (EUNIS) for a standardised framework (EEA 2019). Data dictionaries and ontologies define terms and represent relationships between concepts. Quality control procedures, capacity-building and expert reviews in development and monitoring ensure data accuracy. Collaborative platforms and data portals facilitate data-sharing and standardisation. Adhering to these principles promotes consistency and interoperability in benthic habitat mapping.

Marine and coastal ecosystem and habitat assessment

According to the world ocean assessment (United Nations n.d.), nine important marine ecosystems and habitats exist around the globe: cold-water coral, tropical coral, estuaries and deltas, hydrothermal vents and cold seeps, high-latitude ice, kelp forests and seagrass meadows, mangroves, salt marshes, the Sargasso Sea, seamounts and other submarine features. They can be broadly categorised into several types, each with unique physical and biological characteristics, such as coastal marine ecosystem, deep-sea ocean, open ocean (pelagic zones) and polar marine ecosystems. To assess the extent and condition of these marine ecosystems, several methods and equipment or tools have been developed to gather baseline and monitoring data. For coastal marine ecosystems, human-led assessments can be conducted with or without equipment. Methods include the following:

- **Interviews and questionnaires** (Meixler and Bain 2022). Gathering local knowledge from coastal communities can provide valuable insights into changes in the ecosystem over time. Fishers and coastal communities, for instance, can share observations about habitat conditions over time based on their knowledge. An important step is triangulation, which validates data/information and reduces bias influence by individual perspectives of respondents (Shackeroff et al. 2011; Moon et al. 2016).
- **Visual surveys** (Meixler and Bain 2022). Researchers conduct visual surveys to observe and record ecosystem extent and condition. This method is particularly useful for assessing coral reefs, seagrass beds, and mangroves. This method includes underwater survey methods (e.g., manta tows), rapid assessment techniques, ground truthing for Geographic Information System (GIS) analysis (Miller and Müller 1999; Erftemeijer 2002; Jokiel et al. 2015; BSN 2024). Surveyors or researchers typically visit and observe specific areas of an ecosystem, then estimate its extent and conditions using established guidelines and techniques.
- **Transect and quadrat sampling** (Meixler and Bain 2022). This systematic approach involves laying out transects (lines) or quadrats (square plots) in the study area to sample sections of the ecosystem. Researchers then record data on species diversity, population sizes and habitat conditions within these plots. This method includes line intercept transect, point intercept transect, seagrass watch and the transect line plot method (Hill and Wilkinson 2004; McKenzie and Roshida 2009). Other methods, such as video transect and Coral Point Count with Excel extensions, require cameras and other equipment to collect data (Hill and Wilkinson 2004; Kohler and Gill 2006).

When a marine ecosystem is too difficult to access and measure by humans (the limit is 40 metres deep), advanced technology and equipment are required. These survey or assessment methods are particularly useful for deep-sea ecosystems such as hydrothermal vents, cold seeps, seamounts and other submarine features, as well as pelagic ecosystems. Several technologies and equipment have also been developed for marine coastal ecosystem assessment. The technologies and equipment can enhance the accuracy and efficiency of data collection. These allow researchers to cover larger areas and gather more detailed information. Furthermore, using technology and equipment in assessments can reduce the potential for human error

and allow for continuous monitoring of ecosystems. However, these methods still require human interpretation and analysis of the data collected.

- **Benthic and pelagic surveys using ROVs and others** (Lahoz-Monfort and Magrath 2021). These surveys use ROVs, submersibles and towed camera systems to document the benthic and pelagic communities. ROVs equipped with cameras and sensors are used to map features, document biological communities, and collect samples. They provide data on habitat structure, species diversity and abundance. This equipment allows researchers to access and study deep-sea ecosystems such as hydrothermal vents and seamounts without risking human safety.
- **Drones** (Lahoz-Monfort and Magrath 2021). Unmanned aerial vehicles (drones) are increasingly used for aerial surveys of coastal and marine habitats. Drones can capture high-resolution images and videos, allowing researchers to monitor shoreline changes, assess the health of coral reefs, and track the movement of marine species.
- **Multibeam sonar and submersibles** (Digby et al. 2016; Lahoz-Monfort and Magrath 2021). These tools are used to map the seafloor and identify vents and seep locations. Multibeam sonar provides high-resolution bathymetric data, and submersibles allow for direct observation and sampling.
- **Water sampling, geochemical sampling and microbial analysis** (Cordes et al. 2010; Meirelles et al. 2015). Researchers collect water and sediment samples to analyse their physical and chemical composition. The chemical parameters typically measured in water sampling include temperature, salinity, dissolved oxygen, and nutrient concentrations including concentrations of metals and gases. The sediment samples are analysed to measure concentrations of methane, hydrogen sulphide and other hydrocarbons. Furthermore, microbial diversity is assessed using metagenomic techniques to understand the microbial communities associated with seamounts. This method also helps researchers to understand the geochemical processes and the impact of vent emissions on surrounding environments.
- **Ichthyoplankton survey and oceanography modelling** (Reglero et al. 2014; Hernández et al. 2019). Pelagic zones are critical habitats for pelagic fish, serving as spawning and nursery grounds. To assess these habitats, researchers often conduct larval fish surveys and analyse water mass movements. Larval fish surveys involve collecting samples of fish larvae using plankton nets or bongo nets, which are then analysed to determine species composition, abundance and distribution. Additionally, the analysis of water mass movements, using tools such as satellite remote sensing and oceanographic drifters, helps link larval distribution with oceanographic conditions like sea surface temperature and chlorophyll concentration. This integrated approach helps researchers to understand the complex interactions between the physical and biological processes in pelagic ecosystems.
- **Artificial intelligence and machine learning** (Lahoz-Monfort and Magrath 2021). Artificial intelligence and machine learning algorithms can analyse large data sets to identify patterns and predict changes in ecosystems. For instance, artificial intelligence can be used to detect coral bleaching events, monitor fish populations and assess the impact of climate change on marine habitats. These technologies are currently still largely applied to ecosystems accessible to humans for verification.

Assessing marine species is crucial for understanding biodiversity, monitoring ecosystem health and informing conservation efforts. Various methods are employed to study marine species, each with its own advantages and limitations:

- **Visual surveys.** Visual surveys involve direct observation of marine species by divers or from boats. This method is commonly used for assessing coral reefs, seagrass beds and other shallow-water habitats. The methods for visual surveys are transect survey, quadrat sampling and timed swim (Hill and Wilkinson 2004; Yulianto et al. 2015).
- **Camera traps** (Reis-Filho et al. 2020). These devices capture images of wildlife, allowing researchers to study species presence and behaviour without direct human interference. Camera traps are often used to monitor the nesting sites of seabirds, which are important species in the mangrove ecosystem.
- **Baited remote underwater video systems** (Costello et al. 2017; Whitmarsh et al. 2017). These systems use bait to attract marine species to a camera, allowing researchers to record and identify species. They are non-invasive and provide valuable data on species diversity and behaviour.
- **Acoustic survey** (Digby et al. 2016; Lahoz-Monfort and Magrath 2021). Acoustic surveys use two main types of equipment: echosounders and hydrophones. Echosounders emit sound waves that bounce off objects in the water, such as fish and other nektonic organisms. The returning echoes are used to estimate fish abundance and distribution. These surveys provide data on the vertical and horizontal distribution of pelagic species and can detect changes in population sizes over time. Echosounders are effective for large-scale surveys and can cover extensive areas quickly. Hydrophones (underwater microphones) are used to detect and record sounds produced by marine mammals, such as whales and dolphins. This method helps in monitoring species presence, behaviour and communication.
- **Aerial surveys** (Hodgson et al. 2017; Kelaher et al. 2020). Aircraft equipped with cameras and sensors are often used to survey marine species in remote or inaccessible areas. This method is useful for monitoring large marine mammals, such as whales and seals.
- **Genetic methods** (Costello et al. 2017). Genetic methods involve analysing DNA to identify and study marine species. The methods using DNA are genetic barcoding and environmental DNA (eDNA). Genetic barcoding involves sequencing a short, standardised region of DNA to identify species. Genetic barcoding is used to verify species identity, study population genetics and detect cryptic species. eDNA is genetic material obtained directly from environmental samples, such as water or sediment. By analysing eDNA,

researchers can detect the presence of species without needing to see or capture them. This method is particularly useful for monitoring elusive or rare species.

- **Tagging and tracking** (Costello et al. 2017). Tagging and tracking methods involve attaching devices to marine animals to monitor their movements and behaviour. The devices can be satellite or acoustic tags. Satellite tags transmit data to satellites, providing information on the location, depth and behaviour of tagged animals. Satellite tagging is commonly used for studying migratory species, such as sea turtles, sharks and whales. Acoustic tags emit sound signals that are detected by underwater receivers. This method is used to track the movements of fish and other marine animals within a defined area.

Citizen science is another emerging assessment method for marine ecosystems and species (NOAA n.d.). Citizen science involves the participation of non-professional scientists in data collection and analysis. This approach leverages the power of community involvement to gather extensive data across large areas and over long periods. Volunteers, often trained by scientists, participate in various monitoring activities, such as beach surveys, water quality assessments and species identification. One such programme, the Long-term Monitoring Program and Experiential Training for Students, engages students and community groups in monitoring rocky intertidal and sandy beach ecosystems, contributing to long-term data sets that inform conservation efforts. In addition to ecosystem monitoring, citizen science projects also focus on specific marine species. For example, the Whale Alert app allows the public to report whale sightings, helping to reduce the risk of ship strikes and gather data on whale populations. Other initiatives include sea turtle and manta monitoring projects in Indonesia, where the divers can engage to monitor the behaviour of these important species (MMF 2021). Citizen science projects not only provide valuable data but also raise public awareness and engagement in marine conservation. Proper training and validation of data collected by citizen scientists are essential to ensure its scientific quality (Done et al. 2017).

Social data and ITK

It is crucial that SOPs incorporate social data and are co-produced with ITK systems. A variety of methods can be used to collect social data and ITK for SOPs. Table F-1 discusses some of these methods.

TABLE F-1. **Methods for collecting social data and ITK for SOPs**

METHOD	DESCRIPTION	ADVANTAGES	LIMITATIONS
Surveys	Structured questionnaires used to gather quantitative data on a wide range of social indicators.	Can be administered to large populations, providing statistically representative data.	May not capture the nuances of individual experiences or cultural values.
Interviews	In-depth conversations with individuals to explore their experiences, perspectives and knowledge.	Allow for rich qualitative data and in-depth understanding of individual perspectives.	Can be time-consuming and may not be representative of the broader population.
Focus groups	Facilitated discussions with small groups of people to explore specific topics.	Can generate diverse perspectives and insights through group interaction.	May be influenced by group dynamics and may not capture individual views.
Community workshops	Interactive sessions that bring together diverse stakeholders and rights holders to share information, discuss issues and develop solutions.	Promote collaborative planning and build consensus among stakeholders and rights holders.	Can be challenging to facilitate and may require significant resources.
Participant observations	Researchers immerse themselves in the daily lives of communities to gain firsthand understanding.	Provide rich qualitative data and insights into social and cultural practices.	Can be time-consuming and may be influenced by researcher bias.
Secondary data analysis	Using existing data sources, such as census data, government reports and academic studies.	Can be cost-effective and provide valuable baseline data.	May not be tailored to the specific needs of the Sustainable Ocean Plan or may be outdated.
Social media application programming interfaces	Using application programming interfaces to collect data from social media platforms.	Can provide large-scale, real-time data on public attitudes and opinions.	Require technical expertise and may raise privacy concerns.

Source: WRI authors.

Appendix G: Sourcing and accessing data

Once data requirements are identified, the next step is locating and accessing relevant data sets. Table G-1 lists some useful data sets.

TABLE G-1. **Data sets available for defining the baseline and outlining future conditions for the SOP**

DATA CATEGORY	DATA SET TITLE	DESCRIPTION, USE AND APPLICATION	REFERENCE AND/OR LINK
Biodiversity and ecosystems	Global Mangrove Watch	25-metre resolution global mangrove data from 1996 to 2020	Bunting et al. 2022; https://www.globalmangrovewatch.org
	Allen Coral Atlas	5-metre resolution global coral reef habitat maps showing reef extent and composition	Lyons et al. 2024; https://allencoralatlas.org
	Global Ecosystems Atlas	Comprehensive global map of terrestrial, freshwater and marine ecosystem functional groups	https://global-ecosystems.org; https://globalecosystemsatlas.org/
	United Nations Environment Programme World Conservation Monitoring Centre (UNEP-WCMC) Ocean Data Viewer	Repository for multiple marine data sets including habitats, species and protected areas	https://data.unep-wcmc.org
	Global Biodiversity Information Facility	Open access repository for global species occurrence data including marine species	https://www.gbif.org
	World Seagrass Association global seagrass distribution	Global data set showing the distribution and extent of seagrass ecosystems	UNEP-WCMC & Short 2021
	Reef Life Survey global reef fish database	Standardised underwater visual census data of reef fishes from over 3,000 sites globally	Edgar and Stuart-Smith 2014; https://reeflifesurvey.com
Jurisdictional boundaries	Vlaams Instituut voor de Zee (VLIZ) Maritime Boundaries Database	Comprehensive global maritime boundaries, including territorial seas and exclusive economic zones (EEZs)	https://www.marineregions.org
	Flanders Marine Institute Maritime Boundaries Geodatabase (MAREG)	Standardised global maritime boundaries, including territorial seas and EEZs	https://www.marineregions.org/eezmapper.php
	United Nations Office of Legal Affairs continental shelf submissions database	Official repository of extended continental shelf claims submitted to the United Nations	https://www.un.org/depts/los/clcs_new/commission_submissions.htm
Protected areas	World Database on Protected Areas (WDPA)	Comprehensive global database of marine and terrestrial protected areas	Protected Planet (UNEP-WCMC and International Union for Conservation of Nature); https://www.protectedplanet.net
	Marine Protection Atlas	Global database tracking marine protected areas with implementation status details	Marine Conservation Institute; https://mpatlas.org
	United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Marine Programme database	Database of marine sites designated as UNESCO World Heritage	https://whc.unesco.org/en/marine-programme

TABLE G-1. **Data sets available for defining the baseline and outlining future conditions for the SOP (cont.)**

DATA CATEGORY	DATA SET TITLE	DESCRIPTION, USE AND APPLICATION	REFERENCE AND/OR LINK
Human activities	Global Fishing Watch	Satellite-based fishing vessel monitoring showing global fishing effort distribution	https://globalfishingwatch.org
	European Marine Observation and Data Network (EMODnet)	Human Activities portal for European waters showing maritime sector activities	https://www.emodnet-humanactivities.eu
	Automatic Identification System (AIS) vessel tracking data	Real-time and historical vessel movement data for shipping traffic analysis	Various providers, including MarineTraffic, exactEarth
	Global Shipping Traffic Density Maps (NCEAS)	Standardised global maps showing shipping intensity across oceans	National Center for Ecological Analysis and Synthesis; https://www.nceas.ucsb.edu
	Global Underwater Noise Assessment	Maps of anthropogenic underwater noise distribution and intensity	Duarte et al. 2021; https://oceannoisecoalition.org
Bathymetry and elevation	General Bathymetric Chart of the Oceans (GEBCO) 2022 grid: 15 arc-second global bathymetry	15 arc-second global bathymetric data set combining ship-based and satellite data	https://www.gebco.net
	National hydrographic services (e.g., National Oceanic and Atmospheric Administration [NOAA] Bathymetric Data Viewer)	National-scale high-resolution bathymetric data for coastal and territorial waters	NOAA Bathymetric Data Viewer; https://www.ncei.noaa.gov/maps/bathymetry
	SRTM30_PLUS global bathymetry and topography	30 arc-second resolution global bathymetry combining multiple data sources	https://topex.ucsd.edu/WWW_html/srtm30_plus.html
	National Aeronautics and Space Administration (NASA) ICESat-2 bathymetry	High-resolution satellite-derived bathymetry products for shallow coastal waters	https://icesat-2.gsfc.nasa.gov
Earth observation	Copernicus Marine Environment Monitoring Service: European Union Sentinel satellite data	European Union Sentinel satellite data providing ocean parameters and monitoring	https://marine.copernicus.eu
	NASA Earth Observing System Data and Information System (EOSDIS)	Earth Observing System Data and Information System offering satellite ocean data products	https://earthdata.nasa.gov
	NOAA CoastWatch: satellite-derived ocean products	Satellite-derived ocean products, including sea surface temperature and chlorophyll	https://coastwatch.noaa.gov
	Google Earth Engine Data Catalog: pre-processed satellite imagery archives	Pre-processed satellite imagery archives available for cloud-based analysis	https://developers.google.com/earth-engine/datasets
	NASA Ocean Color Web: global ocean colour data products	Global ocean colour data products, including chlorophyll concentration and water clarity	https://oceancolor.gsfc.nasa.gov
	Open Data Cube implementations (e.g., Digital Earth Australia, Digital Earth Pacific, Digital Earth Africa)	Regional implementations (Australia, Pacific, Africa) of satellite data analysis platforms	https://www.opendatacube.org

National and local data sources

National geospatial data infrastructure includes the following:

- Local government GIS departments.
- National statistical offices.
- Marine research institutions and universities.
- Environmental monitoring programmes.

Data access methods

- Direct download from data portals.
- Web services (web map services, web feature services) for dynamic data access.
- Application programming interface connections for programmatic data retrieval.
- Formal data-sharing agreements with data custodians.

Data validation and quality assessment

Before integrating data into a GIS framework, validation and quality assessment are crucial. Data sources may come with a range of validation information — from comprehensive standardised methods to some qualitative information to nothing at all. The importance and potential downstream use of validation information can be assessed for each data source.

Quality assessment criteria:

- Spatial accuracy (positional error).
- Attribute accuracy (correctness of non-spatial data).
- Completeness (coverage of study area without gaps).
- Logical consistency (internal data coherence).
- Temporal currency (recency of data).
- Lineage (documentation of data sources and processing methods).

Validation methods:

- Cross-reference with alternative data sources.
- Ground truthing through field surveys (especially important for ecosystem extent and condition data).
- Expert review by domain specialists.
- Statistical validation techniques.
- Documentation of uncertainties and limitations.

Addressing data gaps:

- Prioritise gaps based on their importance to planning objectives.
- Consider proxy indicators where direct data are unavailable.
- Develop models to estimate missing data.
- Incorporate traditional and local ecological knowledge.
- Design targeted field surveys to fill critical data gaps.

Data processing and integration

After validation, data from multiple sources needs to be harmonised and integrated.

Standardisation processes:

- Unify the coordinate reference systems (typically using a standard projection such as Universal Transverse Mercator or equal-area projection; this is often handled automatically by GIS software/programmes).
- Harmonise attribute data schemas for consistent classification (using standardised thematic schemas and indicators where possible).
- Standardise temporal resolution (e.g., annual, seasonal).
- Apply consistent units of measurement.
- Align taxonomic classifications for biodiversity data.

Integration approaches:

- Develop a geodatabase structure with logical organisation of data layers.
- Create relationship classes between related data sets.
- Establish metadata standards following International Organization for Standardization 19115 or similar frameworks.
- Implement data version control systems.
- Document transformation and processing workflows.

Software and tools:

- **Desktop GIS applications:**
  - QGIS (open source): Comprehensive GIS with Marine Tools plug-in for oceanographic data.
  - ArcGIS Pro (commercial): With Marine Data Model and Maritime Chart Server extensions.
  - GRASS GIS (open source): Advanced spatial modelling capabilities.
  - SAGA GIS (open source): Specialised for geoscientific analyses.
- **Spatial databases:**
  - PostGIS: Open-source spatial database extension for PostgreSQL.
  - MongoDB (or similar non-relational): NoSQL; source-available, cross-platform, document-oriented database programme.
  - ArcSDE: Esri's spatial database engine.
  - GeoPackage: Open Geospatial Consortium standard for geospatial data storage.
  - SpatiaLite: Lightweight spatial extension for SQLite.
  - Oracle Spatial: Enterprise-level spatial data management.

- **Cloud-based geospatial platforms:**
  - Google Earth Engine: Satellite imagery analysis at scale.
  - Open Data Cube: Open-source implementation, used in combination with additional programming environments (see below).
  - ArcGIS Online: Esri's cloud-based mapping platform.
  - Mapbox: Custom visualisation platform.
  - Microsoft Planetary Computer: Earth observation data and compute platform.
  - Sentinel Hub: Satellite imagery processing platform.
- **Programming environments:**
  - R with packages: sf, raster, tmap, leaflet, marmap (specialised for marine data).
  - Python with libraries: GeoPandas, Rasterio, Xarray, PyGMT (for oceanographic data).
  - Jupyter Notebooks: Interactive analysis environment.
  - MATLAB with Marine Geospatial Ecology Tools.

Spatial analysis and modelling

With integrated data, advanced analysis can generate insights to support planning.

Key analytical approaches:

- **Overlay analysis:**
  - Identify spatial relationships between different features (e.g., overlap between fishing grounds and critical habitats).
  - Tools: QGIS Intersection tool, ArcGIS Overlay tool set, R "sf" package overlay functions.
  - Example application: Mapping fishing pressure on vulnerable benthic habitats (Amoroso et al. 2018).
- **Proximity analysis:**
  - Measure distances and identify buffer zones around sensitive areas.
  - Tools: QGIS Buffer tool, ArcGIS Proximity tool set, Python Shapely library.
  - Example application: Establishing protection zones around coral reefs (Green et al. 2014).
- **Density analysis:**
  - Map concentrations of activities or ecological features.
  - Tools: QGIS Heatmap plug-in, ArcGIS Kernel Density tool, R "spatstat" package.
  - Example application: Identifying shipping traffic hot spots (Robards et al. 2021).
- **Time series analysis:**
  - Track changes in ecosystem extent or condition over time.
  - Tools: Google Earth Engine time series functions, R "rts" package, TimeManager plug-in for QGIS.
  - Example application: Monitoring mangrove loss and recovery (Goldberg et al. 2020).
- **Suitability analysis:**
  - Identify optimal locations for conservation or sustainable use.
  - Tools: ArcGIS Weighted Overlay tool, QGIS Weighted Sum tool, MGET toolbox for ArcGIS.
  - Example application: Site selection for MPAs (Giakoumi et al. 2015).

Specialised modelling techniques:

- **Species distribution modelling:**
  - Predict habitat suitability for key marine species.
  - Tools: R "sdm" package, Maxent software, Biomod2 R package.
  - Example application: Predicting coral reef fish distributions (Robinson et al. 2017).
- **Connectivity models:**
  - Analyse larval dispersal and ecological networks.
  - Tools: Marxan Connect, Connectivity Analysis Toolkit, Marine Geospatial Ecology Tools.
  - Example application: Designing connected MPA networks (Magris et al. 2018).
- **Cumulative impact assessment**:
  - Evaluate combined effects of multiple human activities.
  - Tools: EcoPath with EcoSim, InVEST Cumulative Impacts model, CUMULEO-RAM
  - Example application: Global ocean cumulative human impact assessment (Halpern et al. 2019).
- **Ecosystem service mapping**:
  - Identify areas providing key services, such as coastal protection or carbon sequestration.
  - Tools: InVEST suite of ecosystem service models, ARIES modelling platform.
  - Example application: Blue carbon sequestration potential mapping (Macreadie et al. 2019).

- **Scenario analysis**:
  - Explore potential future conditions under different management options.
  - Tools: Marxan with Zones, SeaSketch, MSP Challenge simulation platform.
  - Example application: Scenario planning for climate change adaptation (Gattuso et al. 2018).

Implementation considerations:

- Match analytical complexity to available data quality and decision needs.
- Document assumptions and limitations in analytical models.
- Validate model outputs against independent data when possible.
- Consider uncertainty propagation through analytical workflows.

Visualisation and map production

Effective visualisation is critical for communicating spatial information to diverse stakeholders and rights holders.

Map design principles:

- Select appropriate symbology to highlight key patterns and relationships.
- Use colour schemes that are intuitive and accessible (including for colour-blind users).
- Balance detail with clarity based on the intended audience.
- Include necessary map elements (legend, scale, north arrow, data sources).
- Create hierarchical visual organisation to guide attention.

Visualisation approaches:

- **Static maps for reports and publications:**
  - Tools: QGIS Print Layout, ArcGIS Pro Layout, R "tmap" package, Adobe Illustrator for final touches.
  - Example: High-resolution PDF maps for Ocean Health Index reports (Halpern et al. 2019).
- **Interactive web maps for stakeholder and rights holder engagement:**
  - Tools: Leaflet, Mapbox, ArcGIS Online, CARTO, OpenLayers.
  - Example: Marine Scotland National Marine Plan interactive (NMPi) portal.
- **Time-series animations to show temporal changes:**
  - Tools: QGIS Temporal Controller, ArcGIS Time Slider, R "gganimate" package.
  - Example: SeaSketch animated habitat change projections.
- **Three-dimensional visualisations for complex marine environments:**
  - Tools: ArcGIS Pro 3D Analyst, QGIS 3D Map View, Paraview, Blender GIS.
  - Example: NOAA Science on a Sphere visualisations of ocean temperature change.
- **Dashboards combining maps with charts and statistics:**
  - Tools: Tableau, Power BI, R Shiny, CARTO dashboard builder, Observable + D3.
  - Example: Global Fishing Watch interactive dashboard.

Output formats:

- Print-quality PDFs for formal documents.
- Web-optimised formats for online distribution.
- GIS packages for technical users.
- Mobile-friendly formats for field use.

Data-sharing and publishing

Finally, data and analytical results must be made accessible to ensure transparency and support broader use.

Data-sharing platforms:

- **Institutional geoportals and data catalogues:**
  - NOAA Data Access Viewer.
  - Australia's Integrated Marine Observing System (IMOS) portal.
  - UK Marine Environmental Data and Information Network (MEDIN).
- **National spatial data infrastructures:**
  - US Marine Cadastre.
  - Indonesia's One Map Policy geoportal.
  - Philippines National Mapping and Resource Information Authority (NAMRIA) portal.
- **Regional or global marine data networks:**
  - Ocean Biodiversity Information System (OBIS).
  - European Marine Observation and Data Network (EMODnet).
  - Australian Ocean Data Network (AODN).
  - Data Publisher for Earth & Environmental Science (PANGAEA).
- **Open data repositories:**
  - Zenodo (repository operated by the European Organization for Nuclear Research).
  - Dataverse (Harvard's open-source repository).
  - Figshare (commercial repository with free options).
  - Esri Open Data portal.

Data documentation requirements:

- Comprehensive metadata following international standards.
- Clear attribution of data sources.
- Documentation of processing methods and analytical workflows.
- Statement of limitations and appropriate use cases.
- Terms of use and licensing information.

Accessibility considerations:

- Provide data in multiple formats to serve different user needs.
- Ensure compliance with open data standards where appropriate.
- Create different knowledge products for technical and non-technical audiences.
- Implement user-friendly interfaces for data discovery and access.

To illustrate this process, consider a case study from Indonesia's national ecosystem extent accounts for mangroves, coral reefs and seagrasses. The planning process involved the following steps:

1. **Identifying requirements:** Baseline data on ecosystem extent was needed to track progress towards conservation goals.
2. **Sourcing data:** Combined global data sets (Global Mangrove Watch) with national remote sensing data (SPOT 6/7).
3. **Validation:** Field surveys and on-screen digitisation to verify ecosystem boundaries.
4. **Processing:** Water column correction methods applied to improve seagrass detection.
5. **Analysis:** Integration of data across 11 fisheries management areas to create baseline extent accounts.
6. **Visualisation:** Maps showing the distribution of key ecosystems by management area.
7. **Publishing:** Results incorporated into national ecosystem accounting reports.

This systematic approach ensured that spatial data effectively supported Indonesia's sustainable ocean planning process by providing robust baseline information on critical marine ecosystems.

Appendix H: Indicators

TABLE H-1. Ocean wealth

INDICATOR TYPE	DESCRIPTION	SOURCE
Economic	Proportion of fish stocks within biologically sustainable levels	CBD Target 5.1, SDG Target 14.4, Indicator 14.4.1, Tier I *More specifically, with SEEA asset accounts (Agriculture, Forestry and Fisheries)
Economic	Sustainable fisheries as a percentage of gross domestic product in Small Island Developing States, least developed countries and all countries	SDG Target 14.7, Indicator 14.7.1, Tier I
Environmental	Benefits from the sustainable use of wild species	CBD Target 9.1
Economic	Ocean and offshore renewable energy research, development and demonstration (RD&D) as share of total energy RD&D budget	OECD indicator
Economic	Illegal, unreported and unregulated (IUU) fishing, number of IUU incidents reported, percent decrease in illegal fishing, IUU risk status	IUU Fishing Risk Index
Economic	Value of subsidies and other incentives harmful to biodiversity (overlaps with BPER)	CBD Target 18.2
Economic	Nature-based tourism revenue — direct tourism income from marine ecosystems (tonnes/year)	Ocean accounts
Economic	Tourism employment — economic returns from marine resources (US$)	Ocean accounts
Economic	Fisheries employment — jobs supported by marine tourism (number)	Ocean accounts

Notes: * = Indicators aligned with the United Nations System of Environmental-Economic Accounting (SEEA). BPER = Blue Public Expenditure Review; CBD = Convention on Biological Diversity; OECD = Organisation for Economic Co-operation and Development; SDG = Sustainable Development Goal.

TABLE H-2. Ocean health

INDICATOR TYPE	DESCRIPTION	SOURCE
Environmental	Index of coastal eutrophication and plastic debris density	SDG Target 14.1, Indicator 14.1.1, Tier II *More specifically, with SEEA ecosystem condition account
Environmental	Index of coastal eutrophication potential	CDB Target 7.1
Environmental	Average marine acidity (pH) measured at agreed suite of representative sampling stations	SDG Target 14.3, Indicator 14.3.1, Tier II * More specifically, with SEEA ecosystem condition account
Environmental	Ocean warming	WMO GCOS global climate indicator; GOOS indicator

TABLE H-2. **Ocean health (cont.)**

INDICATOR TYPE	DESCRIPTION	SOURCE
Environmental	Sea level rise	WMO GCOS global climate indicator; GOOS indicator
Environmental	Sea ice change	WMO GCOS global climate indicator; GOOS indicator
Environmental	Ocean acidification	WMO GCOS global climate indicator; GOOS indicator
Environmental	Ocean deoxygenation	GOOS
Environmental	Net Community Production	GOOS
Environmental	Seagrass cover change	GOOS
Environmental	Phytoplankton communities	GOOS
Environmental	Macroalgae cover and composition	GOOS
Environmental	Percentage of land and seas covered by biodiversity-inclusive spatial plans	CBD Target 1.1
Environmental	Coverage of protected areas and other effective area-based conservation measures	CBD Target 3.1
Environmental	Services provided by ecosystems	CBD Goal B.1, Target 11.1
Environmental	Asset extent — total area of a specific ecosystem (e.g., coral reef, seagrass or mangrove) (km^2)	Ocean accounts
Economic	Positive incentives in place to promote biodiversity conservation and sustainable use	CBD Target 18.1
Environmental	Critical condition measures — measures critical to measurement of ecosystem health (e.g., live coral cover)	Ocean accounts
Environmental	Coral Reef Health Index — composite measure of coral cover, diversity and mortality	Ocean accounts
Economic	Coastal protection value — number of homes and infrastructure protected, valued in physical and monetary terms (number/US$)	Ocean accounts
Economic	Reef fish production — annual reef fish biomass production, potentially through resource rent (tonnes/US$ per year)	Ocean accounts
Economic	Carbon sequestered by coastal ecosystems (tonnes/US$ per year)	Ocean accounts
Economic	Ocean economy GDP — annual blue carbon sequestration (tCO_2e/year)	Ocean accounts
Economic	MPA coverage — total area of protected marine ecosystems (km^2)	Ocean accounts

Notes: *= indicators that are aligned with the United Nations System of Environmental-Economic Accounting (SEEA). CBD = Convention on Biological Diversity; GDP = gross domestic product; GOOS = Global Ocean Observing System; MPA = marine protected area; SDG = Sustainable Development Goal; tCO2e = tonnes of carbon dioxide equivalent; WMO GCOS = World Meteorological Organization Global Climate Observing System.

TABLE H-3. **Ocean equity**

INDICATOR TYPE	DESCRIPTION	SOURCE
Social	Degree of application of a legal/regulatory/policy/ institutional framework that recognises and protects access rights for small-scale fisheries	SDG Target 14.b, Indicator 14.b.1, Tier I MOI-type indicator
Social	Extent to which Indigenous Peoples and local communities, women and girls as well as youth participate in decision-making related to biodiversity	Target 20 under the Post-2020 Global Biodiversity Framework SDG Target 5.5, Indicators 5.5.1 and 5.5.2, Tier I
Social	Number of women with leadership roles in the community	Ocean accounts
Social	Proportion of women in ocean industries	Ocean accounts
Social	Proportion of a population or community working in different ocean industries	Ocean accounts
Social	Household income from different ocean industries	Ocean accounts
Social	Dependence on extraction of resources, such as from mangroves (e.g., wood, crabs, fish, herbs)	Ocean accounts
Social	Fish and seafood consumption per capita	Ocean accounts
Social	Percentage of population who are in food poverty	Ocean accounts

Notes: MOI = means of implementation; SDG = Sustainable Development Goal.

TABLE H-4. **Ocean knowledge**

INDICATOR TYPE	DESCRIPTION	SOURCE
Economic	Proportion of total research budget allocated to research in the field of marine technology	SDG Target 14.a, Indicator 14.a.1, Tier II MOI-type indicator
Social	Progress by countries in the proportion of students (formal education category) and number of community members (community engagement category) engaged in ocean sustainability actions	United Nations Decade of Ocean Science strategy document indicators[a]

Note: MOI = means of implementation; SDG = Sustainable Development Goal.
Source: a. UNESCO-IOC 2020.

TABLE H-5. **Ocean finance**

INDICATOR TYPE	DESCRIPTION	SOURCE
Economic	Official development assistance, public expenditure and private expenditure on conservation and sustainable use of biodiversity and ecosystems	Target 18 under the Post-2020 Global Biodiversity Framework, Headline Indicator 18.0.1 MOI-type indicator
Economic	International public funding, including official development assistance for conservation and sustainable use of biodiversity and ecosystems	CBD Goal D.1, Target 19
Economic	Domestic public funding on conservation and sustainable use of biodiversity and ecosystems (overlaps with the BPER)	CBD Goal D.2, Target 19
Economic	Private funding (domestic and international) on conservation and sustainable use of biodiversity and ecosystems	CBD Goal D.3, Target 19
Economic	Conservation investment — annual spending on marine conservation (US$)	Ocean accounts
Economic	Resource user fees — revenue from marine resource permits/ fees (US$)	Ocean accounts
Economic	Blue finance flows — investment in sustainable ocean projects (US$)	Ocean accounts
Economic	Environmental damage costs — loss of asset value (US$)	Ocean accounts

Note: BPER = Blue Public Expenditure Review; CBD = Convention on Biological Diversity.

Appendix I: Global Ocean Observing System

TABLE I-1. **Essential Ocean Variables**

ESSENTIAL OCEAN VARIABLE	DESCRIPTION	USE
Ocean surface stress	The force exerted by the wind on the ocean surface.	Important for determining the large-scale momentum forcing the ocean and consequent ocean circulation, including ocean upwelling regions. Accurate knowledge of stress magnitudes is also essential for reliable computations of air-sea heat fluxes as well as air-sea gas exchanges and mass fluxes.
Ocean sound	The sounds produced by marine animals, human activities and natural phenomena.	Characterising ocean soundscapes (the levels and frequency of sound over time and space and the sources contributing to the sound field), temporal trends in ocean sound at different frequencies, distribution and abundance of marine species that vocalise and distribution and amount of human activities that generate sound.
Hard coral cover and composition	The percentage of the reef surface covered in live coral.	One of the ways scientists monitor the health of the Great Barrier Reef is by calculating the percentage of live hard and soft corals present.
Phytoplankton biomass and diversity	The amount and variety of phytoplankton in the ocean.	Phytoplankton are primary producers in the food chain and serve as food (organic matter) directly or indirectly for many animals.
Marine turtles, birds, mammals abundance and distribution	The number and location of marine turtles, birds and mammals.	As wide-ranging, relatively long-lived and large-bodied animals, marine turtle, bird and mammal species play a crucial role in maintaining the health of their ecosystems.
Macroalgal canopy cover and composition	The percentage of the seafloor covered by macroalgae.	Macroalgae are an important component of benthic ecosystems. They are important primary producers and the foundation for complex food chains, serve as habitat for many invertebrates and juvenile fishes and some are of economic value.
Mangrove cover and composition	The area and types of mangrove forests.	Mangroves contribute many environmental benefits to coastal and estuarine ecosystems. Mangrove tree and root structures prevent erosion by stabilising soils and sediment in intertidal zones and provide buffer zones from severe storms and cyclones.
Seagrass cover and composition	The area and types of seagrass meadows.	Seagrasses are often highly productive and provide essential habitat and nursery areas for many finfish, shellfish, charismatic megafauna and species of concern, including sea turtles, dugongs and manatees.
Sea surface temperature (SST)	The temperature of the ocean surface.	SST is a key indicator of the state of the ocean and its interactions with the atmosphere. SST influences weather patterns, ocean currents and marine ecosystems. Changes in SST can have significant impacts on marine life, fisheries and coastal communities.
Sea surface salinity (SSS)	The salt content of the ocean surface.	SSS is a fundamental property of seawater that affects ocean circulation, water density and the distribution of marine organisms. SSS is influenced by factors such as evaporation, precipitation and river runoff. Monitoring SSS is crucial for understanding the ocean's role in the global water cycle and climate system.
Sea surface height (SSH)	The height of the ocean surface relative to a reference level.	SSH is a measure of the ocean's topography and is used to study ocean currents, tides and sea level rise. SSH is influenced by factors such as wind, ocean circulation and gravity. Monitoring SSH is essential for understanding ocean dynamics and predicting changes in sea level.

TABLE I-1. **Essential Ocean Variables (cont.)**

ESSENTIAL OCEAN VARIABLE	DESCRIPTION	USE
Subsurface temperature	The temperature of the ocean below the surface.	Subsurface temperature plays a crucial role in ocean circulation, water density and the distribution of marine organisms. It's influenced by factors such as solar radiation, ocean currents and mixing processes. Monitoring subsurface temperature is essential for understanding the ocean's thermal structure and its role in climate change.
Subsurface salinity	The salt content of the ocean below the surface.	Subsurface salinity is a key factor in ocean circulation, water density and the distribution of marine organisms. It's influenced by factors such as evaporation, precipitation and the mixing of different water masses. Monitoring subsurface salinity is crucial for understanding the ocean's salinity structure and its role in climate change.
Subsurface currents	The movement of water below the ocean surface.	Subsurface currents play a vital role in ocean circulation, the transport of heat and nutrients and the distribution of marine organisms. They're influenced by factors such as wind, temperature and salinity gradients. Monitoring subsurface currents is essential for understanding ocean dynamics and the movement of water masses.
Surface currents	The movement of water at the ocean surface.	Surface currents are driven by wind and influenced by Earth's rotation. They play a crucial role in ocean circulation, the transport of heat and nutrients and the distribution of marine organisms. Monitoring surface currents is essential for understanding ocean dynamics and predicting the movement of water masses.
Ocean surface heat flux	The transfer of heat between the ocean and the atmosphere.	Ocean surface heat flux is a key component of Earth's climate system. It influences weather patterns, ocean currents and sea level rise. Monitoring ocean surface heat flux is crucial for understanding the ocean's role in climate change and predicting future climate scenarios.
Sea ice	The frozen seawater that covers parts of the ocean.	Sea ice plays a vital role in Earth's climate system by reflecting sunlight and regulating ocean-atmosphere heat exchange. It also provides habitat for marine organisms and influences ocean circulation. Monitoring sea ice is crucial for understanding climate change and its impacts on polar regions.
Sea state	The condition of the ocean surface, including waves and swell.	Sea state affects navigation, coastal erosion and the exchange of heat and gases between the ocean and atmosphere. Monitoring sea state is essential for maritime safety, coastal management, and understanding ocean-atmosphere interactions.
Ocean colour	The colour of the ocean, which is influenced by the presence of phytoplankton and other substances.	Ocean colour is used to estimate phytoplankton biomass, which is a key indicator of ocean productivity and health. It's also used to study the distribution of other substances in the ocean, such as sediments and pollutants. Monitoring ocean colour is essential for understanding marine ecosystems and the impacts of human activities on the ocean.
Oxygen	The amount of oxygen dissolved in seawater.	Oxygen is essential for marine life and plays a crucial role in biogeochemical cycles. Oxygen levels in the ocean are influenced by factors such as temperature, salinity and biological activity. Monitoring oxygen is crucial for understanding ocean health and the impacts of climate change and pollution.
Nutrients	The dissolved inorganic compounds that support marine life.	Nutrients, such as nitrates and phosphates, are essential for phytoplankton growth and primary production in the ocean. Nutrient levels are influenced by factors such as river runoff, upwelling and biological activity. Monitoring nutrients is crucial for understanding marine ecosystems and the impacts of human activities on the ocean.

TABLE I-1. **Essential Ocean Variables (cont.)**

ESSENTIAL OCEAN VARIABLE	DESCRIPTION	USE
Inorganic carbon	The dissolved inorganic carbon in seawater, including carbon dioxide, bicarbonate and carbonate ions.	Inorganic carbon plays a crucial role in the ocean's carbon cycle and its ability to absorb carbon dioxide from the atmosphere. Monitoring inorganic carbon is essential for understanding ocean acidification and the ocean's role in climate change.
Transient tracers	The chemical compounds that are released into the ocean and can be used to track water masses and ocean circulation.	Transient tracers, such as chlorofluorocarbons and tritium, are used to study ocean circulation, mixing processes and the age of water masses. They provide valuable information about ocean dynamics and the transport of heat and nutrients.
Particulate matter	The particles suspended in seawater, including living organisms, sediments and pollutants.	Particulate matter influences ocean clarity, light penetration and the distribution of marine organisms. It also plays a role in biogeochemical cycles and the transport of pollutants. Monitoring particulate matter is essential for understanding ocean health and the impacts of human activities on the ocean.
Nitrous oxide	A greenhouse gas that is produced in the ocean and contributes to climate change.	Nitrous oxide is produced by microbial processes in the ocean and is a potent greenhouse gas. Monitoring nitrous oxide is crucial for understanding the ocean's role in climate change and the impacts of human activities on the ocean.
Stable carbon isotopes	The different forms of carbon atoms that have different numbers of neutrons.	Stable carbon isotopes are used to study the sources and cycling of carbon in the ocean, including the uptake of carbon dioxide from the atmosphere and the transfer of carbon through marine food webs. They provide valuable information about the ocean's carbon cycle and its role in climate change.
Dissolved organic carbon	The organic carbon that is dissolved in seawater.	Dissolved organic carbon is a major component of the ocean's carbon cycle and plays a role in the transfer of carbon between the ocean and atmosphere. It's also a source of energy for marine organisms. Monitoring dissolved organic carbon is essential for understanding the ocean's carbon cycle and its role in climate change.
Zooplankton biomass and diversity	The amount and variety of zooplankton in the ocean.	Zooplankton are a crucial link in marine food webs, transferring energy from phytoplankton to higher trophic levels. They also play a role in biogeochemical cycles. Monitoring zooplankton biomass and diversity is essential for understanding marine ecosystems and the impacts of climate change and pollution.
Fish abundance and distribution	The number and location of fish in the ocean.	Fish are an important component of marine ecosystems and a valuable resource for human consumption. Monitoring fish abundance and distribution is crucial for sustainable fisheries management and understanding the impacts of climate change and fishing pressure on fish populations.

Source: UNESCO-IOC n.d.

Abbreviations

ABNJ	areas beyond national jurisdiction
BBNJ	Biodiversity Beyond National Jurisdiction
BPER	Blue Public Expenditure Review
BTR	biennial transparency report
CBD	Convention on Biological Diversity
CIA	cumulative impact assessment
eDNA	environmental DNA
EEZ	exclusive economic zone
EOV	Essential Ocean Variable
FAO	Food and Agriculture Organization of the United Nations
GBF	Kunming-Montreal Global Biodiversity Framework
GCOS	Global Climate Observing System
GDP	gross domestic product
GHG	greenhouse gas
GIS	Geographic Information System
GOOS	Global Ocean Observing System
G20	Group of 20
ICZM	integrated coastal zone management
IPCC	Intergovernmental Panel on Climate Change
ITK	Indigenous and traditional knowledge*
IUU	illegal, unreported and unregulated
MCDA	multicriteria decision analysis
MOI	means of implementation
MPA	marine protected area
MSMEs	micro, small and medium enterprises
MSP	marine spatial planning
N/A	not applicable
NBSAP	National Biodiversity Strategy and Action Plan
NDC	Nationally Determined Contribution
NGO	non-governmental organisation
ODA	official development assistance
OA	ocean account
OECD	Organisation for Economic Co-operation and Development
OECM	other effective area-based conservation measure
OESA	ocean economy satellite account
O20	Oceans20
PES	payments for ecosystem services
PSMA	Port State Measures Agreement
RCP	Representative Concentration Pathway
ROV	remotely operated vehicle
SDG	Sustainable Development Goal
SEEA	System of Environmental-Economic Accounting
SMARTIE	specific, measurable, achievable, relevant, time bound, inclusive and equitable
SOE	sustainable ocean economy
SOP	Sustainable Ocean Plan
tCO_2e	tonnes of carbon dioxide equivalent
TNFD	Taskforce on Nature-related Financial Disclosures
TS	territorial sea
UNCLOS	United Nations Convention on the Law of the Sea
UNDRIP	United Nations Declaration on the Rights of Indigenous Peoples
UNEP	United Nations Environment Programme
UNEP FI	United Nations Environment Programme Finance Initiative
UNEP-WCMC	United Nations Environment Programme World Conservation Monitoring Centre
UNESCO-IOC	Intergovernmental Oceanographic Commission of the United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
WMP	water management plan
WWF	World Wide Fund for Nature

** Indigenous and traditional knowledge (ITK) is used throughout this report in alignment with the Ocean Panel's recent Blue Paper entitled "Co-producing Sustainable Ocean Plans with Indigenous and Traditional Knowledge Holders" (Strand et al. 2024*

Endnotes

1. Incubators and accelerators are organisations or programmes that provide support and resources to start-ups and early-stage companies for their development. Impact funds are investment vehicles that aim to generate a measurable and positive environmental or social impact as well as a financial return.
2. The members of the Ocean Panel are the heads of government of Australia, Canada, Chile, Fiji, France, Ghana, Indonesia, Jamaica, Japan, Kenya, Mexico, Namibia, Norway, Palau, Portugal, Seychelles, United Arab Emirates, and the United Kingdom.
3. The 2025 deadline is for the 14 original member countries of the Ocean Panel. For countries that joined after its inception, the deadline is five years after becoming a member. Currently, 8 member countries have published their SOPs (Ocean Panel n.d.).
4. *Maritime territories* refers to the legally defined areas under national jurisdiction, including the territorial sea, exclusive economic zone and, where applicable, the continental shelf as outlined in the United Nations Convention on the Law of the Sea (United Nations 1982). *Ocean space*, by contrast, is a broader concept that encompasses not only areas under national jurisdiction but also areas beyond national jurisdiction, such as the high seas and deep seabed.
5. National SOPs are published on the Ocean Panel's website, https://oceanpanel.org/published-sustainable-ocean-plans/.
6. According to UNCLOS, "the Area" refers to the seabed and ocean floor and subsoil thereof, beyond the limits of national jurisdiction (United Nations 1982).
7. When referring to peoples, the terms *Aboriginal* and *Indigenous* are used interchangeably. *Aboriginal* is a legally defined term in certain nation-states to describe the original inhabitants of the land and waters in specific areas. *Indigenous* is also an internationally accepted term to describe the original inhabitants, whether or not they are legally recognized.
8. The ORRAA initiated Blue Bond Accelerator (BBA) offers a global not-for-profit initiative building and scaling the blue bond market to drive investment into sustainable and regenerative blue economies, available online here: https://bluebondaccelerator.org/
9. "See Indonesia's Ministry of Marine Affairs and Fisheries to learn more about its ocean account: https://sidako.kkp.go.id/oceanaccounts/home."

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